The City of Cedar Hill, Texas

"Hill Country of the Metroplex"

CEDAR HILL
WHERE OPPORTUNITIES GROW NATURALLY

CEDAR HILL

PUBLIC WORKS DEPARTMENT

STANDARD CONSTRUCTION DETAILS

JANUARY 2015

MIKE CHAPMAN - INSPECTOR - 469.865.8010

SHEET INDEX

CITY GENERAL CONSTRUCTION NOTES:

1. The size and location of all underground utilities identified on construction plans shall be obtained from available records and field verified. The Contractor, prior to construction, must determine the exact location ction of all franchise and City utilities. The City does not assume responsibility for utilities not shown or not in the location shown.

2. It is the responsibility of the Contractor to protect all public utilities during the construction of this project. All manholes, cleanouts, valve boxes, fire hydrants, etc. must be adjusted to proper line and grade by the Contractor prior to and after the placing of final grade and/or pavement. Any removal or damage to existing improvements shall be replaced or repaired by the Contractor at his expense and shall be approved by the City. Said existing improvements include berms, ditches, fences, vegetation, etc.

3. During the construction of this project, any interpretation of the City's Standards and NCTCOG's Standard Specifications for Public Works Construction for North Central Texas, and any matter which requires the approval of the owner, must be approved by the City before any construction involving that decision commences. Assumptions about what these decisions might be, which are made during the bidding phase, will have no bearing on the decision.

4. Any test that fails to meet City requirements shall be re-tested at the Contractor's expense. The City will only accept signed original copies of all testing reports for review.

5. It shall be the Developer's & Contractor's responsibility to comply with all federal, state and local requirements before and during construction.

6. It is the responsibility of the Contractor to protect City monuments/benchmarks during construction. Any monument/benchmark removed, damaged or otherwise disturbed will be required to be replaced by a City approved surveyor. The replacement of the monument/benchmark shall be coordinated by the City and the expense shall be the responsibility of the Contractor.

7. Where trenching is utilized during construction, no more than 100' of trench shall be open at any given time. Where a trench is left open during non-working hours, orange safety fencing shall be installed at least 5' around the trench perimeter and the trench secured.

8. For all uses of concrete, either a printout or batch ticket record shall be furnished by the Contractor for each batch of concrete.

9. Pavement preservation techniques shall be utilized by the Contractor at all times during construction. No track equipment is allowed on any street.

10. Open cutting of public streets is prohibited unless the Contractor obtains prior approval from the City Engineer. If City allows a concrete street to be cut, the Contractor must remove and replace full panels. Half sections may be allowed by the City if the pavement is in good condition and the resulting panels would not be less than 10' in length.

11. No Contractor shall close a street to traffic or interfere with traffic movement on a street without notifying the City 48 hrs prior and securing permission to do so. Working hours shall be 7:00 am to 7:00 pm Monday-Friday. Saturday work must be approved 48 hrs. prior. When any street or any section of a street is closed, or traffic flow is restricted, the Contractor shall furnish a Traffic Control Plan acceptable to the City Engineer or his/her designee and maintain barricades, warning and directing signs, lights, flags and provide flagmen along the entire street within the limits of the project in accordance with the Texas Manual of Uniform Traffic Control Devices. All barricades shall be equipped with flashers and be kept burning between the hours of sunset and sunrise.

12. The Contractors shall, at all times, keep their construction site free from accumulation of waste material, debris, or rubbish generated during construction. At the completion of construction and prior to the City scheduled Walk-thru, the Contractor shall remove from the site all tools, surplus materials, debris and shall leave the site in a "broom clean" condition, unless otherwise noted on the City approved plans.

13. The Contractor shall provide and maintain sanitary convenience facilities at the project site for use by all laborers and City Inspectors. They shall be well ventilated, but provide concealment, and shall be kept clean at all times by the Contractor. The facilities shall be removed and the site restored to its original condition upon completion of the project. All such facilities shall conform to the requirements of the State and local health authorities. "Porta Can" or other similar facilities which may be rented from commercial venders are acceptable.

14. The Contractor must schedule and attend a site specific Pre-Construction meeting hosted by the City's Public Works Department prior to commencing with any construction activity. All City required Pre-Construction items must be submitted and approved by the Public Works Department prior to the meeting being scheduled.

15. The Contractor shall provide Performance and Payment Bonds to the City prior to the City releasing the Contractor to proceed with construction. Both bonds must be provided by a single entity and be in the City's standard bond format. Contractor shall furnish two year Maintenance Bond equal to 50% of the construction costs. Said bonds shall remain effective for a period of two (2) years from the date of final acceptance by the City.

16. Contractor shall provide all City required inspection fees (3.5% of Public Improvements).

17. Contractor shall submit a Trench Safety Plan and a Traffic Control Plan to the City prior to scheduling the preconstruction meeting. The trench Safety Plan shall adhere to OSHA requirements.

18. Trenches shall be avoided on slopes steeper than 3-ft. horizontal to 1-ft. vertical (3:1). Use of trenchless installation shall be viewed as prefereed installation method. Protection and restoration of the natural slope shall be required when trenchless methods are not feasible. Other geotechnical methods may be proposed in plan submittals. In non case shall a slope of 1 5:1 be disturbed from it's natural state..

19. The contractor shall take necessary precautions to ensure that electrical power and telephone poles are not disturbed during construction. All costs are incidental for moving electric power and telephone poles shall be included in the price bid for the project.

20. The contractor shall avoid damaging and existing water sprinkler system that may be in the construction area and will be responsible for repairs to any heads, valves, control wires and water lines. Replacement parts shall be equal of better than the damaged item and shall be installed by a licensed irrigator at the contractor's expense.

21. Existing facilities including, but not limited to, fences, driveways, sidewalks, pavement, curbs, mailboxes, fire hydrants, and drainage structures which are damaged, altered or removed to permit work or by done by accident shall be repaired or replaced by the contractor in the same location and the same or better condition at no additional cost to the owner.

22. Limits of Construction shall be established and clearly marked in the field. Unless otherwise permitted in writing, contractor shall not trespass on adjacent p rivate property.

CITY PAVING CONSTRUCTION NOTES:

1. All materials, construction, testing and workmanship shall conform to Special Conditions in the Contract Documents, the City's Manual for General Design Standards, the City of Cedar Hill Standard Construction Details and Specifications and the Standard Specifications for Public Works Construction for North Central Texas Council of Governments, latest edition, except as noted in an approved change order and accepted by the City. Clarifications to any discrepancies shall be approved by the City.

2. Absolutely no earthwork, lime application, or other preparation of the subgrade for paving of streets or alleys shall be initiated without authorization from the City. Once all testing of underground facilities have been completed and verified to meet the City's specifications or otherwise specified in the project's geotechnical recommendations, The paving contractor may commence with the initiation of all subgrade work in preparation for paving.

3. All concrete for machine finished pavement shall have a minimum compressive strength of 4,000 psi at 28 days with a minimum of 5 sacks of cement. All concrete for hand finished pavement shall have a minimum compressive strength of 4500 psi @ 28 days with a minimum of 6 sacks of cement. Slump shall be 1 to 3 inches for all machine finish and 1 to 4 inches for hand finish. The contactor shall provide and utilize mechanical vibrators as required per NCTCOG specifications Section 303.4.5. Maximum allowable rock size for aggregate shall be 1". Two batch designs shall be submitted to the City for approval (one for machine finish and one for hand finish). All batch designs must be signed by the testing laboratory and include all documentation, such as historical data on the concrete strength as required by ACI 318. All public streets must be machine finished. No concrete shall be placed when concrete temperature is over 98°F. Temperature must be at least 35°F and rising or 40°F and falling with no significant forecasted temperature drop for the next 12 hrs before concrete placement will be allowed. Temperature conditions and placing concrete shall meet NCTCOG 303.5.5. Reinforcement shall be in accordance with details provided herein. Bar laps shall be 30 bar diameters. Bar chairs or an approved supporting device shall be utilized.

4. Use of fly ash or any chemical admixture is discouraged in concrete and will require prior approval from the City and will be subject to special monitoring and inspection of the work. A 3-5% air entrainment will be required. In any scenario, Fly ash shall not exceed 20%.

5. The Contractor shall make full depth sawcuts at all proposed drive approaches.

6. Sawed Dummy joints shall be cut into new concrete within 4 hours after placement, or as soon as practical, but in no case later than 6 hours after placement.

7. Finished pavement within City R.O.W. or public easement shall meet certain quality standards for surface of the concrete including the durability, texture, riding surface and appearance. The surface must be durable, firm, dense and well bonded to the aggregate to maintain an appearance and texture which is satisfactory to the City. Concrete pavement having a poor surface which has spalled (exposed aggregate) due to poor quality paste, high water-cement ration, over-vibration, improper curing, extreme weather or any other reason, or does not have a satisfactory riding surface shall be removed and replaced at the contractor's expense. It is extremely important that the pavement have a good rideable surface, free from undulations and rough joints. The Public Works department shall determine the acceptability of the pavement.

8. Concrete Finishes - Non-residential street surfaces shall have a traversed tined texture and baker broom finish. For driveways and residential streets, a baker broom finish shall be performed so that the corrugation produced in the surface shall be uniform in appearance and not more than 1/8-inch in depth. For sidewalks, a light straw broom finish shall be performed. Applying the textured surface shall be completed before the concrete is in such condition that the surface will be torn or unduly roughened by the operation. The finished surface shall be free from rough and porous areas, irregularities and depressions resulting from improper handling of the broom. Broom finish needs to be with the flow of the traffic.

9. Cracks formed in concrete pavement shall be repaired or removed by the Contractor at the City's discretion. Uncontrolled cracks that extend an entire panel or multiple cracks in a single panel must be removed and replaced (full panels unless otherwise approved by the City Engineer).

10. Fire lanes shall be painted as shown in details on SD-101 in accordance with the City's ordinance as directed by the Fire Marshal.

11. Sidewalks as shown on plans or indicated as a bid item shall be constructed along all streets that do not have lot frontage and along all Collector & Arterial streets. Where roadside ditches are encountered, a sidewalk extension and storm sewer culvert (if applicable) shall be constructed at all street intersections across the ditch.The sidewalks shall be constructed to comply with all ADA requirements. Barrier Free Ramps shall be constructed at all street intersections, drive approaches and accessible routes. A copy of the Notice of Substantial Compliance from TLDR or a letter provided to the City from a Registered Accessibility Specialist certifying the project is in compliance with TLDR regulations.

12. Traffic Barricades will be required for all construction within the Public R.O.W. Barricades shall conform to the installation identified in the Texas Manual of Uniform Traffic Control Devices, as currently amended. The contractor shall have the Traffic Control Plan at the time of the pre-construction meeting. All streets, drive approaches shall be barricaded with type III barricades or city approved equal until the pavement is cured and accepted by the City.

13. Rebar shall be inspected and approved by city 24 hrs prior to pouring.

14. Unless otherwise specified as described in Note 2 above, minimum of 42 lbs. per SY for 6" of lime shall be required for all city streets.

15. Cul-de-sac paving to be constructed in 1/2 sections or monolithically unless otherwise approved in writing.

16. All additional testing, inspections and related project expenses occurred by City forces after regular working hours, shall be paid for by the contractor.

17. No Blockout allowed for Manholes and Valves.

18. False Bottoms for Sanitary Sewer Manholes shall be installed before final grade and subgrade preparation.

19. Dust generated during construction due to sweeping, saw cutting, joint cleaning, high wind, etc. shall be kept to a minimum by use of vacuums, water or other approved measures.

20. The Contractor shall replace existing water services when constructing new pavement over existing water main.

21. All placed concrete shall be consolidated by mechanically vibrator.

22. All subgrade will be maintained at optimum moisture for 72 hours after final compaction is achieved.

23. All subgrade work including stabilization treatment will extend 24" from back of curb.

24. Use white pigment curing compound on all placed concrete.

CITY WATER & SANITARY SEWER CONSTRUCTION NOTES:

1. All materials, construction, testing and workmanship shall conform to TCEQ regulations, City of Cedar Hill Manual for General Design Standards, the City's Standard Construction Details and Specifications for Public Works Construction for North Central Texas Council of Governments, latest edition, except as explicitly noted in an approved change order and accepted by the City. Clarifications to any discrepancies shall be approved by the City.

2. All water mains shall have a minimum cover of 48" as measured from top of pipe to ground level or finished grade. All water mains 6" and 8" shall be PVC, DR-14, AWWA C900 and water mains 10" and 12" shall be PVC. DR-18, AWWA C900 water pipe. AWWA C905 PVC water pipe shall be DR-21. The pipe shall be new, showing no signs of age and shall be "blue" in color without discoloration or bleaching. The embedment shall be a minimum of Class "B", six inch (6") wide non-metallic poly tape (Blue-"Caution Buried Water Line Below" or approved equal) shall be installed above all PVC water mains to a depth of 12" to 24" above the water pipe.

3. All fittings and valves shall be full body ductile iron. Fittings shall be American made and mechanical joint type or slip joint, and shall be Class D, or Class 350 on sizes 12" and smaller in accordance with A.W.W.A. Specification C-153, compact fittings. All fittings shall be restrained by the use of Mega-Lugs or City approved equal and concrete thrust blocking. A submittal for alternatives shall be provided to the City for approval. Stainless steel shall be used for all tapping sleeves, bolts, washers and nuts and coated with a approved coatings or water proof material.

4. Concrete blocking shall be provided on water mains at all bend fittings and fire hydrants per the City Standards. All concrete for blocking shall be minimum 2000 psi concrete. Polyethylene wrap shall be installed around all ductile iron fittings and valves. The wrap shall have a min. 8 mil. thickness and shall be wrapped and held in place by 2" wide plastic backed adhesive tape (Polyken 900, Scotchrap #50 or City approved equal). The wrap shall be installed free of breaks, tears or holes in the film.

5. Water lines crossing under storm sewer lines shall have a minimum vertical clearance of 24". Water lines crossing under a sanitary sewer main shall have one 20-foot joint centered on the sewer and the sewer shall be concrete encased for 24 feet or as governed by TCEQ Chapter 290 requirements. Parallel water lines shall have at least 10' clearance horizontally to sanitary sewer lines and manholes. Where minimum clearance cannot be achieved, the sanitary sewer shall be constructed with SDR-26, class 150 pressure pipe. Where water lines cross creeks or ditches, the water line shall be protected by concrete encasement at least 10' past the embankment slope on each side.

6. All fire hydrants shall be Mueller, Waterous or City approved equal, painted per City of Cedar Hill Standards and Specifications and located 3' to 6' from back of curb to the operating nut. The fire hydrants shall have a 4" I.D. (4.5" O.D.) steamer connection and 2-1/2" outlets. Steamer connections shall be located 18" to 24" above the top of curb and shall face the center of the fire lane or street. Anchor fittings shall be used to attach fire hydrants. All caps shall be attached by chains. Hydrants shall be new with the current year stamped on barrel. Fire hydrants will have a 3' wide splash pad located from back of curb to 1' behind fire hydrants location (max length 6'). It will be 6" thick with 3000 psi concrete and #3 bars at 24" o.c.

7. A blue Stimsonite fire-lite reflector (or City approved equal) shall be placed in the center of the street or drive opposite each fire hydrant.

8. Unless otherwise approved by the City, all water valves shall be American made Resilient Seat Gate Valves (RSGV) & valve boxes shall be Bass & Hays model No. 340-1 with a cast-iron lid or City approved equal. Valves shall be new and show no signs of prior use. "No-Flow" protectors/inserts shall be installed in all valve boxes. After the final clean up and alignment has been completed, the contractor shall pour a reinforced concrete block around all valve boxes outside of pavement and are flush with the final grade.

9. All water meter vaults/boxes shall be furnished and installed in a non-paved area by the Contractor.

10. All residential water services shall be as follows:
   A. Located within 3' from the side yard lot line or front yard lot line for corner lots. The water service shall be a minimum of 1" nominal diameter continuous 200 psi rated polyethylene tubing. sand embedment shall be used around the pipe and the corporation stop. The City will make taps to the mains for existing residential lots only.
   B. A meter box, as approved by the City, shall be installed between the sidewalk and curb. The meter box shall not be located within any ditch, swale, channel or creek.

11. All water and sanitary sewer service locations shall be marked on the nearest curb face or edge of pavement if non-curbed street with a "W" & "S", respectively. All valves shall be marked with a "V". All letters shall be 3", stamped into the curb, located directly over the service line and painted blue for water, green for sanitary sewer and blue for valves. If the valve is in the paving, the "V" shall be marked upright; if the valve is outside of the paving, the "V" shall be marked upside down. Green for "M.H." for manholes. Stamps to be approved by City prior to use. A sewer cleanout shall be provided for each sewer service inside the R.O.W. line as shown in Sheet SD-202.

12. Any plumbing installed outside of R.O.W. or an easement shall be installed by a licensed plumber or a licensed irrigator and inspected by Building Inspections.

13. All water services & backflow assemblies shall meet requirements of City Ordinance No. 98-399 and City Code Sections 18-221 through 18-296. Backflow assemblies shall be installed at the R.O.W. line on the private property side, tested & certified to be working prior to the issuance of a certificate of occupancy.

14. All water lines shall be sterilized and pressure tested initially at 200 psi for a 3-hour continuous period or per NCTCOG requirements. Afterwards, testing and sterilization shall be meet NCTCOG 506.5 - 506.7.

15. All sanitary sewer pipes 4" to 15" shall be PVC SDR 35 or SDR 26 (for depths deeper than 14 ft) per ASTM D3034 and have rubber gasket joints. All sanitary sewer pipes 18" and larger shall be PVC per ASTM F679. All pipes shall be "green" in color as per City Specifications and be laid on a minimum of 6" of crushed stone (diameter 3/4"). The initial backfill shall consist of the same crushed stone per NCTCOG Class B to 12" above the top of pipe. Six inch (6") non-metallic poly tape ("Green - Caution: Buried Sewer line Below" or approved equal) shall be installed to a depth of 12" to 24" above all mains.

16. All sanitary sewer mains shall be a minimum diameter of 8" and have a minimum cover of 60". Stub-outs and dead ends shall extend at to outside property lines of the development and a manhole placed at each extended pipe end.

17. All residential sanitary sewer services shall be 4" in diameter and shall be located at the center of the front yard lot line. The City will make taps to existing mains to existing platted residential lots not having a viable tap and the main is less than 10ft. deep.

18. Minimum inside diameter for manholes is 5 ft. Sanitary sewer manhole lids and frames shall be 30" in diameter. Stainless Steel Rainstoppers or City approved equal manhole inserts shall be installed and attached to all manholes.

19. The Contractor shall be responsible for providing "As-Built" plans to the design engineer of record showing the location of water & sanitary sewer services and valves by distances to lot lines. This information shall be placed and marked on "As-Built" or "Record Plans" by the engineer of record. A signed and sealed set of these plans shall be furnished to the City prior to final acceptance.

20. All sanitary sewer lines shall be tested for infiltration and outflows in accordance with City Standards. TV inspections before and after paving, low pressure air testing, vacuum testing of themanholes, and mandrel testing are required on all sewer lines. If a connection is made into an existing manhole, that manhole must also be tested at the Contractor's expense. All sanitary sewer mains shall be videoed (TV Inspected) by a professional service company. The Contractor may provide their own videoing if prior approval is granted by the City, the City's Public Works inspector is present and the video is turned over to the inspector immediately upon completion. Prior to videoing, the Contractor shall contact the Public Works inspector and flow water down the sewer line in the presence of the inspector. Mains that are on a grade of 0.7% or less may have $\frac{1}{2}$" inch of standing water. Mains on a grade greater than 0.7% shall not have any standing water. The completed video must provide stations for every service location and be identified on the video by voice and digital readouts. The Contractor shall provide TV inspections both before and after paving operations.

21. All manholes located within a creek, ditch, swale or flood plain shall have a rim elevation at least 1' above the 100 year W.S.E. & the rim shall not extend more than 2' above final grade. Also built with a water tight manhole cover that is bolted down. Manhole lids and frames shall be the bolted down with stainless steel bolts. Manholes shall be vented per TCEQ requirements.

22. All sewer laterals or plugged mains shall have an EMS (3-M #1253) marker placed at each dead end without a manhole.

23. Water services and blow-offs that are to be abandoned, must be abandoned at the main.

24. All water & sanitary sewer constructed outside of a street R.O.W. shall have a Rhino TriView Flex marker (or City approved equal) with water pipeline and sanitary sewer pipeline decals for water and sanitary sewer, respectively placed at grade above the utility line every 500'.

25. Fire hydrants shall not be operated without the use of a City approved fire hydrant wrench.

26. A 5'x5' concrete pad shall be constructed around all manholes located outside of paved areas.

27. All manholes and vaults shall be set on a prepared subgrade compacted to 95% density. All voids and gaps in the structures shall be filled and wiped with non-shrink grout.

CITY STORM SEWER CONSTRUCTION NOTES:

1. All materials, construction, testing and workmanship shall conform to the City of Cedar Hill Manual for General Standard Design, City's Standard Construction Details and Specifications and the Standard Specifications for Public Works Construction for North Central Texas Council of Governments, latest edition, except as explicitly noted in an approved change order and accepted by the City. Clarifications to any discrepancies shall be approved by the City.

2. All public storm sewer pipe mains shall be a minimum of 24" (18" min. for laterals) and shall be Class III or Class IV RCP based upon depth of cover. Class III RCP shall be used where the depth of cover, from ground line to top of pipe, is less than or equal to 3 feet and where the depth of cover is greater than 10 feet. All storm sewer pipe shall be laid on a minimum of 4" of 3/4" max crushed stone, NCTCOG Class B. The initial backfill shall consist of the same crushed stone to a minimum of the spring line of the pipe. The remainder backfill must be clean and free of rocks & lumps of earth larger than 4" and of vegetation. The backfill must be approved by the City and stockpiled for use when needed.

3. The joints shall be constructed and jointed together in a manner that eliminates seepage of backfill. Approved joint materials for RCP are concrete collars, rubber gaskets, and Omni-Flex gasket, (ASTM D1056 type 2c-1) or city approved equal.

4. The tops of all storm drainage inlets, manholes and junction structures shall have a round manhole cover with locking device. All drainage inlets shall have a City approved Environmental marker attached to the inlet top.

5. All drainage structures shall have a minimum compressive strength of 3600 psi at 28 days.

6. All precast box culverts, drainage structures and RCP will require a certification from the manufacturer that the product meets the design requirements and 28 day compressive strength. Pre-Cast requires prior approval from the City. No Pre-Cast structures allowed in R-O-W.

7. All storm sewer systems shall avoid curved alignments and use prefabricated bends where called for on the plans. All bends, wyes, reducers shall be prefabricated.

8. Bring Storm Sewer Manholes to grade with Grade Rings.

9. Contractor shall provide TV inspections for both public and private storm sewer prior to final paving.

10. Contractor shall wipe all manhole and joints 1" or larger with non-shrink grout. Manholes and all drainage structures shall be placed on a prepared subgrade compacted to 95% density.

11. Sonotube shall not be allowed without City approval. In no case shall more than 2' of Sonatube be used at a single location.

CITY EROSION CONTROL STANDARD NOTES:

1. Erosion Control Devices shall be installed prior to any soil disturbing activities at the project site. The operator for the SWPPP shall mean the General Contractor for the project's erosion control unless otherwise accepted by the City.

2. Construction Site Notice and/or signed N.O.I.'s must be posted at the project site as required by the State. SWPPP shall be readily available and updated as required by the TPDES General Permit TXR150000.

3. Erosion Control Devices shall be inspected weekly or bi-weekly and after major rain events to ensure that they are functioning properly. Adjustments to and maintenance of the erosion control measures shall be at the discretion of the City Inspector.

4. Any sediment shall be removed from Erosion Control Devices when the design capacity has been reduced by one-third. Erosion Control Devices that utilize stone, shall have the stone replaced when the voids spaces in the rock become clogged with sediment.

5. If an Erosion Control Device is not functioning properly to eliminate erosion or off-site sedimentation, then the device must be replaced or modified. In addition, the Storm Water Pollution Plan shall be revised to indicate the change.

6. Off-site material storage areas used solely by the permitted project (i.e., off-site soil borrow or spoil sites) are considered a part of the project and shall be addressed in the Storm Water Pollution Prevention Plan. These areas shall be stabilized with permanent ground cover prior to final approval of the project.

7. Chemicals and the portable temporary sanitary facilities shall be secured on skids and placed within a lined containment system. MSDS forms shall be available at all times for products used and stored at the site during the life of the project. Chemicals shall be clearly labeled. Construction debris and rubbish shall be collected and contained. Do not allow trash from blowing off site. Runoff from wash pit areas shall be structurally controlled to not discharge into drainage ways and the excess material collected as needed per requirements of the TPDES General Permit TXR150000.

8. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

9. Vegetative slope stabilization shall be in place and established at all areas disturbed by construction and all temporary Erosion Control Devices removed prior to final acceptance of the project. Depending on slope conditions, proposed measures to address and control erosion shall be approved by the engineer of record and accepted by the City of Cedar Hill.

10. Parkways, drainage ways, all disturbed sloped areas greater than 5:1 and all disturbed areas within twenty feet (20') of each lot or common area draining off site shall be stabilized with vegetation and permanent erosion material per City standards prior to final acceptance of the project.

11. All erosion control measures must be planned for, installed, maintained, and removed in accordance with city, state, and federal storm water pollution prevention requirements. A project staging plan from beginning of the project to final acceptance shall be provided and adhered to.

12. Contractor shall include the cost of installing and maintaining Erosion Control measures for the drainage portion in the Permit Application for Public Improvements in order to calculate 3.5% inspection fees.

13. Finish grading in all drainage ways shall be smooth and compacted to a minimum 95% standard proctor density. This requirement includes compaction of sub-base material below any storm drainage structure, rip rap and geotextile material.

14. Temporary rock check dams for temporary erosion control shall be wire bound with no loose rock. Provide protection from erosion scour at downstream toe of the check dam. These devices shall be removed prior to final grading and seeding.

15. Grouted rock rip rap shall be placed over compacted soil, above a consistent anchored geotextile material with no gaps. Rocks shall be hand placed onto a minimum 6" layer of 2000 or greater psi grout. The grout shall closely match the color of rock rip rap. The rock shall be 8" or larger and not be chalky and have a wear of not more than 40% when tested in accordance with TxDOT Test Method Tex-410-A Abrasion of Coarse Aggregate. Reference NCTCOG 803.3 for further requirements. Other proposed armored lining for channels and drainage ways shall approved by the engineer of record and accepted by the City prior to construction.

16. Permanent geotextile material or Erosion Control Blankets (ECB) shall be North American Green, Vmax Reinforcement Series P550 or engineer approved equal. Other fabric shall also be accepted by the City prior to construction. The ECB shall be installed over compacted soil and per manufacture's specifications.

17. For areas where grass sod or hydromulch is used for permanent erosion control and slope stabilization, a top soil dressing shall be applied per NCTCOG Stanard Item 202.2. Native material shall meet top soil NCTCOG specifications. Finish grading shall be smooth and free of rocks and debris.

CITY CONSTRUCTION NOTES

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
		CC	DEC 2014	NOT TO SCALE	RGW	SD-001

SD-001.DWG

CITY OF CEDAR HILL
APPROVED MATERIALS LIST

ITEM	SPECIFICATIONS[1]	MANUFACTURER 1	MANUFACTURER 2	MANUFACTURER 3	SPECIAL CONDITIONS - APPLICATIONS
WATER FACILITIES					
PVC WATER PIPE 6" -8"	AWWA C-900, DR14, PRESSURE CLASS 305	DIAMOND	JM EAGLE		
PVC WATER PIPE 10" -12"	AWWA C-900, DR18, PRESSURE CLASS 235	DIAMOND	JM EAGLE		
PVC WATER PIPE 14" -24"	AWWA C-905, DR21, PRESSURE CLASS 200	DIAMOND	JM EAGLE		
DUCTILE IRON PIPE (12" -24")	AWWA C150 &C151, PRESSURE CLASS 350	AMERICAN	US PIPE		
CONCRETE CYLINDER STEEL PIPE (21"+)	AWWA C303	HANSON	AMERON INTERNATIONAL		
DI FITTINGS	AMERICAN MADE - MECH. JOINT, C153 & CLASS 350<12", C110 14" OR LARGER, THRUST BLOCKED AND MECHANICALLY RESTRAINED BY RETAINER GLANDS -	TYLER, DOMESTIC MADE	AMERICAN		
RETAINER GLANDS	AMERICAN MADE	EBAA IRON			
GATE VALVES (4" -12")		MUELLER			
GATE VALVES (14" -24") W/ BYPASS		MUELLER			
VALVE BOXES	CAST IRON LIDS	BASS & HAYES MODEL #340-1			
BUTTERFLY VALVES 16" OR LARGER	MECHANICAN SEAL -	VAL-MATIC Tri-Loc RESILLENT SEAT	M&H		
TAPPING SLEEVES	STAINLESS STEEL				
FIRE HYDRANTS		MUELLER CENTURIAN	AMERICAN WATEROUS PACER		
FIRE HYDRANT MARKERS		STIMSONITE FIRE-LITE			
BACKFLOW PREVENTER		WATTS	FEBCO	CONBRACO	
CURB STOPS		MUELLER	FORD		
PIPE TO SERVICE METERS	NSF 61, AWWA C901 1" & 2" ONLY	ENDOT INDUSTRIES	DriscoPlex 5100		
METER BOXES		DFW PLASTICS 1300RB			
METER VAULTS		HANSON	PARK		
VALVES COVERS					
VALVE STACKS					
AIR VALVES		VAL-MATIC	CRISPIN	APCO	
SANITARY SEWER FACILITIES					
PVC SANITARY SEWER PIPE	SDR 35 FOR PIPE DEPTHS LESS THAN 14'; SDR 26 FOR PIPE DEEPER THAN 14'	DIAMOND	JM EAGLE		
CONCRETE MANHOLES	5' DIAMETER WITH 30" MANHOLE LID AND FRAME	HANSON	TURNER	RINKER	
MANHOLE LID AND FRAME	30" LID & FRAME WITH CITY'S LOGO, STAINLESS STEEL RAINSTOPPERS	BASS $ HAYS (# VRM30 WT)			
INSIDE DROP BOWL FOR DROP MANHOLES	6" - 10" DROP BOWL AT THE UPPER TRANSITION END OF DROP PIPE TO BOTTOM	RELINER / DURAN INC.			
STORM DRAINS					
STORM DRAIN PIPE		HANSON	TURNER	RINKER	
STORM DRAIN PRE-CAST CONCRETE STRUCTURES		HANSON	TURNER	RINKER	PARK
CAST IRON INLET RINGS & COVERS	LOCKING 24" MANWAY LIDS WITH CITY LOGO	BASS AND HAYS MODEL # 225 L			
RUBBER GASKETS		RINKER OMNI-FLEX	UNI-FLEX		

1- Unless otherwise expliciantly specified, the specifications for City Standard materials list the major governing requirements. Other minor specifications are listed in the contract documents, approved submittals, City's Standard Details or General Notes.

2. Mixtures of pipe manufacturers is prohibited. Selection of materials shall be by manufacturer and consistent through out the life of the project. If a subsitution is desired, a written shop drawing or techinal specification shall be submitted to the City.

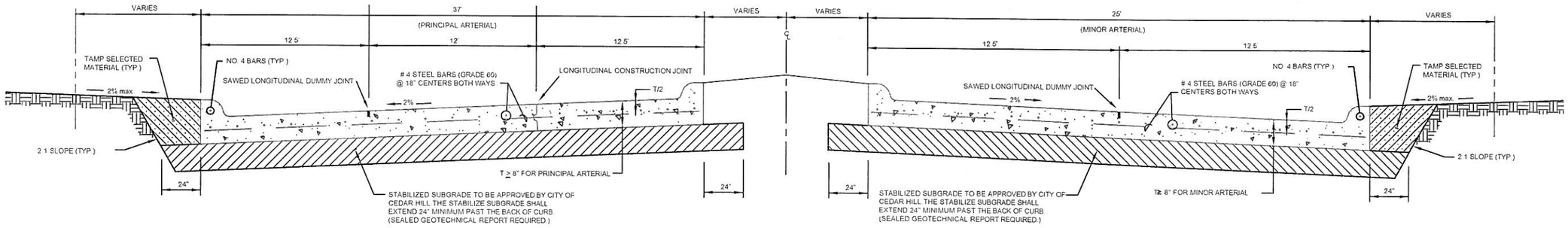
3. Approved Equal materials - The items listed above are materials typically used within the City for public improvements, Other materials, including shop drawings, not list above shall be submitted to the City for approval.

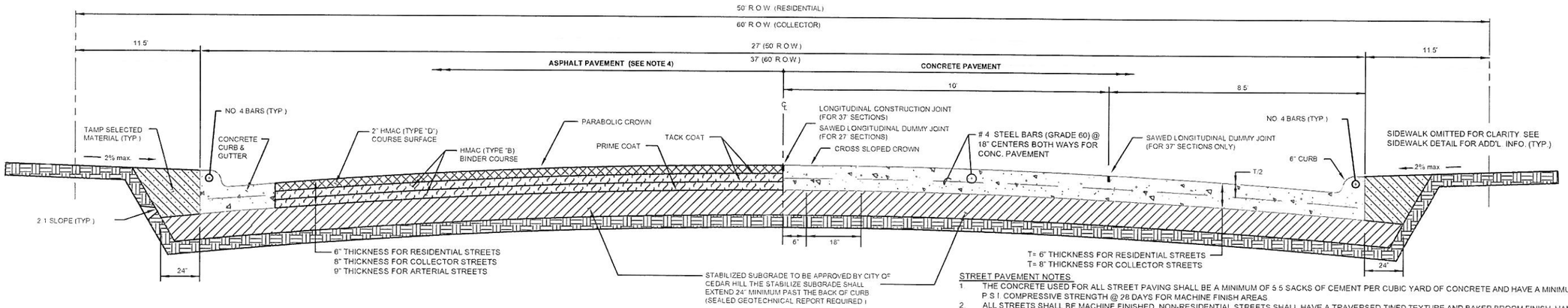
APPROVED MATERIAL LIST

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
		CC	FEB 2015	NOT TO SCALE	RGW	SD-002

SD-002.DWG





TYPICAL STREET SECTIONS

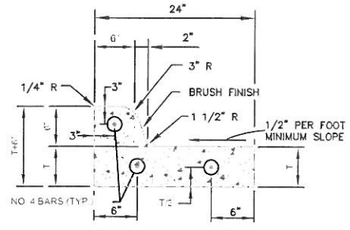
NO STREET SHALL BE DESIGNED AND OR CONSTRUCTED TO A GRADE OF LESS THAN 0.60% SLOPE

STREET PAVEMENT NOTES

1. THE CONCRETE USED FOR ALL STREET PAVING SHALL BE A MINIMUM OF 5.5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE AND HAVE A MINIMUM 4,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS FOR MACHINE FINISH AREAS.
2. ALL STREETS SHALL BE MACHINE FINISHED. NON-RESIDENTIAL STREETS SHALL HAVE A TRAVERSED TINED TEXTURE AND BAKER BROOM FINISH. HAND FINISHING SHALL BE PERMITTED ONLY IN INTERSECTIONS. AREAS INACCESIBLE TO A FINISHING MACHINE AND AS APPROVED BY THE CITY. HAND FINISHED CONCRETE SHALL BE A MINIMUM OF SIX (6) SACKS OF CEMENT PER CUBIC YARD OF CONCRETE AND HAVE A MINIMUM OF 4,500 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS.
3. BINDER COURSE SHALL BE PLACED IN 2" LIFTS. A TACK COAT SHALL BE APPLIED BETWEEN LIFTS IF SUBSEQUENT LIFTS ARE NOT PLACED IN THE SAME DAY. EACH LIFT SHALL BE STAGGERED 3" LONGITUDINALLY. DENSITY SHALL BE 95% STANDARD PROCTOR.
4. ANY ASPHALT DESIGN MUST BE REQUESTED ALONG WITH A REPORT WHICH MUST BE APPROVED BY THE PUBLIC WORKS DIRECTOR.
5. FOR LEFT TURN LANES, AN ADDITIONAL 3" OF CONCRETE OVER COMPACTED SUBGRADE CAN BE INSTALLED IN LIEU OF LIME / CEMENT STABILIZATION.

