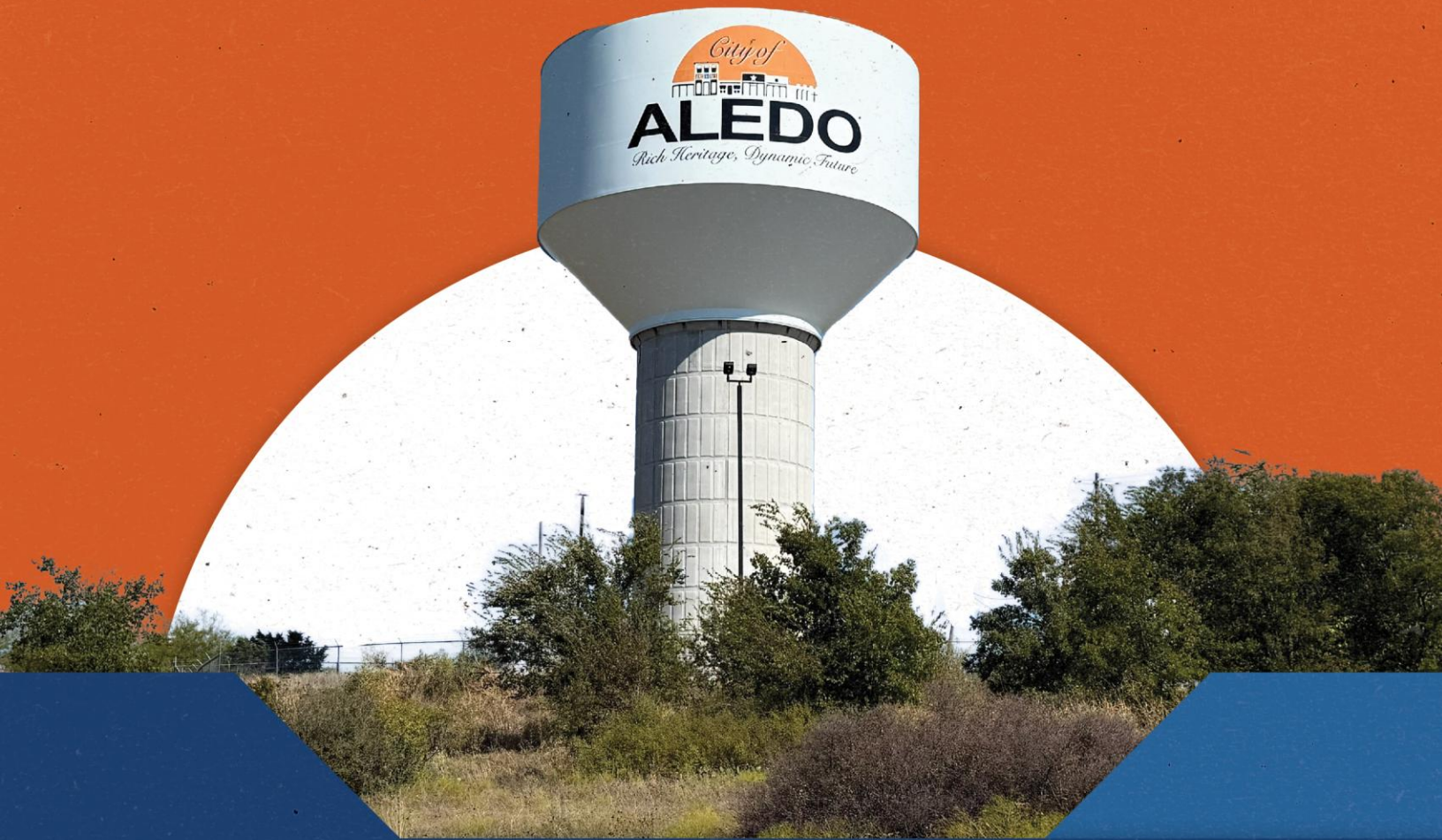




DESIGN STANDARDS MANUAL

APRIL 2026



CITY OF
ALEDO

200 Old Annetta Road Aledo, Texas 76008

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SECTION 1. PURPOSE

The Design Standards Manual contains the various construction criteria, techniques and details that are the minimum City of Aledo (City) requirements for the design and construction of public facilities. This data is intended for use by Developers and engineers and is intended to provide design standards for the public facilities associated with a proposed development or the City's Capital Improvements Projects.

In the event specific circumstances dictate additional requirements, it shall be the responsibility of the Developer's engineer to provide the necessary details for construction to be approved by the City's reviewing engineer.

All water, sewer, street, drainage or other installation shall be in accordance with current City Standards and specifications. In general, all construction shall follow provisions of the most current version of the "Public Works Construction Standards – North Central Texas – Standard Specification/Standard Drawings, North Central Texas Council of Government", except as provided herein.

SECTION 2. AMENDMENT PROCEDURES

The design and details contained in this manual may be modified by administrative action of the City and subsequent resolution by the City Council at such times as may be appropriate in keeping with the most up to date construction techniques and specifications.

SECTION 3. ABBREVIATIONS

Abbreviations used in this manual are as follows:

R.C.	Reinforced concrete
H.M.A.C.	Hot mix asphaltic concrete
P.I.	Point of intersection

SECTION 4. DEFINITIONS

The definitions contained in Chapter 66 – Unified Development Code within the City of Aledo's Code of Ordinances shall apply to the terms and words used herein.

SECTION 5. ENGINEERING PLAN AND PLAT STANDARDS

ENGINEERING PLANS – GENERAL

1. Each sheet of the Engineering plans shall be prepared, sealed, and signed by a civil engineer, licensed to practice engineering in the State of Texas and experienced in street, drainage and utility design.
2. Plans shall be drawn on standard 22" x 34" sheets with the City's title block, if applicable.
3. All elevations shall be referenced to the City datum.
4. Preliminary street, drainage and utility layouts shall accompany the submittal of the Preliminary Plat.
5. Final construction street, drainage and utility or other plans, including specifications, shall accompany the submittal of the Final Plat, and shall be furnished in the following format:
 - A. Cover Sheet containing:
 - ▶ Project title
 - ▶ Legal property description

- ▶ City name
 - ▶ Vicinity map
 - ▶ Owner, Engineer, and Surveyor's name, address, email address, and telephone number
 - ▶ Project title in small print placed vertically along the right border
 - ▶ Sheet index
 - ▶ Signature block (if applicable)
 - ▶ Engineer's name, seal, and engineering firm name and registration number, in accordance with Chapter 137 of the Texas Engineering Practice Act.
- B.** Copy of applicable Plat bound with plans. The recorded Final Plat shall be bound with the as-built drawings.
- C.** Drainage Area Map and calculations with all existing contours, existing and proposed FEMA limits, existing and proposed storm drains, and/or other drainage facilities.
- D.** Site Plan indicating the location and width of all proposed and existing street and driveway approaches noting the back-of-curb radii, parking areas, and fire lanes.
- E.** Utility Plan indicating the location and size of all existing and proposed water and sanitary sewer lines. Also show the location of all existing and proposed fire hydrants adjacent to the site including the maximum coverage radius of each as outlined in later sections of this manual.
- F.** Plan and Profile Sheets for roads, sewer, storm drains, flumes, water lines (12-inch diameter and larger), and channels. Stationing shall be generally left to right with stationing beginning at the downstream end for all sewers, storm drains, and channels.
- G.** Stationing shall be included on the plan view as well as the profile for all roads, water, sewer, storm drain and channel sheets. Elevations shall be calculated and provided in all profiles as indicated below.
- ▶ Straight grade-provide elevations at a maximum interval of 100 feet.
 - ▶ Vertical curve-provide elevations at the beginning and ending points and at a maximum interval of 25 feet in between.
- H.** Details for improvements which are to become public.
- I.** Streetlight plans.
- J.** Traffic striping and signage plans, if applicable. Traffic signal plans, if required.
6. Horizontal scale shall be 1-inch = 40 feet. Vertical scale shall be 1 inch = 4 feet, unless otherwise approved by City.
7. Construction plans will be reviewed by the City's reviewing engineer and permitted after all comments have been resolved. Construction must start within three years following the signature approval. Plans for projects which have not commenced construction within this time must be resubmitted for a new review and shall be subject to all requirements and standards of the then existing Design Standards.
8. All easements and rights-of-way required to serve the project shall be provided to the City at Developer's cost. If a Developer is unable to obtain an off-site easement/right-of-way, the City may exercise its right of eminent domain; but all costs incurred shall be borne by the Developer. See *Section 14 – Easement Standards* for additional easement requirements.

DRAINAGE PLANS

1. A preliminary drainage layout/study at a legible scale shall be submitted concurrently with the submittal of the Preliminary Plat. The **layout/study** shall cover the total property that is to be developed, including off-site drainage and outfalls. Off-site drainage areas must note the source and date of contour or topography information. 2019 LiDAR contours are available on TNRIS Data Hub or NCTCOG and may be used unless more accurate data is available. Existing and proposed easements shall be shown.
2. Preliminary drainage layout/studies shall include the following:
 - A.** An overall plan, showing the existing topography at a contour interval of two feet, except for terrain with an average slope of less than two percent, where one-foot contours are required. Both existing

and proposed contours shall be shown. Information shall be provided for each of the following: Existing Conditions, Proposed Conditions, and Ultimate Conditions.

- B.** A drainage area map at a legible scale.
 - C.** Existing and proposed drainage facilities both on-site and off-site.
 - D.** Existing improvements, or existing infrastructure and appurtenances, such as, but not limited to curb and gutter, pavement, sidewalks and driveways, storm sewers, inlets, manholes, culverts, streetlight and traffic equipment, fences, utility lines and structures, water meters, power poles and guy wires, etc.
 - E.** Supporting design calculations with typical details for all proposed drainage facilities, (i.e., bridge, culverts, storm drain, channels, street capacities, etc.) along with sufficient detail to show that an adequate outfall is provided.
 - F.** Preliminary calculations to show adequate drainage capacity in streets on a five-year frequency and in curb on a 100-year frequency.
3. Design shall provide for a minimum distance from top of curb to inlet depth pipe of 2.5 feet. As a standard, inlets should typically contain a depth of 4 to 4.5 feet (or otherwise approved).
 4. For construction plans, the appropriate hydraulic grade line (HGL) or water surface profile shall be plotted with all drainage design. Provide calculations in a standard HGL table format. Capacity, design discharge, velocity, and velocity head shall be noted on each drainage facility segment in the profile whenever one or more these parameters changes.

WATER AND SANITARY SEWER PLANS

1. A preliminary utility layout, at a scale of not more than 1" = 100', (or otherwise approved) will be submitted concurrently with the submittal of the Preliminary Plat. The layout shall show all existing and proposed water and sanitary sewer lines, along with existing and proposed appurtenances such as manholes, valves, and fire hydrants. Easement requirements shall also be shown.
2. Final construction plans shall be consistent with the approved preliminary utility layout.

OTHER UTILITIES – PLANS

1. The Developer shall furnish all easements and right-of-way necessary for construction of electrical, gas, cable television, and telephone service to the proposed subdivision.

STREET PLANS

1. Streets will be shown on plan and profile sheets, at a horizontal scale of 1" = 40' and a vertical scale of 1" = 4'; oriented with North at the top or to the right of the sheet and the stationing increasing from the left to the right. Generally, each street shall be shown on a separate plan and profile sheet.
2. The plan will show property lines; lot and block numbers; intersecting streets with their widths; curb-lines and returns; valley gutters; drainage flow arrows; centerline stationing; curve stationing and data; inlets and culverts; existing utilities; benchmarks and any other features to show the extent of the work.
3. The profile will show the existing ground at the center line and both property lines; top-of-curb profile; percent grades; beginning and ending elevations; P.I. with intersecting streets; locations of changes in grade; high point and low-point elevations with station and storm drainage facilities with size and grade.
4. A geotechnical report shall be provided including soil borings and analysis, pavement thickness, and cement or lime content to provide a recommended pavement design. Street plans shall comply with the minimum requirements below:

A. Local Streets

- (i) 50 feet of right-of-way width in accordance with City's Unified Development Code.
- (ii) Pavement Requirements:

- ▶ Pavement widths of 26 or 30 feet in accordance with City's Unified Development Code.
- ▶ 5-inch crown (parabolic)
- ▶ 5-inches reinforced concrete (R.C.) over 6-inches of lime or cement stabilized sub-grade (6-inch curb); or
- ▶ 6-inches (1 ½ - inch surface course, 4 ½ - base in two courses) hot mix asphaltic concrete (H.M.A.C.) (7-inch curb/2-foot gutter) over 8-inches of lime or cement stabilized sub-grade.