RESIDENTIAL & COLLECTOR STREET DIMENSION TABLE

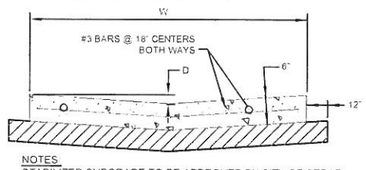
R.O.W. WIDTH	PVM'T. WIDTH	PVM'T. THICKNESS	CROWN HEIGHT	ORDINATES FOR PARABOLIC CROWN "X" FT.	"Y" FT.	"Y" IN.
60'	37' B–B	8"	6"	0	0.000	0
"	"	"	"	1	0.002	1/32
"	"	"	"	4	0.025	5/16
"	"	"	"	8	0.090	1 3/16
"	"	"	"	12	0.222	2 21/32
"	"	"	"	16	0.395	4 3/4
"	"	"	"	18	0.500	6
50'	27' B–B	6"	4"	0	0.000	0
"	"	"	"	1	0.002	1/32
"	"	"	"	4	0.036	7/16
"	"	"	"	8	0.142	1 3/32
"	"	"	"	12	0.320	3 27/32
"	"	"	"	15	0.500	6



NOTE
SEPARATE CURB & GUTTER SHALL BE USED ONLY FOR REPLACEMENT PURPOSES. JOINTS MUST MATCH STREET JOINTS & BE SEALED FROM BACK TO BACK OF CURB.
T=EXISTING CONCRETE THICKNESS (REQUIRES LONG. BUTT JOINT)
T=6" FOR ASPHALT STREETS (REQUIRES THICKENED EDGE)

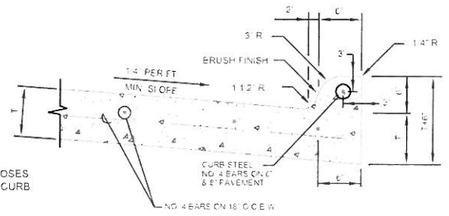
SEPARATE CURB & GUTTER DETAIL

ALLEY WIDTH (W)	INVERT DEPTH (D)
10'	5"
12'	6"
16'	6"
20'	6"

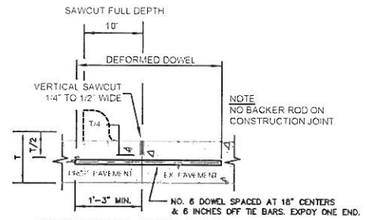


NOTES:
1. STABILIZED SUBGRADE TO BE APPROVED BY CITY OF CEDAR HILL (SEALED GEOTECHNICAL REPORT)
2. CONCRETE FOR ALLEYS SHALL BE MINIMUM OF 5.5 SACKS OF CEMENT PER CUBIC YARDS OF CONCRETE AND A 4,000 PSI MINIMUM COMPRESSIVE STRENGTH @ 28 DAYS FOR MACHINE FINISH & 4,500 PSI SIX SACK (6.0) MIX FOR HAND FINISH.
3. WHERE BARRIER FREE RAMPS ARE REQUIRED, SECTION IS TO BE FLATTENED TO COMPLY TO "ADA" STANDARDS.

ALLEY TYPICAL SECTION



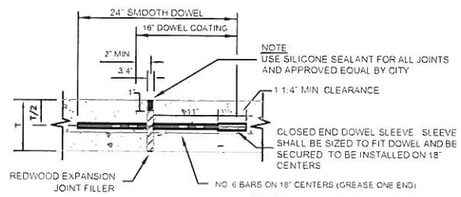
MONOLITHIC CURB SECTION



LONGITUDINAL BUTT JOINT

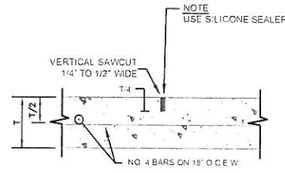
NOTES
1. FOR T USE NO. 6 DOWELS
2. DOWELS & REINFORCEMENT SHALL BE SUPPORTED BY AN APPROVED DEVICE.
3. LONGITUDINAL BUTT JOINT MAY BE UTILIZED IN PLACE OF KEYWAY JOINT AT CONTRACTORS OPTION.
4. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG. DRILLING BY HAND IS NOT ACCEPTABLE. PUSHING DOWEL BARS INTO GREEN CONCRETE IS NOT ACCEPTABLE.

GENERAL PAVEMENT JOINT NOTES
1. SAWED DUMMY JOINTS SHALL BE PLACED @ 15' CENTERS. EXPANSION JOINT SPACING SHALL NOT EXCEED 200'. THE PROPERLY SEALED EXPANSION JOINT SHALL BE PLACED AT ALL STREET INTERSECTIONS, BRIDGES AND/OR OTHER STRUCTURES.
2. BAR DIAMETER LAPS SHALL BE USED FOR ALL SPLICE REINFORCED BARS.
3. BAR CHAIRS OR AN APPROVED SUPPORTING DEVICE SHALL BE UTILIZED.
4. ALL CURBS SHALL BE INTEGRAL WITH PAVEMENT.
5. A SOIL STABILIZATION REPORT STATING THE STABILIZATION MATERIAL COMPOSITION AND APPLICATION METHOD MUST BE SUBMITTED TO THE CITY FOR APPROVAL. THE STABILIZED SUBGRADE SHALL EXTEND 24" MINIMUM PAST THE BACK OF CURB.
6. 9" PAVEMENT - KEYWAY ALL TURN LANES, BLOCKOUTS & HAND POURS.

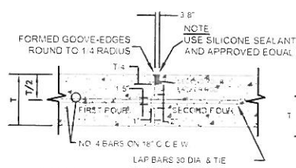


EXPANSION JOINT

NOTES
1. DOWELS & REINFORCEMENT SHALL BE SUPPORTED BY AN APPROVED DEVICE.
2. EXPANSION JOINTS SHALL NOT EXCEED 3.4' IN WIDTH.

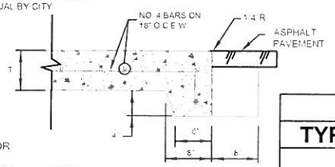


SAWED DUMMY JOINT



NOTE
CONTRACTOR SHALL PROTECT KEYWAY PRIOR TO SECOND POUR. IF KEYWAY IS DAMAGED CONTRACTOR SHALL REPAIR WITH THE USE OF LONGITUDINAL BUTT JOINT. DRILL DOWELS INTO FIRST POUR.

KEYWAY CONSTRUCTION JOINT



NOTE
MUST POUR UP AGAINST EXISTING ASPHALT. NO PATCHES ALLOWED UNLESS APPROVED BY CITY.

THICKENED EDGE
(CONCRETE TO ASPHALT STREET HEADER)

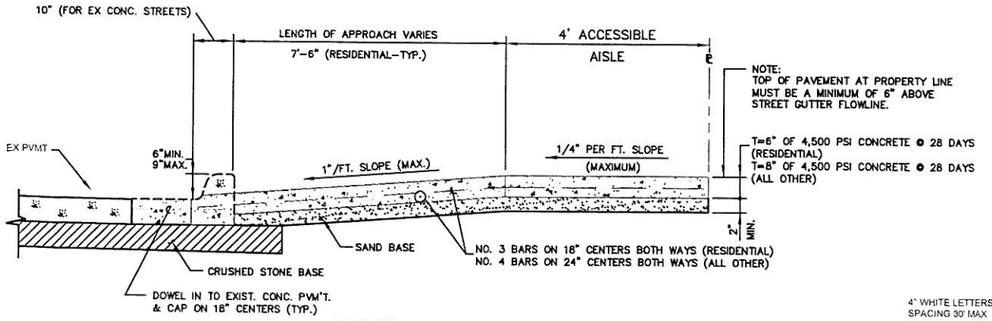
CONCRETE PAVING JOINTS

PAVING
TYPICAL STREET SECTIONS AND PAVEMENT JOINTS
STANDARD DETAILS

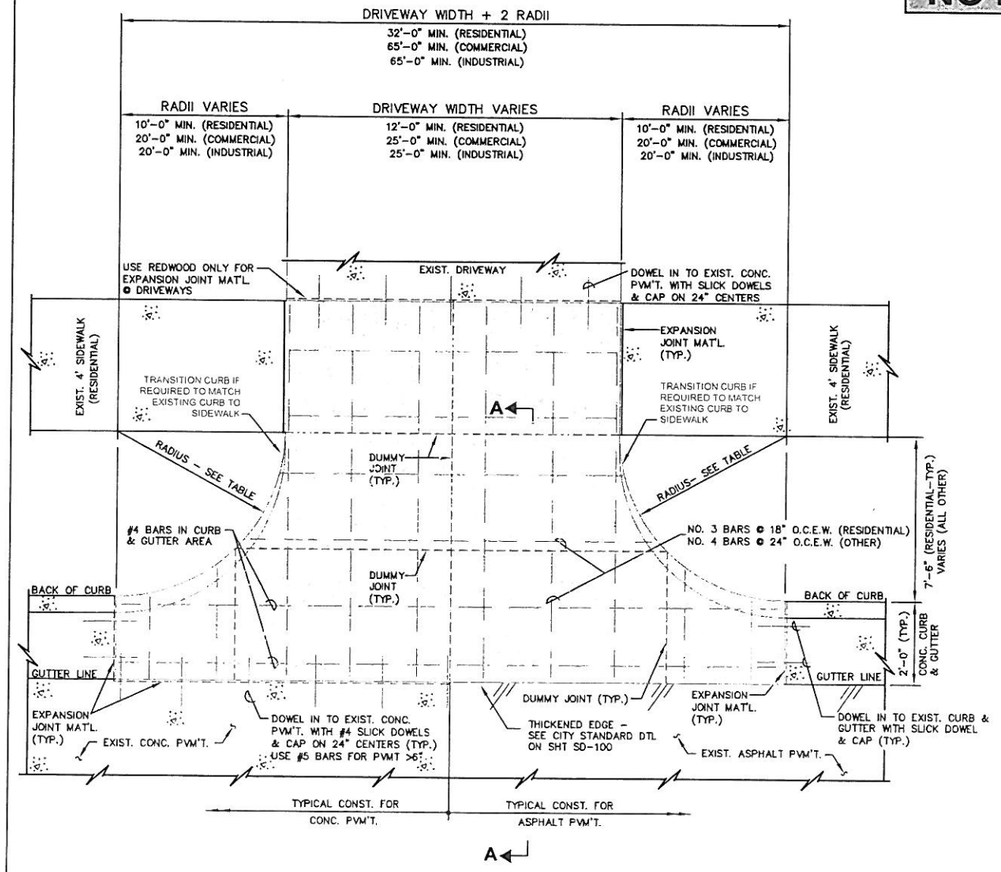
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
		RGW	DEC 2014	NOT TO SCALE	RGW	SD-100

SD–100

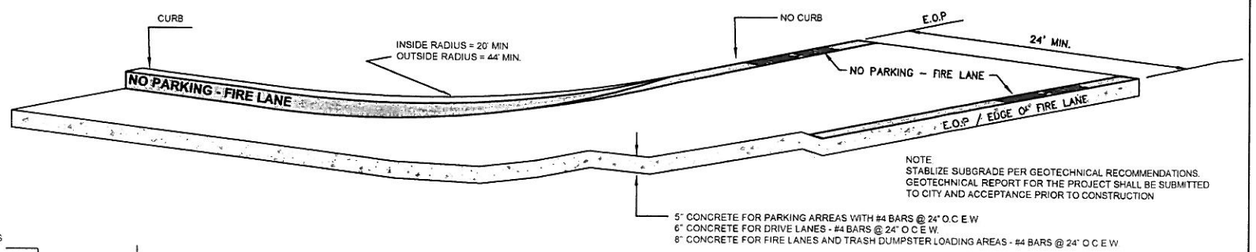


SECTION A - A

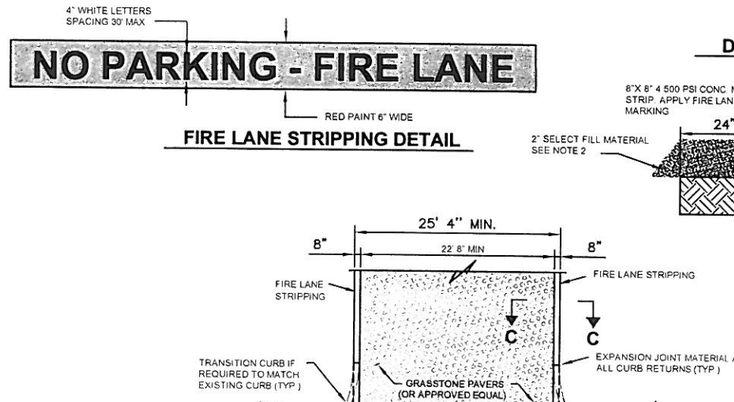


DRIVEWAY APPROACH DETAIL

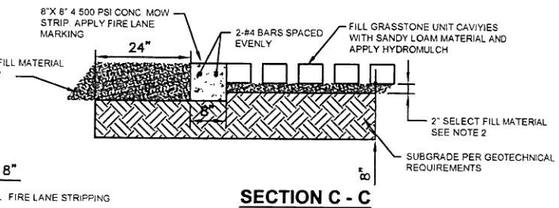
CONCRETE PAVEMENT NOTES:
1. A LIGHT BROOM FINISH SHALL BE REQUIRED ON ALL EXPOSED SURFACES.
2. IF AN EXISTING SIDEWALK OR DRIVEWAY IS AT AN ELEVATION AT WHICH THE MINIMUM 6" RISE CANNOT BE MET OR THE MAXIMUM GRADE OF 1"/FT WOULD BE EXCEEDED, THE EXISTING PAVEMENT MUST BE REMOVED AND REPLACED SO THAT THESE LIMITS CAN BE MET.
3. IN EXISTING CONCRETE STREETS, THE CURB CUT FOR NEW DRIVEWAYS SHALL BE 24" FROM BACK OF CURB.
4. SIDEWALKS AND RAMPS SHALL BE ADA COMPATIBLE.



DETAIL FOR FIRE LANE & PARKING AREAS



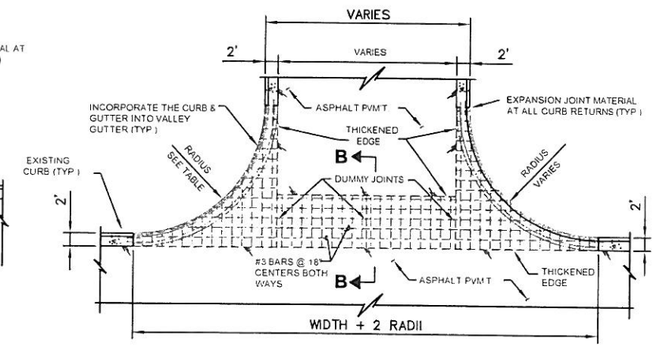
FIRE LANE STRIPPING DETAIL



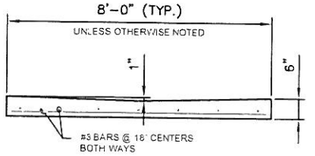
SECTION C - C

NOTES FOR EMERGENCY VEHICLE ACCESS ROUTES ONLY:
1. THE SUBGRADE SHALL BE STABLIZED PER GEOTECHNICAL RECOMMENDATIONS. GEOTECHNICAL REPORT FOR THE PROJECT SHALL BE SUBMITTED TO THE CITY AND ACCEPTANCE PRIOR TO CONSTRUCTION.
2. FINAL GRADING SHALL USE SELECT FILL, FREE OF ORGASNIC MATERIAL AND SAND. THE SELECT FILL SHALL COMPACTED TO 95% SPD, PER ASTM D698.
3. CONTRACTOR SHALL INSTALL THE PAVERS PER MANUFACTURER'S SPECIFICATIONS.
4. VOIDS IN GRASSTONE PAVERS SHALL BE FILLED WITH SANDY LOAM MATERIAL AND HYDROMULCH. SEASONAL MIXTURES PER NCTCOG SPEFICATIONS.

DETAIL FOR EMERGENCY ACCESS ROUTES ONLY



PLAN



SECTION B - B

TYPICAL VALLEY GUTTER DETAIL

THE CONCRETE USED FOR VALLEY GUTTERS SHALL BE CLASS "P2" WITH A MINIMUM OF 6 SACKS OF CONCRETE PER CUBIC YARDS OF CONCRETE AND A 4,500 P S I @ 28 DAYS

DRIVE APPROACH REQUIREMENTS

REQUIREMENTS	STREET CLASS	RESIDENTIAL DRIVEWAY	APARTMENT, COMMERCIAL & RETAIL DRIVEWAY	INDUSTRIAL DRIVEWAY
DRIVEWAY THROAT WIDTH	RESIDENTIAL	10-25 FEET	NOT ALLOWED	NOT ALLOWED
	COLLECTOR	10-25 FEET	25-35 FEET	25-35 FEET
	MINOR ARTERIAL	10-25 FEET	25-35 FEET	25-40 FEET
	PRINCIPAL ARTERIAL	12-25 FEET	25-35 FEET	25-50 FEET
DRIVEWAY CURB RADIUS	RESIDENTIAL	10 FEET	NOT ALLOWED	NOT ALLOWED
	COLLECTOR	10 FEET	20 FEET	20 FEET
	MINOR ARTERIAL	10 FEET	20 FEET	20-30 FEET
	PRINCIPAL ARTERIAL	15 FEET	20-30 FEET	20-30 FEET
MINIMUM DRIVEWAY SPACING ALONG ROADWAY (EDGE TO EDGE)	RESIDENTIAL	22 FEET	NOT ALLOWED	NOT ALLOWED
	COLLECTOR	32 FEET	125 FEET	125 FEET
	MINOR ARTERIAL	80 FEET	150 FEET	150 FEET
	PRINCIPAL ARTERIAL	100 FEET	200 FEET	200 FEET
MINIMUM DISTANCE FROM EDGE OF DRIVEWAY TO CURB INTERSECTION ALONG	RESIDENTIAL	35 FEET	NOT ALLOWED	NOT ALLOWED
	COLLECTOR	50 FEET	125 FEET	125 FEET
	MINOR ARTERIAL	100 FEET	200 FEET	200 FEET
	PRINCIPAL ARTERIAL	100 FEET	200 FEET	200 FEET

PAVING
DRIVE APPROACH AND FIRE LANES STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

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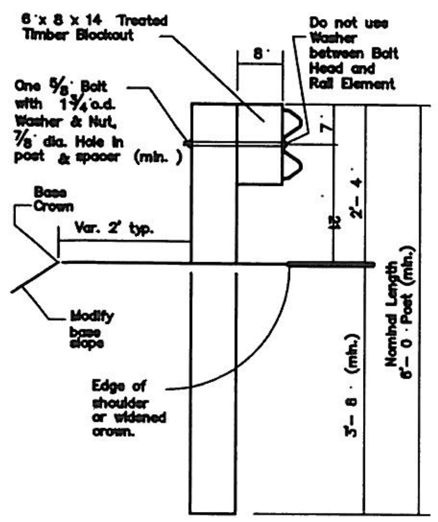
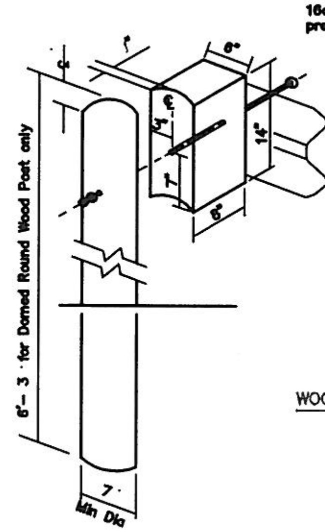
CCH	LL	JMC	SEPT 2011	NOT TO SCALE	RGW	SD-101

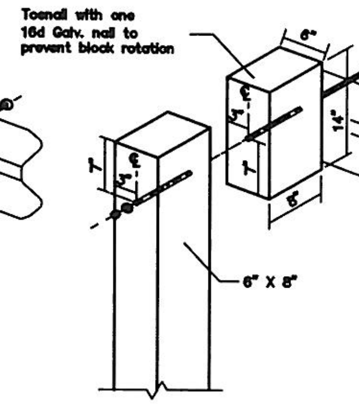
SD-102



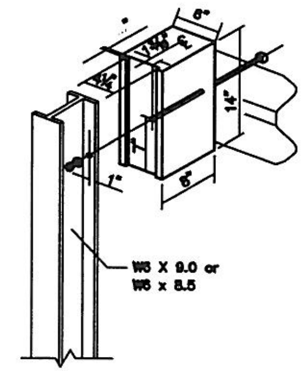
TYPICAL POST



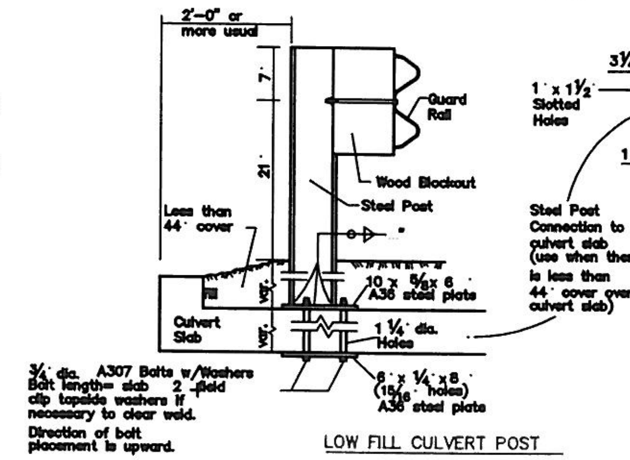
WOOD BLOCKOUT TO ROUND WOOD POST DETAIL



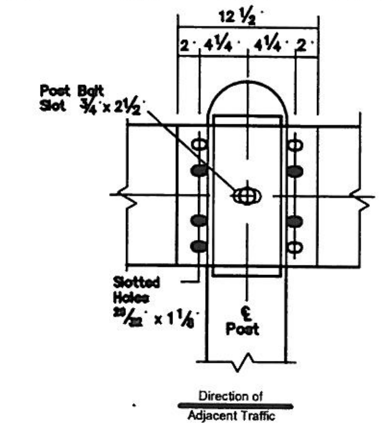
WOOD BLOCKOUT TO RECTANGULAR WOOD POST DETAIL



WOOD BLOCKOUT TO STEEL POST DETAIL



LOW FILL CULVERT POST MOUNTING OPTION



RAIL SPLICE

GENERAL NOTES

1. The exact position of guard fence shall be as shown elsewhere on the plans or as directed by the Engineer. Guard fence shall be transitioned to a smooth connection with other guard fence or structure railing as shown elsewhere on plans.

2. Rail element shall meet all requirements of AASHTO M-180 except as modified on the plans. The terminal connectors shall be of the same material, but shall not be less than 10 gauge.
Contractor shall verify that the locations of bolt holes match those in the Terminal Connector prior to ordering of materials.

3. Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be blocked out so that the face of curb is located directly below or behind the face of the blockout. Rail placed over curbs shall be installed so that the post bolt is located approximately 21-inches above the gutter pan or roadway surface.

4. Unless otherwise shown in the plans, MBGF shall be placed with the face of rail directly above the shoulder edge (or curbface) except for upstream end treatments.

5. At the option of the Contractor, the rail elements for the guard fence may be furnished in either 12 / or 25 foot nominal lengths with post bolt slots for connection to posts.

6. The terminal anchor post shall be set in Class A concrete in (unless otherwise shown on plans) in accordance with Item, Portland Cement Concrete . Concrete shall be subsidiary to the bid item requiring construction of the terminal rail section and anchorage system.

7. An anchor other than to a terminal anchor post shall consist of a connection similar to the rail splice or similar to the terminal connector.

8. Galvanized washers used with the eight 5/8" splice bolts and nuts that are provided for terminal connectors and/or terminal anchor posts shall be 1 3/4 x 3 x 3/16 or 1 i.d. and 2 o.d. x 0.134 (ANSI B27.2) narrow Type A plain washers.

9. Special fabrication will be required at installations having a curvature of less than 150' radius.

10. Button head post bolts (A307) shall be of sufficient length to extend through the full thickness of the nut and no more than 1/2" beyond it. Button head splice bolts (A307) are 5/8"x 1 " with a 5/8" double recessed nut. Fittings (bolts, nuts, and washers) shall be in accordance with Item, Metal for Structures". Fittings shall be subsidiary.

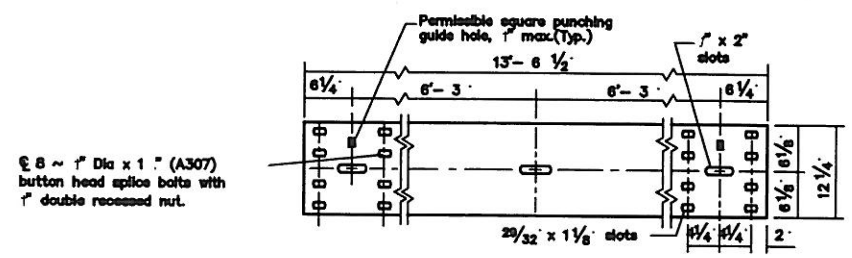
11. Crown will be widened to accommodate guard fence.

12. If guardrail is placed on a side slope away from the pavement edge, then the slope rate between the edge of the pavement and the face of the barrier will be 1V:10H or flatter.

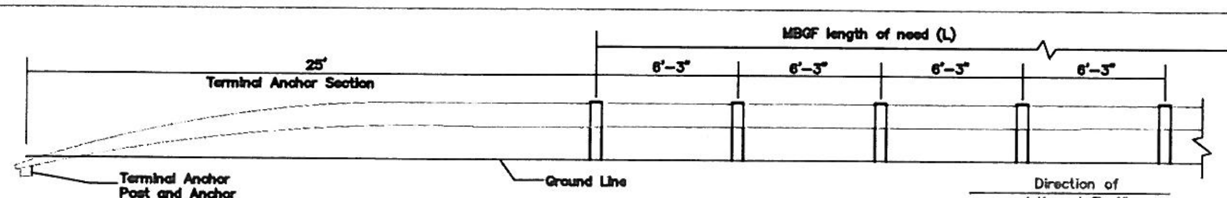
13. Posts shall not be set full depth in concrete.

14. Where solid rock is encountered or where shown on the plans, the diameter of the holes shall be approximately 12 inches, the backfilling shall be with a cohesionless material, and embedment depth shall be 1'-6 or more as directed by the Engineer.

15. Unless otherwise directed by the Engineer, a composite material post and/or blockout from the Department approved list of suppliers may be substituted for a post and/or blockout of similar dimensions. The list of approved suppliers of posts and blockouts will be maintained by the Construction Division,TxDOT.

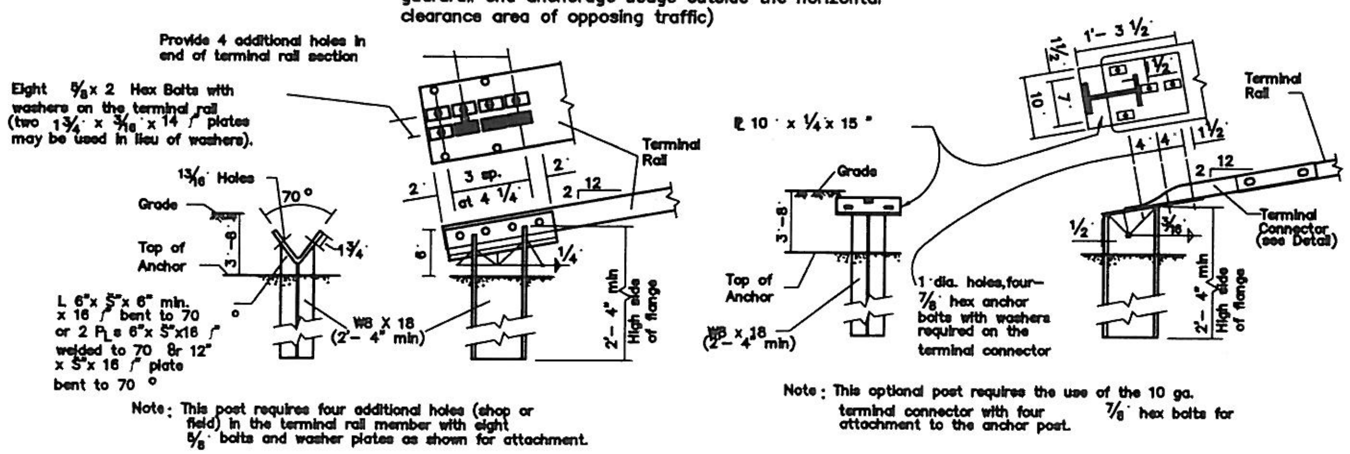


ELEVATION OF NOMINAL 12 FOOT GUARDRAIL
(25 foot sections may also be supplied)

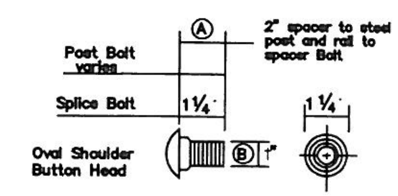


ELEVATION FOR TERMINAL ANCHOR SECTION (TAS)

(Terminal anchor sections are only for downstream guardrail end anchorage usage outside the horizontal clearance area of opposing traffic)



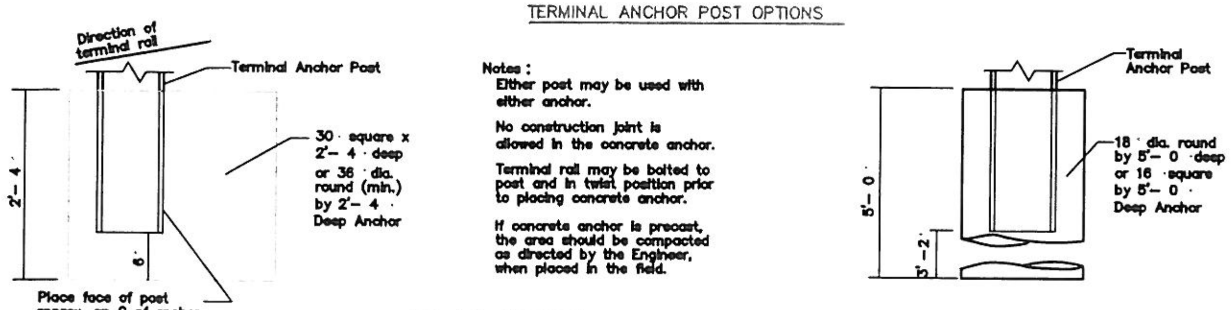
TERMINAL ANCHOR POST OPTIONS



SPLICE BOLT

(A) 1 " spacer to steel post hex bolt. 2" rail to spacer button head bolt.

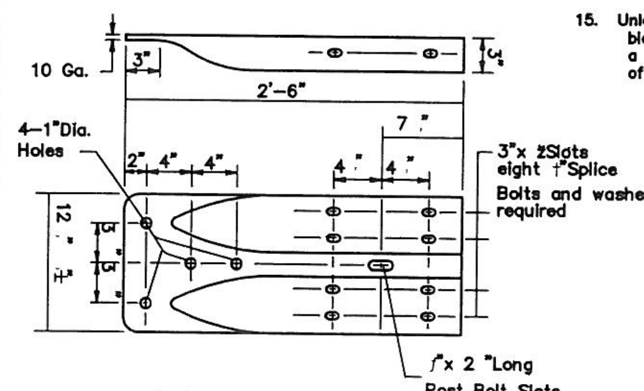
(B) (5/8" hex bolts required for terminal connector)



Notes :
Either post may be used with either anchor.
No construction joint is allowed in the concrete anchor.
Terminal rail may be bolted to post and in twist position prior to placing concrete anchor.
If concrete anchor is precast, the area should be compacted as directed by the Engineer, when placed in the field.

TERMINAL CONCRETE ANCHOR OPTIONS

TERMINAL CONNECTOR :The terminal connector may also be used on the MBGF(TL2) transition (See MBGF(TL2) Standard Sheet), or on the downstream end of a concrete rail located outside the horizontal clearance area of opposing traffic.(See BED Standard Sheet)



TERMINAL CONNECTOR

R = Radius
D = Diameter

DISCLAIMER :
The use of this standard is governed by the Texas Engineering Practice Act . No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

LEVELS DISPLAYED

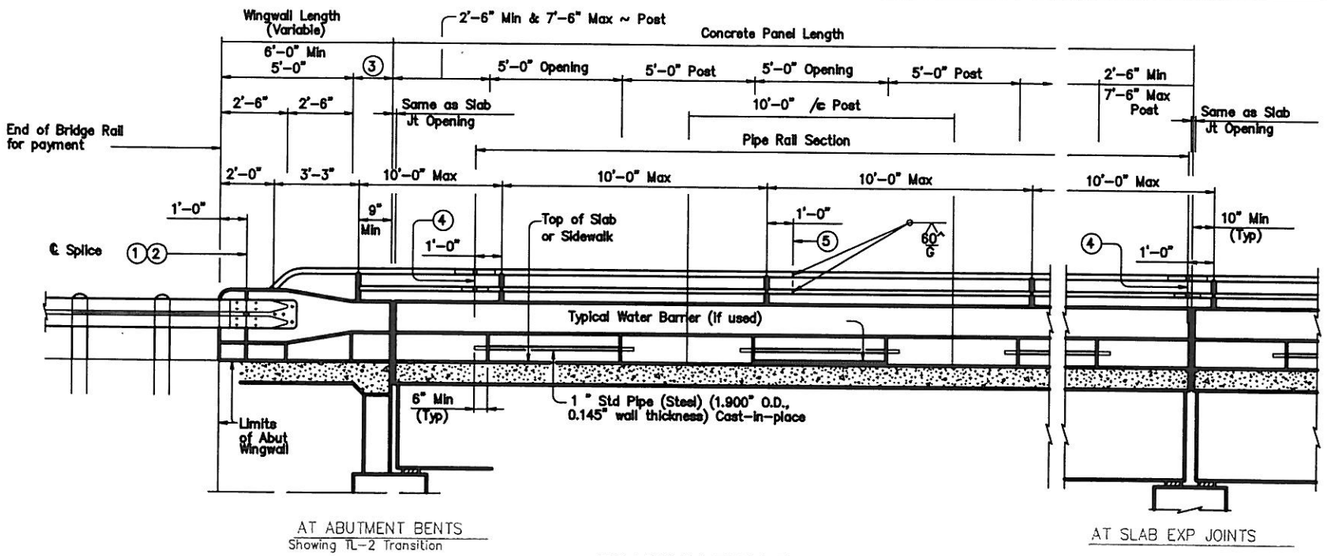
1	2		4	5	6	7	8	9	10	11	12	13	14	15	16
7	8	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	50	51	52	53	

Texas Department of Transportation
Design Division (Roadway)

METAL BEAM GUARD FENCE

MBGF-03A

FILE: mbgf03a.dgn	DN: MAM	CK: MAM	DW: RAR	CK: MAM	NEG:
© TxDOT JULY 1994	DIST	FED REG	FEDERAL AID PROJECT		SHEET
REVISIONS		6			
SD-102	COUNTY		CONTROL	SECT	JOB	HIGHWAY

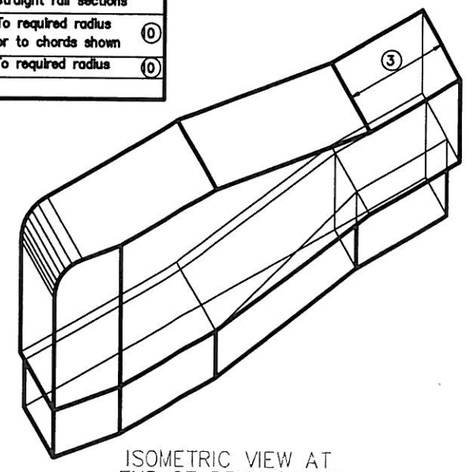


AT ABUTMENT BENTS
Showing TL-2 Transition

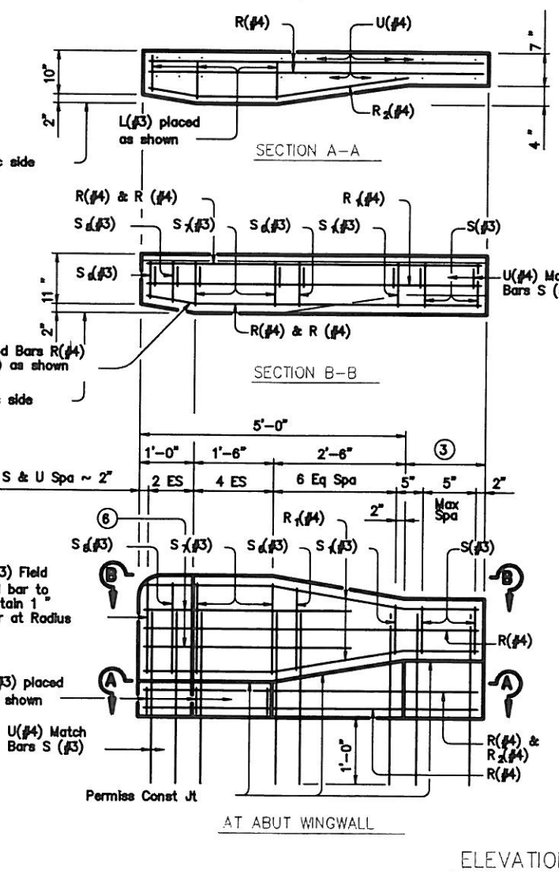
AT SLAB EXP JOINTS

RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
Pipe Rail	Over 2800'	29'-0"	Straight rail sections
	Over 1400'thru 2800'	14'-6"	To required radius or to chords shown (10)
	Over 700'thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius (10)

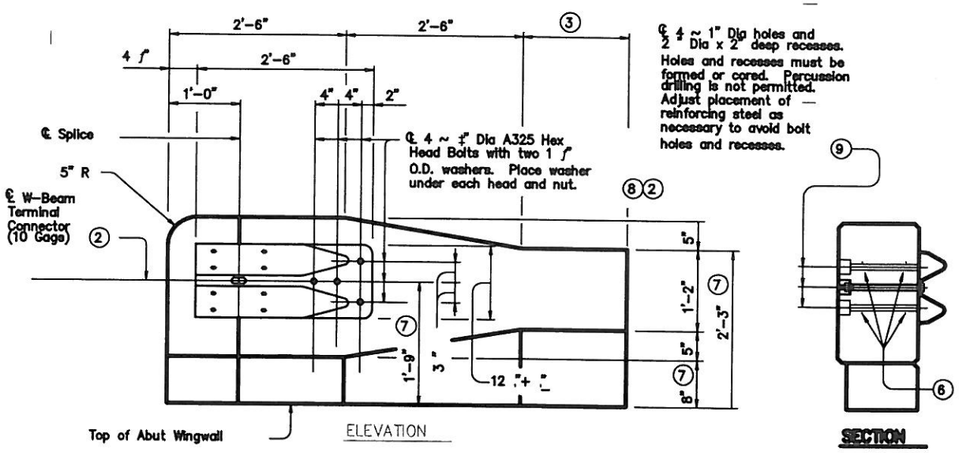


ISOMETRIC VIEW AT END OF BRIDGE RAIL



AT ABUT WINGWALL

ROADWAY ELEVATION OF RAIL



TL-2 TERMINAL CONNECTION DETAILS

℄ 4 ~ 1" Dia holes and 2 # Dia x 2" deep recesses. Holes and recesses must be formed or cored. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses.