B. Collectors

- (i) Major: 70 feet of right-of-way width in accordance with City's *Unified Development Code*.
- (ii) Minor: 60 feet of right-of-way width in accordance with City's *Unified Development Code*.
- (iii) Paving Requirements:
 - ▶ 6-inch crown
 - ▶ 6-inches reinforced concrete (R.C.) over 6-inches of lime or cement stabilized sub-grade (6-inch curb).
 - ▶ Collector streets in industrially zoned areas, or in the City's opinion will be subjected to regular use by vehicles of excess weight, require 7-inch R.C. over a 6-inch lime or cement stabilized sub-grade.

C. Arterials

- (i) Major: 110 feet of right-of-way width in accordance with City's *Unified Development Code*.
- (ii) Minor: 80 to 100 feet of right-of-way width in accordance with City's *Unified Development Code*.
- (iii) Paving Requirements:
 - ▶ 8-inch crown
 - ▶ 8-inches of R.C. over a 6-inch lime or cement stabilized sub-grade, (unless required otherwise by the City's Thoroughfare Plan or traffic analysis).

D. Rural Streets

- (i) This section applies for streets within the City Limits or for property where an annexation petition has been submitted for City approval.
- (ii) 60 feet of right-of-way width and 10 feet of dedicated easement on each side in accordance with City's *Unified Development Code*.
- (iii) Pavement Requirements:
 - ▶ Pavement widths of 28 feet in accordance with City's *Unified Development Code*.
 - ▶ 5-inch crown
 - ▶ 6-inches reinforced concrete (R.C.) over 6-inches of lime or cement stabilized sub-grade (7-inch curb)
 - ▶ Curb and gutter is not required and borrow ditches are allowed for drainage (minimum three feet depth with side slopes no deeper than 3:1 on the back slope and 4:1 on the front slope).

- E.** The requirements set forth in this Section may be revised as required by the City's Thoroughfare Plan, a traffic study, or other special circumstances.

TRAFFIC PLANS

1. All developments, unless otherwise directed by the City, are required to prepare and submit a Traffic Impact Analysis (TIA) Worksheet, accompanied by a conceptual site plan, for review by the City. See *Appendix* for the worksheet.
 - A.** The TIA Worksheet must be prepared by a licensed professional engineer in the State of Texas using trip generation information in the latest edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. If approved by the City, other sources for trip generation information

may be used if provided detailed trip generation data from at least three (3) sites with development-specific land uses not included in the *Trip Generation Manual*.

- (i) Peak hours outside of those included in the TIA Worksheet may be required for consideration dependent on the proposed land use (i.e., religious sites, retail sites, etc.).
- B. The conceptual site plan should depict the development's proposed land uses, building square footages, and proposed access locations.
- C. The City will review the TIA Worksheet and conceptual site plan to determine the need for a Traffic Impact Analysis (TIA). In general, if a proposed development is anticipated to generate 100 or more peak hour vehicle trips, a development contains 50 residential units or more, a non-residential development requires 200 parking spaces or more, or in the opinion of the City, traffic congestion may result from the development, a TIA will be required. General TIA trip generation thresholds are provided below:
 - (i) All Projects
 - ▶ TIA Worksheet
 - At the City's discretion, the City may waive the need for a TIA Worksheet for sites with negligible site-generated traffic (i.e., one (1) single-family home).
 - (ii) 100+ Peak Hour Vehicle Trips
 - ▶ TIA Required
 - ▶ Scenarios including Existing, Build Out Background (Post-Construction Year, without site traffic), and Build Out (Post-Construction Year, with site traffic)
 - ▶ Study area including intersections and roads anticipated to be significantly impacted by the site (generally within ½-mile of the site at the discretion of the City), in addition to site access locations
 - (iii) 500+ Peak Hour Trips
 - ▶ TIA Required
 - ▶ Scenarios including Existing, Build Out Background, Build Out, Horizon Background (5 Years beyond the Build Out Year, without site traffic), and Horizon (5 Years beyond the Build Out Year, with site traffic)
 - ▶ Study area including intersections and roads anticipated to be significantly impacted by the site (generally within 1 mile of the site at the discretion of the City Engineer), in addition to site access locations
 - (iv) If a development is proposed in phases, the anticipated completion year of each phase may be required to be evaluated with, and without, site traffic.
- 2. If a TIA is determined to be required for a proposed development, prior to beginning the TIA, a scoping memorandum shall be submitted to the City for review and comment. The scoping memorandum must be approved by the City prior to beginning the TIA. Upon request, the City may meet to discuss scoping memorandum comments. The scoping memorandum should include the following:
 - A. Overview of the project
 - B. Definition of the proposed study intersections
 - C. Proposed data collection (i.e., peak hour turning movement counts at the study intersections while schools are in session)
 - D. Trip generation
 - E. Generalized trip distribution percentages (i.e., X% to/from the east along Y road)
 - F. Proposed background growth methodology
 - (i) The City may provide adjacent development information to be included in future conditions
 - G. Proposed evaluations to be included in the TIA

3. The following elements shall be included in a TIA report, at a minimum:

A. Introduction

- (i) Provide a brief overview of the purpose of the study, location of the site, and proposed land uses and access locations.
- (ii) Provide the current conditions of the site, including existing land uses and zoning.
- (iii) Describe the study intersections being evaluated and provide a vicinity map to show the study area and proposed site access locations.

B. Existing Roadway Conditions

- (i) Describe all major roadways in the site's vicinity that are anticipated to be impacted by the development (i.e., all roadways included in study area). Identify the existing cross sections, speed limits, whether it is a TxDOT facility, and number of access locations proposed along the facility. Include the ultimate thoroughfare classifications and cross sections, as well as existing pedestrian infrastructure or lack thereof.
- (ii) Provide an exhibit showing the existing intersection lane assignments and traffic controls at the study intersections.
- (iii) Describe any known projects in the study area that are anticipated to impact the analysis. This may include intersection improvements or roadway projects.
- (iv) Provide an exhibit showing the existing peak hour turning movements at the study intersections. Typically, this is the highest hourly volumes from 7-9 AM and 4-6 PM. Both AM and PM peak hour volumes should be included for evaluation purposes.

C. Trip Generation

- (i) Describe the methodology used to determine the proposed development's trip generation. Provide a table showing the rates used and the resulting daily and peak hour trip generations. Each peak hour to be analyzed should be included in the table. Any impacts due to pass-by or internal capture that are being accounted for should be described and included in the table. If the development is proposed to be constructed in phases, the trip generation for each phase should be provided.

D. Trip Distribution and Traffic Assignment

- (i) An estimate of the directional distribution of site traffic entering and exiting the proposed development should be presented. The directional distribution of the development should be based on existing traffic patterns, access locations and configurations, and future study area roadway network, as applicable. Provide an exhibit clearly communicating the trip distribution assumptions for the overall study area and at each study intersection and access location. The exhibit should distinguish between entering and exiting patterns. Multiple trip distributions may be needed for phases developments to reflect changing traffic patterns resulting from additional land uses and access locations provided in subsequent phases.
- (ii) The resulting traffic assignment should be provided at each study intersection and access location during the peak hours evaluated.
- (iii) Exhibits illustrating the pass-by distribution and resulting assignment should be provided if being evaluated.

E. Future Traffic Volumes

- (i) Provide a methodology for the determination of a compounding growth rate to account for background growth in future conditions.
- (ii) Provide a table summarizing the historical traffic volumes, model projections, etc. used to determine the growth rate.
- (iii) Describe any adjacent developments being included in addition to the background growth rate, as applicable, and provide those developments' site traffic throughout the study area.
- (iv) Provide exhibits for the peak hour turning movement counts in the future analysis scenarios (with, and without, site traffic).

F. Access Evaluations**(i) Sight Distance Analysis**

- ▶ Guidelines provided in the AASHTO Green Book should be used to determine the required intersection sight distance required for the proposed access locations. The analysis should consider Left-turn from Stop (Case B1), Right-turn from Stop (Case B2), and Left-turn from Major Road (Case F). Provide the required sight distances at each access location.
- ▶ Field observations should be conducted to confirm adequate sight distance is provided at each proposed project access location. Provide a photolog for the intersection sight distance for all proposed access locations.

G. Turn Lane Analysis

- (i) Each proposed access location should be evaluated for turn lane needs based on the most future analysis scenario.
- (ii) Left-turn lanes shall be provided at all median openings where left-turns are allowed on streets with medians. For roadways without a median, left-turn and right-turn lanes are required when warrants provided in the NCHRP *Report 457* are satisfied. Provide the NCHRP *Report 457* worksheets for each proposed access location during the evaluated peak hours of the development.
- (iii) The determination of turn lane needs along a TxDOT roadway shall be evaluated using TxDOT criteria.
- (iv) If the development is anticipated to contribute traffic to existing turn lanes, the 95th-percentile queue length in the most future analysis scenario shall be confirmed to be adequately accommodated by existing infrastructure.

H. Access Spacing

- (i) The concept plan shall provide dimensions for the spacing between all proposed access locations and the nearest upstream and downstream intersections or driveways.
- (ii) The spacing of proposed access locations is subject to approval by the City.
- (iii) The evaluation of access spacing along a TxDOT roadway shall be analyzed using TxDOT criteria.

I. Intersection Capacity Analysis

- (i) Provide an overview of the scenarios being evaluated and intersection analysis tool being used. The target level of service (LOS) for traffic analysis purposes must meet the requirements of the City's *Unified Development Code*.
- (ii) When reporting LOS, the model should account for overall intersection peak hour factors and heavy vehicle percentages from the data collection used in all analysis scenarios in the respective peak hours.
- (iii) A table shall be provided that identifies the stop-controlled approach delays and LOS at two-way stop-controlled intersections. All intersection approaches and overall intersection delays in seconds and LOS shall be included in the table for all-way stop-controlled and signalized intersections.
- (iv) For any intersection or approach projected to operate at LOS D or worse, provide mitigations necessary to improve operations to acceptable LOS. Provide the mitigated intersection or approach delays and LOS in a table, as applicable.

J. Other Considerations

- (i) Site-specific evaluations may be required based on the context of the proposed development, including thoroughfare capacity analyses, crash history evaluations, on-site queue management plans, detailed pedestrian or bicyclist considerations, etc.

K. Conclusions and Recommendations

- (i) Summarize the conclusions of the analysis included in the report and all resulting mitigation measures recommended. All evaluations should be discussed, including if concluded that no mitigations are recommended.
 - L. The TIA must be prepared and sealed by a licensed professional engineer in the State of Texas. The City will review the TIA and provide comments. Once comments have been addressed and the TIA has been approved by the City, the approval is valid for 24 months, provided that significant changes in the development proposal or surrounding conditions have not occurred. The TIA shall be revised if the proposed land use is changed significantly to generate greater than 10% more trips than evaluated in the TIA, site access locations are modified, or the initial TIA assumptions are no longer valid.
- 4. Traffic control signals should not be installed unless one, or more, of the signal warrants are met in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD). The satisfaction of a warrant or warrants is not in itself justification for a signal. Traffic signals should only be used where an Engineering Study indicates the installation of a traffic signal will improve the overall safety and/or operation of the intersection. If these requirements are not met, a traffic signal should neither be put into operation nor continued in operation (if already installed).
- 5. In instances where the City determines the need for traffic signals due to a development, the Developer shall provide engineered plans, specifications, and bid documents for construction of the traffic signal(s) and shall construct and pay for the required signals.

FINAL CONSTRUCTION PLANS

1. Submittal Requirements:
 - A. A PDF of the final engineering plans shall be submitted for review, in conjunction with a Final Plat by uploading the submittal to the City's permitting software.
 - B. After approval of the final engineering plans, PDF of the approved final plans shall be provided to the City.
2. General:
 - A. Final construction plans shall show all existing and proposed improvements including, but not limited to curb and gutter, pavement, sidewalks and driveways, storm sewers, inlets, manholes, culverts, streetlight and traffic equipment, public fences, utility lines and structures, water meters, power poles and guy wires, etc.
3. Drainage Final Plans:
 - A. Final construction plans (horizontal scale 1" = 40', vertical scale 1" = 4') shall be consistent with the approved preliminary drainage layout/study and shall provide a drainage system which is fully functional and readily maintainable. Existing and proposed water, sewer or other underground facilities of private utilities or other entities shall be shown on the plans. It shall be the responsibility of the Developer and Developer's engineer to see that this information is correctly shown.
4. Water Final Plans:
 - A. Final construction plans (minimum scale of 1" = 100') will show all lines, valves, fire hydrants, services and special connections. The sanitary sewer system, drainage lines or lines of other entities will be shown on the water plans. It shall be the responsibility of the Developer and their engineer to confirm this information is correctly shown. Minimum depth to top of water lines shall be 42-inches from proposed ground surface, or as necessary to clear conflicts. Where lines are to be installed in street right-of-way, profiles will be required only for lines of 12-inch diameter or larger. In other instances (such as easements), a profile (or top of pipe elevations at regular station intervals) will be required for any size line. Centerline stations for services and appurtenances are required for all lines of any size.