(1) Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.

(2) Terminal Connector and associated hardware are to be paid for under the Item "Metal Beam Guard Fence".

(3) Wingwall Length minus 5'-0" (Varies)

(4) ℄ Splice Jt or Exp Jt

(5) One shop splice per pipe rail section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(6) 4 additional Bars R(#4) 3'-8" in length shall be placed inside Bars S(#3) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

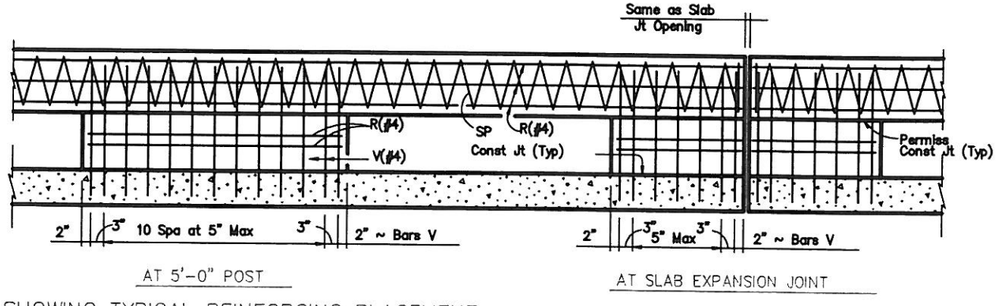
(7) Increase 2" for structures with overlay.

(8) Bolts shall be sufficient length to extend " to f" beyond nut.

(9) Bolt recesses are only required when pedestrians sidewalks are adjacent to back of rail.

(10) Shop drawings required for tubular steel sections (may be submitted as 11"x 17" prints, provided they are clearly legible).

The use of this railing is restricted to design speeds of 45 mph or less.



AT 5'-0" POST

AT SLAB EXPANSION JOINT

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

LEVELS DISPLAYED
ACC:

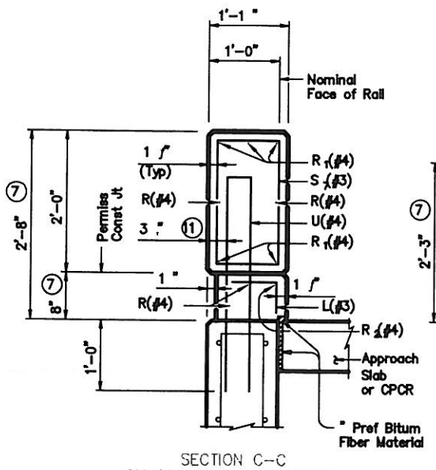
Texas Department of Transportation
Bridge Division

COMBINATION RAIL

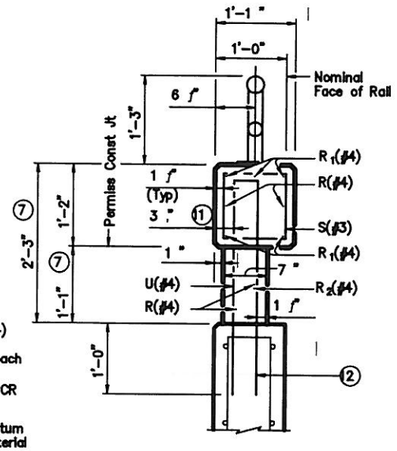
TYPE C203

FILE: ristde28.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
© TxDOT February 2003	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 4-03: Replaced TL-3 Terminal Connection with TL-2 Terminal Connection, added anchor bolt system & modified Notes.	COUNTY	CONTROL	SECT	JOB	HIGHWAY

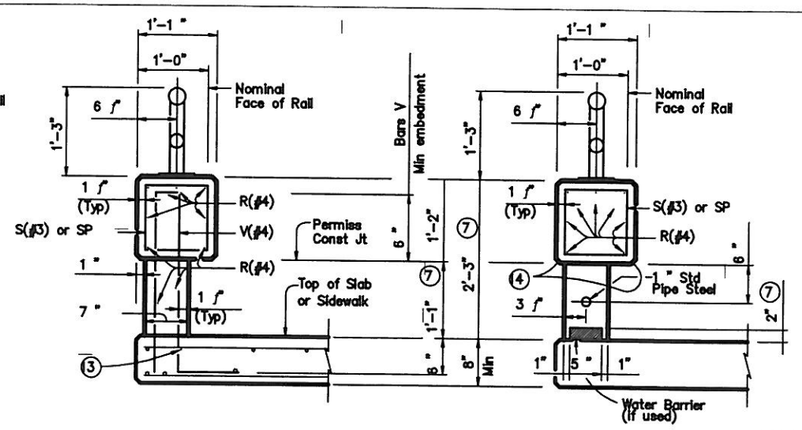
SHEET: SD-103



SECTION C–C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

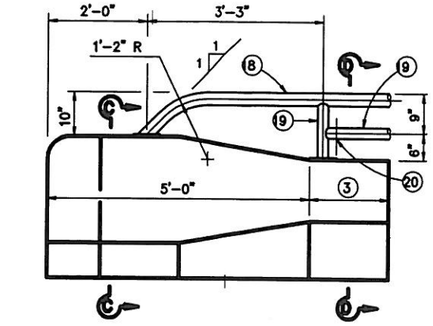


SECTION D–D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

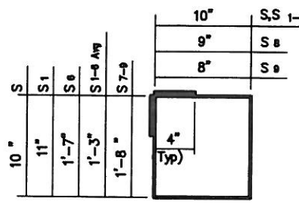


AT POST
ON BRIDGE SLAB

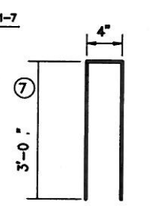
AT OPENING
ON BRIDGE SLAB



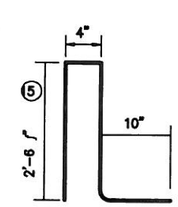
ELEVATION AT ABUTMENT WINGWALL
WITH PIPE RAIL TERMINAL DETAIL



BARS S (#5)

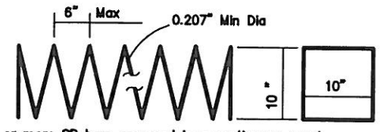


BARS U (#4)



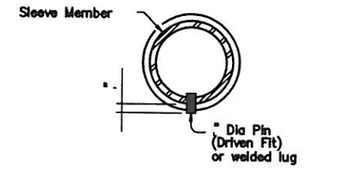
BARS V (#4)

SECTIONS THRU RAIL

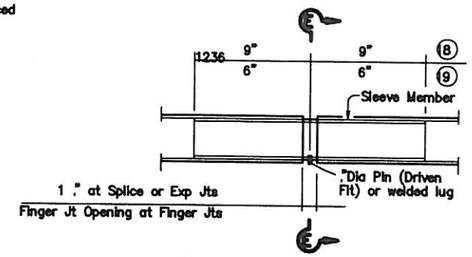


If two or more SP bars are used in a continuous panel length, they shall be butted within the center 3 ft of a rail post. At Contractor's option, Bars S spaced at 6" may be substituted for Bars SP.

BARS SP (0.207" Smooth Wire)

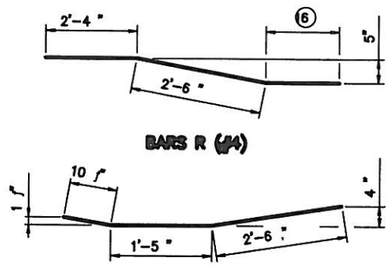


SECTION E–E

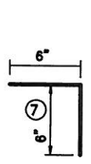


PIPE SPLICE DETAIL

Note: The difference between the outside dimension of sleeve and inside dimension of rail member shall not exceed 0.167" before galvanizing. Minimum wall thickness of sleeve shall be 0.120".



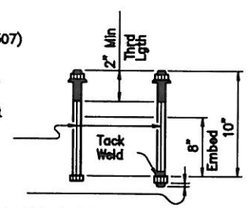
BARS R (#4)



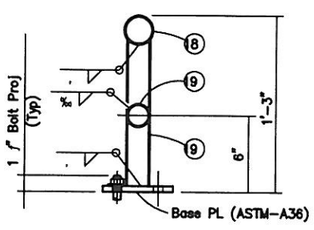
BARS L (#5)

BARS R (#4)

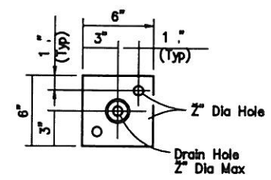
Q 1" Dia Hex Head Anchor Bolt (ASTM-A307) or Threaded Rod (ASTM-A36) with one Hardened Steel Washer placed under Hex Nut. One additional Hex Nut shall be furnished for each Threaded Rod.



CAST–IN–PLACE ANCHOR BOLT OPTIONS ⑦



SECTION THRU PIPE RAIL



SECTION THRU PIPE RAIL POST

PIPE RAIL DETAILS

③ Wingwall Length minus 5'–0" (Varies)

⑦ Increase 2" for structures with overlay.

⑪ 3 " when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

② Bars U shall be rotated slightly to maintain cover requirements shown.

③ Top longitudinal slab bar may be adjusted laterally 3" – to tie reinforcing.+

④ 1 "x f" or f"x f" Chamfer (Typ at all openings)

⑤ Length shown for 6 " Min bar embedment with no overlay. Adjust as required.

⑥ Wingwall Length minus 4'–10 "

⑦ See "General Notes" for anchor bolt information.

⑧ 2 " Std Pipe (2.875" O.D., 0.203" wall thickness)

⑨ 2" Std Pipe (2.375" O.D., 0.154" wall thickness)

⑳ ..." Dia Hole in bottom of pipe or tube (Minimum of 1 hole between posts ~ Typ)

GENERAL NOTES:

This rail, without the pipe rail, has been successfully evaluated by full–scale crash tests to meet NCHRP Report 350 TL–3 criteria. However, its use is limited to design speeds of 45 mph or less because the pipe rail presents an occupant compartment intrusion threat to high speed vehicular traffic.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

All steel components except reinforcing shall be galvanized unless otherwise shown on plans.

All concrete shall be Class "C". Chamfer all exposed corners.

Epoxy coat Bars V and U if slab bars are epoxy coated.

All reinforcing shall be grade 60 except spirals.

Erection drawings showing panel lengths, tubular rail post spacing, and anchor bolt setting shall be submitted to the Engineer for approval.

Anchor bolts shall be 1" Dia ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. Embed threaded rods into parapet wall with an epoxy anchorage system. Estimated required embedment depth is 3". Core drill holes (percussion drilling not permitted). Anchorage system chosen must be able to achieve an ultimate tensile resistance of 3.9 kips. The Contractor must provide evidence to the Engineer that this can be achieved. Evidence of adequate tensile resistance can be based on the manufacturer's published values of ultimate tensile strength (anchor spacing and edge distance must be accounted for). Anchor installation, including hole size, drilling, and clean–out, must be in accordance with the manufacturer's recommendations.

At the contractor's option anchor bolts may be cast with the parapet (See Cast–in–Place Anchor Bolt Options).

Optional cast–in–place anchor bolts shall be 1" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt.

Pipe for pipe rail shall conform to ASTM A53 Grade B or A501.

Face of rail, posts and parapet shall be vertical transversely unless otherwise approved by the Engineer. Pipe rail posts and opening end faces shall be perpendicular to top of adjacent concrete parapet grade. Grout may be used under pipe rail post base plates if necessary.

Water barriers shall be provided at openings draining onto undercrossing roadways and sidewalks. They may be cast–in–place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Pipe rail sections shall not include less than two posts, and no more than four (except at Abutments).

Exposed edges of pipe rail and pipe rail posts shall be rounded or chamfered to approximately " by grinding.

Average weight of railing with no overlay: 250 plf (Conc)
12 plf (Steel)

Texas Department of Transportation
Bridge Division

COMBINATION RAIL

TYPE C203

FILE: ristde28.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT February 2003	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 4–03: Replaced TL–2 Terminal Connection with TL–2 Terminal Connection, added anchor bolt system & modified Notes.	COUNTY	CONTROL	SECT	JOB	HIGHWAY

SHEET: SD–104

LEVELS DISPLAYED ACC:

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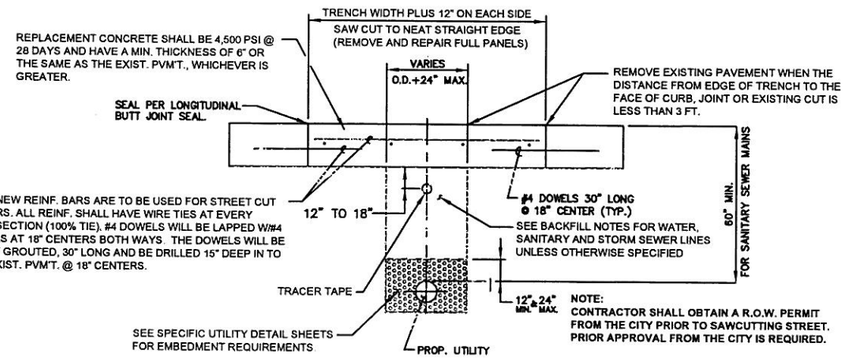
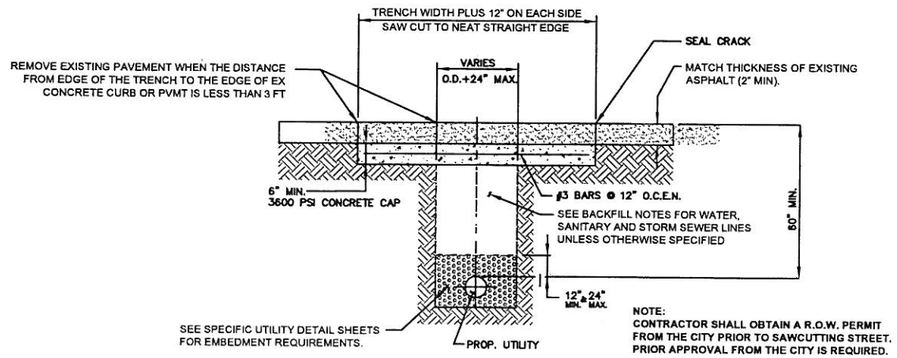
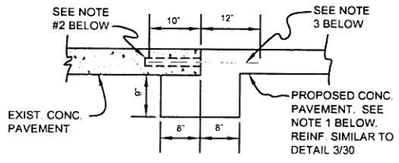


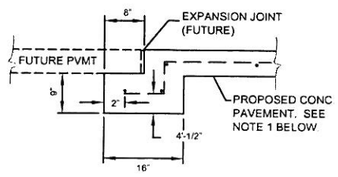
TYPICAL REINFORCED CONCRETE STREET REPAIR SECTION



TYPICAL ASPHALT STREET REPAIR SECTION



PAVEMENT HEADER W/DOWELS
N.T.S.



PAVEMENT HEADER
N.T.S.

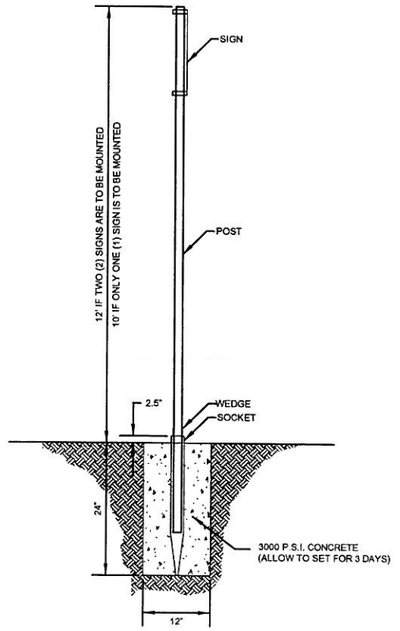
DOWEL NOTES:

1. PAVEMENT REINFORCING BARS SHALL BE BENT DOWN INTO HEADER PAVEMENT AND HEADER SHALL BE MONOLITHIC
2. DRILL 1-1/8" DIA. HOLE - INSIDE SHALL BE BLOWN CLEAN AND COATED W/EPOXY RESIN
3. INSTALL 1" DIA. SMOOTH DOWELS X 1'-10" AT 2'-0" SPACING. COAT DOWELS W/APPROVED EPOXY RESIN BEFORE INSERTION INTO DRILLED HOLE

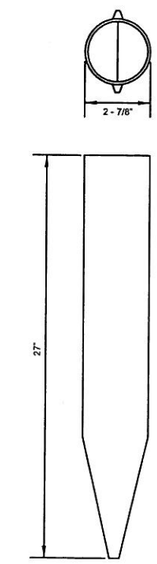
FLOWABLE BACKFILL NOTES:

FLOWABLE BACKFILL SHALL BE USED AS BACKFILL FOR A TRENCH WITHIN THE STREET REPAIR SECTION. THE FLOWABLE BACKFILL SHALL CONSIST OF A MIXTURE OF SAND (NCTCOG ITEM 504.2.2.5), CEMENT AND/OR FLY ASH AND WATER WHICH PRODUCES A MATERIAL W/ UNCONFINED COMPRESSIVE STRENGTH OF BETWEEN 50 PSI AND 150 PSI AFTER 28 DAYS. THE FLOWABLE MIXTURE SHALL BE MIXED IN A PUG MILL, CONCRETE MIXER OR TRANSIT MIXER AND SHALL HAVE A MINIMUM SLUMP OF 5 INCHES. THE FLOWABLE MIXTURE MUST BE ALLOWED TO SET PRIOR TO THE PLACEMENT OF ANY OVERLAYING MATERIAL.

SD-105

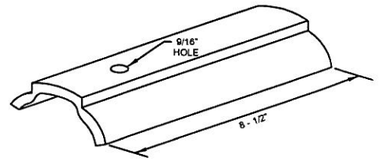


SIGN POST ASSEMBLY
N.T.S.



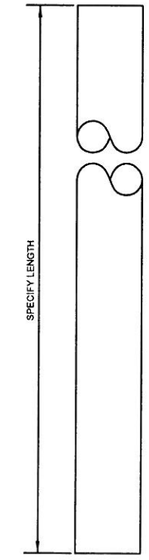
MATERIAL:
1. 2¼" O.D. x 12 Ga. GALVINIZED TUBING
2. ASTM A-787
3. WEIGHT 7.21 Lb

SOCKET
N.T.S.



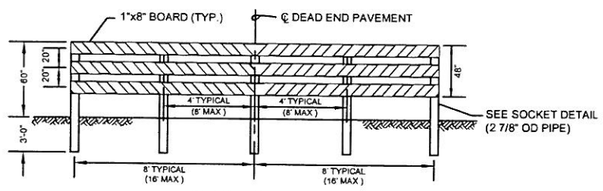
MATERIAL:
1. 2½" x 8½" x 11 Ga. GALVINIZED SHEET
2. ASTM A-526 G-90
3. WEIGHT 1.0 Lb

POST WEDGE
N.T.S.

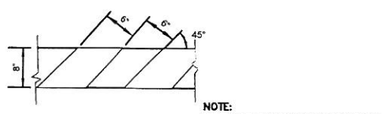


MATERIAL:
1. 2½" O.D. 65 GAUGE
2. SPECIFY WALL THICKNESS

POST
N.T.S.

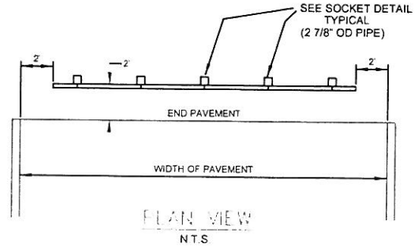


ELEVATION



NOTE:
WIDTH OF SHEETING TO BE 7" MIN.

PAINTING DETAIL
N.T.S.



PLAN VIEW
N.T.S.

END OF ROAD BARRICADE DETAIL
SCALE AS NOTED

BARRICADE NOTES:

1. BARRICADE SHALL CONFORM TO THE TEXAS MUTCD.
2. LENGTH SHALL BE GIVEN ON PLANS IN MULTIPLES OF 4 FT.
3. VERTICAL SUPPORTS MAY BE OF EQUAL ALTERNATE DESIGN APPROVED BY THE ENGINEER.
4. MINIMUM LENGTH SHALL BE STREET WIDTH MINUS TWO (2) FT. EACH ROADWAY OF A DIVIDED STREET SHALL BE BARRICADED IN THE SAME MANNER.
5. "DEAD END" ADVANCED WARNING SIGN TO BE INSTALLED PER MUTCD STANDARDS.
6. STRIPES SHALL BE HIGH INTENSITY REFLECTIVE TAPE.

PAVING
MISCELLANEOUS PAVING DETAILS
STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	MAR 2010	NOT TO SCALE	RGW	SD-105

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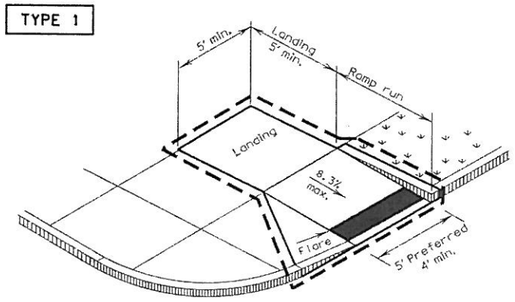
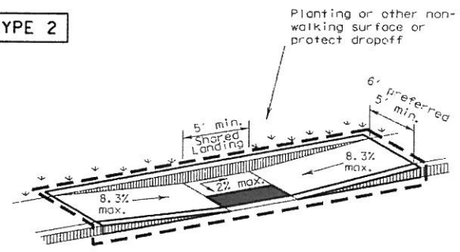
TYPE 1



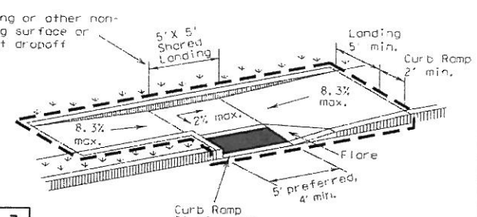
PERPENDICULAR CURB RAMP

TYPE 2

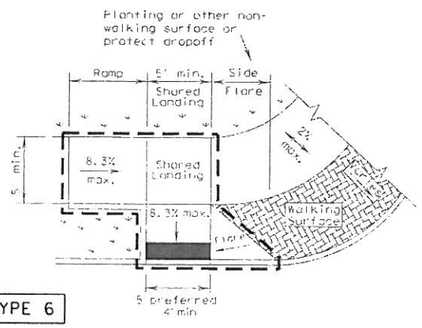


PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 3

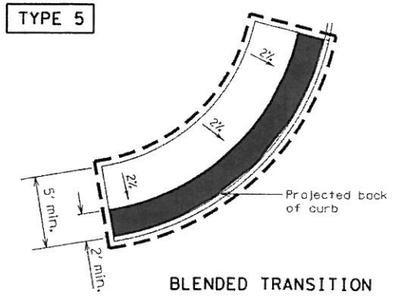


TYPE 6



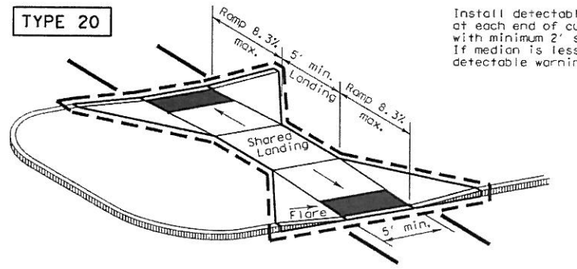
COMBINATION CURB RAMPS

TYPE 5



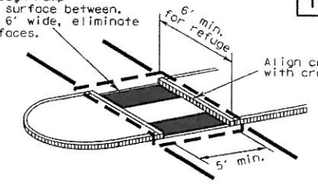
BLENDED TRANSITION

TYPE 20



Install detectable warning surface at each end of cut-through ramp with minimum 2' smooth surface between. If median is less than 6' wide, eliminate detectable warning surfaces.

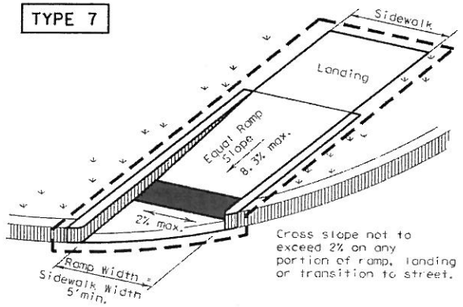
TYPE 21



Curb details are shown elsewhere in the plans.

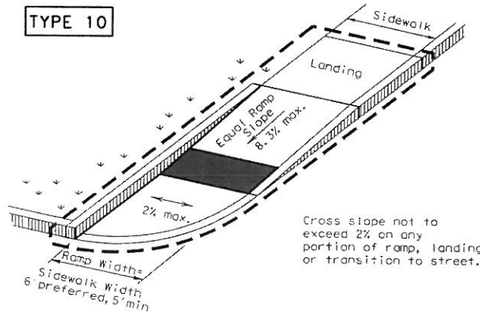
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7



(Sidewalk set back from curb)

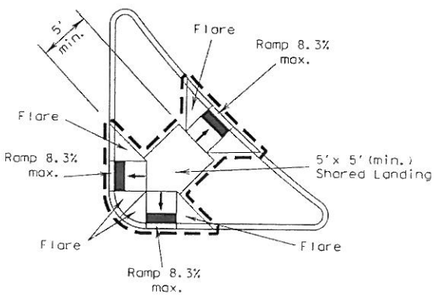
TYPE 10



(Sidewalk adjacent to curb)

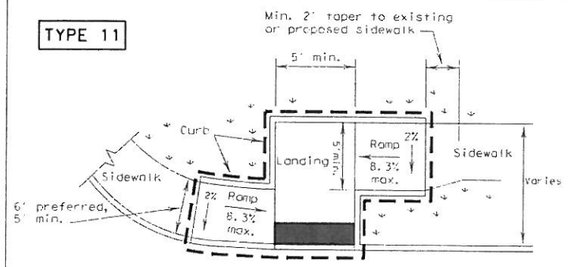
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 22

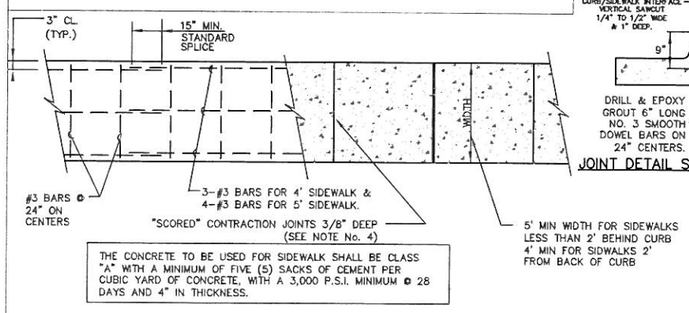


COMBINATION ISLAND RAMPS

TYPE 11

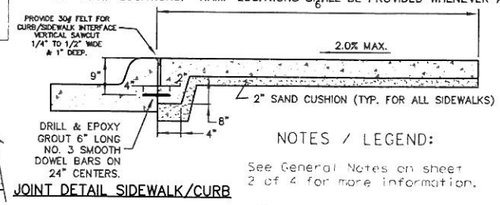


OFFSET PARALLEL CURB RAMP



THE CONCRETE TO BE USED FOR SIDEWALK SHALL BE CLASS "A" WITH A MINIMUM OF FIVE (5) SACKS OF CEMENT PER CUBIC YARD OF CONCRETE, WITH A 3,000 P.S.I. MINIMUM @ 28 DAYS AND 4" IN THICKNESS.

CITY OF CEDAR HILL SIDEWALK AND STEEL REINFORCING



JOINT DETAIL SIDEWALK/CURB

GENERAL NOTES FOR CITY OF CEDAR HILL:

1. RAMPS AND SIDEWALKS SHALL COMPLY WITH ALL ASPECTS OF THE TEXAS DEPARTMENT OF LICENSING AND REGULATION (TLDR) REQUIREMENTS FOR TEXAS ACCESSIBILITY STANADARDS (TAS). COMPLIANCE SHALL BE VERIFIED IN WRITTING BY A REGISTRATED ACCESSIBILITY SPECIALIST.
2. DETECTABLE WARNING AREAS SHALL BE ARMOR TILE CAST-IN-PLACE SYSTEMS OR AN APPROVED EQUAL BY CITY. COLOR SHALL BE BRICK RED. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. DETECTABLE WARNINGS USED ON INTERIOR SURFACES SHALL DIFFER FROM ADJOINING WALKING SURFACES IN RESILIENCY OR SOUND-ON-CANE CONTACT. DETECTABLE WARNINGS SHALL CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 IN (23 MM), A HEIGHT OF NOMINAL 0.2 IN (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 IN (60 MM) AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES
3. REMOVE ALL EXISTING TREES, BUSHES, AND/OR SHRUBS IN THE PATH OF THE SIDEWALK CONSTRUCTION. SPECIAL LANDSCAPE FEATURES TO REMAIN OR BE REPLACED WHEN DETERMINED BY THE CITY ENGINEER.
4. ALL STANDARD SIDEWALK CONSTRUCTION SHALL HAVE A MINIMUM THICKNESS OF 4 INCHES UNLESS OTHERWISED NOTED. WHEN SIDEWALKS ARE CONSTRUCTED THRU DRIVEWAYS, THE MINIMUM THICKNESS IS 6 INCHES.
5. EXPANSION JOINTS SHALL BE CONSTRUCTED AT EVERY 48 FEET FOR 4' & 6' WIDE SIDEWALKS, EVERY 50' FOR 5' WIDE SIDEWALKS, AT CURBS, AND AT ALL DRIVEWAYS.
IF SIDEWALK ABUTS CURB, EXPANSION JOINTS SHALL ALSO BE CONSTRUCTED TO MATCH/ALIGN WITH ROADWAY PAVEMENT.
6. CONTRACTION JOINTS SHALL BE PLACED AT 4 FOOT INTERVALS ON 4 FOOT WIDE SIDEWALKS, 5 FOOT INTERVALS ON 5 FOOT SIDEWALKS, AND AT 6 FOOT INTERVALS ON 6 FOOT WIDE SIDEWALKS. IF SIDEWALK ABUTS CURB, JOINTS SHALL MATCH/ALIGN WITH ROADWAY JOINTS AND THEN EQUALLY SPACED BETWEEN TO CLOSELY APPROXIMATE SPACING PREVIOUSLY STARTED.
7. THE RAMPS AND SIDEWALKS SHALL HAVE THE SAME REINFORCING STEEL.
8. RAMPS SHALL HAVE 4,500 PSI COMPRESSIVE STRENGTH FOR 28 DAYS PER HAND FINISH SPECIFICATIONS IN GENERAL NOTES, SHEET SD-001
9. A LIGHT BROOM FINISH SHALL BE REQUIRED ON ALL EXPOSED SURFACES.
10. RAMP LOCATIONS: RAMP LOCATIONS SHALL BE PROVIDED WHENEVER AN ACCESSIBLE ROUTE CROSSES A CURB.

NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

V. V. V. Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation | Design Division Standard

PAVING
SIDEWALK BARRIER FREE RAMPS
(BFR) DETAILS
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
RGW			FEB 2015	NOT TO SCALE	RGW	SD-106a

SD-106.DWG

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

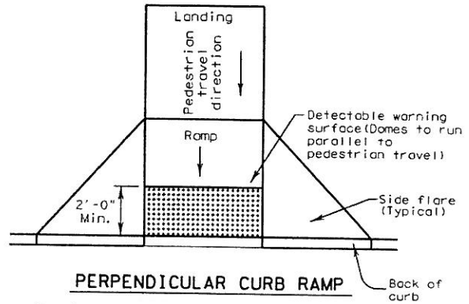
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever an accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

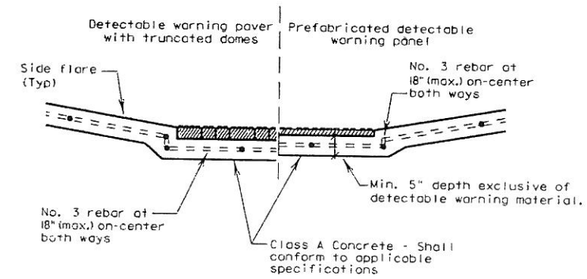
Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

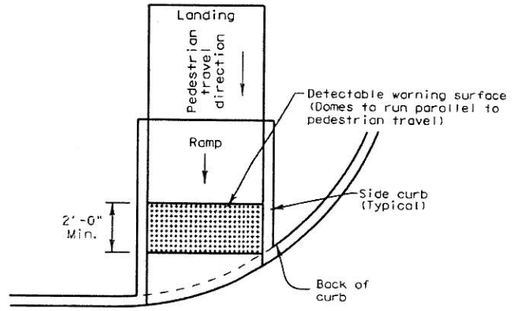


PERPENDICULAR CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

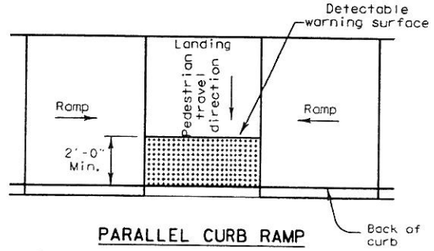


SECTION: CURB RAMP AT DETECTABLE WARNING



DIRECTIONAL CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.



PARALLEL CURB RAMP

Typical placement of detectable warning surface on landing at street edge.

DETECTABLE WARNINGS

Detectable Warning Pavers

24. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

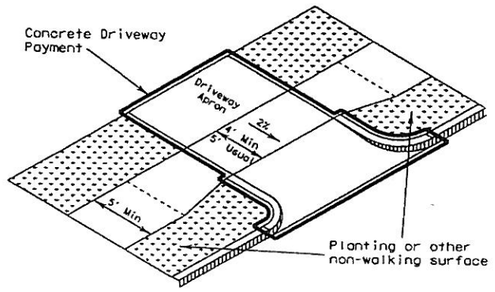
SHEET 2 OF 4

Texas Department of Transportation | Design Division Standard

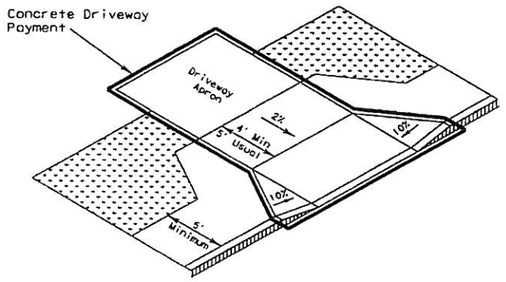
PAVING
SIDEWALK BARRIER FREE RAMPS
(BFR) DETAILS
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
RGW			FEB 2015	NOT TO SCALE	RGW	SD-106b

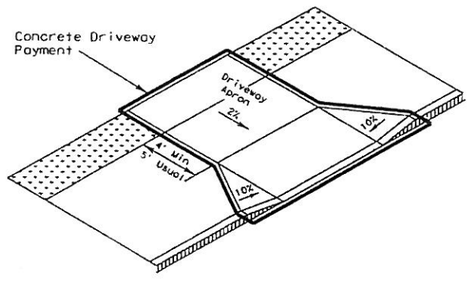
SD-106.DWG



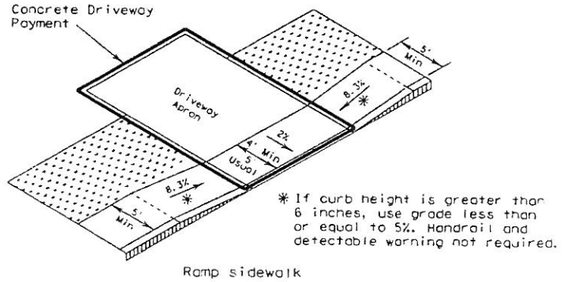
Setback sidewalk



Apron offset sidewalk



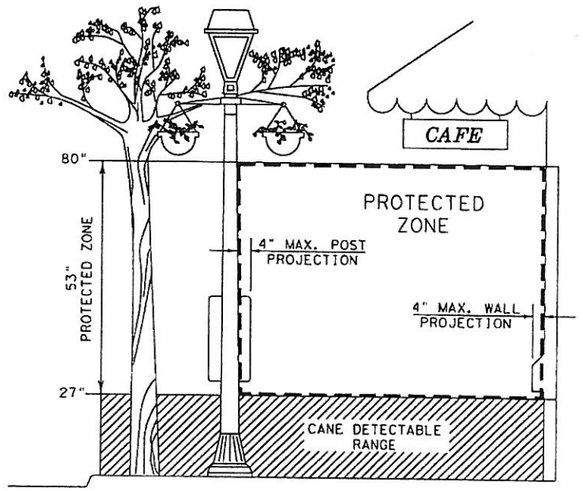
Wide sidewalk



* If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

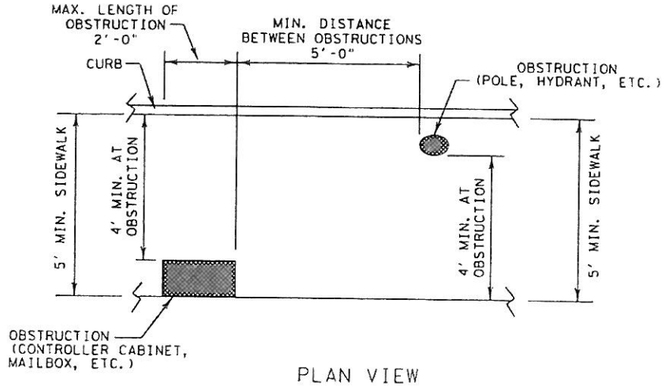
Ramp sidewalk

SIDEWALK TREATMENT AT DRIVEWAYS



PROTECTED ZONE

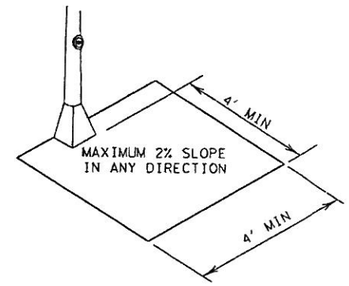
In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27"and 80" above the surface.