- B. Where water mains are to be installed in rights-of-way having road constructed without curb and gutter, a plan and profile sheet shall be submitted with the construction plans showing the proposed water main profile, the existing street grades, and the preliminary future top-of-curb grades for at least 300 feet either side of the boundary of the proposed subdivision.
 - C. A profile, or top of pipe elevation table, is required also when the water main is to be constructed outside street right-of-way.
5. Sewer Final Plans:
- A. Final sewer plans and profiles, at a horizontal scale of 1" = 40' and a vertical scale of 1" = 4', will show similar information as shown on the street plan and profiles; grade line with stations and elevations at each grade break; line size with percent slope to two decimal places, service connections with station and lot to be served; elevation of the service at the curb-line; manholes with flow lines and top elevations; water lines, storm drain lines or underground lines of other entities. It shall be the responsibility of the Developer and their engineer to confirm this information is correctly shown. Minimum depth to sewer flow lines shall be 48-inches from proposed ground surface, unless otherwise approved.
 - B. If a new sanitary sewer line is to be constructed adjacent to an existing street, the profile will need to include the existing top of curb grades.

PLAT SUBMITTAL (CAD) REQUIREMENTS

1. All Plats must be drawn to a legible scale.
2. PDF of the Final Plat shall be uploaded to the City's permitting software for review.
3. The Plat should include the following information:
 - ▶ Border Frame
 - ▶ Existing Building Line
 - ▶ Existing Center Line
 - ▶ Existing Drainage and Utility Easements
 - ▶ Existing Flood Plain
 - ▶ Existing Lots and/or Tracts
 - ▶ Existing Street Names
 - ▶ Existing Survey Abstract
 - ▶ Existing Iron Rods
 - ▶ Proposed Setbacks
 - ▶ Proposed Block
 - ▶ Proposed Centerline
 - ▶ Proposed City Limit Line
 - ▶ Proposed Boundary Line
 - ▶ Proposed Boundary Line Dimension Data
 - ▶ Proposed Drainage and Utility Easements
 - ▶ Proposed Flood Plain / Flood Plain Easement
 - ▶ Proposed Iron Rods
 - ▶ Proposed Lots and/or Tracts
 - ▶ Proposed Street Names
4. The proposed Plat shall tie to survey control monuments accepted by the City. The Plat shall contain a note describing control points to which dimensions are referenced.
5. CAD files must be provided in the Texas Coordinate System of 1983 (NAD83), North Central Zone (4202)..

SECTION 6. GOVERNING SPECIFICATIONS AND DETAILS

GENERAL

1. All platted lots shall be connected to a public water and sanitary sewer system in accordance with the requirements set forth in the City's *Unified Development Code* and City Code *Chapter 81 - Utilities*.
2. The design for all improvements shall be in accordance with the following regulations:
 - A. City Design Standards Manual
 - B. The *Standard Specifications and Drawings for Public Works Construction* as published by the North Central Texas Council of Governments (NCTCOG)
 - C. 30 Texas Administrative Code (TAC) Chapter 290
 - D. 30 TAC Chapter 217
3. Any water main, sanitary sewer main, storm drainage infrastructure, and associated appurtenances not in complete conformance with City Design Standards Manual shall not be permitted, unless approved by the City.
4. Water, sanitary sewer mains, and storm drainage infrastructure within the City Limits, or property proposed to be annexed, shall be designed and constructed in accordance with design standards and specifications contained herein.

SECTION 7. WATER SYSTEMS

POLICY

1. Water mains adequate for domestic supply, and for fire protection needs, shall be installed to serve each lot in every subdivision in accordance with the City's *Unified Development Code*.
2. In general, water main design shall meet the intent of the City's Water Master Plan. On a case-by-case basis, the City may elect to require infrastructure to be sized beyond the capacity required to meet the demand for the specific development, requiring the Developer to oversize the infrastructure as part of a separate Development Agreement in accordance with the City's *Unified Development Code*.
3. Any new construction requiring the extension of public water mains requires a Development Agreement, which shall be prepared in accordance with the City's *Unified Development Code*.
4. All water mains constructed within a proposed subdivision shall be extended to the perimeter of the proposed subdivision to allow for future extension of the water system into adjacent properties in accordance with the City's *Unified Development Code*.

EASEMENT REQUIREMENTS FOR WATER MAINS

1. Developer shall, without charge to the City, furnish all necessary easements and rights-of-way for off-site and on-site utilities required to serve the development. See *Section 14 – Easement Standards* for further requirements.

MINIMUM WATER MAIN SIZE

1. The minimum water main size in all areas shall be 8 inches in diameter.
2. Larger diameter mains will be required if called for by the Water Master Plan, or other analysis. Larger diameter mains will also be necessary if fire flow requirements so dictate.

- A.** A fire flow analysis may be required by the City if deemed necessary to determine adequate proposed water main sizes.

WATER MAIN MATERIALS

1. All materials and workmanship incorporated in water system improvements shall be in accordance with the City's Design Manual contained herein. Water lines shall be minimum Pressure Class 305, AWWA C900, DR14.

HORIZONTAL/VERTICAL ALIGNMENT AND CLEARANCE REQUIREMENTS

1. Minimum depth of cover over all water mains shall be three and one-half feet (42-inches).
2. Clearance Requirements
 - A.** Storm Drain – The minimum horizontal separation between any water main and a storm drain facility shall be 2.5 feet, unless approved otherwise by the City.
 - B.** Sanitary Sewer Mains – In accordance with Texas Commission on Environmental Quality requirements, the minimum horizontal separation between any water main and a sanitary sewer main shall be nine feet measured from outside edge of pipe to outside edge of pipe. When the nine-foot horizontal separation distance cannot be achieved, or if a water main is crossing a sanitary sewer main, the mains must meet separation requirements set forth in 30 TAC Chapter 290.44.