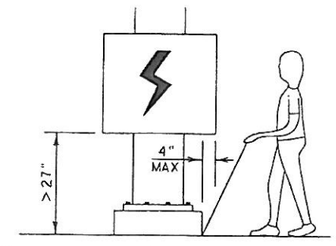
PLAN VIEW

PLACEMENT OF STREET FIXTURES

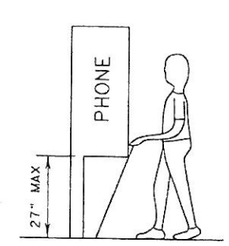
(ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' x 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.)



CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



When an obstruction of a height greater than 27" from the surface would create a protrusion of more than 4" into the pedestrian circulation area, construct additional curb or foundation at the bottom to provide a maximum 4" overhang.



Protruding objects of a height ≤ 27" are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation | Design Division Standard

PAVING
SIDEWALK BARRIER FREE RAMPS
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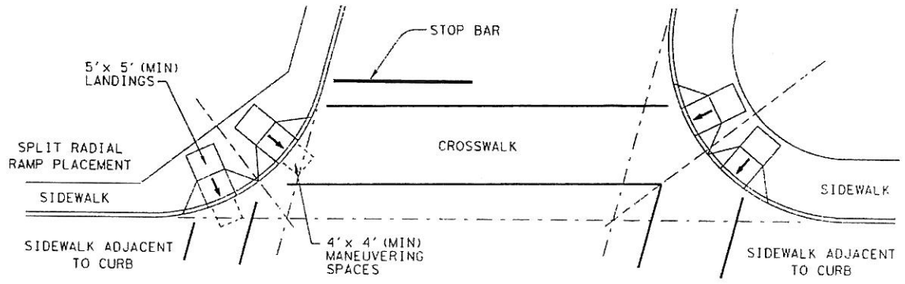
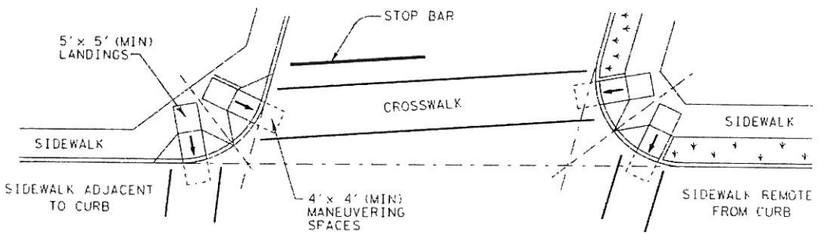
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
RGW			FEB 2015	NOT TO SCALE	RGW	SD-106c

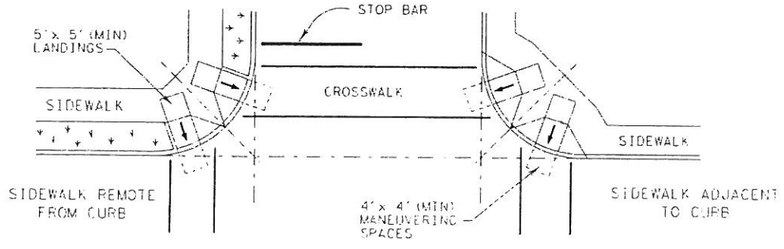
SD-106.DWG



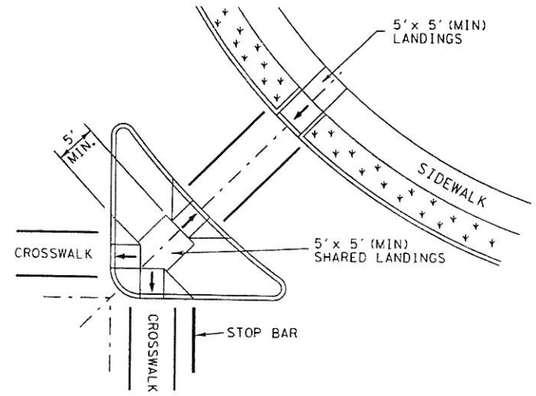
SKEWED INTERSECTION WITH "LARGE" RADIUS



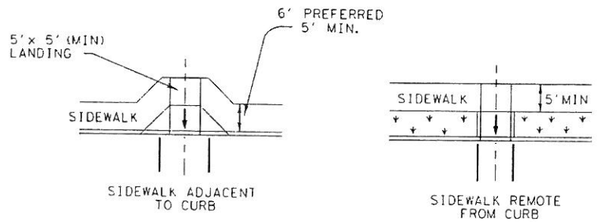
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

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3. REMOVE ALL EXISTING TREES, BUSHES, AND/OR SHRUBS IN THE PATH OF THE SIDEWALK CONSTRUCTION. SPECIAL LANDSCAPE FEATURES TO REMAIN OR BE REPLACED WHEN DETERMINED BY THE CITY ENGINEER.
4. ALL STANDARD SIDEWALK CONSTRUCTION SHALL HAVE A MINIMUM THICKNESS OF 4 INCHES UNLESS OTHERWISED NOTED. WHEN SIDEWALKS ARE CONSTRUCTED THRU DRIVEWAYS, THE MINIMUM THICKNESS IS 6 INCHES.
5. EXPANSION JOINTS SHALL BE CONSTRUCTED AT EVERY 48 FEET FOR 4' & 6' WIDE SIDEWALKS, EVERY 50' FOR 5' WIDE SIDEWALKS, AT CURBS, AND AT ALL DRIVEWAYS.
IF SIDEWALK ABUTS CURB, EXPANSION JOINTS SHALL ALSO BE CONSTRUCTED TO MATCH/ALIGN WITH ROADWAY PAVEMENT.
6. CONTRACTION JOINTS SHALL BE PLACED AT 4 FOOT INTERVALS ON 4 FOOT WIDE SIDEWALKS, 5 FOOT INTERVALS ON 5 FOOT SIDEWALKS, AND AT 6 FOOT INTERVALS ON 6 FOOT WIDE SIDEWALKS. IF SIDEWALK ABUTS CURB, JOINTS SHALL MATCH/ALIGN WITH ROADWAY JOINTS AND THEN EQUALLY SPACED BETWEEN TO CLOSELY APPROXIMATE SPACING PREVIOUSLY STARTED.
7. THE RAMPS AND SIDEWALKS SHALL HAVE THE SAME REINFORCING STEEL.
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TYPICAL CROSSING LAYOUTS

Texas Department of Transportation | Design Division Standard

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CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

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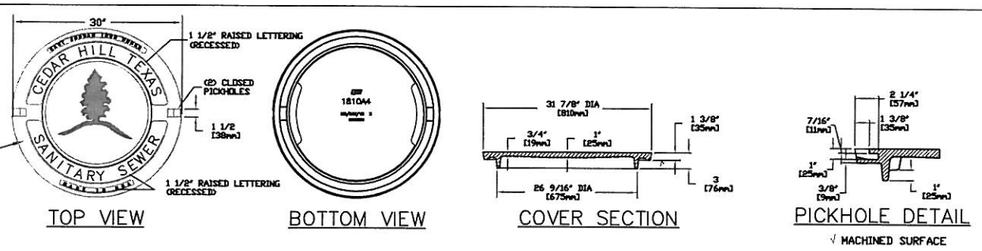
RGW			FEB 2015	NOT TO SCALE	RGW	SD-106d

SD-106.DWG



MANHOLE RING & COVER SHALL BE BASS & HAYS FOUNDARY, INC. MODEL NO. VRM30 WT WITH CITY'S LOGO, OR CITY APPROVED EQUAL. IF MANHOLE IS LOCATED WITHIN AN AREA SUBJECT TO CONCENTRATED STORM WATER FLOWS, THE MANHOLE SHALL HAVE A WATER-TIGHT RIM & COVER WITH CITY LOGO. ALL MANHOLE RIMS SHALL HAVE THE CITY OF CEDAR HILL'S LOGO & NAME.

TOP VIEW | BOTTOM VIEW | COVER SECTION | PICKHOLE DETAIL

√ MACHINED SURFACE

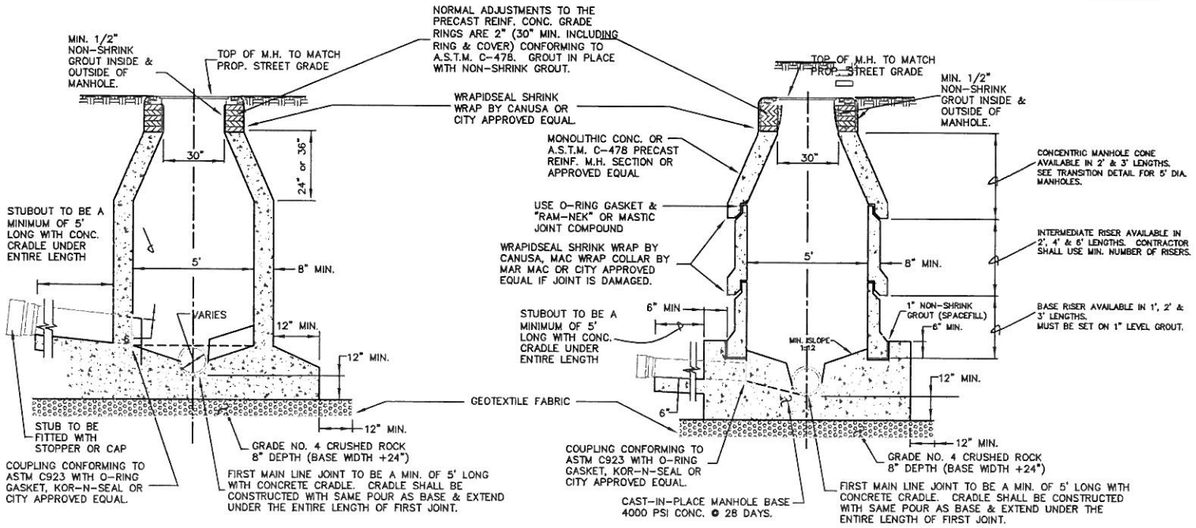
30" MANHOLE LID AND FRAME DETAILS

STANDARD MANHOLE NOTES:

1. CONCRETE SHALL HAVE A MIN. 3600 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
2. ALL MANHOLES SHALL BE 5' IN DIAMETER.
3. FIBERGLASS MANHOLES MAY BE USED AS AN ALTERNATE TO CONCRETE MANHOLES WHERE SPECIFIED BY THE CITY. FIBERGLASS MANHOLES MUST BE "FLOWTITE FIBERGLASS MANHOLES" AS MANUFACTURED BY CONTAINMENT SOLUTIONS, INC. OR CITY APPROVED EQUAL AND MUST MEET REQUIREMENTS OF N.T.C.O.G. ITEM NO. 2.20 & ASTM D3753.
4. MANHOLE LOCATION SHALL BE STAMPED ON THE FACE OF CURB AT MANHOLE.
5. A 5'x5' CONCRETE PAD IS TO BE CONSTRUCTED AROUND MANHOLE IF NOT IN PAVEMENT. SEE DTL THIS SHEET.
6. ALL MANHOLES SHALL HAVE INSTALLED, COMPLETE AND INPLACE STAINLESS STEEL RAINSTOPPERS OR CITY APPROVED EQUAL

JUNCTION M.H. NOTES:

1. WHEN POSSIBLE STD. PIPE FITTING SHALL BE USED TO FORM INVERTS AT JUNCTION M.H.'S. USING THE FOLLOWING INSTALLATION.
   A. PIPE FITTINGS.
   B. POUR M.H. FLOOR TO SPRING LINE OF FITTING.
   C. CUT OUT TOP OF FITTING TO SPRING LINE.
   D. POUR REMAINDER OF M.H. INVERT TO PROVIDE VERTICAL INVERT WALL UP TO THE 3/4 POINT OF THE LARGE PIPE INVOLVED, SEE DETAIL.
   E. STEEL TROWEL FINISH INVERT OF M.H'S.
2. WHEN SPECIAL SITUATIONS PROHIBIT USE OF THE STD. PIPE FITTINGS AS MENTIONED ABOVE, THE INVERT SHALL BE FORMED OF CONCRETE AND HAVE A STEEL TROWEL FINISH. THE FINAL PRODUCT SHALL HAVE A SIMILAR FORM & FUNCTION AS A STD. PIPE FITTINGS INSTALLATION. ALL THE WORK SHALL BE DONE TO CITY STANDARDS AND VOID OF ROUGH EDGES.



CAST-IN-PLACE MANHOLE NOTES:

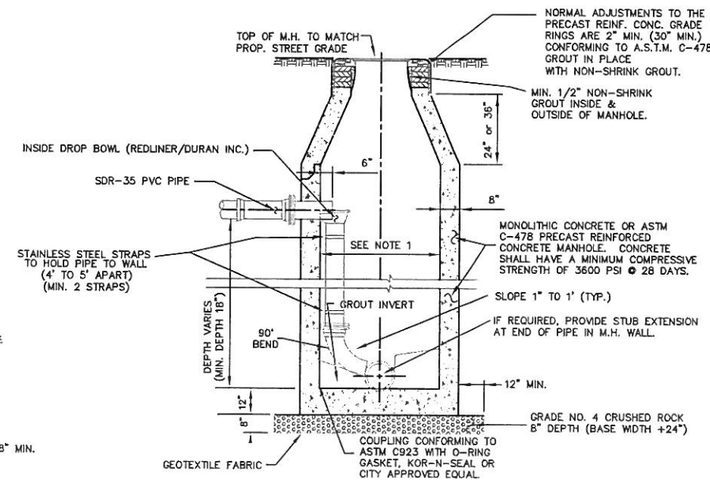
1. KEYWAYS REQUIRED FOR ALL CONSTRUCTION JOINTS.
2. PVC WATER STOP REQUIRED FOR ALL JOINTS IN LOWER 4' OF MANHOLE.
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI @ 28 DAYS.

PRE-CAST MANHOLE NOTES:

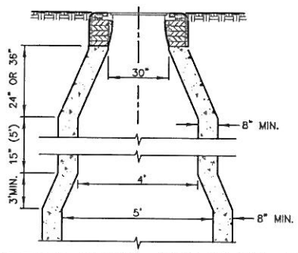
1. ALL PRECAST MANHOLES MUST MEET OR EXCEED ASTM C-478 REQUIREMENTS. THE CONCRETE IN PRECAST MANHOLES MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3600 PSI @ 28 DAYS.
2. PRECAST BASE MAY BE USED INSTEAD OF CAST-IN-PLACE MANHOLE BASE IF APPROVED BY THE CITY. THE BASE MUST BE AN "EXTENDED BASE" THAT COMES EQUIPPED WITH A MINIMUM 6" FOOTING. STUBOUTS SHALL BE A MINIMUM OF 5' LONG SUPPORTED BY CONCRETE DOWELED TO MANHOLE BASE. STUBOUTS TO BE GROUTED AT MANHOLE WITH NON SHRINK GROUT. STUBOUTS SHALL ALSO BE FITTED WITH WATER TIGHT STOPPER OR CAP. AN APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET IS REQUIRED. SUBGRADE SHALL BE THE SAME AS REQUIRED FOR CAST-IN-PLACE BASE.

STANDARD CAST-IN-PLACE MANHOLE

PRECAST MANHOLE



ELEVATION

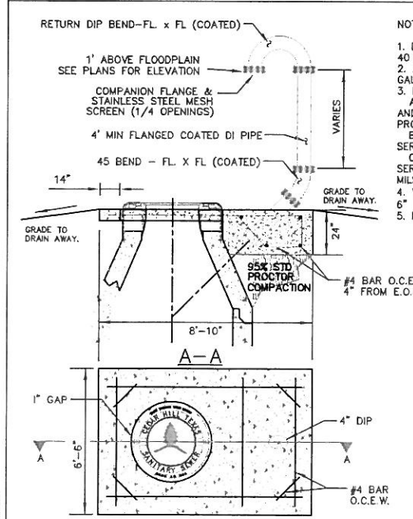


TRANSITION DETAIL FOR 5' DIA. M.H.

DROP MANHOLE NOTES:

1. ALL MANHOLES SHALL BE 5' IN DIAMETER.
2. ALL MANHOLESS SHALL HAVE A WALL THICKNESS OF 8".
3. MANHOLE LOCATION SHALL BE STAMPED ON THE FACE OF CURB AT M.H.

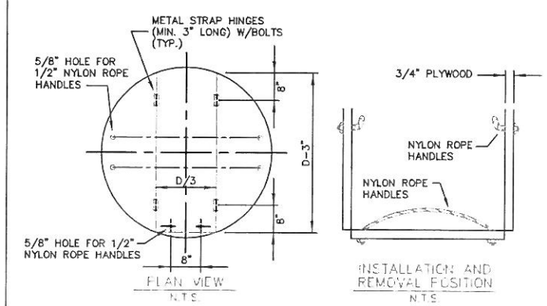
5' DIA. DROP MANHOLE



NOTES FOR VENTED MANHOLE:

1. DI PIPE & FITTINGS TO HAVE A MIN 40 MIL POLYETHYLENE INTERIOR COATING.
2. ALL BOLTS AND NUTS TO BE GALVANIZED STEEL.
3. FINISH COATING;
   A. WIRE BRUSH TO REMOVE ALL DIRT AND CONCRETE AND PROVIDE ANCHOR PROFILE FOR NEW COATINGS.
   B. APPLY ONE COAT OF TNEMAC SERIES 37 PRIMER TO 3 MILS DFT.
   C. APPLY TWO COATS OF TNEMAC SERIES 43-38 ALKYD ALUMINUM TO 2 MILS DFT FOR EACH COAT.
4. VENT PIPES LONGE THAN 6' SHALL BE 6" DI PIPE.
5. FL= FLANGED.

MANHOLE VENTILATION DETAIL



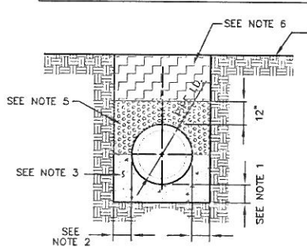
INSTALLATION:
FALSE MANHOLE BOTTOM SHALL BE FURNISHED AND INSTALLED IN ALL MANHOLES CONSTRUCTED IN ADVANCE OF PAVING. THESE FALSE MANHOLE BOTTOMS SHALL BE INSTALLED AFTER ALL WORK IS COMPLETED ON THE WASTEWATER SYSTEM INCLUDING THE AIR TEST, BUT PRIOR TO PAVING OPERATIONS.

REMOVAL:
FALSE MANHOLE BOTTOM SHALL BE REMOVED AFTER THE FINAL APPURTENANCE ADJUSTMENT INSPECTION. MUST BE REMOVED BEFORE CITY FINAL ACCEPTANCE INSPECTION.

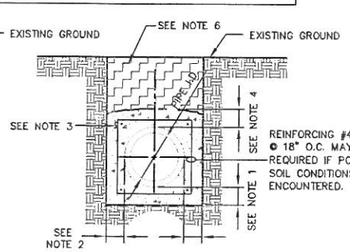
SANITARY SEWER MANHOLE FALSE BOTTOM

CONCRETE CRADLE & CONCRETE ENCASEMENT NOTES:

1. 6" DEPTH REQUIRED.
2. 6" MIN. WIDTH REQUIRED FOR 24" MAINS OR SMALLER.
3. CLASS "B" CONC. (2000 PSI @ 28 DAYS).
4. 6" MIN. DEPTH REQUIRED.
5. CRUSHED STONE (NOTCOG CLASS B EMBEDMENT WITH AGGREGATE 3/4" MAX. DIA.) COMPACTED TO 95% STANDARD PROCTOR DENSITY. CLEAN ROCK IS NOT ALLOWED UNLESS APPROVED BY CITY.
6. THE BACKFILL FOR ALL UTILITY TRENCHES SHALL CONSIST OF ON-SITE SOILS OR SIMILAR MATERIALS. MOST IMPORTANTLY, SANDS OR GRAVELS THAT ARE FREELY DRAINING, WITH LESS THAN 25 PERCENT PASSING THE NO. 200 SIEVE, SHALL NOT BE USED. TRENCH BACKFILL SHOULD BE PLACED AND COMPATED SIMULTANEOUSLY ON BOTH SIDES OF THE UTILITY IN 6" LOOSE LIFTS (MAX.) TO 98% STANDARD PROCTOR DENSITY. THE ON-SITE MATERIAL MUST BE FREE FROM ORGANIC MATERIA, TRASH, AND ROCK & DIRT LUMPS LARGER THAN 4". THE ON-SITE MATERIAL SHALL BE STOCKPILED FOR USE WHEN NEEDED AND BE APPROVED BY THE CITY PRIOR TO BACKFILLING TRENCH. SUBGRADE STABILIZATION UNDER PAVEMENT SHALL BE COMPACTED TO 98% STANDARD PROCTOR DENSITY @ ±2% OPTIMUM MOISTURE TO THE DEPTH IDENTIFIED ON PLANS & IN ACCORDANCE WITH THE CITY SPECIFICATIONS. THE CITY MAY REQUIRE SOILS COMPACTION TESTS EVERY OTHER LIFT AND EVERY 300 FEET. EXPENSE TO BE BORNE BY CONTRACTOR OR UTILITY COMPANY.
7. THERE WILL BE NO ADDITIONAL PAYMENT FOR ANY CONCRETE THAT EXCEEDS THE MIN. DEPTH REQUIRED ON ALL BIDS PER CUBIC YARD.
8. WHEN THE TRENCH OR EXCAVATION EXCEEDS 5 FEET IN DEPTH, THE CONTRACTOR SHALL MEET OR EXCEED O.S.H.A. STANDARDS FOR TRENCH SAFETY.

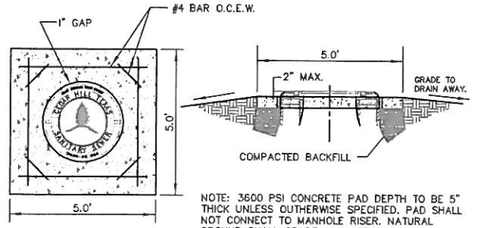


CONC. CRADLE DETAIL



REINFORCING #4 BARS @ 18" O.C. MAY BE REQUIRED IF POOR SOIL CONDITIONS ARE ENCOUNTERED.

CONC. ENCASEMENT DETAIL



NOTE: 3600 PSI CONCRETE PAD DEPTH TO BE 5" THICK UNLESS OUTHERWISE SPECIFIED. PAD SHALL NOT CONNECT TO MANHOLE RISER. NATURAL GROUND SHALL GRADE AWAY FROM CONC. PAD AND BACKFILL SHALL BE COMPACTED UNDER CONC. PAD.

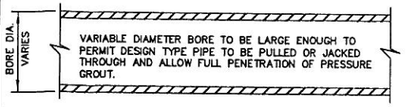
5'x 5' CONCRETE PAD (5" THICK)

(FOR MANHOLES OUTSIDE OF PAVED AREAS)

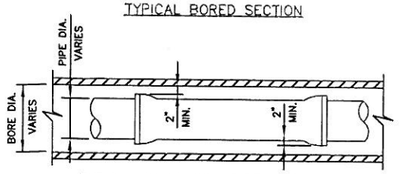
SANITARY SEWER
MANHOLES AND
SPECIAL EMBEDMENT
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-200

SD-200.DWG

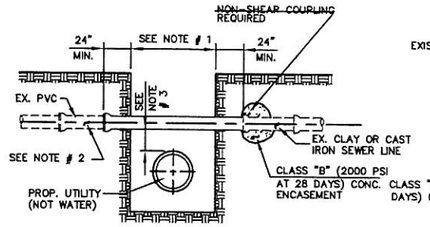


TYPICAL BORED SECTION

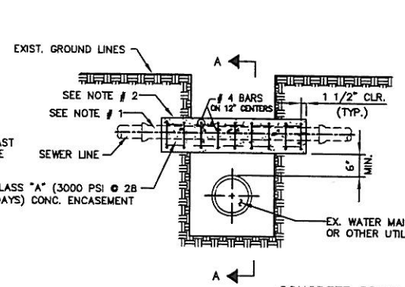


TYPICAL BORE WITH PIPE INSTALLED

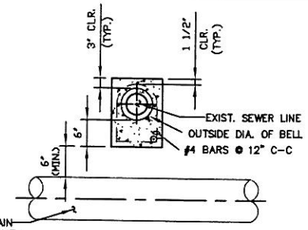
SEWER PIPE DIA.	MIN. CASING PIPE I.D.
4"	8"
6"	12"
8"	14"
10"	16"
12"	18"



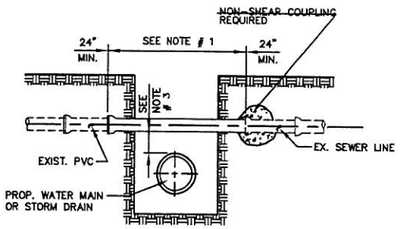
TYPE I REPLACEMENT OF PIPE DETAIL
(PROPOSED UTILITY UNDER EX. SEWER OTHER THAN WATER)



CONCRETE BEAM AROUND PIPE DETAIL



SECTION A-A



TYPE II REPLACEMENT OF PIPE DETAIL
(PROPOSED WATER UNDER EX. SEWER)

TYPE I REPLACEMENT NOTES:

1. WHERE A PROPOSED WATER LINE IS PROPOSED TO BE CONSTRUCTED UNDERNEITH AN EXISTING SANITARY SEWER LINE, THE SANITARY SEWER LINE SHALL BE CONSTRUCTED OF PVC WITH A MINIMUM PRESSURE RATING OF 160 PSI (SDR 26 CLASS 160 OR CITY APPROVED EQUAL) TO 10' PAST THE WATER LINE. ONE LENGTH OF THE SEWER PIPE MUST BE CENTERED ON THE WATER LINE.
2. THE JOINING OF PVC PIPE TO CLAY OR CAST IRON SHALL BE MADE WITH CLASS "B" CONC. (2000 PSI @ 28 DAY) SEE CONCRETE COLLARS DETAIL AND WITH NON-SHEAR COUPLING FOR PIPE CONNECTIONS. THE ENTIRE AREA EXCAVATED TO ACCOMPLISH THE REPLACEMENT SHALL COMPLY WITH REQUIREMENTS SHOWN IN "SEWER LINES EMBEDMENT AND BACKFILL DETAILS".
3. THE MINIMUM VERTICAL CLEARANCE OF SEWER TO WATER LINES SHALL BE TWO (2') FEET.
4. THE EMBEDMENT FOR THE WATER LINE TO THE FLOW LINE OF THE SANITARY SEWER PIPE SHALL BE FLOWABLE BACKFILL TO 10' PAST THE SANITARY SEWER CROSSING.

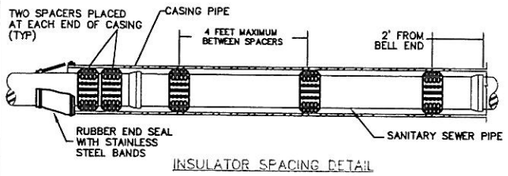
CONCRETE BEAM NOTES:

1. WHERE A PROPOSED SANITARY SEWER IS TO BE CONSTRUCTED OVER AN EXISTING WATER MAIN, THE SANITARY SEWER LINE SHALL BE SUPPORTED BY REINFORCED CONCRETE BEAM AND THE PIPE SHALL BE CONSTRUCTED OF PVC WITH A MINIMUM PRESSURE RATING OF 160 PSI (SDR 26 CLASS 160 OR CITY APPROVED EQUAL) TO 10' PAST THE WATERLINE. ONE LENGTH OF THE SEWER PIPE MUST BE CENTERED OVER THE WATERLINE.
2. THE SANITARY SEWER PIPE (WITH THE EXCEPTION OF SEWER SERVICE LINES) SHALL BE ENCASED BY A REINFORCED CONCRETE SUPPORT BEAM WHICH SHALL BE CONSTRUCTED OF A MINIMUM CLASS "A" (3000 PSI AT 28 DAYS) CONCRETE REINFORCED WITH #4 BARS AT 12" CENTERS TO 10' PAST THE WATERLINE.

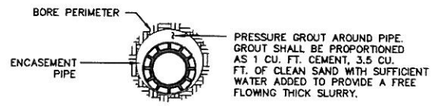
TYPE II REPLACEMENT NOTES:

1. VARIABLE TRENCH WIDTH. PIPE LENGTH SHALL BE MEASURED AS STANDARD TRENCH WIDTH, PLUS FOUR (4') FEET. NO JOINTS WILL BE ALLOWED WITHIN THE DIMENSION. A MINIMUM BEARING OF 24" SHALL BE REQUIRED ON EACH SIDE OF THE TRENCH.
2. SEWER LINES LESS THAN TWELVE (12") INCHES IN DIAMETER SHALL BE REPLACED WITH SDR-35 OR 26 PVC, SUPPORTED AND/OR ENCASED (IF REQUIRED) SEE DETAIL.
3. THE JOINING OF CAST IRON PIPE TO CLAY OR PVC SHALL BE MADE WITH CLASS "B" CONC. (2000 PSI @ 28 DAY) SEE CONCRETE COLLARS DETAIL AND WITH NON-SHEAR COUPLING FOR PIPE CONNECTIONS. THE ENTIRE AREA EXCAVATED TO ACCOMPLISH THE REPLACEMENT SHALL COMPLY WITH REQUIREMENTS SHOWN IN "SEWER LINES EMBEDMENT AND BACKFILL DETAILS".
4. THE MINIMUM VERTICAL CLEARANCE OF SEWER TO WATER LINES SHALL BE TWO (2') FEET.

SANITARY SEWER PIPE TRENCH CROSSING DETAIL



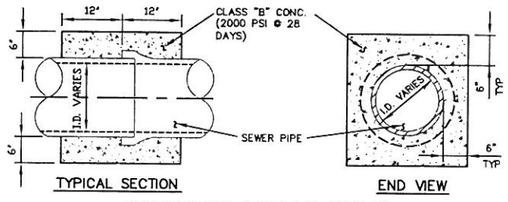
INSULATOR SPACING DETAIL



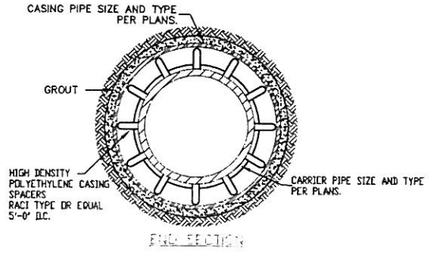
TYPICAL END VIEW

BORE NOTES:
1. JOINTS TO BE WELDED AT 100%.
2. CASING SPACERS SHALL BE PROJECTED TYPE AND SHALL BE RACI TYPE SPACERS OR CITY APPROVED EQUAL.
3. TYPICAL CASING SHALL BE STEEL PIPE, MIN DR-48.

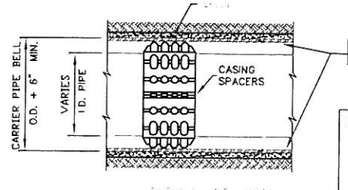
BORED CROSSING DETAILS



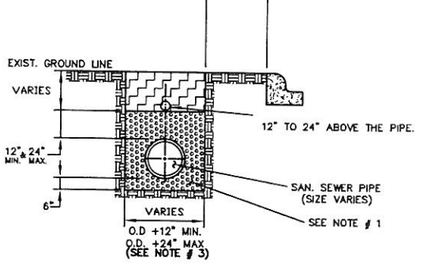
CONCRETE COLLAR DETAIL



END SECTION



NOTES:
1. FURNISH AND INSTALL GROUT IN RATIO OF 1 CU. FT. OF CEMENT TO 3.5 CU. FT. OF CLEAN FIND SAND WITH SUFFICIENT WATER ADDED TO PROVIDE A FREE FLOWING THICK SLURRY.
2. FOR SANITARY SEWER LINES, THE GRADE OF THE CASING PIPE MUST BE HELD ON DESIGN GRADE BY LASER OR OTHER POSITIVE METHODS.



TYPICAL DITCH LINE BEHIND CURB

SEWER LINE EMBEDMENT AND BACKFILL DETAIL
(PAVEMENT REPAIR TO FOLLOW PAVING DETAIL, SEE SHEET SD-105)

SEWER LINE EMBEDMENTS AND BACKFILL NOTES

1. CRUSHED STONE (NCTCOG CLASS B AGGREGATE GRADE # 4 – 3/4" DIA MAX. – NO CLEAN ROCK) COMPACTED TO 90% STANDARD PROCTOR DENSITY FROM 6" BELOW BOTTOM OF PIPE TO 12" ABOVE TOP OF PIPE.
2. THE BACKFILL FOR UTILITY TRENCH SHALL CONSIST OF ON-SITE SOILS OR SIMILAR MATERIALS. MOST IMPORTANTLY, SANDS OR GRAVELS THAT ARE FREELY DRAINING, WITH LESS THAN 25 PERCENT PASSING THE NO. 200 SIEVE, SHALL NOT BE USED. TRENCH BACKFILL SHOULD BE PLACED AND COMPACTED SIMULTANEOUSLY ON BOTH SIDES OF THE UTILITY IN 6" LOOSE LIFTS (MAX.) TO 95% STANDARD PROCTOR DENSITY. THE ON-SITE MATERIAL MUST BE FREE FROM VEGETATION AND ROCK & DIRT LUMPS LARGER THAN 4". THE ON-SITE MATERIAL SHALL BE STOCKPILED FOR USE WHEN NEEDED AND BE APPROVED BY THE CITY PRIOR TO BACKFILLING TRENCH. BACKFILL & SUBGRADE STABILIZATION UNDER PAVEMENT SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY @ ±2% OPTIMUM MOISTURE TO THE DEPTH IDENTIFIED ON PLANS & IN ACCORDANCE WITH THE CITY SPECIFICATIONS. THE CITY MAY REQUIRE SOILS COMPACTION TESTS EVERY OTHER LIFT AND EVERY 300 FEET. EXPENSE TO BE BORNE BY CONTRACTOR OR UTILITY COMPANY.
3. WIDTH OF TRENCH AT TOP OF PIPE SHALL NOT EXCEED O.D. OF PIPE PLUS 24 INCHES (12" EACH SIDE OF PIPE). PIPE SHALL BE CENTERED IN THE TRENCH, NOT LESS THAN 6" OR MORE THAN 18" FROM TRENCH WALL.
4. FLOWABLE BACKFILL MAY BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER WHEN COMPACTION CANNOT BE ACHIEVED FOR BACKFILL.

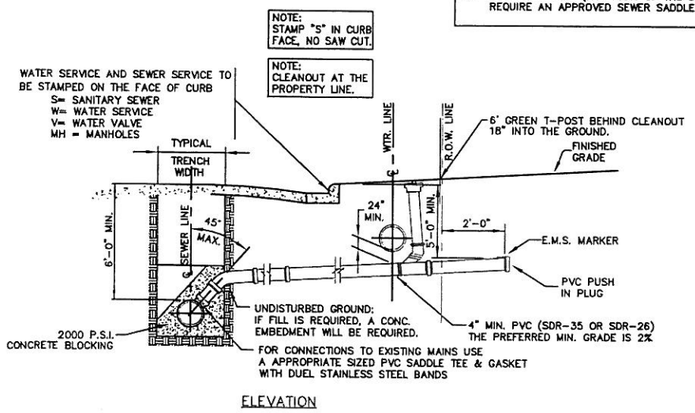
SANITARY SEWER
STREET REPAIR, COLLAR,
BORE & MISC.
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-201

SD-201.DWG

SEWER SERVICE NOTES:

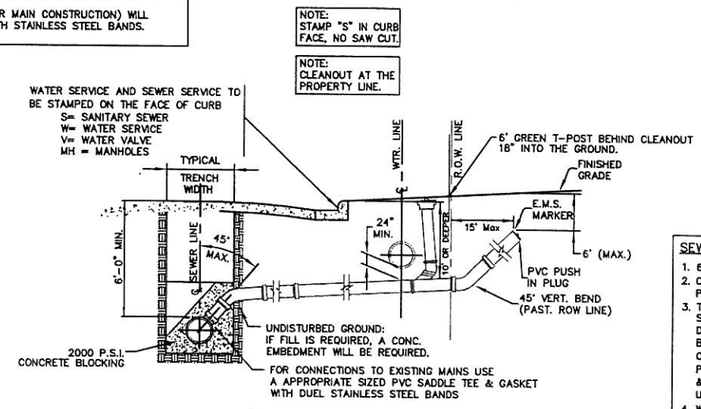
1. THE PRICE BID FOR SEWER SERVICE COMPLETE IN PLACE, SHALL INCLUDE ALL EMBEDMENT AND BACKFILL REQUIRED FOR SEWER MAINS.
2. 45° WYES WILL BE REQUIRED FOR ALL SEWER SERVICE LINES WHEN INSTALLING TO THE MAIN SEWER LINE.
3. ALL SEWER TAPS (NOT PART OF THE SEWER MAIN CONSTRUCTION) WILL REQUIRE AN APPROVED SEWER SADDLE WITH STAINLESS STEEL BANDS.



ELEVATION

TYPE I SEWER SERVICE DETAIL

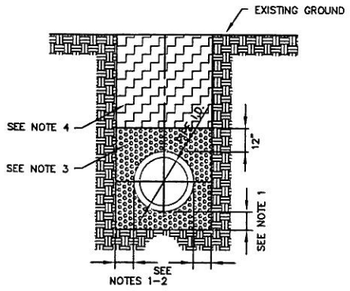
(FOR SEWER SERVICES LESS THAN 10 FEET DEEP)



ELEVATION

TYPE II SEWER SERVICE DETAIL

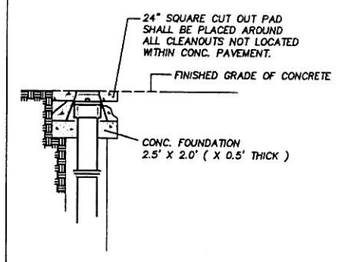
(FOR SEWER SERVICES 10 FEET OR DEEPER)

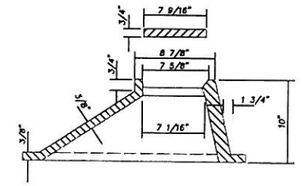


SEWER SERVICE EMBEDMENT NOTES:

1. 6" MIN. ON EACH SIDE OF PIPE WIDTH REQUIRED FOR ALL SEWER SERVICES.
2. CRUSHED STONE (NCTCOG CLASS B AGGREGATE 3/4" MAX. DIA.) COMPACTED TO 95% PROCTOR DENSITY. NO CLEAN ROCK ALLOWED.
3. THE BACKFILL FOR ALL UTILITY TRENCHES SHALL CONSIST OF ON-SITE SOILS OR SIMILAR MATERIALS. MOST IMPORTANTLY, SANDS OR GRAVELS THAT ARE FREELY DRAINING, WITH LESS THAN 25 PERCENT PASSING THE NO. 200 SIEVE, SHALL NOT BE USED. TRENCH BACKFILL SHOULD BE PLACED AND COMPATED SIMULTANEOUSLY ON BOTH SIDES OF THE UTILITY IN 6" LOOSE LIFTS (MAX.) TO 98% STANDARD PROCTOR DENSITY. THE ON-SITE MATERIAL MUST BE FREE FROM VEGETATION AND ROCK & DIRT LUMPS LARGER THAN 4". THE ON-SITE MATERIAL SHALL BE STOCKPILED FOR USE WHEN NEEDED AND BE APPROVED BY THE CITY PRIOR TO BACKFILLING TRENCH.
4. WHEN THE TRENCH OR EXCAVATION EXCEEDS 5 FEET IN DEPTH, THE CONTRACTOR SHALL MEET OR EXCEED O.S.H.A. STANDARDS FOR TRENCH SAFETY.

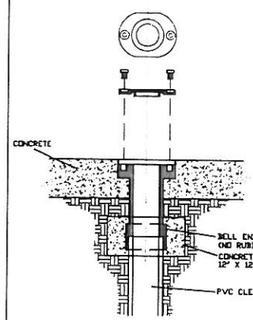
SERVICE EMBEDMENT





SANITARY SEWER CLEANOUT BOOT

Bass & Hass Foundry, Inc. #339 Cleanout Boot (American Made) or Approved Equal



SANITARY SEWER LATERAL CLEANOUT

Bass & Hass Foundry, Inc. #404 Lateral Cleanout Or Approved Equal

NOT TO SCALE

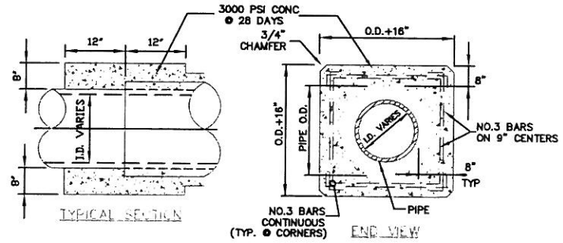
SERVICE CLEAN OUTS

Aerial Crossing Notes :

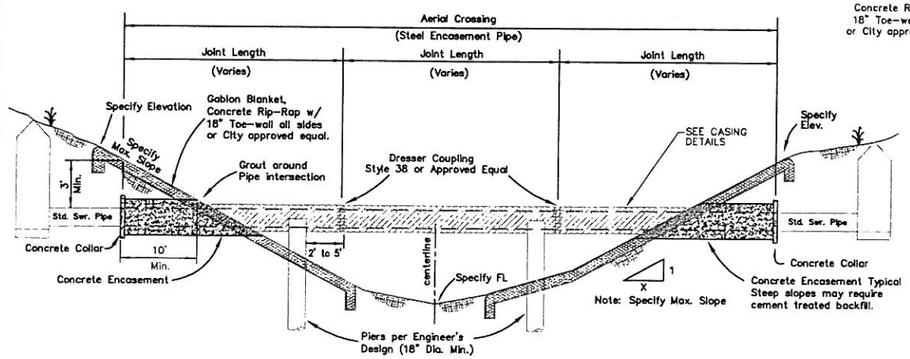
1. The Contractor shall field verify all stations and elevations prior to construction.
2. Steel pipe shall conform with the requirements of AWWA C200 steel water pipe, grade B and shall have a minimum wall thickness of 1/4".
3. Coupling shall be dresser style 38 or approved equal and shall be located as shown.
4. Pipe shall receive an interior shop applied liquid epoxy coating system in conformance with AWWA C210.
5. Pipe shall receive the following exterior coatings:

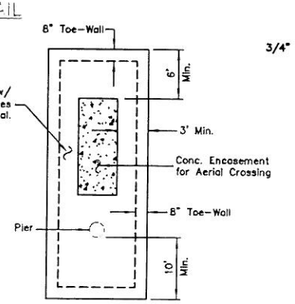
   Tnemec series 66, Mobil 78 series or Koppers 200HB or approved equal at the following schedule:

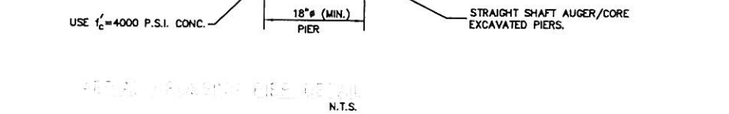
   1st coat 5.0 dry mils each
   2nd & 3rd coat 6.0 dry mils each
6. Concrete for pier construction shall conform to the requirements of ACI 318 latest edition. The concrete shall have a compressive strength (F'c) of 4000 psi at 28 days, with a slump between 2" & 5".
7. All steel reinforcing shall conform to the requirements of ANSI/ASTM a 615 grade 60 and shall be deformed bars. Rebar shall be shop bent and shall conform to the minimums specified in ACI 318.
8. Pipe flanges shall be assembled by pipe manufacturer. All field welds shall be x-rayed for verification.
9. Engineering design shall be submitted for each crossing. Piers shall be placed at maximum span distance as dictated by design. Piers shall not be less than 18" in diameter. Piers shall extend 6' minimum into shale or rock.
10. Lowest span at aerial crossing shall be at least one-foot (1') above the 100-Year water surface elevation (BFE)

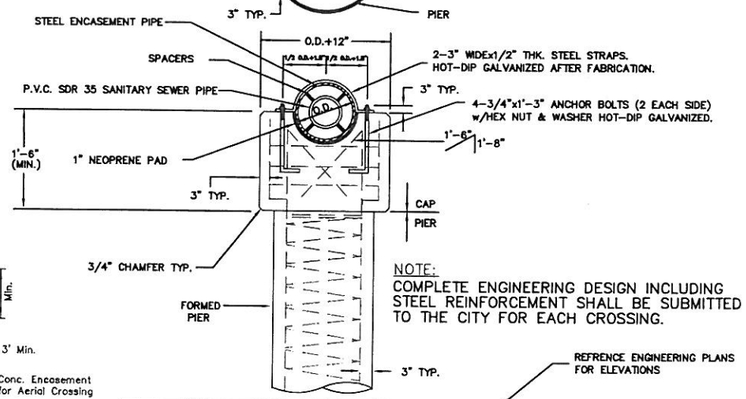


CONCRETE ENCASEMENT DETAIL









NOTE:
COMPLETE ENGINEERING DESIGN INCLUDING STEEL REINFORCEMENT SHALL BE SUBMITTED TO THE CITY FOR EACH CROSSING.

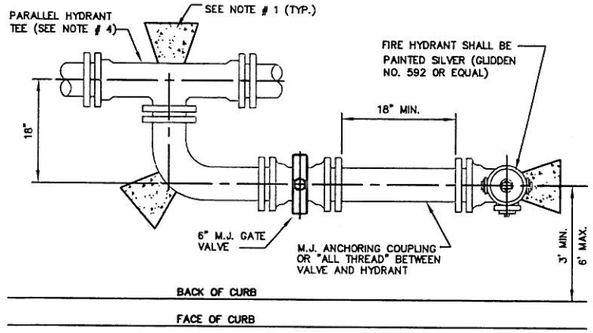
N.T.S.

SANITARY SEWER
SERVICES & AERIAL CROSSING
STANDARD DETAILS

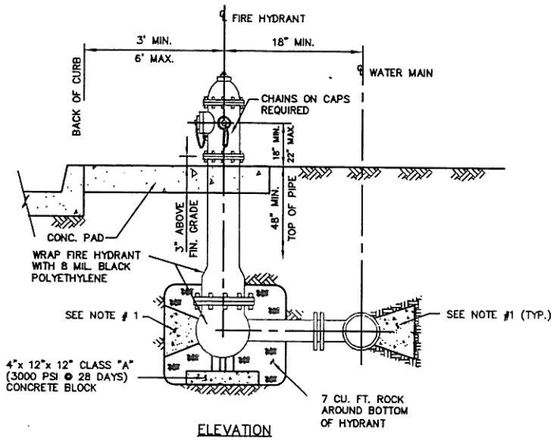
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-202

SD-202.DWG

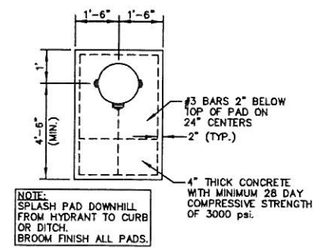


PLAN VIEW

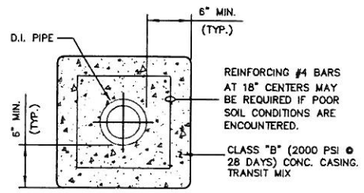


ELEVATION

STANDARD FIRE HYDRANT TEE INSTALLATION

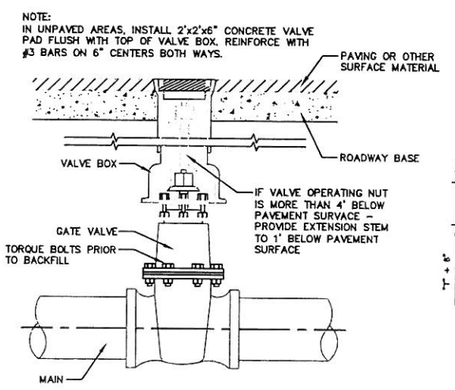


FIRE HYDRANT & CONCRETE SPLASH PAD



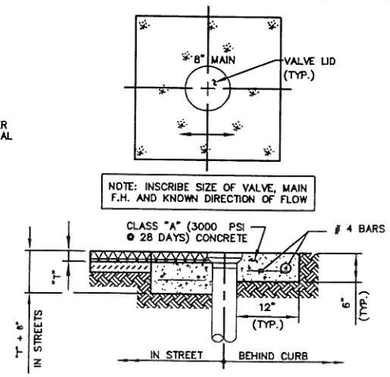
SECTION B-B

COMPACT BACKFILL PER CITY STANDARD



GATE VALVE BOX & EXTENSION STEM

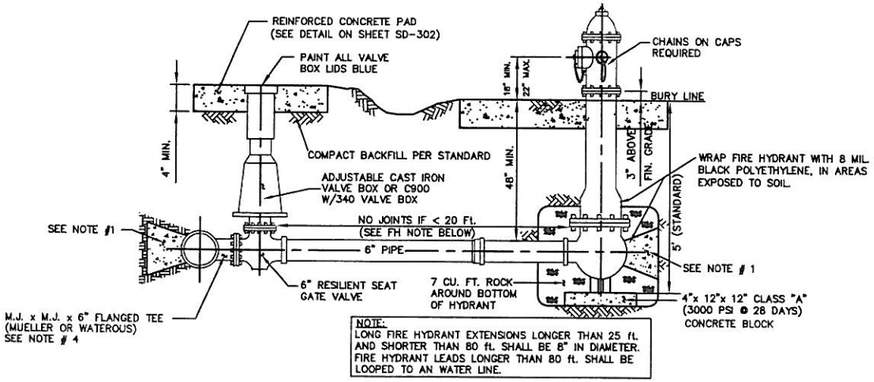
GATE VALVE SIZES 4" TO 12"VALVE BOX



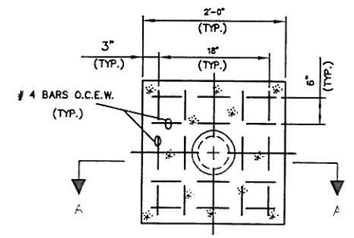
SECTION A-A

TYPICAL DETAIL

REINFORCED CONCRETE PAD AT VALVE BOX



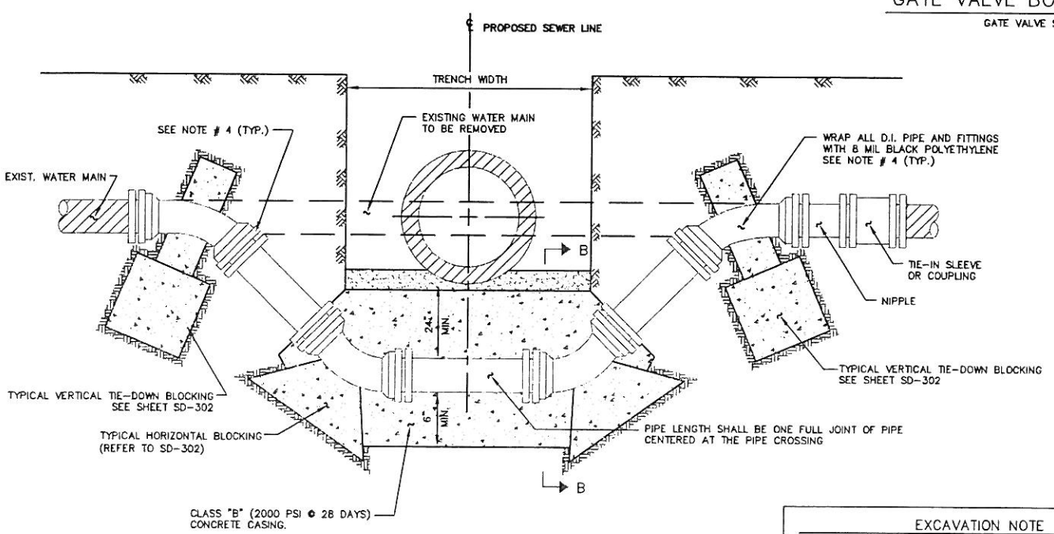
SPECIAL FIRE HYDRANT INSTALLATION



PLAN

NOTES:

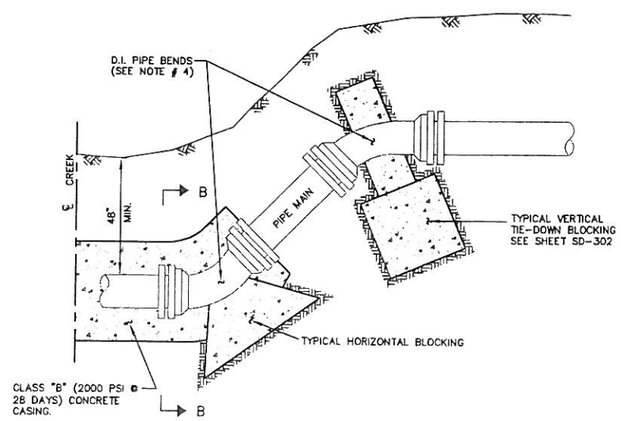
1. CLASS "B" (2000 PSI @ 28 DAYS) CONCRETE QUANTITIES AT EACH LOCATION AS DESIGNATED ON THE DRAWINGS OR AS DETERMINED FROM BLOCKING DETAILS AND TABLES ON SD-302.
2. SEE CITY WATER & SEWER CONSTRUCTION NOTE NO. 6 ON SHEET SD-001 FOR APPROVED FIRE HYDRANT TYPES AND ADDITIONAL SPECIFICATIONS.
3. FIRE HYDRANT SHALL BE PAINTED SILVER (GLIDDEN NO. 592 OR EQUAL).
4. ALL BENDS AND TEES SHALL BE OF THE MECHANICAL JOINT TYPE AND BE RESTRAINED BY THE USE OF MEGA-LUGS. ALL BOLTS, WASHERS AND BOLTS SHALL BE STAINLESS STEEL BELOW GRADE.
5. WHEN THE TRENCH OR EXCAVATION EXCEEDS 4' FEET IN DEPTH, THE CONTRACTOR SHALL MEET OR EXCEED THE O.S.H.A. STANDARDS FOR TRENCH SAFETY PLAN.
6. IF VALVE OPERATING NUT IS MORE THAN 4' BELOW PAVEMENT SURFACE PROVIDE EXTENSION STEM TO 1' BELOW PAVEMENT SURFACE.
7. ALL VALVE STEM EXTENSIONS SHALL HAVE RETAINER CLIPS ATTACHED TO TEE EXTENSION.



WATER MAIN LOWERING

EXCAVATION NOTE

WHEN THE TRENCH OR EXCAVATION EXCEEDS 4 FEET IN DEPTH, THE CONTRACTOR SHALL MEET OR EXCEED THE CITY OF CEDAR HILL STANDARDS FOR TRENCH SAFETY PLAN.

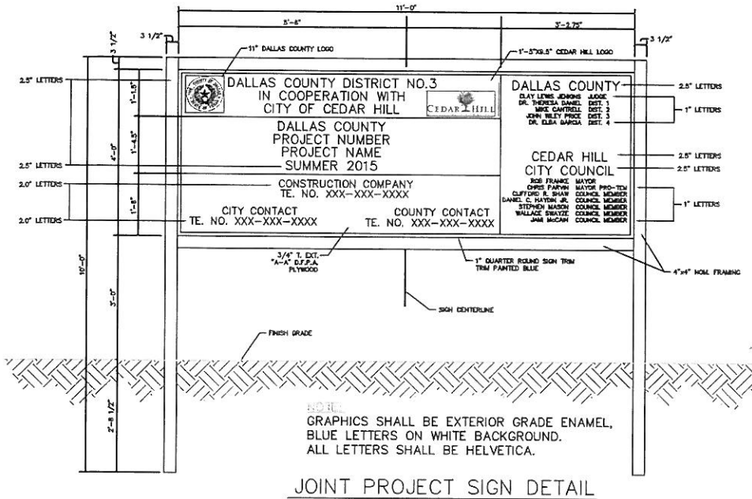


HALF-SECTION TYPICAL CREEK CROSSING

WATER
FIRE HYDRANTS, VALVE BOXES,
CROSSINGS & JOINTS
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

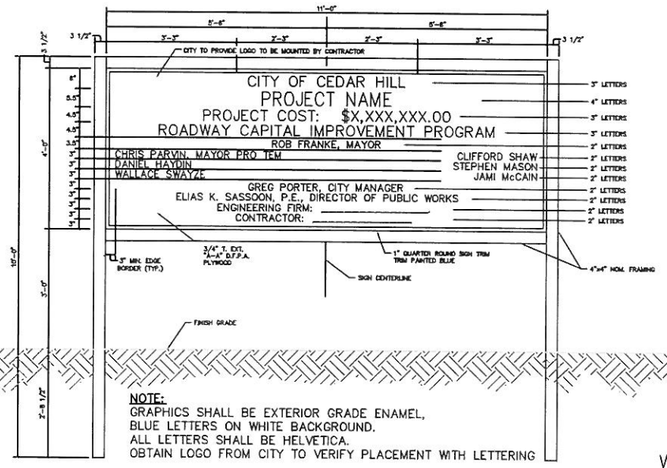
DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-300

SD-300.DWG



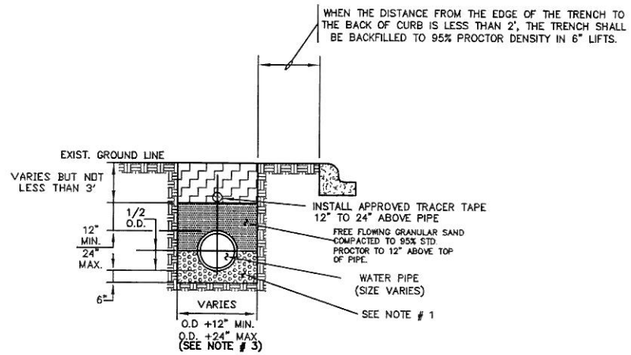
NOTE:
GRAPHICS SHALL BE EXTERIOR GRADE ENAMEL,
BLUE LETTERS ON WHITE BACKGROUND.
ALL LETTERS SHALL BE HELVETICA.

JOINT PROJECT SIGN DETAIL



NOTE:
GRAPHICS SHALL BE EXTERIOR GRADE ENAMEL,
BLUE LETTERS ON WHITE BACKGROUND.
ALL LETTERS SHALL BE HELVETICA.
OBTAIN LOGO FROM CITY TO VERIFY PLACEMENT WITH LETTERING

PROJECT SIGN DETAIL

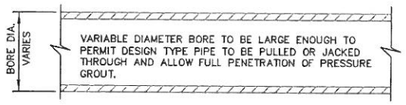


TYPICAL DITCH LINE BEHIND CURB

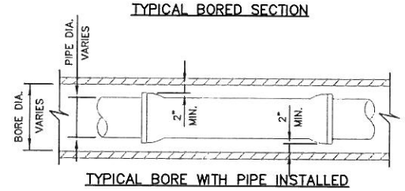
WATER LINE EMBEDMENT AND BACKFILL BEHIND CURB DETAIL

(FOR STREET REPAIR DETAILS, SEE SHEET SD-105)

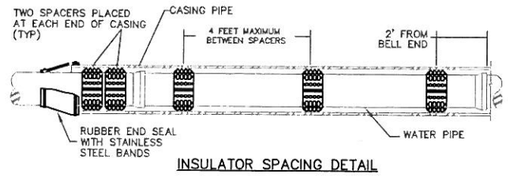
WATER PIPE DIAMETER	CASING PIPE DIA. (MIN)
4"	10"
6"	14"
8"	16"
10"	18"
12"	20"



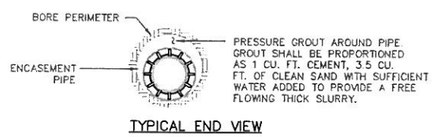
TYPICAL BORED SECTION



TYPICAL BORE WITH PIPE INSTALLED



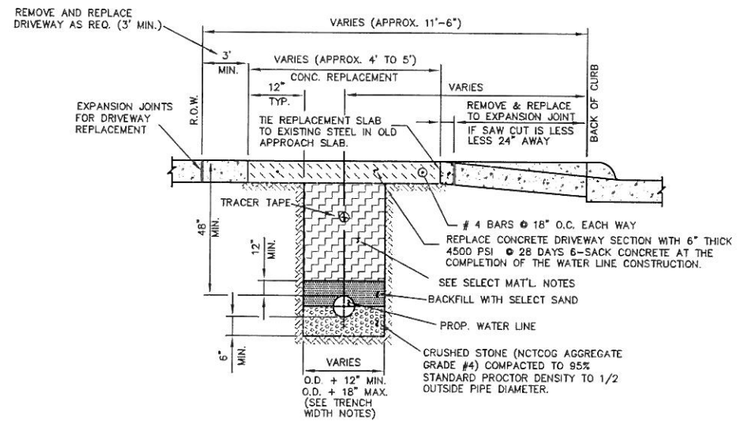
INSULATOR SPACING DETAIL



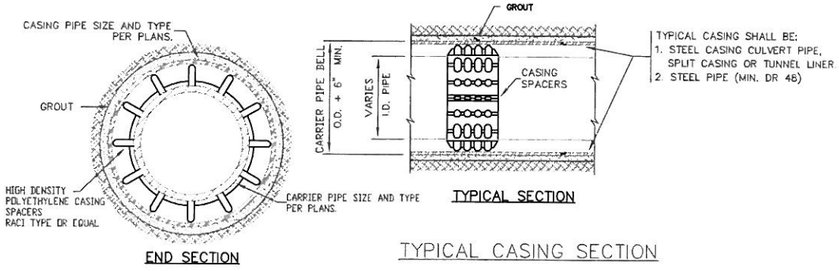
TYPICAL END VIEW

BORE NOTES:
1. JOINTS TO BE WELDED 100%.
2. CASING SPACERS SHALL BE PROJECTION TYPE AND SHALL BE RACI TYPE SPACERS OR CITY APPROVED EQUAL.
3. FURNISH AND INSTALL GROUT IN RATION OF 1 CF CEMENT TO 3.5 CF OF CLEAN FINE SAND. ADD WATER TO PROVIDE FREE FLOWING THICK SLURRY.

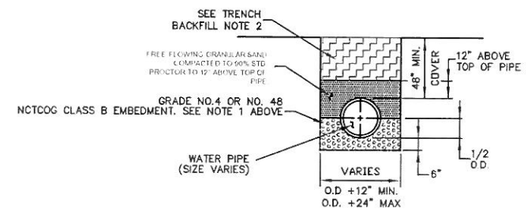
BORED CROSSING DETAILS



WATER LINE UNDER DRIVEWAY APPROACH



TYPICAL CASING SECTION



WATER LINE EMBEDMENT AND BACKFILL DETAIL

(FOR STREET REPAIR DETAILS, SEE SHEET SD-105)

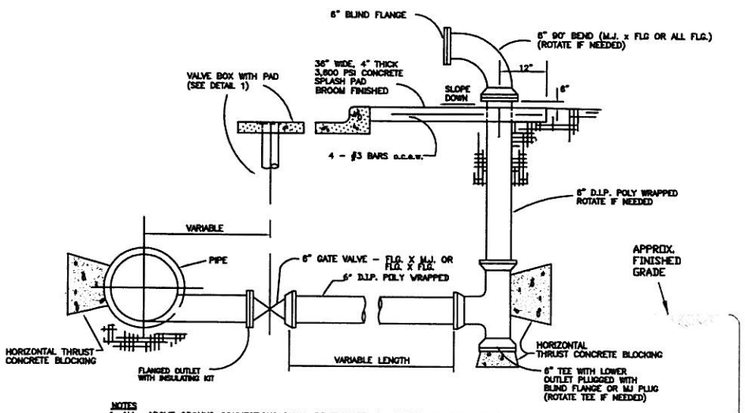
WATER LINE EMBEDMENTS AND BACKFILL DETAIL NOTES

1. CRUSHED STONE (NCTCOG CLASS B AGGREGATE GRADE # 4 OR 48 – 3/4" MAX. DIA.) COMPACTED TO 90% STANDARD PROCTOR DENSITY FROM 6" BELOW BOTTOM OF PIPE TO SPRINGLINE (1/2 OUTSIDE PIPE DIAMETER). NO CLEAN ROCK IS ALLOWED.
2. THE BACKFILL FOR UTILITY TRENCH SHALL CONSIST OF ON-SITE SOILS OR SIMILAR MATERIALS. MOST IMPORTANTLY, SANDS OR GRAVELS THAT ARE FREELY DRAINING, WITH LESS THAN 25 PERCENT PASSING THE NO. 200 SIEVE, SHALL NOT BE USED. TRENCH BACKFILL SHOULD BE PLACED AND COMPACTED SIMULTANEOUSLY ON BOTH SIDES OF THE UTILITY IN 6" LOOSE LIFTS (MAX.) TO 98% STANDARD PROCTOR DENSITY. THE ON-SITE MATERIAL MUST BE FREE FROM VEGETATION AND ROCK & DIRT LUMPS LARGER THAN 4". THE ON-SITE MATERIAL SHALL BE STOCKPILED FOR USE WHEN NEEDED AND BE APPROVED BY THE CITY PRIOR TO BACKFILLING TRENCH. SUBGRADE STABILIZATION UNDER PAVEMENT SHALL BE COMPACTED TO 95 % STANDARD PROCTOR DENSITY @ 2% OPTIMUM MOISTURE TO THE DEPTH IDENTIFIED ON PLANS & IN ACCORDANCE WITH THE CITY SPECIFICATIONS. THE CITY MAY REQUIRE SOILS COMPACTION TESTS EVERY OTHER LIFT AND EVERY 300 FEET. EXPENSE TO BE BORNE BY CONTRACTOR OR UTILITY COMPANY.
3. WIDTH OF TRENCH AT TOP OF PIPE SHALL NOT EXCEED O.D. OF PIPE PLUS 24 INCHES; 12" ON EACH SIDE. PIPE SHALL BE CENTERED IN THE TRENCH; NOT LESS THAN 6" OR MORE THAN 18" FROM TRENCH WALL.

WATER
EMBEDMENT & BACKFILL, CASING AND PROJECT SIGN STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-301

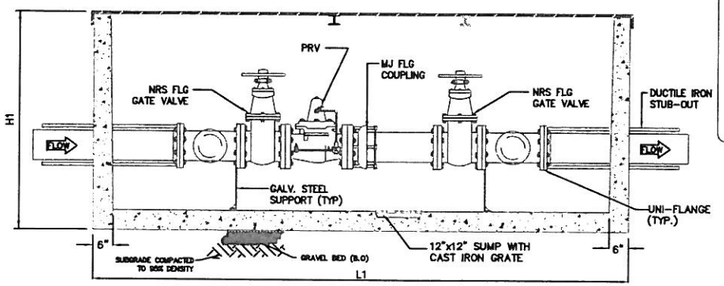
SD-301.DWG



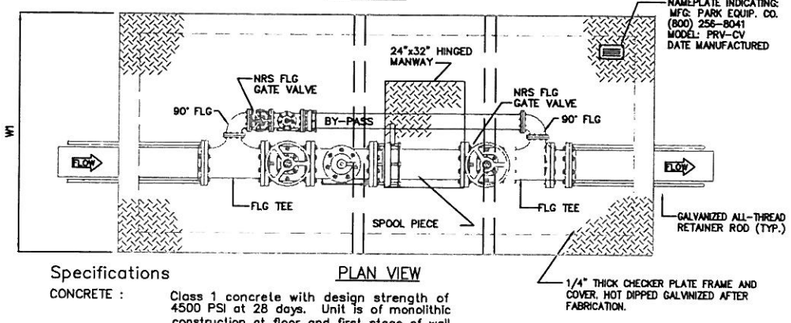
NOTES

1. ALL ABOVE GROUND CONNECTIONS SHALL BE FLANGED, M.J RESTRAINED WITH APPROVED RETAINER GLANDS OR THRUST RESTRAINT DEVICES SHALL BE BELOW GRADE.
2. ALL PIPING TO BE DUCTILE IRON WITH ALL BURIED VALVE, PIPE & FITTINGS TO BE POLY-WRAPPED.
3. BRUSH PAINT ALL ABOVE GROUND EXPOSED FITTINGS AND PIPE WITH TWO COATS OF OF PAINT PER LATEST NCTCOG SPECIFICATIONS FOR PAINT STEEL STRUCTURES. USE SILVER EPOXY PAINT - 12 MILS TOTAL DFT. (NO SPRAYING).

BLOW-OFF VALVE



ELEVATION



PLAN VIEW

Specifications

CONCRETE : Class 1 concrete with design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth. Gross empty weight of approximately 20,000 pounds.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

STEEL COVER: 1/4" steel skid-resistant floor plate welded to 3" angle frame with (2) 3"x2-3/8" I beam supports.

Engineering Data

Field excavation and preparation shall be completed prior to delivery of assembly. Use dimensional data as shown. Pipe, valves and fittings of the assembly are approved by one or more of the following associations:

MODEL	SIZE	BY PASS	L1	W1	H1	WEIGHT LBS
PRV-CH-4-2	4"	2"	8'-8"	5'-0"	4'-0"	14,000
PRV-CH-6-3	6"	3"	8'-8"	5'-0"	4'-0"	16,000
PRV-CH-8-4	8"	4"	9'-0"	6'-0"	4'-0"	18,000
PRV-CH-10-4	10"	4"	11'-0"	6'-0"	4'-3"	20,000

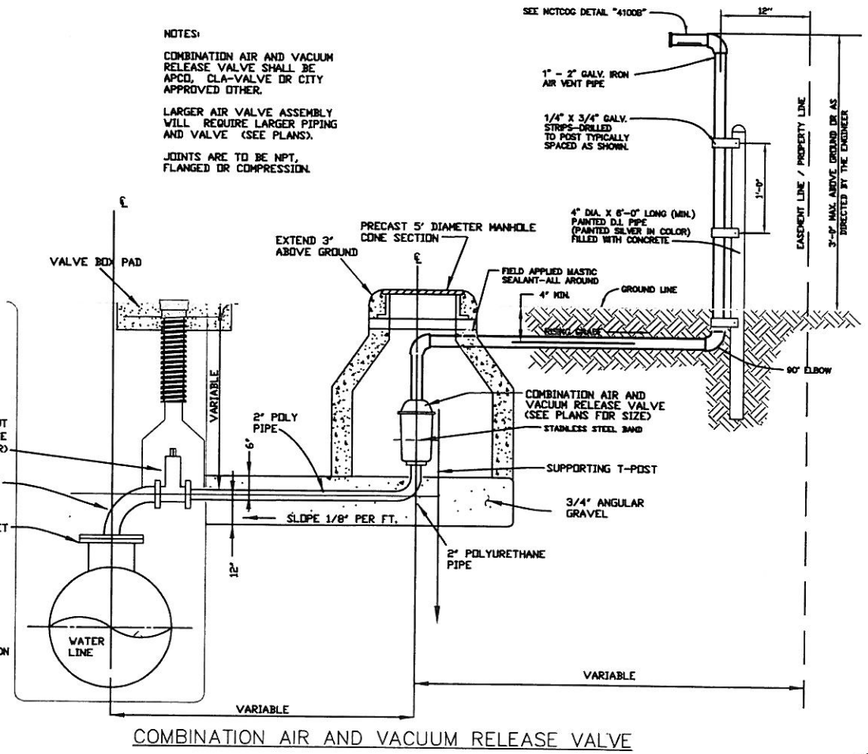
AUTOMATIC CONTROL VALVE ASSEMBLY (PRV)

NOTES:

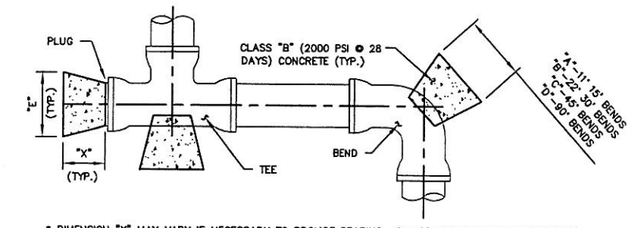
COMBINATION AIR AND VACUUM RELEASE VALVE SHALL BE APCD, CLA-VALVE OR CITY APPROVED OTHER.

LARGER AIR VALVE ASSEMBLY WILL REQUIRE LARGER PIPING AND VALVE (SEE PLANS).

JOINTS ARE TO BE NPT, FLANGED OR COMPRESSION.



COMBINATION AIR AND VACUUM RELEASE VALVE

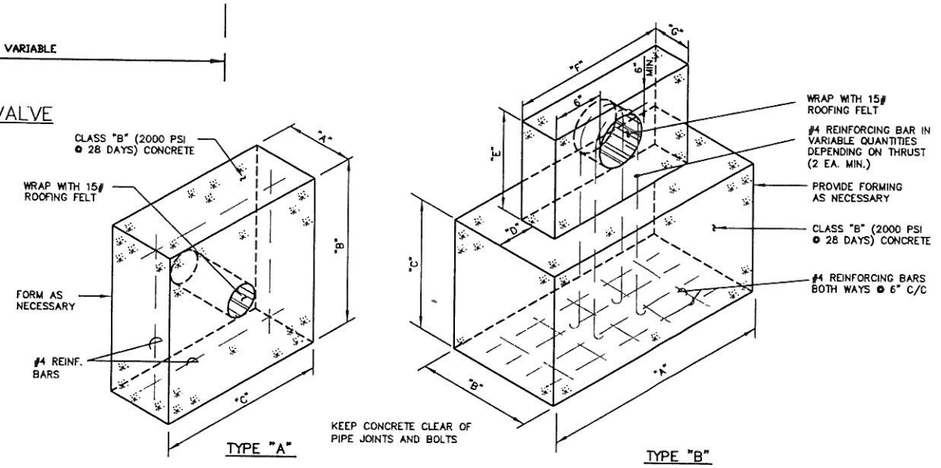


* DIMENSION "X" MAY VARY IF NECESSARY TO PROVIDE BEARING AGAINST UNDISTURBED TRENCH WALL.