SERVICE LINE AND WATER METER REQUIREMENTS

1. Without cost to the City, the Developer shall install all water lines, including customer services and meter boxes (excluding water meters).
2. Residential water services shall not be directly connected to water mains 16-inches in diameter or greater. Smaller, parallel water mains are required to provide water service connections and shall be extended across the full-frontage of the development.
3. Typical Location of Water Services
 - A.** All water services shall be placed at the lot line, between lots, where possible and all water meters shall be located in City right-of-way or inside a water line easement, unless approved otherwise by the City.
 - B.** In Urban subdivisions, location of water meters shall be as per Standard Detail. Where sidewalks are adjacent to the street, meter boxes shall be required between the sidewalks and the property lines. Water services shall be plainly marked on the curb in accordance with the Standard Details.
 - C.** In streets without curbs, water meters shall be located 2 feet from the property line.

FIRE LINES

1. The maximum length of fire lines is 250 feet from the backflow preventer or private hydrant to the City water main.
2. Fire lines must be installed in accordance with the City's adopted *Fire Code*.

VALVES

1. All tee intersections of public water mains shall include at least two gate valves.
2. All cross intersections of public water mains shall include at least three gate valves.
3. All dead-end water mains shall end with a valve and fire hydrant for flushing purposes. Dead-end mains shall not exceed 150 feet.

FIRE HYDRANTS

1. In all conventional single-family, or two-family, subdivisions, fire hydrant spacing shall not allow the fire hose lay distance to the main entrance of the building to exceed 500 feet, as measured along public right-of-way and/or emergency access easements.
2. Generally, in all other subdivisions, fire hydrant spacing shall not allow the fire hose lay distance to the main entrance of the building to exceed 300 feet as measured along public right-of-way and/or emergency access easements. For special commercial installation requirements, consult the City's adopted Fire Code.
3. Fire hydrants located on the opposite side of a major collector or arterial street, (i.e., pavement width greater than 40 feet), from a development shall not be considered when determining adequate fire hydrant coverage for a development.
4. All dead-end water mains shall end with a valve and fire hydrant for flushing purposes.

ALTERNATIVE WATER FACILITIES

1. All development within the jurisdiction of the City shall have an approved water supply and shall be required to connect to City facilities unless alternative arrangements have been approved in accordance with City Code Chapter 66 – *Unified Development Code*.

SECTION 8. SANITARY SEWER SYSTEMS

POLICY

1. In general, sanitary sewer mains shall meet the intent of the City's Wastewater Master Plan. On a case-by-case basis, the City may elect to require infrastructure to be sized beyond the capacity required to meet the demand for the specific development requiring the Developer to oversize the infrastructure as part of a Development Agreement in accordance with the City's Unified Development Code.
2. Any new construction requiring the extension of public sanitary sewer mains requires a Development Agreement, which shall be prepared in accordance with the City's Unified Development Code.
3. All sewer mains installed within a development must extend to the borders (full-frontage) of the subdivision as required for future extensions of the collection system regardless of whether or not such extensions are required for service within the development in accordance with the City's Unified Development Code.
4. No connection shall be made to any sanitary sewer within the City that will permit the entrance of surface water or waste which has other than domestic sewage characteristics without the special authorization of the City Council.

EASEMENT REQUIREMENTS FOR SANITARY SEWER MAINS

1. The Developer shall, without charge to the City, furnish all necessary easements and rights-of-way for off-site and on-site utilities required to serve the development. See *Section 14 – Easement Standards* for further requirements.

MINIMUM SANITARY SEWER MAIN SIZE

1. No sanitary sewer main shall be less than 8 inches in diameter.
2. Larger diameter mains will be required if called for by the Wastewater Master Plan, or other analysis.

SIZING SANITARY SEWER MAINS

1. All sanitary sewer mains shall be designed with consideration for the entire basin serving area subject to collection by the sewer in question. Additional requirements may be requested to be provided at the direction of the City.
2. The contributing sewage flow shall be determined on the basis of an average flow of 100 gallons per person per day without separate provisions for infiltration. The population density shall be based on 3 persons per single family unit but shall not be less than 9.5 persons per acre. For non-residential developments, the average flow shall be 35 gallons per day per employee/person/student proposed for the development. Outfall Sewers and Collector Sewers shall be designed on the basis of the following peaking factor formula:
 - ▶ $M = \text{Peaking Factor} = 1 + \frac{14}{4 + \sqrt{P}}$ (Harmon's Formula)
Where: P = Population expressed in thousands
 - ▶ Sewer line sizing procedure is as follows;
L = Load/person/day = 100 gal./person/day
A = Average load/person - **L/1440** = .0694 gal/min/person
T = Total average load of a given population T = A x # of persons in population (ultimate)
D = Design load = M x T = gal/min (GPM)
In certain areas, the design load (D) may need to be increased by an infiltration factor to be provided by the City.

SANITARY SEWER MAIN MATERIALS

1. All materials and workmanship incorporated in sanitary sewer system improvements shall be in accordance with the City's Design Manual contained herein. Sanitary Sewer lines shall be minimum ASTM D3034, DR 26 PVC mains.

HORIZONTAL/VERTICAL ALIGNMENT AND CLEARANCE REQUIREMENTS

1. Vertical curves in the sanitary sewer mains will not be allowed.
2. Clearance Requirements
 - A. *Storm Drains* – The minimum horizontal separation between any sanitary sewer main and a storm drain facility shall be equal to two and one-half feet or one-half times the depth of the sanitary sewer or storm drain, whichever is greater.
 - B. *Water Mains* – In accordance with Texas Commission on Environmental Quality requirements, the minimum horizontal separation between sanitary sewer main and water main shall be nine feet measured from outside edge of pipe to outside edge of pipe. When the nine-foot horizontal separation distance cannot be achieved, or if a water main is crossing a sanitary sewer main, the mains must meet separation requirements set forth in *30 TAC Chapter 217.53*.