PIPE SIZE	X =	11°-15°			22°-30°			45°			90°			TEE & PLUGS		
	DIM. FT.	"A"	MIN. AREA	MIN. VOL.	"B"	MIN. AREA	MIN. VOL.	"C"	MIN. AREA	MIN. VOL.	"D"	MIN. AREA	MIN. VOL.	"D"	MIN. AREA	MIN. VOL.
4"	1.00	1.50	2.25	0.10	1.50	2.25	0.10	1.50	2.25	0.10	1.50	2.25	0.10	1.50	2.25	0.10
6"	1.50	1.50	2.25	0.15	1.50	2.25	0.15	1.50	2.25	0.15	1.75	3.20	0.20	1.50	2.25	0.15
8"	1.50	1.75	3.20	0.20	1.75	3.20	0.20	1.75	3.20	0.20	2.00	4.00	0.25	1.75	3.20	0.20
10"	1.50	2.00	4.00	0.25	2.00	4.00	0.25	2.00	4.00	0.25	2.25	5.10	0.35	2.00	4.00	0.25
12"	1.50	2.25	5.00	0.30	2.25	5.00	0.30	2.25	5.00	0.30	2.80	8.00	0.50	2.40	5.80	0.35
16"	2.00	2.50	6.30	0.45	2.50	8.00	0.45	2.80	8.00	0.60	3.75	14.10	1.00	3.20	10.00	0.75
20"	2.00	2.75	7.80	0.60	2.75	12.50	0.60	3.50	12.50	0.90	4.75	22.60	1.70	4.00	16.00	1.20
24"	2.00	3.10	9.30	0.75	3.20	18.20	0.80	4.30	16.20	1.40	5.75	33.00	2.45	4.80	23.00	1.75
30"	2.50	3.50	12.30	1.10	3.80	27.00	1.30	5.20	27.00	2.50	6.80	46.00	3.40	5.90	35.00	2.60
36"	2.50	3.90	15.40	1.50	4.50	40.00	1.90	6.30	40.00	3.70	7.90	63.00	5.10	7.10	51.00	3.75
42"	3.00	4.30	18.50	2.00	5.25	55.00	3.00	7.40	55.00	5.10	9.00	81.00	7.90	8.30	69.00	5.25
48"	3.00	4.70	21.80	2.50	6.00	72.00	4.00	8.50	72.00	6.70	10.80	116.00	10.40	8.50	90.00	8.25
54"	4.00	5.00	25.00	3.70	6.75	92.00	6.70	9.60	92.00	10.00	13.00	169.00	16.00	10.70	115.00	12.00

NOTES:
1. MINIMUM AREAS SHOWN ARE IN SQUARE FEET.
2. MINIMUM VOLUMES SHOWN ARE IN CUBIC YARDS. IF IN THE OPINION OF THE CITY, THE UNDISTURBED TRENCH WALL DOES NOT EXHIBIT ADEQUATE SOIL BEARING CHARACTERISTICS, THE VOLUME OF CONCRETE SHOWN IN THE TABLE SHALL BE INCREASED. THE ADJUSTED QUANTITIES MUST BE APPROVED BY THE CITY ENGINEER. ON CITY CONTRACTS PROJECTS, THERE SHALL BE NO ADDITIONAL COMPENSATION FOR THESE LARGER THRUST BLOCKS
3. VERTICAL DIMENSION OF ALL BLOCK BEARING AREAS SHALL BE IDENTICAL TO THE HORIZONTAL DIMENSIONS SHOWN.
4. THE THRUST BLOCKING SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF INSTALLING THE PIPE.

HORIZONTAL BLOCKING DETAIL



VERTICAL TIE-DOWN BLOCK DETAIL

PIPE NOMINAL DIA. (IN.)	BENDS		90°	45°	22 1/2°	11 1/4°
6	Vol. Req'd.	C.F.	39.99	21.64	11.03	5.54
	A	Ft.	2.50	1.42	1.00	0.75
	B	Ft.	4.00	3.88	3.36	2.75
	C	Ft.	4.00	3.88	3.36	2.75
8	Vol. Req'd.	C.F.	71.09	38.47	19.61	9.85
	A	Ft.	2.83	1.67	1.50	1.00
	B	Ft.	5.00	4.80	3.66	3.20
	C	Ft.	5.00	4.80	3.66	3.20
10	Vol. Req'd.	C.F.	111.07	60.11	30.65	15.40
	A	Ft.	3.25	1.92	1.75	1.50
	B	Ft.	5.90	5.60	4.25	3.25
	C	Ft.	5.90	5.60	4.25	3.25
12	Vol. Req'd.	C.F.	159.94	86.56	44.13	22.17
	A	Ft.	4.17	2.42	1.42	1.25
	B	Ft.	6.20	6.00	5.54	4.20
	C	Ft.	6.20	6.00	5.54	4.20

*VOLUME CALCULATED ON THE BASIS OF CONCRETE REACTING THRUST ON THE RESPECTIVE BENDS UNDER AN INTERNAL PRESSURE OF 150 PSIG AT THE RATE OF 150 LB. WT. PER CU. FT. OF CONCRETE.

NOTES:
1. THE VERTICAL TIE-DOWN BLOCKING SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF INSTALLING THE PIPE.
2. DIMENSIONS "E","F" AND "G", REINFORCING BAR PATTERN AND VOLUME OF CONCRETE WILL BE SPECIFIED ON PLANS OR AS DIRECTED BY THE ENGINEER ON PIPES LARGER THAN 12 INCHES. ON PIPES 12" AND SMALLER, DIMENSION "E" AND "F" SHALL BE O.D. + 12", AND "G" SHALL BE A MINIMUM OF 6".

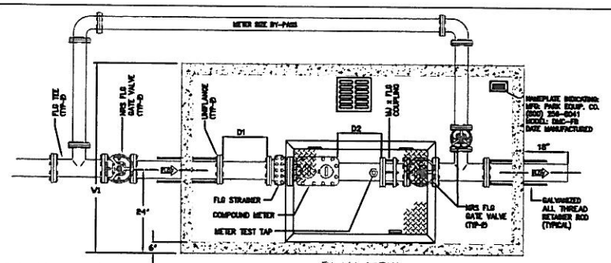
WATER

SPECIAL VALVES AND CONCRETE BLOCKING STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-302

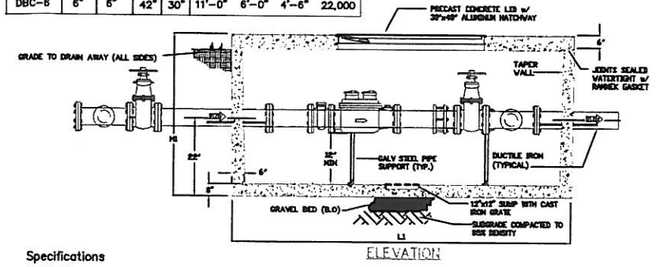
SD-302.DWG



PLAN VIEW

MASTER METER DUEL BODY COMPOUND (DBC) METERS

MODEL	SIZE	BY PASS	DIMENSIONS D1	D2	L1	W1	H1	WEIGHT LBS
DBC-3	3"	3"	21"	15"	8'-8"	4'-8"	4'-6"	14,000
DBC-4	4"	4"	28"	20"	8'-8"	4'-8"	4'-6"	14,000
DBC-6	6"	6"	42"	30"	11'-0"	6'-0"	4'-6"	22,000



ELEVATION

Specifications

CONCRETE : Class 1 concrete with design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

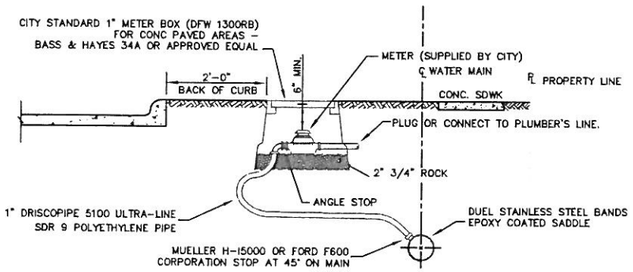
HATCHWAY: Hinged 1/4" Aluminum diamond plate cover, with 1/4" extruded aluminum frame. Hatch to be furnished with Stainless Steel Hardware.

Engineering Data

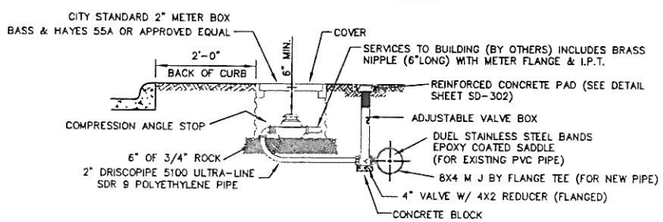
The meter assembly shall be factory assembled in vault & hydrostatically tested prior to delivery. Field excavation & preparation shall be complete prior to delivery. Pipe, valves and fittings of the assembly shall be approved by one or more of the following associations:

AWWA UL IAPMO FM

3" THRU 6" DOMESTIC COMPOUND WATER METER ASSEMBLY

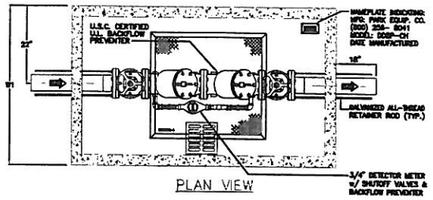


TAP FOR 1" SERVICES



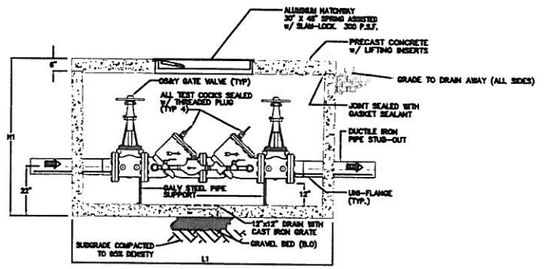
2" SERVICE CONNECTION

NOTES FOR 1" TO 2" SERVICE:
1. WATER SERVICE LINES SHALL CONSIST OF ONE (1) CONTINUOUS SEGMENT OF PIPE
2. NO JOINTS OR CONNECTIONS ARE ALLOWED BETWEEN THE TAP AND METER.
3. TAPS TO MAINS SHALL BE NO LESS THAN 5 FEET APART FROM ANOTHER TAP.
4. EACH PARCEL OF PROPERTY SHALL HAVE AT LEAST ONE DEDICATED SERVICE AND TAP. (NO BULLHEAD CONNECTIONS)
5. IRRIGATION AND DOMESTIC LINES TO A SINGLE PARCEL CAN HAVE AT LEAST ONE SERVICE AND TAP TO THE WATER MAIN. EACH TAP AND METER SHALL BE ADEQUATLEY SIZED BY A LICENSED IRRIGATOR, ARCHITECT OR ENGINEER.



PLAN VIEW

MODEL	SIZE	L1	W1	H1	ALUMINUM HATCHWAY	WEIGHT LBS
709DCDA	3"	6'-0"	3'-6"	4'-6"	30"x36"	6,000
806YD	4"	7'-10"	4'-4"	6'-0"	30"x48"	9,000
	6"	7'-10"	4'-4"	6'-0"	30"x48"	9,000
	8"	8'-8"	5'-0"	6'-0"	30"x48"	15,000
	10"	9'-2"	5'-8"	6'-6"	30"x48"	18,000



ELEVATION

Specifications

CONCRETE : Class 1 concrete with design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

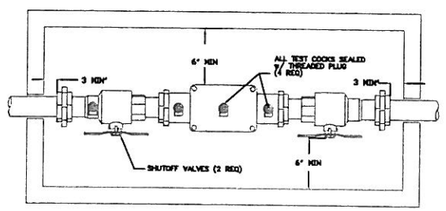
HATCHWAY: 1/4" Aluminum diamond plate cover with extruded aluminum frame. Hatch to be furnished with 316 stainless steel snap lock & brass hinges.

Engineering Data

The backflow assembly shall be factory assembled in vault & hydrostatically tested prior to delivery. Field excavation & preparation shall be complete prior to delivery. Pipe, valves and fittings of the assembly shall be approved by one or more of the following associations:

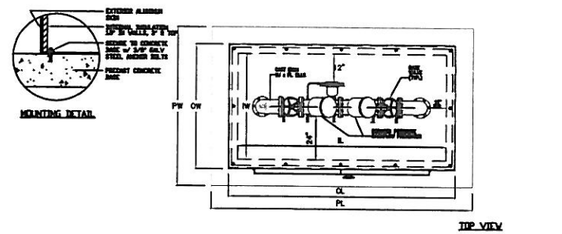
AWWA UL IAPMO FM

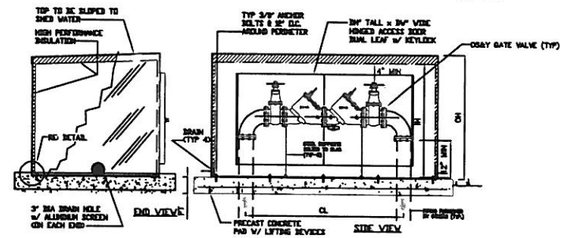
3" THRU 10" DOUBLE DETECTOR BACKFLOW PREVENTER ASSEMBLY FOR FIRE SERVICE



PLAN VIEW

BACKFLOW NOTES:
1. ALL BACKFLOW DEVICES SHALL BE INSTALLED PER CITY ORDINANCE SECTION 18:233.
2. ALL COMMERCIAL AND INDUSTRIAL DOMESTIC POTABLE WATER CONNECTIONS SHALL INSTALL BOTH THE METER AND BACKFLOW PREVENTER ASSEMBLIES. THE BACKFLOW ASSEMBLY SHALL BE LOCATED IMMEDIATELY DOWNSTREAM OF THE METER AND ON PRIVATE PROPERTY AND MAINTAINED BY PROPERTY OWNER.
3. ADEQUATE SPACE MUST BE ALLOWED FOR TESTING AND MAINTENANCE.
4. AREA AROUND ASSEMBLY MUST DRAIN WELL AND AWAY FROM BOX.
5. VAULT INSTALLATIONS REQUIRE THE USE OF BRASS PIPE PLUGS IN ALL TEST COCKS.
6. THOROUGHLY FLUSH THE LINES PRIOR TO INSTALLATION OF THE ASSEMBLY.
7. INSTALL STRAINERS AS REQUIRED BY STATE LAW.
8. USE CITY STANDARD METER BOX DO NOT PRE-DRILL LID/COVER.





Specifications

GENERAL
The Model ERP aluminum enclosure is pre engineered to provide protection to backflow preventers, motors, pumps, and other devices installed above ground. These water conveying devices are subject to freezing and vandalism. The enclosure is designed to be installed over the equipment after installation. The enclosure is equipped with access doors to provide adequate access to the equipment.

CONSTRUCTION
The enclosure shall be manufactured from all new materials. The exterior shall be fabricated with 0.080 aluminum, continuously welded. The access door(s) shall be of the material and hinged with a continuous hinge. The door shall be equipped with a 3-point locking mechanism. The interior of the enclosure shall be structurally lined with high performance, non-shrinking insulation.

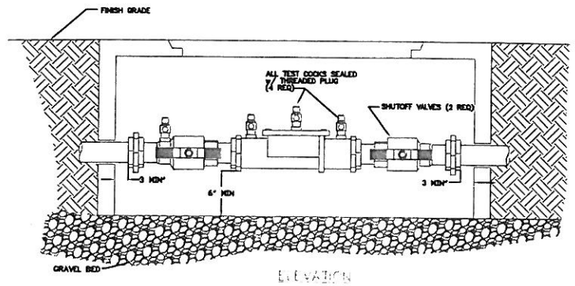
HEATER
Interior heaters (if required) shall be thermostatically controlled and be mounted to the interior wall of the enclosure. A GFI receptacle shall be provided by others to provide power to the electric heater.

WATTS MODEL 909RPDA
FEBCO MODEL 826YD

MODEL	SIZE	A	B OSAY	C	D	NET WT (LBS)
RPBP25	≤2"	41r	15f	5r	28w	200
RPBP3	3	42r	18i	5r	28w	300
RPBP4	4	55w	23e	6	37	500
RPBP6	6	65i	32i	5i[W]	44i	800
RPBP8	8	78e	39r	6i	55r	1500
RPBP10	10	93p	48	8	67y	2300

AWWA UL IAPMO FM

WEATHERPROOF ENCLOSURE REDUCED PRESSURE BACKFLOW



ELEVATION

Specifications

CONCRETE : Class 1 concrete with design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

STEEL COVER: 1/4" skid-resistant floor plate welded to 3" angle frame with (2) 3"x2-3/8" I-beam supports.

Engineering Data

The backflow assembly shall be factory assembled in vault & hydrostatically tested prior to delivery. Field excavation & preparation shall be complete prior to delivery. Pipe, valves and fittings of the assembly shall be approved by one or more of the following associations:

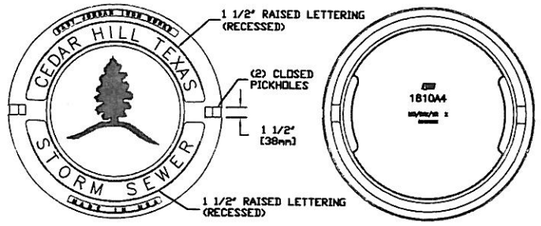
AWWA UL IAPMO FM

1" THRU 2" DOUBLE CHECK BACKFLOW PREVENTER ASSEMBLY

WATER
METERS, BACKFLOW PREVENTION
SERVICES AND VAULTS
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
RGW			FEB 2015	NOT TO SCALE	RGW	SD-303

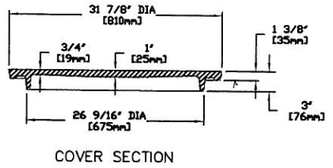
SD-303.DWG



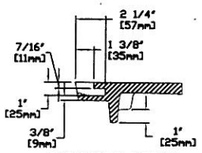
TOP VIEW

BOTTOM VIEW

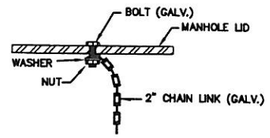
MANHOLE RING & COVER SHALL BE EAST JORDAN IRON WORKS, Inc. MODEL No. NCR05-695A, DEETER FOUNDRY MODEL NO. 1262 (LOGO) OR CITY APPROVED EQUAL. COVER MUST HAVE THE CITY OF CEDAR HILL LOGO.



COVER SECTION



PICKHOLE DETAIL

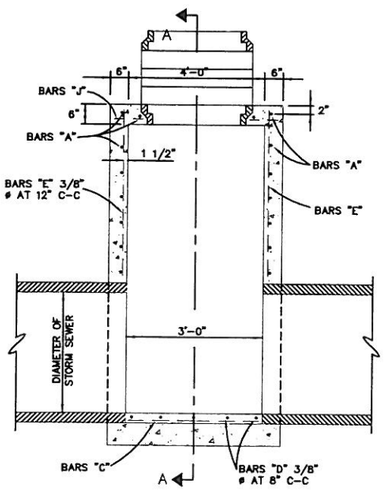


THE MANHOLE COVER SHALL BE SECURED TO THE INSIDE WALL OF THE MANHOLE AND THE COVER WITH A 2" LINK GALVANIZED CHAIN, BOLT, WASHER AND NUT. THE CHAIN SHOULD BE LONG ENOUGH TO REMOVE COVER AND PROVIDE EASY ACCESS INTO THE MANHOLE.

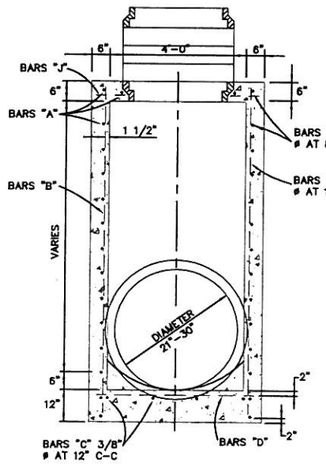
GENERAL NOTES:

1. ALL STRUCTURAL CONCRETE SHALL BE 3600 P.S.I. @ 28 DAYS.
2. DIMENSIONS RELATIVE TO REINFORCING STEEL ARE TO THE CENTER LINE OF BARS.
3. WHEN THE TRENCH OR EXCAVATION EXCEEDS 4' DEPTH, THE CONTRACTOR SHALL MEET OR EXCEED O.S.H.A STANDARDS FOR TRENCH SAFETY.
4. MANHOLE BOTTOMS SHALL BE SHAPED TO MEET INVERTS OF PIPES.
5. THE BACKFILL AROUND THE MANHOLE SHALL BE CITY APPROVED ON-SITE MATERIAL LAID IN 6" LIFTS AND MECHANICALLY TAMPED.

MANHOLE FRAME AND COVER



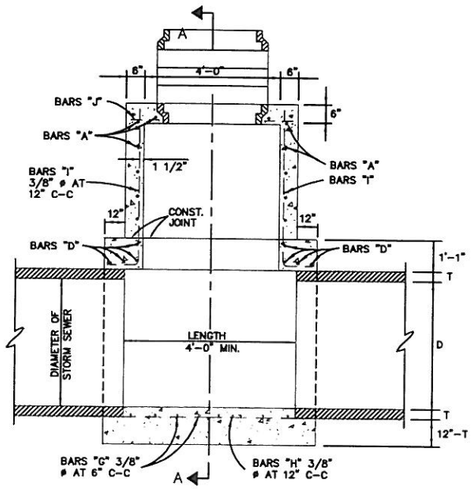
ELEVATION



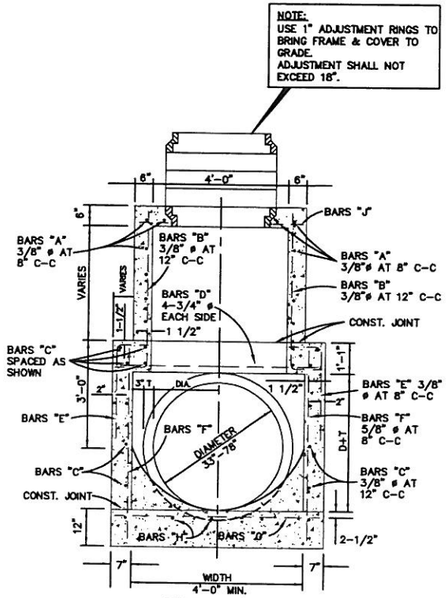
SECTION A-A

TYPE A STORM SEWER MANHOLE

N.T.S.



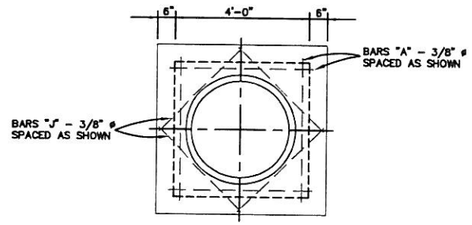
ELEVATION



SECTION A-A

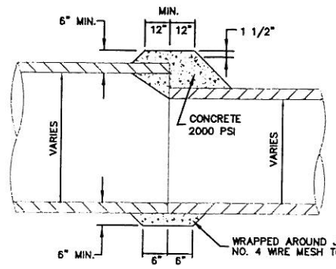
TYPE B STORM SEWER MANHOLE

N.T.S.



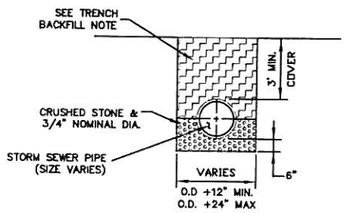
TOP PLAN

TYPE A & B STORM SEWER MANHOLE



DETAIL OF CONCRETE COLLAR FOR PIPE CONNECTIONS

NOTE:
BASS & HAYES PLASTIC COATED STEEL, NEOPRENE COATED STEEL STEPS OR EQUAL SHALL BE PLACED SECURELY INTO MANHOLE WALLS ON 15" CENTERS VERTICALLY AND STAGGEREDON 12" CENTERS HORIZONTALLY.



TYPICAL STORM SEWER EMBEDMENT & BACKFILL

TRENCH BACKFILL NOTES

ALL UTILITY TRENCH BACKFILL SHALL CONSIST OF ON-SITE SOILS OR SIMILAR MATERIALS. MOST IMPORTANTLY, SANDS OR GRAVELS THAT ARE FREELY DRAINING, WITH LESS THAN 25 PERCENT PASSING THE NO. 200 SIEVE, SHALL NOT BE USED. TRENCH BACKFILL SHOULD BE PLACED AND COMPATED SIMULTANEOUSLY ON BOTH SIDES OF THE UTILITY IN 6" LOOSE LIFTS (MAX.) TO 98% STANDARD PROCTOR DENSITY. THE ON-SITE MATERIAL MUST BE FREE FROM VEGETATION AND ROCK & DIRT LUMPS LARGER THAN 4". THE ON-SITE MATERIAL SHALL BE STOCKPILED FOR USE WHEN NEEDED AND BE APPROVED BY THE CITY PRIOR TO BACKFILLING TRENCH. SUBGRADE STABILIZATION UNDER PAVEMENT SHALL BE COMPACTED TO 98 % STANDARD PROCTOR DENSITY @ 2% OPTIMUM MOISTURE TO THE DEPTH IDENTIFIED ON PLANS & IN ACCORDANCE WITH THE CITY SPECIFICATIONS. THE CITY MAY REQUIRE SOILS COMPACTION TESTS EVERY LIFT AND EVERY 300 FEET. EXPENSE TO BE BORNE BY CONTRACTOR OR UTILITY COMPANY.

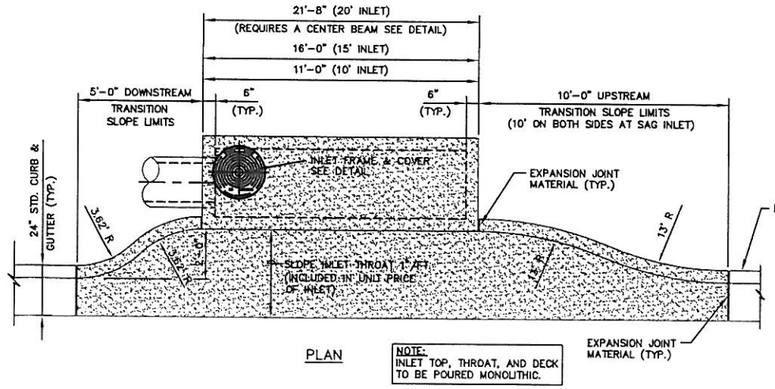
STORM DRAIN

STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

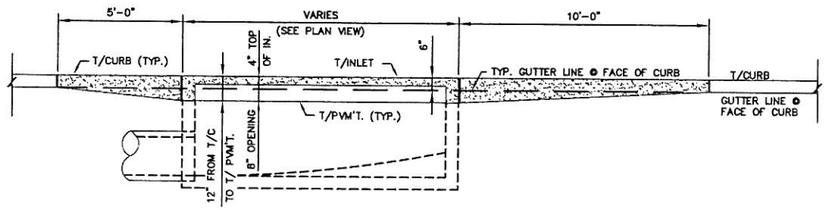
DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-400

SD-400.DWG

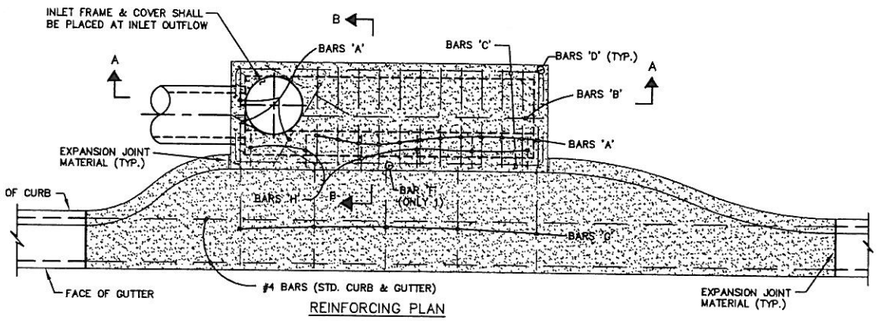


PLAN

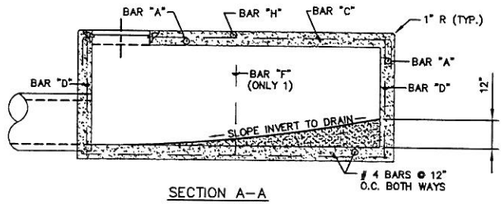
NOTE:
INLET TOP, THROAT, AND DECK TO BE POURED MONOLITHIC.



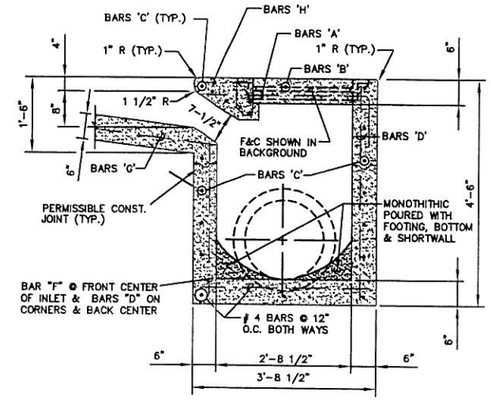
ELEVATION



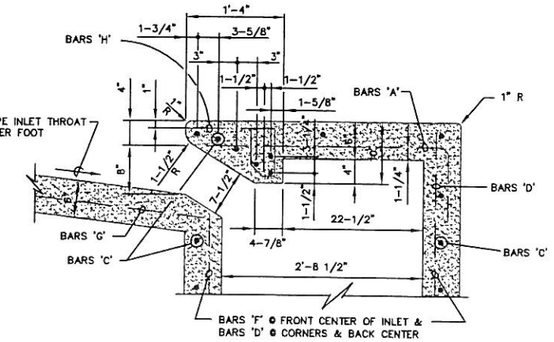
REINFORCING PLAN



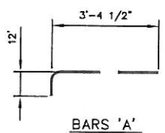
SECTION A–A



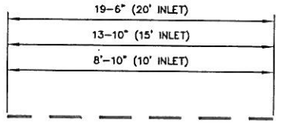
SECTION B–B



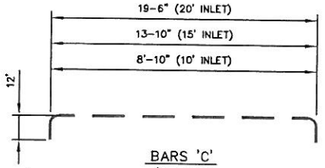
ENLARGE UPPER AREA OF SECTION B–B



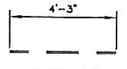
BARS 'A'
(#3 BARS)



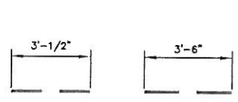
BARS 'B'
(#3 BARS)



BARS 'C'
(#4 BARS)



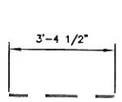
BARS 'D'
(#4 BARS)



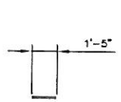
BARS 'G'
(#3 BARS)

BAR 'F'
(#4 BARS)

BARS 'G'
(#3 BARS)



BARS 'J'
(#4 BARS)

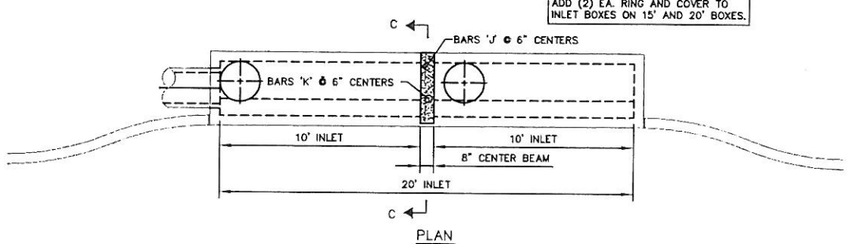


BARS 'K'
(#4 BARS)

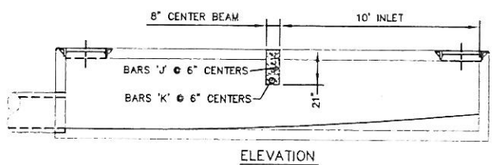
RECESS CURB INLET DETAIL

INLET GENERAL NOTES:
1. RESIDENTIAL INLETS OR NON-RECESSED CURB INLETS SHALL BE BUILT PER NCTCOG DETAIL 6020A-C, WITH THE SAME LIDS AND FRAMES AS DESCRIBED ON THIS SHEET.
2. INLET TOP, THROAT, AND DECK TO BE POURED MONOLITHIC.
3. THE FRAME AND COVER SHALL BE BASS & HAYES 24" OR CITY APPROVED EQUAL.
4. THE BACKFILL SHALL BE ON-SITE SOILS OR SIMILAR MATERIAL & SHALL BE FREE FROM VEGETATION AND ROCKS LARGER THAN 4" IN DIAMETER.
5. PIPE MAY BE PLACED IN ANY WALL; HOWEVER, IT SHALL NOT ENTER ANY CORNER.
6. WOOD AND STEEL FORMS SHALL BE USED FOR CONSTRUCTION.
7. THE CONCRETE USED FOR ALL CURB INLET CONSTRUCTION SHALL HAVE A MINIMUM OF FIVE (5) SACKS OF CEMENT PER CUBIC YARD OF CONCRETE AND A 3600 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS.
8. CONTRACTOR SHALL PROVIDE A 4 ft – 3/8" GALV. STEEL CHAIN ATTACHED TO ROOF OF INLET DECK BY 3/8" STEEL CONCRETE FASTENER.

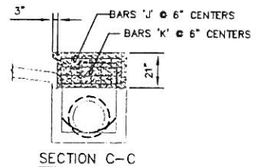
NOTE:
ADD (2) EA. RING AND COVER TO INLET BOXES ON 15' AND 20' BOXES.



PLAN

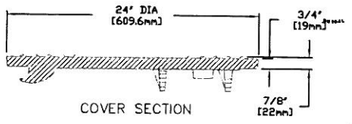


ELEVATION

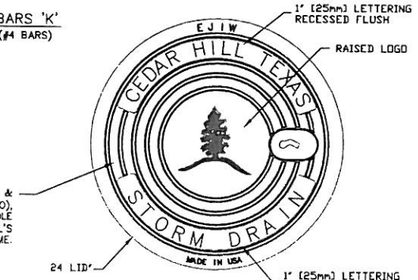


SECTION C–C

CENTER BEAM DETAIL FOR 20' INLET

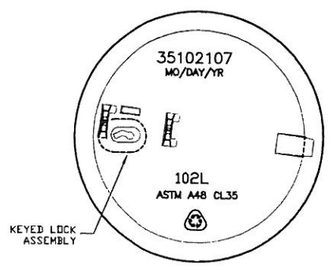


COVER SECTION



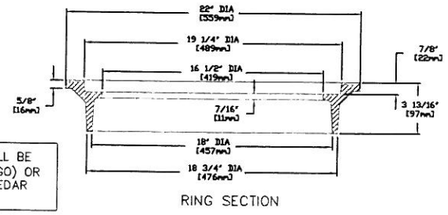
MANHOLE RING & COVER SHALL BE BASS & HAYS FOUNDARY MODEL NO. 226 L (LOGO), OR CITY APPROVED EQUAL. ALL MANHOLE RIMS SHALL HAVE THE CITY OF CEDAR HILL'S LOGO & NAME.

TOP VIEW



BOTTOM VIEW

MANHOLE FRAME & COVER SHALL BE BASS & HAYES MODEL 24" (LOGO) OR CITY APPROVED EQUAL. THE CEDAR HILL LOGO MUST BE ON LID.