SERVICE LINE AND CLEANOUT REQUIREMENTS

1. Sewer services shall be plainly marked on the curb in accordance with the Standard Details.
2. All services shall be placed at the center of each lot unless instructed otherwise by the City.
3. The maximum depth for all sewer services shall be 10 feet unless otherwise approved by the City.

MANHOLE REQUIREMENTS

1. Manholes are required at all points of change in alignment, grade, size, and material. Manhole spacing shall not exceed 500 feet.
2. Sewer mains which require more than an 18-inch difference in flow lines must be accommodated with a four foot inside diameter manhole with an external drop.
3. In general, all sanitary sewer mains shall end at a manhole. Cleanouts will not be allowed unless distance from manhole to cleanout is 250 feet or less.
4. Four foot inside diameter manholes will be required as sampling ports on all automotive repair and food handling facilities. The manhole must be located between the public sewer main and the grease trap.

LIFT STATIONS OR SEPARATE TREATMENT FACILITIES

1. The provisions for lift stations or separate treatment facilities will not be permitted unless, in the opinion of the City, there is no feasible alternative which can provide the necessary service to the proposed subdivision in accordance with the City's *Unified Development Code*.

ALTERNATIVE SEWER FACILITIES

1. A development may be approved with alternative sewer facilities in accordance with the criteria set forth in the City's *Unified Development Code*.

SECTION 9. STREET SYSTEMS

STREET CLASSIFICATION SYSTEM

1. Streets Are Classified As Follows:
 - A. Access or frontage road.** A street or road that provides access to adjacent properties along a freeway or expressway.
 - B. Approach street.** A new or existing street not adjacent to a subdivision being developed but which provides access or improved access to such subdivision.
 - C. Collector street.** A street that may be continuous through several neighborhoods, distributing traffic from the arterial street system. A collector street provides both land access and local traffic movements within neighborhoods.
 - D. Cul-de-sac.** A short street terminating in a turnaround.
 - E. Freeway or expressway.** A highway intended to move large volumes of traffic around and across the City without direct access to adjacent land.
 - F. Local or Residential street.** A street that provides direct access to abutting properties and connects to the collector street system. Residential streets should be short and discontinuous to discourage through traffic.
 - G. Minor arterial.** A street that interconnects and augments the principal arterial system with more land access at a lower level of traffic mobility. Due to high traffic volumes, direct access is closely controlled through City staff review of traffic study where deemed necessary.
 - H. Principal arterial.** A street that serves a major center of metropolitan activity, among the highest traffic volume corridors of trips into and out of the City. Due to the high traffic volume, direct access is closely controlled, through City staff review of traffic study where deemed necessary.
 - I. Thoroughfare (major street).** Designates principal traffic thoroughfares, more or less continuous across the City, which are intended to connect remote parts of the City or areas adjacent thereto

and act as principal connecting streets with State and Federal highways. Major streets are designated on the Comprehensive Land Use Plan and the thoroughfare plan of the City.

- J. Industrial or commercial street.** A street intended to serve traffic within an area of industrial or commercial development.
- K. Alley.** A public right-of-way intended to provide access to individual properties.
- L. Private street.** A street providing direct access to abutting properties which connect to the City's street system and is not owned, improved or maintained by a governmental entity.
- M. Private place.** A cul-de-sac providing direct access to abutting properties which connect to the City's street system and is not owned improved or maintained by a governmental entity.

STREET STANDARDS

1. Unless otherwise approved by the City, provisions shall be made for the extension of arterial streets in accordance with the thoroughfare plan of the City. Collector streets shall be provided for the circulation of traffic through the subdivision and connection to the major streets. Adequate local streets shall be approved to accommodate the subdivision.
2. Where they are not shown in the thoroughfare plan, the streets in the subdivision shall:
 - A.** Provide for the continuation or appropriate projection of existing principal streets in surrounding areas; or
 - B.** Conform to a plan approved or adopted by the City to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical; or
 - C.** Conform to a plan for street location or extension approved by the City Council after review by the Planning and Zoning Commission.
3. Local streets shall be designed so that their use by through traffic will be discouraged.
4. Where a subdivision abuts or contains an existing or proposed major street, the City may require such design as may be necessary for adequate protection of residential properties and to afford the separation of through and local traffic.
5. Where a subdivision borders on or contains a railroad right-of-way or freeway, the City may require a parallel street along each side of such right-of-way at a distance suitable for the appropriate use of the intervening land. The distance of a street from a railroad or freeway shall address the problem of approach grades and future grade separations.
6. More than two streets intersecting at a point shall be avoided. Angles of intersection for streets shall be in accordance with the City's *Unified Development Code*.
7. Streets designated to be permanently dead ended shall meet the requirements set forth in the City's *Unified Development Code*.
8. All streets should be designed to be in line with existing streets. When conditions require the centerlines to be offset, minimum offset distance shall be in accordance with the City's *Unified Development Code*. Greater centerline offsets may be required when necessary for traffic safety.
9. Street right-of-way width requirements shall be in accordance with the City's *Unified Development Code*.
10. Half-streets shall be prohibited, except where essential to the reasonable development of the subdivision in conformity with the other requirements of these specifications, and where the City finds it will be practicable to require the dedication of the other half when the adjoining land is subdivided. The other half of the street shall be dedicated at the time it is platted.
11. All streets within or abutting the proposed subdivision shall be paved in accordance with the City's standards and specifications. All paving shall be to the width specified on the thoroughfare plan or per its function and shall be constructed under the inspection of the City. The construction costs of all street improvements shall be borne by the Developer unless participation by the City has been approved.
12. Underground City-owned utilities required in the subdivision shall be placed under or across all streets after the rough grades are made, but prior to the paving being placed. Paving operations shall not be allowed to start until the utility work is complete.

13. Street grades shall be designed such that excessive sand deposition from too low a water velocity or pavement scouring from too high a velocity is avoided. The minimum street grade permitted shall be 0.50%. The maximum street grade shall be:
 - ▶ Local/Rural – 10%
 - ▶ Collector – 8%
 - ▶ Arterial – 6%
14. Unless otherwise approved by the City, generally, streets will be designed for the following design speeds (without super elevation);
 - ▶ Local / Rural – 30 MPH, no minimum
 - ▶ Collector (Minor) – 35 MPH
 - ▶ Collector (Major) – 40 MPH
 - ▶ Arterial – 45 MPH
15. Standard pavement widths for all classifications shall be in accordance with the City's *Unified Development Code*.
16. The minimum radius for curb returns at intersections shall be 20 feet to the face of curb , unless required to be larger to meet Fire Code requirements.
17. A tangent at least 100 feet long shall be introduced between reverse curves on arterial and collector streets.
18. Visibility triangles/easements shall be provided in accordance with the City's *Unified Development Code*.
19. Reinforced concrete valley gutters shall be required at all asphalt street intersections where gutter flowlines cross another street or at low points where water flow crosses the street.
20. Median openings shall be limited in accordance with the City's *Unified Development Code*.