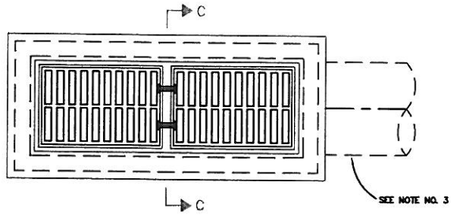
RING SECTION

INLET FRAME AND COVER

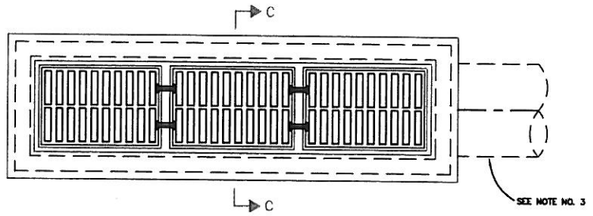
STORM DRAIN
INLETS
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-401

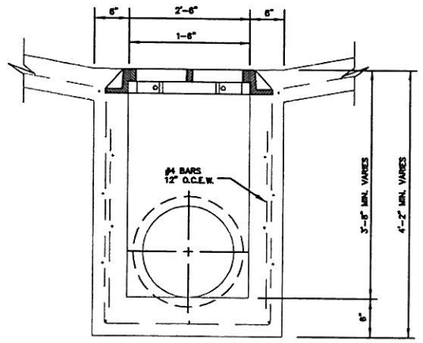
SD-401.DWG



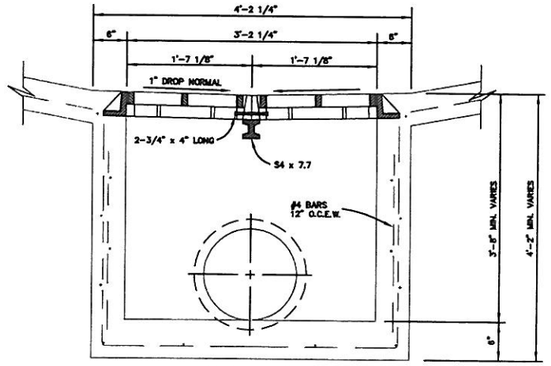
TWO GRATE INLET



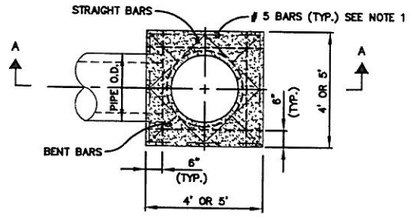
THREE GRATE INLET



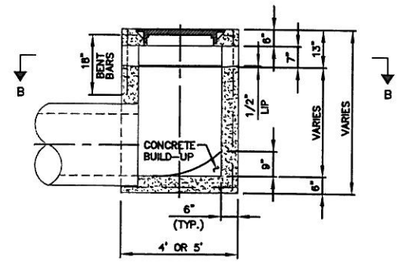
SECTION C-C



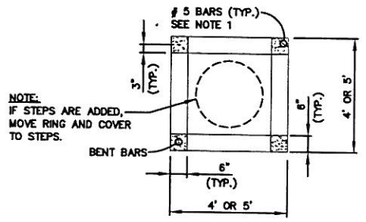
SECTION D-D



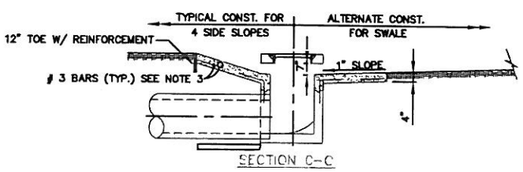
PLAN



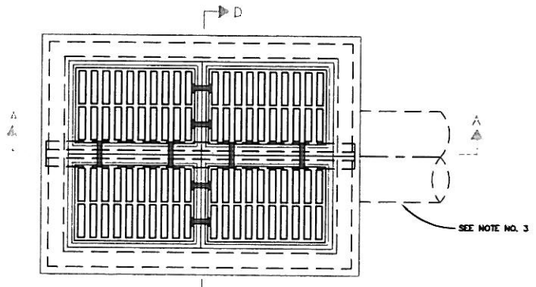
SECTION A-A



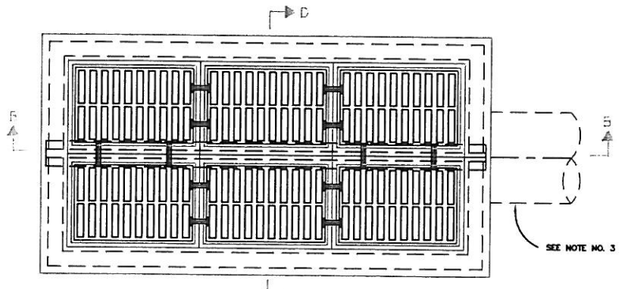
SECTION B-B



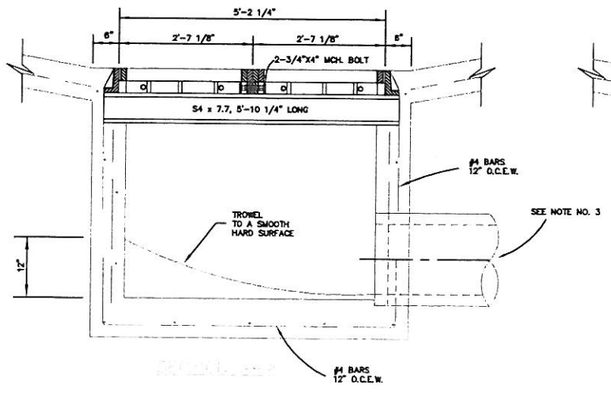
SECTION C-C

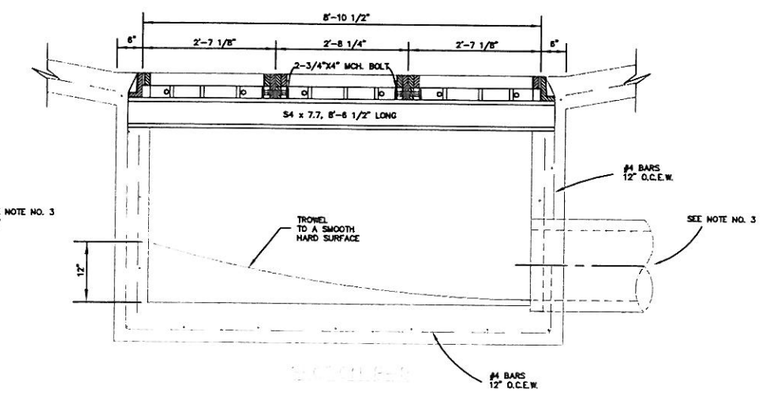


FOUR GRATE INLET



SIX GRATE INLET



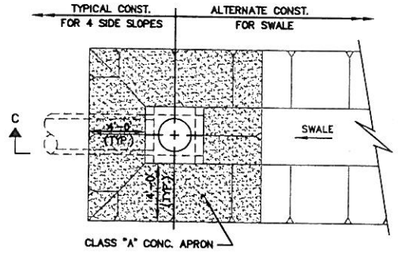


'WYE' INLET NOTES:

1. ALL REINFORCING BARS FOR "WYE" INLET SHALL BE # 5 BARS ON 12" O.C. BOTH WAYS, UNLESS OTHERWISE NOTED.
2. THE REINFORCING BARS FOR THE CONC. APRON SHALL BE # 3 BARS @ 12" O.C. BOTH WAYS, UNLESS OTHERWISE NOTED.
3. THE FRAME & COVER FOR "WYE" INLET SHALL BE THE SAME AS ONE USED FOR THE STANDARD CURB INLET; SEE DETAIL.

GENERAL NOTES:

1. THE CONCRETE FOR ALL GRATE INLETS SHALL BE 4000 P.S.I. @ 28 DAYS WITH A MINIMUM OF FIVE (5) SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
2. ALL DIMENSIONS RELATING TO THE REINFORCING STEEL ARE TO THE CENTER OF BARS UNLESS OTHERWISE NOTED.
3. CHAMFER ALL THE EXPOSED CORNERS 3/4" UNLESS OTHERWISE NOTED.



CONC. APRON PLAN

TYPICAL "WYE" INLET DETAIL

NOTES:

1. ALL LAPS AND EXTENSIONS OF REINFORCING BARS SHALL BE 30 BAR DIAMETERS.
2. TACK WELD GRATES IN PLACE OR USE GRATE LOCK.
3. PIPE MAY BE PLACED IN ANY WALL, BUT SHALL NOT ENTER ANY CORNER, OR BOTTOM.
4. CONCRETE TO BE MIN. OF 4000 PSI.
5. GRATE AND FRAME SHALL BE PATTERN NO. 814 AS MANAFACTURED BY BASS AND HAYES FOUNDRY, OR APPROVED EQUAL.

STORM DRAIN

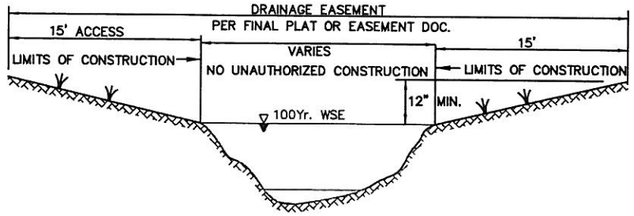
GRATE AND WYE INLETS

STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-402

SD-402.DWG

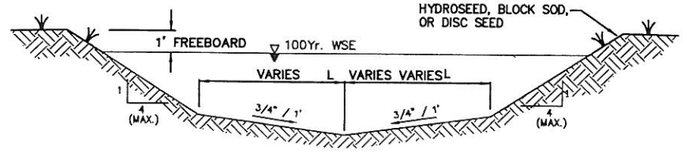


TYPE I UNDISTRURBED NATURAL CHANNELS

1. CHANNEL SHALL COMPLY WITH THE CITY'S SUBDIVISION ORDINANCE.
2. IF PROPOSED GRADING IS PERFORMED WITHIN THE 100 YR WSE AND CREEK BED, PROPOSED WORK SHALL COMPLY WITH THE CITY'S TREE ORDINANCE, FLOODPLAIN ORDINANCE AND APPLICABLE STATE AND FEDERAL REGULATIONS. NO WORK SHALL BE PERFORMED UNTIL WRITTEN AUTHORIZATION IS PROVIDED BY THE CITY AND OTHER ACENIES.
3. UNSANITARY OR UNACCEPTABLE DRAINAGE CONDITIONS DO NOT EXIST IN THE CREEK.
5. TRASH AND UNDERBRUSH FROM CONSTRUCTION IS REMOVED AS NEEDED OR DIRECTED BY

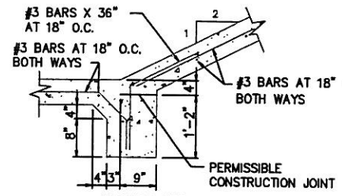
TYPE I – NATURAL CHANNEL

N.T.S.



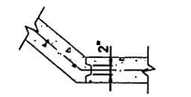
TYPE II – IMPROVED CHANNEL

N.T.S.



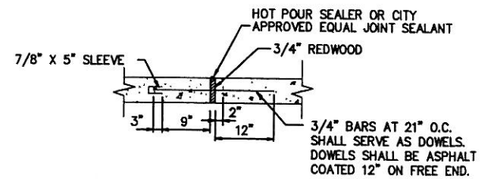
ALTERNATE CONSTRUCTION JOINT

N.T.S.



CONSTRUCTION JOINT

N.T.S.



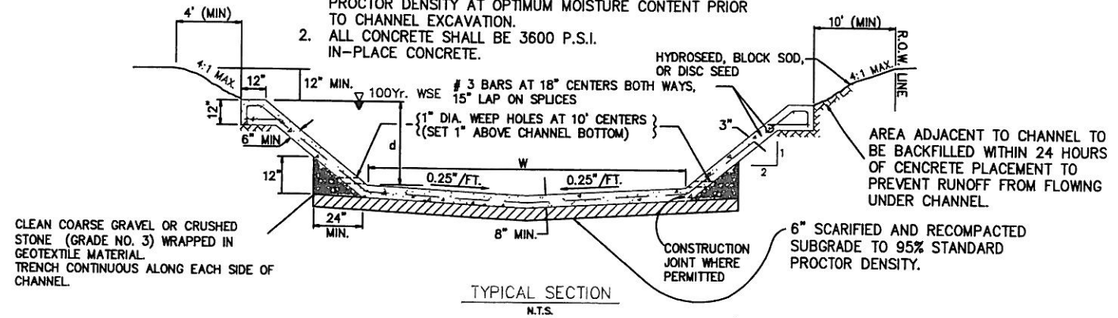
TRANSVERSE EXPANSION JOINT

SPACE 100' O.C. AND USE AT ENDS OF CURVES – P.C. AND P.T.

N.T.S.

NOTES:

1. FILL AREAS SHALL BE COMPACTED IN 8" LIFTS TO 95% STD. PROCTOR DENSITY AT OPTIMUM MOISTURE CONTENT PRIOR TO CHANNEL EXCAVATION.
2. ALL CONCRETE SHALL BE 3600 P.S.I. IN-PLACE CONCRETE.

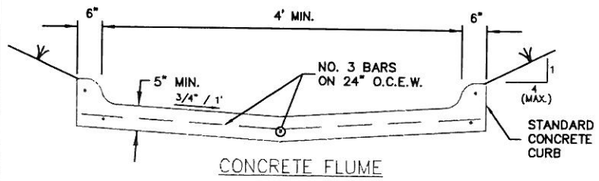


TYPICAL SECTION

N.T.S.

REINFORCED CONCRETE CHANNEL (TYP.)

N.T.S.



CONCRETE FLUME

N.T.S.

CONCRETE LINED CHANNEL NOTES:

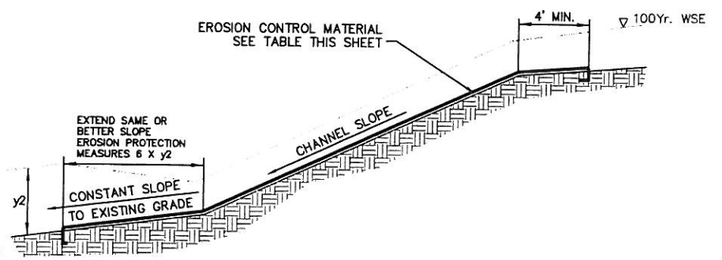
1. ALL CONCRETE USED IN CHANNELS SHALL BE 3600 P.S.I. @ 28 DAYS AND HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD.
2. ALL VISIBLE CONCRETE SURFACES SHALL BE TROWEL FINISH.
3. ALL CHANNELS SHALL HAVE A MINIMUM LONGITUDINAL SLOPE OF 1.00%.
4. A PARALLEL STREET OR IMPROVED SURFACE SHALL BE PROVIDED ON AT LEAST ONE SIDE OF TYPE I CHANNELS.
5. 3/4" CHAMFERS SHALL BE PROVIDED ON ALL CONCRETE CORNERS.
6. GRASS COVER SHALL BE IN PLACE PRIOR TO CITY ACCEPTANCE.

GUIDELINES FOR PROPOSED PERMANENT EROSION CONTROL MEASURES FOR OPEN CHANNELS

CHANNEL SLOPE	VELOCITIES (fps)				
	0-3	>3-6	>6-9	>9-12.5	>12.5
0% - 5%	Seed or Hydromulch	Curlex or Vmax SC250 (1)	Vmax C350 (1)	Vmax P550 (1)	Grouted Rip-Rap (2)
>5% - 10%	Curlex or Vmax SC250 (1)	Vmax C350 (1)	Vmax C350 (1)	Vmax P550 (1)	Grouted Rip-Rap (2)
>10% - 15%	Vmax C350 (1)	Vmax C350 (1)	Vmax P550 (1)	Vmax P550 (1)	Grouted Rip-Rap (2)
>15% - 20%	Vmax C350 (1)	Vmax P550 (1)	Vmax P550 (1)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)
>20% - 25%	Vmax P550 (1)	Vmax P550 (1)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)
>25% - 50%	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)	Grouted Rip-Rap (2)

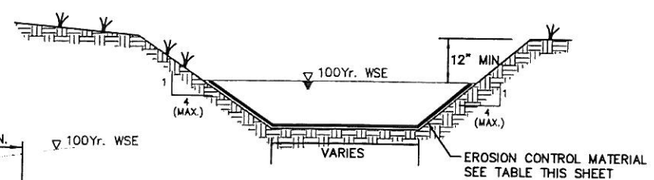
NOTES FOR OPEN CHANNELS

1. VELOCITIES AT BENDS SHALL BE 1.5 TIMES THE AVERAGE VELOCITY OF THE CHANNEL. HIGHER EROSION CONTROL SHALL BE DESIGNED AS REQUIRED AT EACH BEND GREATER THAN 5 DEGREE CHANGE IN THE ALGNMENT.
2. GEOTEXTILE MATERIAL SHALL BE NORTH AMERICAN GREEN EROSION CONTROL PRODUCTS OR CITY APPROVED EQUAL. INSTALLED PER MANUFACTURER'S SPECIFICATIONS. CHANNELS REQUIRING CURLEX/VMAX SHALL BE SEEDED OR HYDROMULCHED FOR THE FULL WIDTH OF THE CHANNEL IN ORDER TO ESTABLISH PERMANENT VEGETATION.
3. SMOOTH REINFORCED CONCRETE CAN BE UTILIZED. SEE DETAILS THIS SHEET. ALL DISTURBED AREAS OUTSIDE OF GROUTED RIP-RAP TO BE SEEDED OR HYDROMULCHED IN ORDER TO ESTABLISH PERMANENT VEGETATION OF THE CHANNEL SIDE SLOPES. GEOTEXTILE FABRIC SHALL BE PLACED UNDER GROUTED ROCK RIP RAP.
4. INFORMATION SHOWN INCLUDES MINIMUM REQUIREMENTS FOR SLOPE STABILIZATION IN OPEN CHANNELS. ACTUAL SLOPE STABILIZATION MEASURES SHALL BE VERIFIED BASED ON SOIL CONDITIONS AND MANUFACTURES RECOMMENDATIONS AND DESIGN CRITERIA.
5. GROUTED RIP RAP INSTALLED IN OPEN CHANNELS SHALL CONFORM TO GENERAL NOTE 15 FOR EROSION CONTROL ON SD-001 AND TO NTCOG ITEM #803.3.
6. SLOPES EXCEEDING 50% SHALL BE SECURED BY A RETAINING WALL OR A CONCRETE REINFORCED STRUCTURE. WALLS ABOVE 4 FEET IN HEIGHT SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS. FOOTINGS SHALL BE AT OR BELOW THE FLOWLINE OF THE STORM WATER RUNOFF. THE FOOTING SHALL HAVE THE APPROPRIATE EROSION CONTROL MEASURES AS INDICATED ABOVE.
7. ALL DISTURBED AREAS SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.



ROADSIDE OPEN CHANNEL OR DRAINAGE WAY (TYP.)

N.T.S.



ROADSIDE CHANNEL X-SECTION

N.T.S.

STORM DRAIN

DRAINAGE CHANNELS

STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

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CFD, III		CC	FEB 2015	NOT TO SCALE	RGW	SD-403

SD-403.DWG

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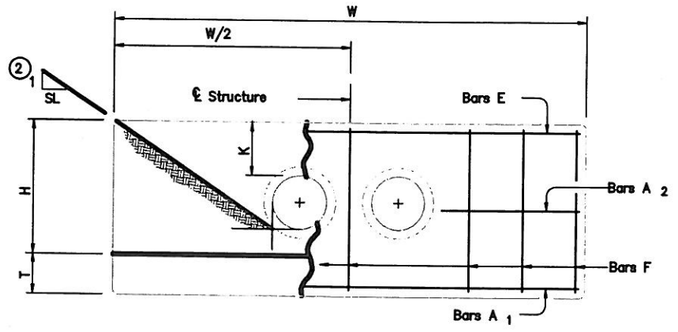
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

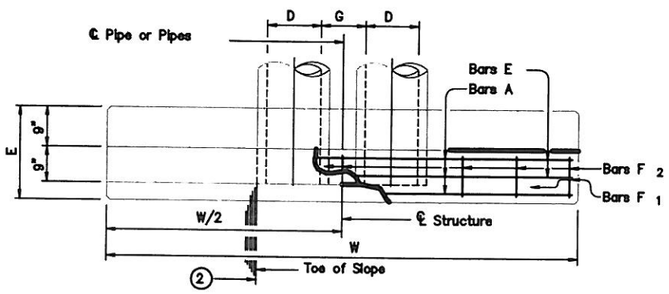
ACC:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL ④

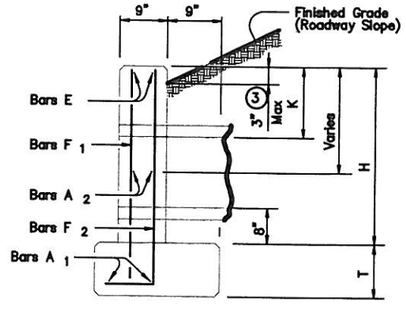
SLOPE	DIA OF PIPE,D	Values for one Pipe W	Values for one Pipe Reinf (Lbs)	Values for one Pipe Conc (CY) ①	Values to be added for each addt'l Pipe W	Values to be added for each addt'l Pipe Reinf (Lbs)	Values to be added for each addt'l Pipe Conc (CY) ①
2:1	12"	9'-0"	122	1.1	1'-9"	15	0.2
	15"	10'-3"	136	1.3	2'-2"	16	0.2
	18"	11'-6"	163	1.5	2'-8"	19	0.3
	21"	12'-9"	200	1.8	3'-1"	31	0.4
	24"	14'-0"	217	2.1	3'-7"	34	0.4
	27"	15'-3"	254	2.4	3'-11"	37	0.5
	30"	16-6"	272	2.7	4'-4"	40	0.6
	33"	17'-9"	314	3.1	4'-8"	43	0.6
	36"	19'-0"	371	3.9	5'-1"	46	0.8
	42"	21'-6"	442	4.9	5'-10"	52	1.0
	48"	25'-0"	569	6.4	6'-7"	59	1.3
	54"	27'-6"	701	7.5	7'-6"	82	1.6
	60"	30'-0"	794	8.8	8'-3"	90	1.8
	66"	32'-6"	894	10.2	8'-9"	96	2.0
	72"	35'-0"	1055	11.7	9'-4"	103	2.3
3:1	12"	13'-0"	175	1.6	1'-9"	14	0.2
	15"	14'-9"	193	1.9	2'-2"	17	0.2
	18"	16'-6"	228	2.2	2'-8"	19	0.3
	21"	18'-3"	299	2.6	3'-1"	31	0.4
	24"	20'-0"	323	3.0	3'-7"	33	0.4
	27"	21'-9"	371	3.5	3'-11"	37	0.5
	30"	23'-6"	415	4.0	4'-4"	40	0.5
	33"	25'-3"	469	4.6	4'-8"	43	0.6
	36"	27'-0"	556	5.7	5'-1"	46	0.8
	42"	30'-6"	675	7.1	5'-10"	52	1.0
	48"	35'-6"	837	9.2	6'-7"	59	1.3
	54"	39'-0"	1015	11.0	7'-6"	84	1.6
	60"	42'-6"	1171	12.9	8'-3"	91	1.8
	66"	46'-0"	1298	14.9	8'-9"	98	2.0
	72"	49'-6"	1561	17.1	9'-4"	103	2.3
4:1	12"	17'-0"	229	2.0	1'-9"	15	0.2
	15"	19'-3"	266	2.4	2'-2"	17	0.2
	18"	21'-6"	308	2.9	2'-8"	19	0.3
	21"	23'-9"	382	3.5	3'-1"	31	0.3
	24"	26'-0"	430	3.9	3'-7"	34	0.4
	27"	28'-3"	486	4.7	3'-11"	37	0.5
	30"	30'-6"	539	5.2	4'-4"	40	0.6
	33"	32'-9"	603	6.0	4'-8"	42	0.6
	36"	35'-0"	738	7.5	5'-1"	47	0.8
	42"	39'-6"	881	9.3	5'-10"	52	1.0
	48"	46'-0"	1102	12.1	6'-7"	61	1.3
	54"	50'-6"	1364	14.4	7'-6"	84	1.6
	60"	55'-0"	1547	16.9	8'-3"	91	1.8
	66"	59'-6"	1741	19.5	8'-9"	98	2.0
	72"	64'-0"	2069	22.4	9'-4"	102	2.3
6:1	12"	25'-0"	336	3.0	1'-9"	14	0.2
	15"	28'-3"	384	3.6	2'-2"	17	0.2
	18"	31'-6"	452	4.2	2'-8"	19	0.3
	21"	34'-9"	581	5.1	3'-1"	31	0.4
	24"	38'-0"	644	5.8	3'-7"	34	0.4
	27"	41'-3"	737	6.9	3'-11"	37	0.5
	30"	44'-6"	807	7.7	4'-4"	39	0.6
	33"	47'-9"	912	8.9	4'-8"	44	0.6
	36"	51'-0"	1108	11.0	5'-1"	48	0.8
	42"	57'-6"	1318	13.7	5'-10"	54	1.0
	48"	67'-0"	1674	17.9	6'-7"	59	1.3
	54"	73'-6"	2064	21.3	7'-6"	83	1.6
	60"	80'-0"	2343	24.9	8'-3"	89	1.8
	66"	86'-6"	2635	28.9	8'-9"	96	2.0
	72"	93'-0"	3123	33.1	9'-4"	101	2.3



ELEVATION



PLAN OF NON-SKEWED PIPES



℄ SECTION

TABLE OF CONSTANT DIMENSIONS

DIA OF PIPE,D	G	K	H	T	E
12"	9"	1'-0"	2'-8"	9"	1'-9"
15"	11"	1'-0"	2'-11"	9"	1'-9"
18"	1'-2"	1'-0"	3'-2"	9"	1'-9"
21"	1'-4"	1'-0"	3'-5"	9"	2'-0"
24"	1'-7"	1'-0"	3'-8"	9"	2'-0"
27"	1'-8"	1'-0"	3'-11"	9"	2'-3"
30"	1'-10"	1'-0"	4'-2"	9"	2'-3"
33"	1'-11"	1'-0"	4'-5"	9"	2'-6"
36"	2'-1"	1'-0"	4'-8"	1'-0"	2'-6"
42"	2'-4"	1'-0"	5'-2"	1'-0"	2'-9"
48"	2'-7"	1'-3"	5'-11"	1'-0"	3'-0"
54"	3'-0"	1'-3"	6'-5"	1'-0"	3'-3"
60"	3'-3"	1'-3"	6'-11'	1'-0"	3'-6"
66"	3'-3"	1'-3"	7'-5"	1'-0"	3'-9"
72"	3'-4"	1'-3"	7'-11"	1'-0"	4'-0"

④ TABLE OF REINFORCING STEEL

Bar	Size	Spa	No.
A1	# 5	~	2
A2	# 5	1'-6"	~
E	# 5	~	2
F	# 5	1'-0"	~

④ Quantities shown are for one structure end. (One headwall)

BARS F 2

GENERAL NOTES:

Designed according to current AASHTO Standard and Interim Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

① Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

② Indicated slope is perpendicular to centerline Pipe or Pipes.

③ For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

④ Quantities shown are for one structure end only (one headwall).

Texas Department of Transportation
Bridge Division

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0

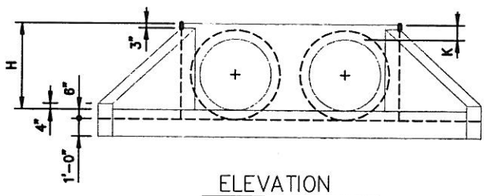
FILE: chpw0ste.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
© TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	COUNTY	CONTROL	SECT	JOB	HIGHWAY

SHEET: SD-404

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL

SLOPE	DIA OF PIPE,D	Values for one Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be added for each addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4'-7 1/2"	2'-6"	2'-10"	3'-3 1/4"	84	0.6	1'-9"	20	0.2
	15"	5'-5 3/4"	2'-9 1/2"	3'-4"	3'-10 1/4"	99	0.7	2'- 2"	24	0.3
	18"	6'-4 1/4"	3'-1"	3'-10"	4'-5"	120	0.9	2'- 8"	32	0.3
	21"	7'-2 3/4"	3'-4 1/2"	4'-4"	5'-0"	137	1.1	3'- 1"	43	0.4
	24"	8'-2 1/2"	3'-9 1/2"	4'-10"	5'-7"	158	1.3	3'- 7"	50	0.5
	27"	9'-1"	4'-1"	5'-4"	6'-2"	173	1.5	3'-11"	56	0.6
	30"	9'-11 1/2"	4'-4 1/2"	5'-10"	6'-8 3/4"	197	1.7	4'- 4"	65	0.8
	33"	10'-10"	4'-8"	6'-4"	7'-3 3/4"	216	2.0	4'- 8"	71	0.9
	36"	11'-8 1/4"	4'-11 1/2"	6'-10"	7'-10 3/4"	241	2.2	5'- 1"	81	1.0
	42"	13'-5 1/4"	5'-6 1/2"	7'-10"	9'-0 1/2"	290	2.8	5'-10"	97	1.3
	48"	15'-9"	6'-1 1/2"	9'-4"	10'-9 1/4"	350	3.8	6'- 7"	117	1.7
	54"	17'-5 3/4"	6'-8 1/2"	10'-4"	11'-11 1/4"	415	4.5	7'- 6"	151	2.1
	60"	19'-2 3/4"	7'-3 1/2"	11'-4"	13'-1"	469	5.3	8'- 3"	174	2.5
	66"	20'-11 1/2"	7'-10 1/2"	12'-4"	14'-3"	530	6.2	8'- 9"	194	2.9
	72"	22'-8 1/2"	8'-5 1/2"	13'-4"	15'-4 3/4"	587	7.1	9'- 4"	213	3.3
3:1	12"	6'-3"	2'-6"	4'-3"	4'-11"	114	0.8	1'- 9"	22	0.2
	15"	7'-5"	2'-9 1/2"	5'-0"	5'- 9 1/4"	133	1.1	2'- 2"	28	0.3
	18"	8'-6 3/4"	3'-1"	5'-9"	6'-7 3/4"	166	1.3	2'- 8"	37	0.5
	21"	9'-8 3/4"	3'-4 1/2"	6'-6"	7'-6"	189	1.6	3'- 1"	48	0.6
	24"	11'-0"	3'-9 1/2"	7'-3"	8'-4 1/2"	221	2.0	3'- 7"	58	0.7
	27"	12'-2"	4'-1"	8'-0"	9'-2 3/4"	245	2.3	3'-11"	67	0.8
	30"	13'-4"	4'-4 1/2"	8'-9"	10'-1 1/4"	287	2.7	4'- 4"	77	1.0
	33"	14'-5 3/4"	4'-8"	9'-6"	10'-11 3/4"	310	3.1	4'- 8"	84	1.2
	36"	15'-7 3/4"	4'-11 1/2"	10'-3"	11'-10"	343	3.5	5'- 1"	96	1.4
	42"	17'-11 1/2"	5'-6 1/2"	11'-9"	13'-6 3/4"	424	4.5	5'-10"	119	1.7
	48"	21'- 1 3/4"	6'-1 1/2"	14'-0"	16'-2"	527	6.1	6'- 7"	146	2.3
	54"	23'- 5 1/2"	6'-8 1/2"	15'-6"	17'-10 3/4"	618	7.3	7'- 6"	186	2.9
	60"	25'- 9 1/4"	7'-3 1/2"	17'-0"	19'-7 1/2"	707	8.7	8'- 3"	219	3.4
	66"	28'-1"	7'-10 1/2"	18'-6"	21'-4 1/4"	797	10.1	8'- 9"	242	3.9
	72"	30'-4 3/4"	8'-5 1/2"	20'-0"	23'-1 1/4"	910	11.7	9'- 4"	272	4.4
4:1	12"	7'-10 3/4"	2'-6"	5'-8"	6'-6 1/2"	144	1.1	1'- 9"	24	0.3
	15"	9'-4"	2'-9 1/2"	6'-8"	7'-8 1/2"	177	1.5	2'- 2"	32	0.4
	18"	10'-9 1/2"	3'-1"	7'-8"	8'-10 1/4"	217	1.9	2'- 8"	42	0.5
	21"	12'-2 3/4"	3'-4 1/2"	8'-8"	10'-0"	254	2.3	3'- 1"	57	0.7
	24"	13'-9 1/2"	3'-9 1/2"	9'-8"	11'-2"	295	2.8	3'- 7"	67	0.9
	27"	15'-3"	4'-1"	10'-8"	12'-3 3/4"	328	3.3	3'-11"	77	1.0
	30"	16'-8 1/4"	4'-4 1/2"	11'-8"	13'-5 3/4"	379	3.8	4'- 4"	89	1.3
	33"	18'-1 3/4"	4'-8"	12'-8"	14'-7 1/2"	417	4.5	4'- 8"	101	1.4
	36"	19'-7"	4'-11 1/2"	13'-8"	15'-9 1/4"	464	5.1	5'-1"	115	1.7
	42"	22'-5 3/4"	5'-6 1/2"	15'-8"	18'-1"	575	6.5	5'-10"	141	2.1
	48"	26'-6 1/4"	6'-1 1/2"	18'-8"	21'-6 3/4"	720	8.9	6'- 7"	175	2.8
	54"	29'-5"	6'-8 1/2"	20'-8"	23'-10 1/4"	863	10.7	7'- 6"	226	3.6
	60"	32'-3 3/4"	7'-3 1/2"	22'-8"	26'-2"	984	12.7	8'- 3"	264	4.3
	66"	35'-2 1/2"	7'-10 1/2"	24'-8"	28'-5 3/4"	1126	14.9	8'- 9"	300	4.9
	72"	38'-1 1/4"	8'-5 1/2"	26'-8"	30'-9 1/2"	1283	17.3	9'- 4"	334	5.6
6:1	12"	11'-2"	2'-6"	8'-6"	9'-9 3/4"	220	1.9	1'- 9"	28	0.4
	15"	13'-2 1/4"	2'-9 1/2"	10'-0"	11'-6 1/2"	264	2.5	2'- 2"	37	0.5
	18"	15'-2 1/2"	3'-1"	11'-6"	13'-3 1/4"	326	3.2	2'- 8"	50	0.7
	21"	17'-2 3/4"	3'-4 1/2"	13'-0"	15'-0 1/4"	381	3.9	3'- 1"	69	0.9
	24"	19'-4 1/2"	3'-9 1/2"	14'-6"	16'-9"	447	4.8	3'- 7"	80	1.2
	27"	21'-4 3/4"	4'-1"	16'-0"	18'-5 3/4"	506	5.7	3'-11"	96	1.4
	30"	23'-5 1/4"	4'-4 1/2"	17'-6"	20'-2 1/2"	587	6.7	4'- 4"	110	1.7
	33"	25'-5 1/2"	4'-8"	19'-0"	21'-11 1/4"	667	7.8	4'- 8"	127	2.0
	36"	27'-5 3/4"	4'-11 1/2"	20'-6"	23'-8"	727	9.0	5'- 1"	144	2.3
	42"	31'-6 1/4"	5'-6 1/2"	23'-6"	27'-1 1/2"	914	11.5	5'-10"	179	3.0
	48"	37'-3 1/2"	6'-1 1/2"	28'-0"	32'-4"	1181	15.9	6'- 7"	231	4.0
	54"	41'-4 1/4"	6'-8 1/2"	31'-0"	35'-9 1/2"	1412	19.2	7'- 6"	300	5.0
	60"	45'-4 3/4"	7'-3 1/2"	34'--0"	39'-3"	1619	22.9	8'- 3"	353	6.0

(1) Quantities increase slightly for metal pipe installations.



ELEVATION
Showing dimensions

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

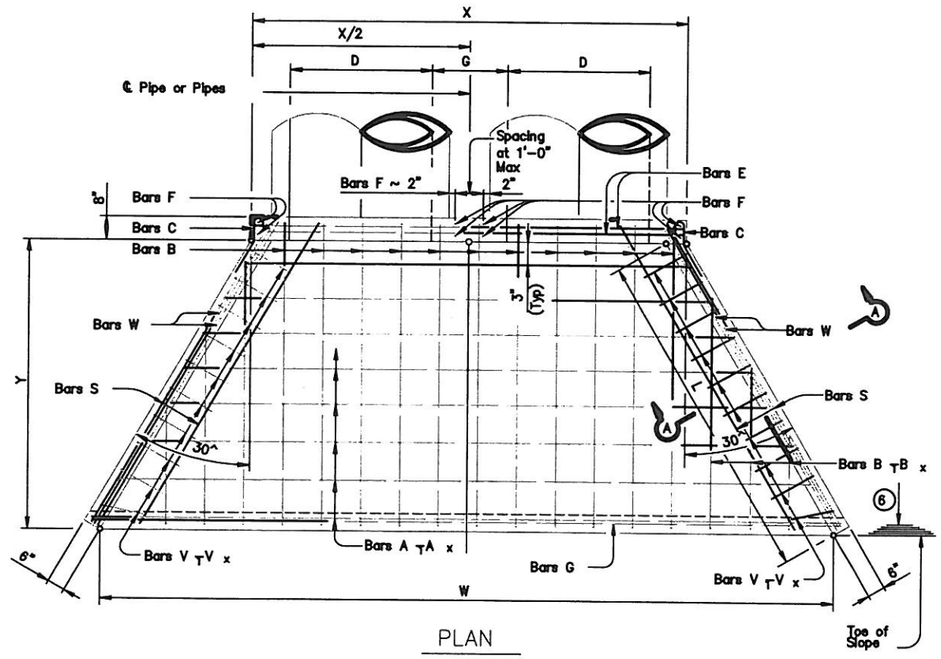
(3) Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.

(4) Quantities shown are for one structure end only (one headwall).

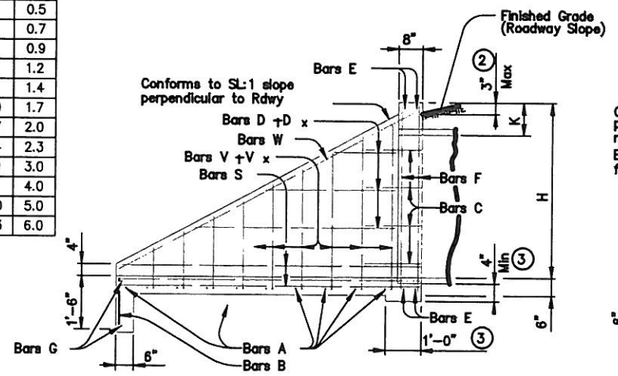
(5) Min Length = 6" $3"\perp x \left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = 12 x H $3"\perp x \left(\frac{12 \times H - 7}{12 \times L}\right) -$

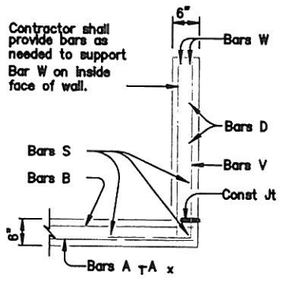
(6) Lengths of wings based on SL:1 Slope along this line.



PLAN



TYPICAL WING ELEVATION



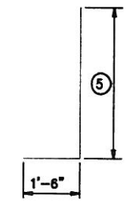
SECTION A-A

(4) TABLE OF REINFORCING STEEL

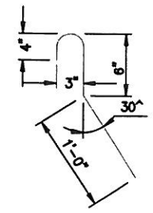
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
C	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
S	# 4	~	6
V	# 4	1'-0"	~
W	# 5	~	4

TABLE OF CONSTANT DIMENSIONS

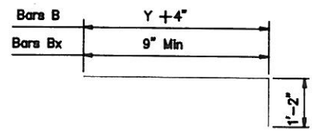
DIA OF PIPE,D	G	K	H
12"	9"	1'-0"	2'-0"
15"	11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-4"	1'-0"	2'-9"
24"	1'-7"	1'-0"	3'-0"
27"	1'-8"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"
33"	1'-11"	1'-0"	3'-9"
36"	2'-1"	1'-0"	4'-0"
42"	2'-4"	1'-0"	4'-6"
48"	2'-7"	1'-3"	5'-3"
54"	3'-0"	1'-3"	5'-9"
60"	3'-3"	1'-3"	6'-3"
66"	3'-3"	1'-3"	6'-9"
72"	3'-4"	1'-3"	7'-3"



BARS V



BARS C
(2'-0" long)



BARS B & B ⊤B x

GENERAL NOTES:

Designed according to current AASHTO Standard and Interim Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation
Bridge Division

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

SHEET: SD-405

FILE: chfw00se.dgn
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REVISIONS

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
DISTRICT	FEDERAL AID PROJECT		SHEET
COUNTY	CONTROL	SECT	JOB	HIGHWAY

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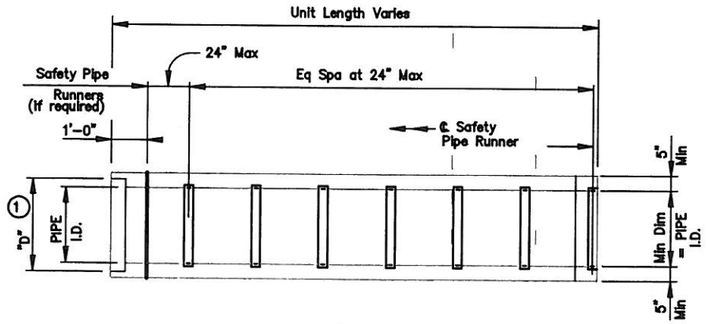
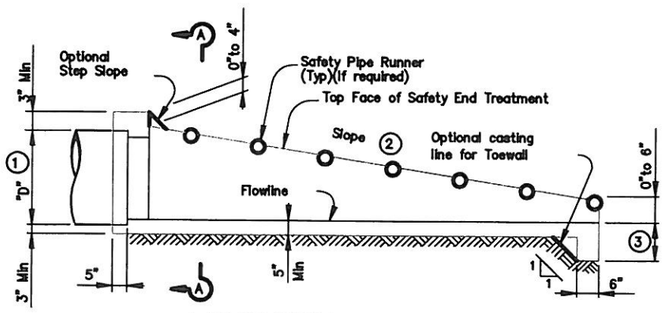
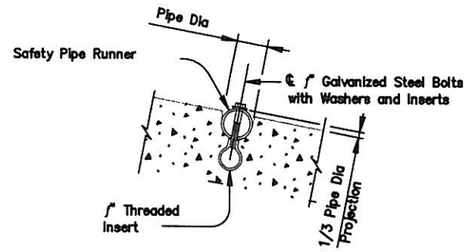
LEVELS DISPLAYED
ACC:



PLAN

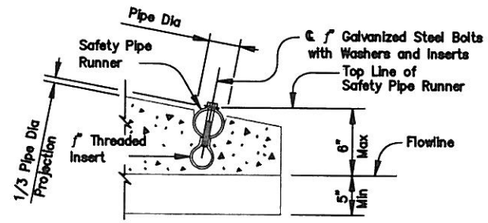


LONGITUDINAL ELEVATION

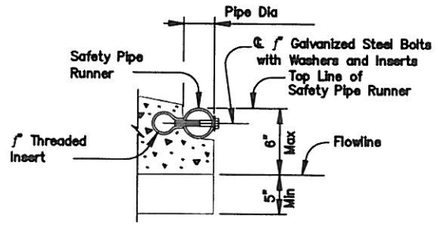


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



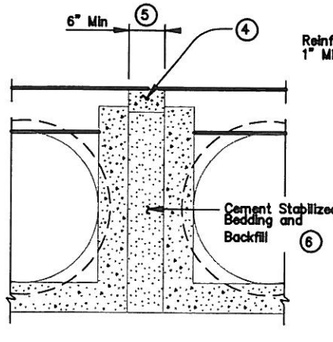
OPTION A



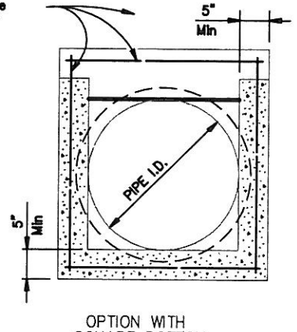
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

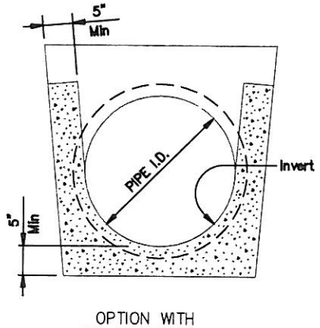
(If required)



MULTIPLE PIPE INSTALLATION

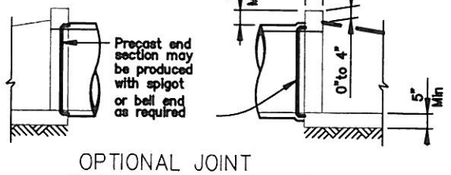


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A–A



OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

PIPE I.D.	PIPE WALL "B" THICKNESS	"D" ①	MAXIMUM SLOPE	MINIMUM LENGTH OF UNIT	PIPE RUNNERS REQUIRED		REQUIRED PIPE RUNNER SIZES		
					SINGLE PIPE	MULTIPLE PIPE	NOMINAL DIA.	O.D.	I.D.
12"	2"	17"	6:1	4'-9"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
15"	2 "	20 "	6:1	6'-5"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
18"	2 "	24"	6:1	8'-0"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
24"	3"	31"	6:1	11'-3"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
30"	3 "	38 "	6:1	14'-8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	45 "	6:1	17'-11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 "	52 "	6:1	21'-2"	Yes	Yes	4" STD	4.500"	4.026"

① Dimension "D" is based on ASTM C-76, Class III, Wall "B" thickness. If any other wall thickness is used, dimension "D" must be adjusted accordingly.

② Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

③ Toewall to be used only when dimension is shown elsewhere in the plans.

④ The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.

⑤ Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

⑥ Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill shall be as directed by Engineer.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below :

A. Minimum reinforcing shall be #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6 x 6 – W12 x W12 or 5 x 5 – W10 x W10 welded wire fabric.

B. Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

At the option and expense of the Contractor the next larger size of Safety End Treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

ACC:

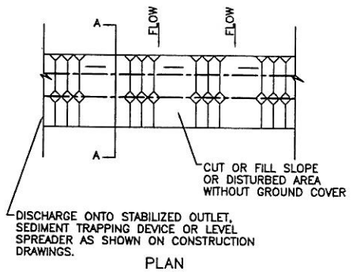
Texas Department of Transportation
Bridge Division

PRECAST SAFETY END TREATMENT
TYPE II ~ PARALLEL DRAINAGE

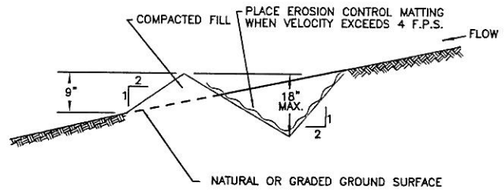
PSET-SP

FILE: psetspse.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
© TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS				
	COUNTY	CONTROL	SECT	JOB	HIGHWAY

SHEET: SD-406



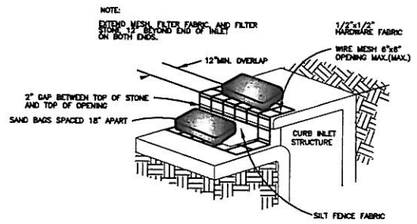
PLAN



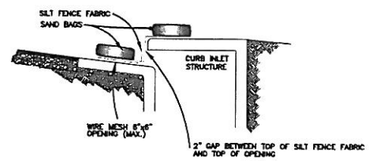
SECTION A-A

TEMPORARY DIVERSION

N.T.S.



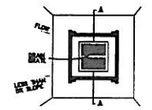
ISOMETRIC PLAN VIEW



INLET SECTION

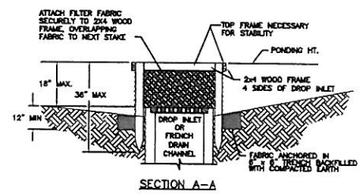
TYPE A CURB
INLET PROTECTION

N.T.S.



PLAN VIEW

NOTE: CONCENTRATED DITCH FLOW COMING FROM ONE OR MORE SIDES TOWARD THE DROP INLET MAY REQUIRE A STONE OVERFLOW STRUCTURE TO BE CONSTRUCTED ON ONE SIDE OF THE DROP INLET. HOG WIRE SHOULD BE USED TO SUPPORT THE FILTER FABRIC FOR INSTALLATIONS USED MORE THAN 90 DAYS



SECTION A-A

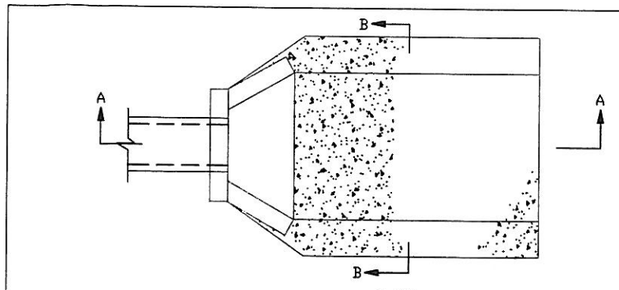
FILTER FABRIC DROP INLET/FRENCH DRAIN CHANNEL PROTECTION

N.T.S.

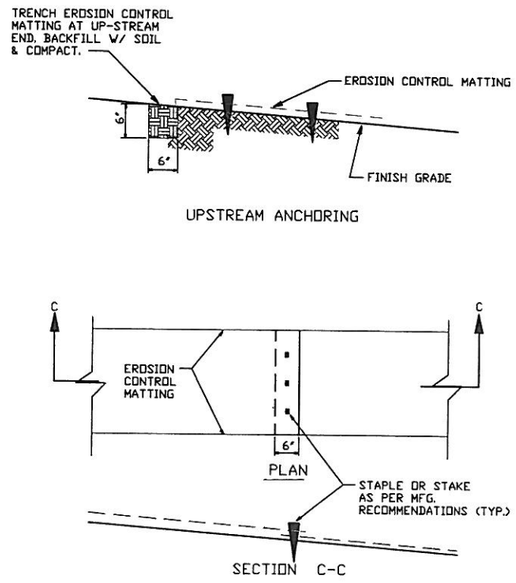
SD-600

TEMPORARY EROSION CONTROL
INLET PROTECTION AND
TEMPORARY DIVERSION
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
CFD, III		DS	FEB 2015	NOT TO SCALE	RGW	SD-500



OUTLET VELOCITY CONTROL STRUCTURE
N.T.S.



EROSION CONTROL MATTING
N.T.S.

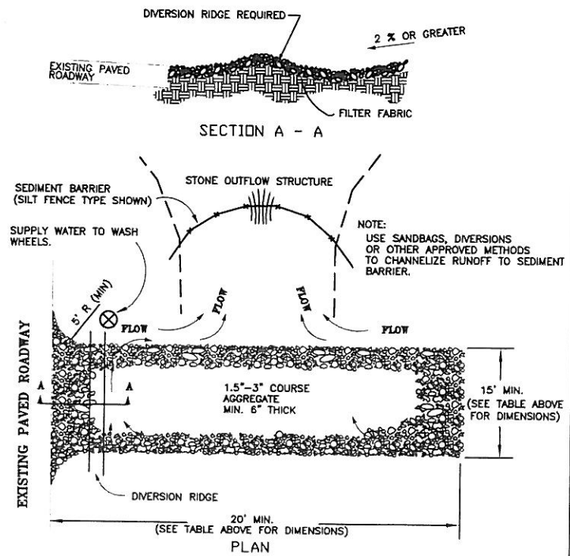
TABLE FOR MINIMUM DIMENSIONS FOR STABILIZED CONSTRUCTION ENTRANCES

TRACT ARE	AVG. LOT DEPTH	MIN. WIDTH OF ENTRANCES	MIN DEPTH OF ENTRANCE
< 1 ACRE	100 FEET	15 FEET	20 FEET
< 5 ACRES	200 FEET	20 FEET	30 FEET
< 10 ACRES	> 200 FEET	20 FEET	40 FEET
>10 ACRES	> 200 FEET	25 FEET	50 FEET

NOTES FOR STABILIZED CONSTRUCTION ENTRANCES

1. DRAINAGE SHALL NOT BE DIVERTED INTO STREET PAVEMENT UNLESS SHOWN ON THE APPROVED CONSTRUCTION PLANS AND AUTHORIZED BY THE CITY. PROVIDE TEMPORARY MEANS TO ALLOW RUNOFF TO CONTINUE AS EXISTING CONDITIONS DICTATE OR FUNCTION AS PART OF THE GRADING AND DRAINAGE PLANS.

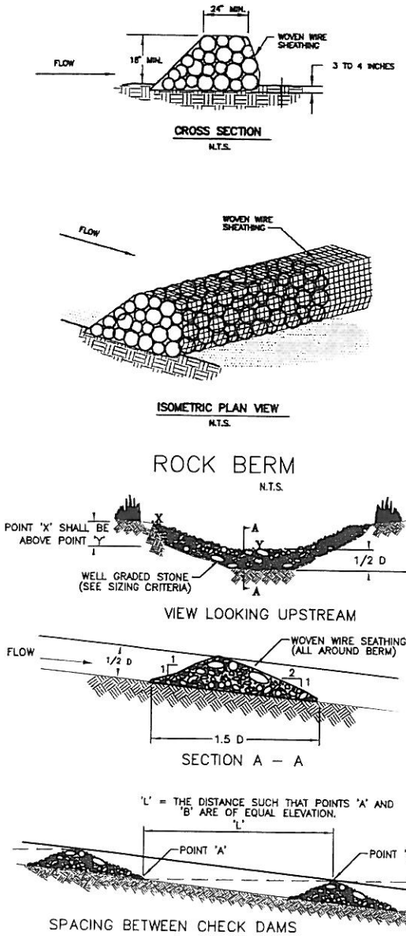
2. ALL MATERIAL USED FOR THE ENTRANCES SHALL BE REMOVED AND VEGETATION ESTABLISED (UNLESS REPLACED BY A PERMANENT CONC. ENTRANCE) PRIOR TO FINAL ACCEPTANCE FOR THR PROJECT.



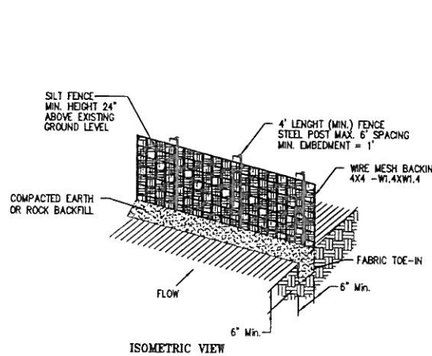
TEMPORARY STONE CONSTRUCTION ENTRANCE / EXIT
N.T.S.

ROCK BERM GENERAL NOTES:

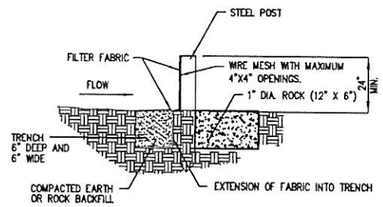
1. USE ONLY OPEN GRADED ROCK 4-8 INCHES IN DIAMETER FOR STREAM FLOW CONDITION. ONLY USE WIRE BOUND ROCK. NO LOOSE BOUND ROCK IS ALOWED FOR ANY CONDITION.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING A MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE SIZE OF 20 GAUGE AND SHALL BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP.
3. THE ROCK BERM SHALL BE INSPECTED EVERY TWO WEEKS OR AFTER EACH 1/2" RAIN EVENT AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTEDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD OF THE HEIGHT OF THE BERM OR ONE FOOT, WHICHEVER IS LESS. THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.
5. WHEN THE SITE IS COMPLETELY STABILIZED WITH VEGETATION IS ESTABLISHED THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.
6. ROCK BERM SHOULD BE USED AS CHECK DAMS FOR CONCENTRATED FLOW AND ARE NOT INTENDED FOR USE IN PERIMETER PROTECTION.

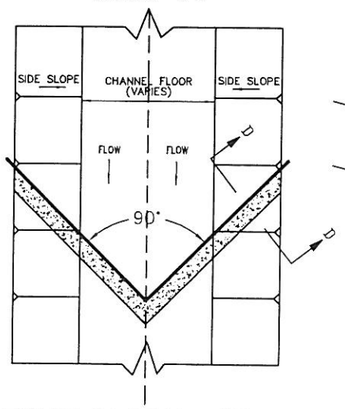


ROCK CHECK DAM
N.T.S.

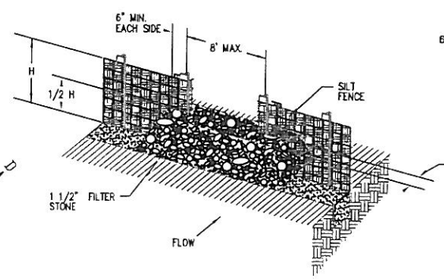


SILT FENCE
N.T.S.

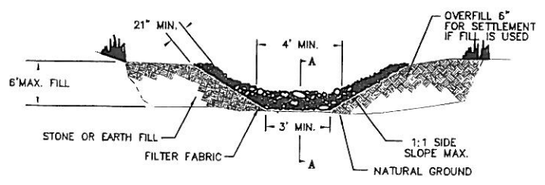


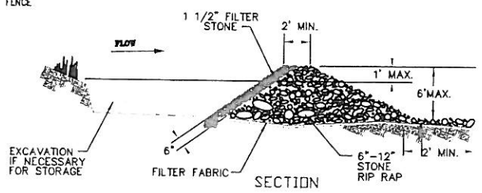


SILT FENCE IN DRAINAGE WAYS
N.T.S.



STONE OVERFLOW STRUCTURE
N.T.S.





STONE OUTLET SEDIMENT TRAP
N.T.S.

* NOTE - ALL SILT FENCE SHALL BE REMOVED AFTER VEGETATION IS ESTABLISHED AND PRIOR TO FINAL ACCEPTANCE.

SD-601.DWG

TEMPORARY EROSION CONTROL
SILT FENCE AND
CONSTRUCTION ENTRANCE
STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

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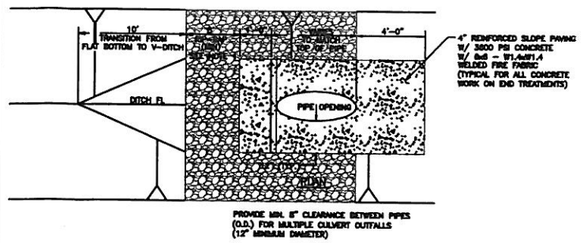
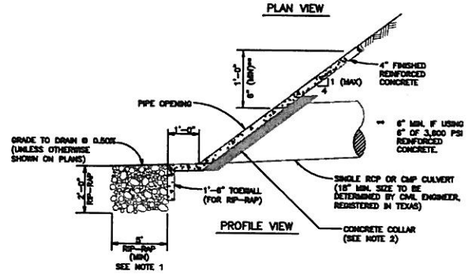
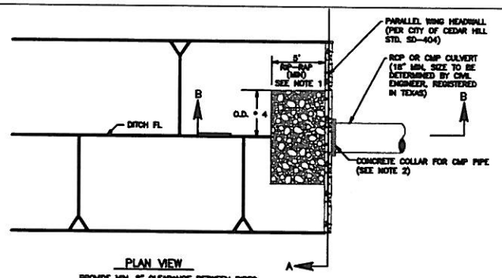
CFD, III		CC	FEB. 2015	NOT TO SCALE	RGW	SD-501



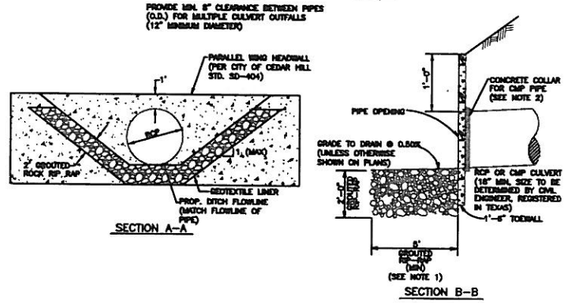
PLAN VIEW



CULVERT WITH SLOPED HEADWALL DETAIL

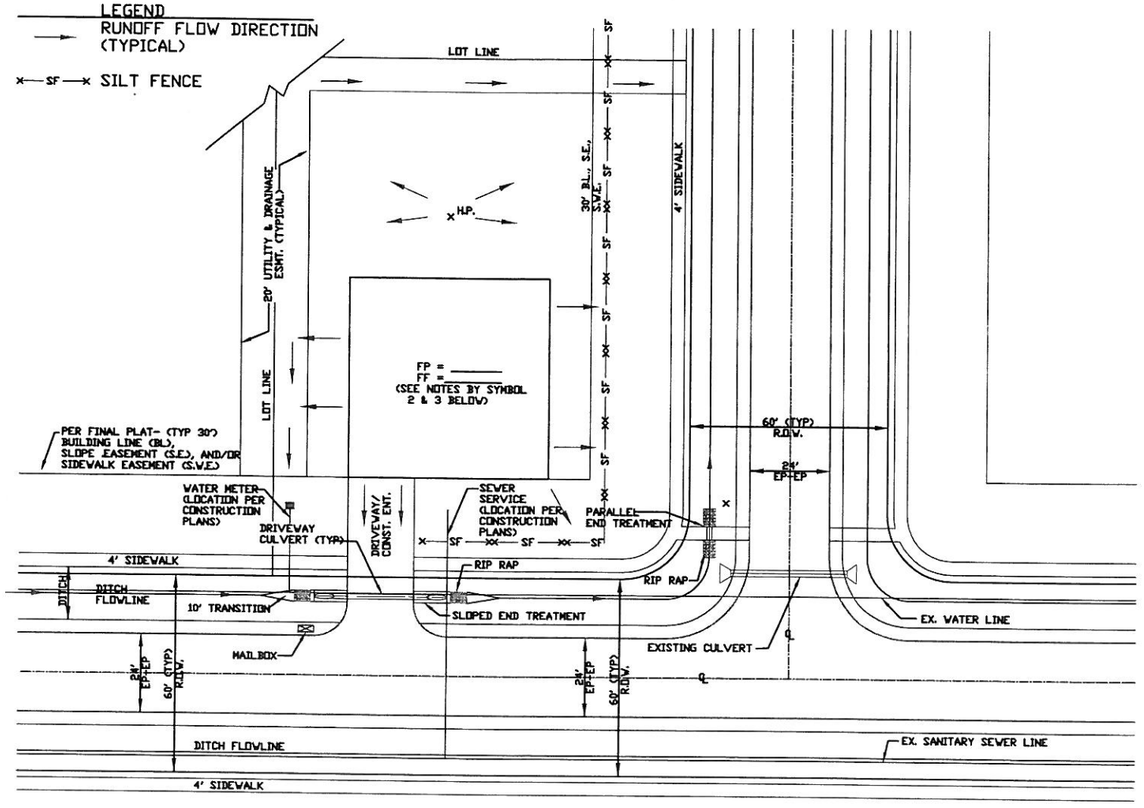


PLAN VIEW



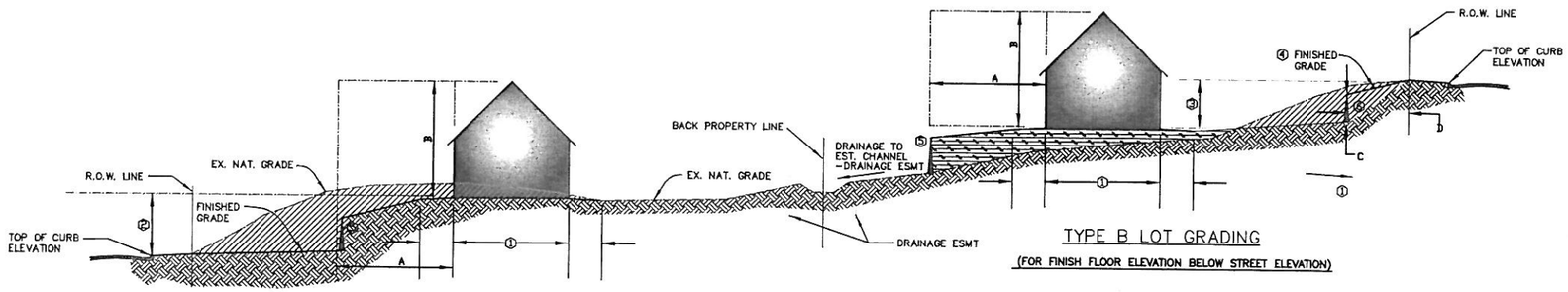
CULVERT WITH PARALLEL WING HEADWALL DETAIL

CULVERT NOTES:
1) REFER TO SHEET SD 403 FOR SELECTION OF APPROPRIATE EROSION/SLOPE STABILIZATION OF DRAINAGE CHANNELS.
2) THE FLOWLINE OF THE CULVERT SHALL MATCH THE FLOWLINE OF THE DRAINAGE CHANNEL.
3) THE MINIMUM DIAMETER OF A SINGLE CULVERT PIPE IS 18". THE MINIMUM DIAMETER OF MUTIPLE CULVERTS IS 12".
4) FINISHED REINFORCED CONCRETE CAN BE USED INSTEAD OF GROUTED ROCK RIP RAP.
5) THE SIDE SLOPES OF THE DITCH SHALL NOT EXCEED 4:1.
5) FINISHED REINFORCED CONCRETE CAN BE USED IN LIEU OF GROUTED ROCK RIP RAP AND SHALL MATCH DIMENSIONS SHOWN IN PLAN VIEW ABOVE.
6) CORREGATED METAL PIPE (CMP) CAN BE USED FOR PRIVATE DRIVEWAYS. HOWEVER ENDS OF PIPE SHALL NOT BE EXPOSED BUT HAND TROWLED WITH NON-SHRINK GROUT TO A SMOOTH FINISH.
7) DISTURBED SOIL SHALL BE COMPACTED TO 95% STANDARD PROTOR DENSITY.



TYPICAL RESIDENTIAL LOT LAYOUT

FOR LAKE RIDGE OR STEEP SLOPED AREAS – TYPE A & B GRADING



TYPE A LOT GRADING

(FOR FINISH FLOOR ELEVATION ABOVE STREET ELEVATION)

TYPE B LOT GRADING

(FOR FINISH FLOOR ELEVATION BELOW STREET ELEVATION)

LOT GRADING NOTES:
1) GRADING AROUND FOUNDATIONS SHALL MEET CITY BUILDING CONSTRUCTION ORDINANCE 2009-376, INCLUDING EXCEPTIONS TO LAKE RIDGE SUBDIVISIONS.
2) FINISH GRADING SHALL NOT EXCEED A 4' TO 1' (25%) SLOPE.
3) DRAINAGE SHALL BE TOWARDS THE STREET (TYPE A). IF THE TOPOGRAPHY DOESN'T ALLOW TYPE A DRAINAGE, TYPE B DRAINAGE SHALL BE TO A ESTABLISHED DRAINAGE WAY OR TO A DRAINAGE EASEMENT. A GRADING PLAN BY AN CIVIL ENGINEER REGISTRERED IN TEXAS SHALL BE PROVIDED FOR THE BUILDING PERMITS FOR LOTS MEETING THE CONDITIONS TYPE B ABOVE OR NOT A TYPICAL LOT LAYOUT. SEE CITY ORDINANCE 2009-376, R401.3.
4) RETAINING WALLS SHALL BE PROVIDED UNDER CONDITIONS DESCRIBED IN THIS SHEET. IF DRAINAGE FLOWS OVER OR ARDUND RETAINING WALLS, PERMANENT EROSION CONTROL MEASURES SHALL BE TAKEN AND REFLECTED IN THE GRADING PLAN OR RETAINING WALL PLANS. THE FOOTING FOR RETAINING WALLS SHALL BE AT LEAST ONE FOOT BELOW THE FLOW LINE ELEVATION OF A DRAINAGE WAY.
5) REFER TO SHEET SD 403 FOR SELECTION OF APPROPRIATE EROSION/SLOPE STABILIZATION OF DRAINAGE CHANNELS.

LEGEND

CUT – NATIVE MATERIAL REMOVED

FILL – SELECT MATERIAL ADDED & COMPACTED

EXISTING NAT. GROUND MATERIAL

NOTES BY SYMBOL ○:
① LOTS SHALL BE GRADED TO DRAIN SURFACE WATER AWAY FROM FROM FOUNDATAION WALLS. THE SLOPE OF THE GRADING SHALL FALL DOWNHILL FROM THE FOUNDATION AT A MINIMUM OF 6 INCHES FOR LEAST 10 FEET (5.0 %). IF THE CONDITIONS ARE SUCH TO PROHIBIT 10 FEET SEPARATION FROM THE WALL OR LOT LINES, A IMPERVIOUS SURFACE OR PERMANENT EROSION MATERIAL CAN BE UTILIZED TO CHANNEL DRAIANGE, BUT IT MUST MAINTAIN A MINIMUM 2% SLOPE AWAY THE BUILDING OR STRUCTURE.
② TYPE A LOT GRADING SHALL SET THE FINISH FLOOR ELEVATION AT A MINIMUM OF TWO (2) FEET ABOVE THE STREET'S TOP OF CURB OR THE STREET'S CROWN ELEVATION. ALL LOT DRAINAGE SHALL BE DIRECTED TOWARDS THE STREET. IF THE TOPOGRAPHY DOES NOT ALLOW DRAINAGE TOWARDS THE STREET, USE TYPE B LOT GRADING; SEE NOTE 3 BELOW.
③ TYPE B LOT GRADING SHALL BE IMPLEMENTED FOR LOTS DRAINING AWAY FROM THE STREET AND THE EXISTING GRADE AT FOUNDATION IS MORE THAT TWO FEET BELOW THE STREET ELEVATION. THE FOUNDATION SHALL BE ELEVATED A MINIMUM OF TWO (2) FEET ABOVE THE EXISTING GRADE AT THE HIGHEST POINT ALONG THE PERIMETER OF THE FOUNDATION FOOTPRINT.
④ FINISHED GRADES SHALL NOT EXCEED 4' TO 1' (25%) SLOPE.
⑤ RETAINING WALLS SHALL BE LOCATED NO LESS THAN DISTANCE "A" WHEN DISTANCE "A" EQUALS HEGHT "B". IF DISTANCE "A" IS LESS THAN HEIGHT "B" OR THE WALL IS MORE THAN 4 FEET TALL, THE WALL SHALL BE DESIGNED BY ENGINEER REGISTERED IN THE STATE OF TEXAS.
⑥ THE DISTANCE "D" FOR RETAINING WALLS LOCATED FROM THE R.O.W. SHALL BE TWICE THE WALL HEIGHT "C". IF DISTANCE "D" IS LESS THAN 2X HEIGHT "C" OR THE WALL IS MORE THAN 4 FEET TALL, THE WALL SHALL BE DESIGNED BY ENGINEER REGISTERED IN THE STATE OF TEXAS.

RESIDENTIAL LOT LAYOUTS AND PRIVATE DRIVEWAY CULVERTS STANDARD DETAILS

CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

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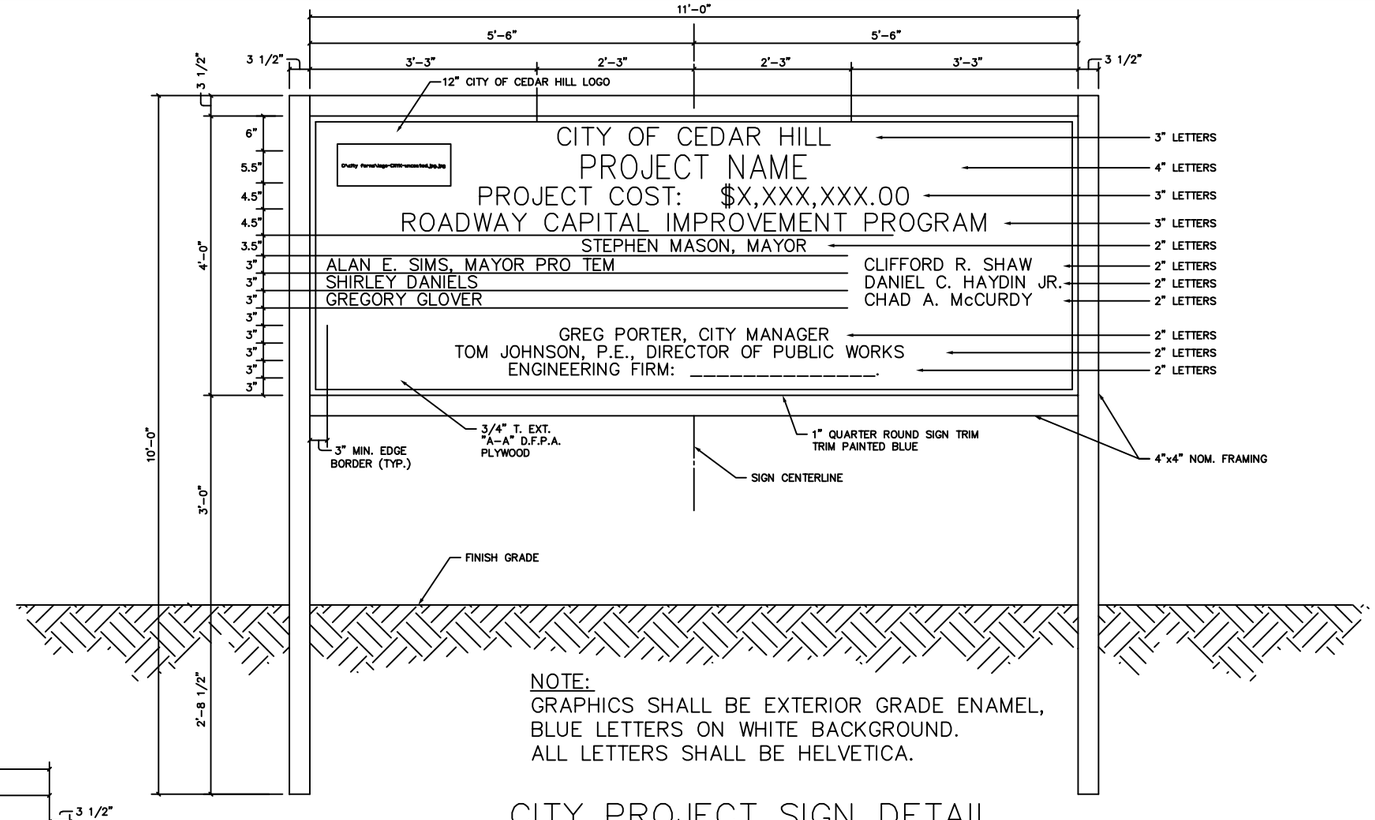
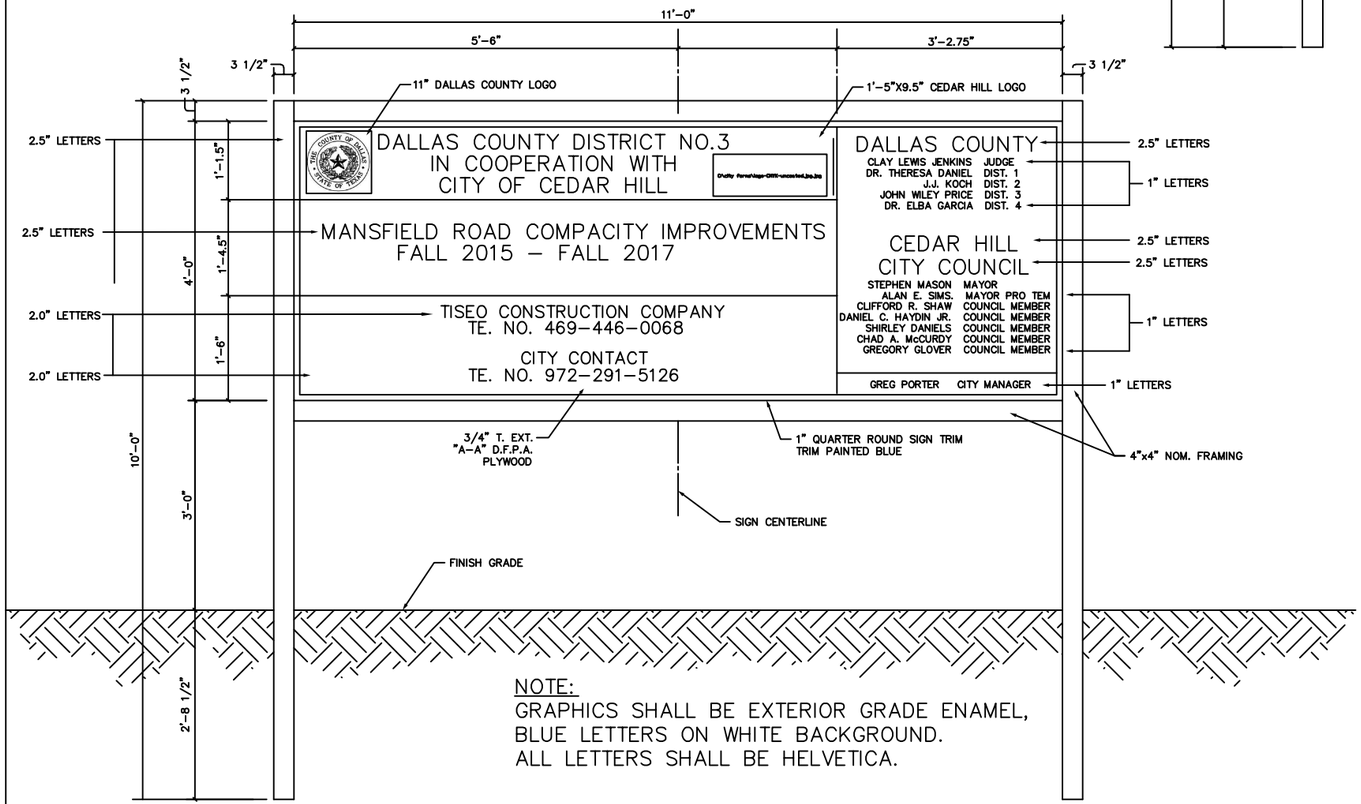
RGW			MAR 2010	NOT TO SCALE		SD-600

SD-600.DWG



NOTE:
GRAPHICS SHALL BE EXTERIOR GRADE ENAMEL,
BLUE LETTERS ON WHITE BACKGROUND.
ALL LETTERS SHALL BE HELVETICA.

CITY PROJECT SIGN DETAIL



NOTE:
GRAPHICS SHALL BE EXTERIOR GRADE ENAMEL,
BLUE LETTERS ON WHITE BACKGROUND.
ALL LETTERS SHALL BE HELVETICA.

JOINT PROJECT SIGN DETAIL

PROJECT SIGN
STANDARD DETAILS
CITY OF CEDAR HILL, TEXAS
ENGINEERING DIVISION

DESIGN	DRAWN	CHECKED	DATE	SCALE	REVISED	FILE NO.
			MAY 2021	NOT TO SCALE	RGW	SD-700

SD-301.DWG