ALLEY STANDARDS

1. Alleys are not preferred but may be allowed in certain cases as approved by the City.
2. Alleys serving residential areas shall have a minimum right-of-way width set forth in the City's *Unified Development Code*.
3. Alleys shall intersect a street at right angles or radially to curved streets.
4. Where two alleys intersect or turn at a sharp angle, an additional triangular area shall be dedicated to provide a minimum turning radius set forth in the City's *Unified Development Code*.
5. Alley paving should have a minimum grade of 0.50% and a maximum grade of 10%.
6. Dead-end alleys shall be no longer than 150 feet.
7. Maximum alley length shall be in accordance with the City's *Unified Development Code*.
8. Paving shall be reinforced concrete of type required for comparable streets construction of similar zoning. A geotechnical report shall be provided including soil borings and analysis, pavement thickness, and cement or lime content to provide a recommended pavement design.

BLOCK STANDARDS

1. See City's *Unified Development Code* for block standards.

SIDEWALK STANDARDS

1. See City's *Unified Development Code* for sidewalk standards.
2. Sidewalks shall be constructed in accordance with the City Standard Details.
3. Accessible ramps shall be constructed at the intersection of all streets or other locations as deemed necessary by the City and in accordance with American Disabilities Act (ADA) requirements.

DRIVEWAY ACCESS

1. To minimize traffic hazards created by numerous intersections along major thoroughfares, direct vehicular access from any residential lot to a minor or principal arterial street, or a thoroughfare is prohibited. In cases where platting prior to the effective date of this ordinance has allowed a residential lot to front on a principal arterial, a minor arterial, or a thoroughfare without a requirement for alternative access, driveway design must provide a "head-out" access, such as a circular drive or side entry garage.
2. Due to high traffic volume, direct access to a thoroughfare is closely controlled and the City may require the Developer to submit a traffic study performed by a licensed professional engineer, or traffic engineer.

DRIVEWAY STANDARDS

1. Residential Driveway Approaches
 - A. Residential driveway approaches shall be designed and constructed in accordance with the City Standard Details. See **Section 15**.
 - B. Width of Driveway Approaches:
 - ▶ Residential driveway approaches shall not be less than 11 feet in width or more than 18 feet wide measured at the property line. Specific exception to these criteria may be requested by the property owner. Any exception granted based on a specific design submittal must have the approval of the City.
 - C. Radius:
 - ▶ Residential driveways shall be constructed with the return curbs having rolled face disappearing at the sidewalk and joining the street curb with a minimum 5-foot radius and a maximum 10-foot radius, unless otherwise approved by the City.
 - D. Provision for Joint Approaches:
 - ▶ Driveway approaches shall be located entirely within the frontage of the premises served except that joint, or cooperative, drives (located within dedicated easements) with adjoining properties may be permitted. Joint driveway approaches may be required by the City. Requests for joint drive approaches must be made by all the interested parties and all property owners involved. The design of the joint driveway facilities must be submitted with the request to be approved by the City.
 - E. Residential Driveway Approaches at Street Intersections:
 - ▶ The drive approach on corner lots must be located to approximately line up with the side of the house or garage that is farthest from the intersection. The drive approach edge farthest from the street intersection must be within three feet of the far side of the house or garage, unless otherwise approved by the City.
 - F. Single and two-family lots will not be allowed direct access drives onto major thoroughfares.
2. Commercial/Industrial Driveway Approaches
 - A. Commercial and industrial driveway approaches shall be constructed in accordance with the City's Standard Details. See **Section 15**.
 - B. Width of driveway approaches:
 - ▶ The width of any commercial or industrial driveway approach shall not be less than 24 feet nor more than 35 feet measured along the property line. Divided driveways may be allowed on a case by-case basis upon approval by the City of a variance. Specific variance to this criterion may be requested by the Developer. Any variance requested based upon a specific design submittal require the approval of the City.

C. Radius:

- ▶ Commercial and industrial driveways shall be constructed with the return curbs having a rolled face disappearing at the sidewalk and joining the street curb with a minimum of 30-foot radius, unless otherwise approved by the City.

D. The allowable spacing for driveway approaches shall be based upon an approved site plan.

E. Provision for Joint Approaches:

- ▶ Driveway approaches inclusive of approach radii, shall be located entirely within the frontage of the premises. Joint approaches and/or cross-lot access easements may be required by the City. Any request for joint drive access must be by agreement of all parties involved and a specific plan submittal must be included for approval of the City. Both parties will be required to dedicate public ingress and egress easements to cover the approach and joint access area.

F. Approaches on properties other than residential:

- ▶ The driveway for the corner lot, if allowed, must be located a minimum of 100 feet from the point of intersection of the curb lines of both streets, unless otherwise approved by the City.

G. Angle of driveway approach:

- ▶ The angle of the driveway approach with the curb line shall be 90 degrees.

H. Drive approaches on State maintained roads shall require approval from the City and the Texas Department of Transportation (TxDOT).

I. Sidewalk to be removed:

- ▶ Where a driveway approach is to be built, the sidewalk shall be removed and the entire area replaced as a driveway. The drive approach shall extend to the back of walk line.

3. Driveways Crossing Borrow Ditches

A. Size.

- ▶ The minimum culvert pipe size shall be 18 inches in diameter, unless otherwise approved by the City. All culverts shall be Class III or better reinforced concrete pipe (RCP). The ends of all culvert pipe shall be cut at a 6:1 slope.
- ▶ Radius: Residential driveways shall be constructed with the return curbs joining the edge of pavement at the street with a minimum of 10-foot radius.

B. Slope.

- ▶ The maximum slope from the edge of driveway to the top of the culvert pipe shall be 6:1. The sloped area around the end of the culvert pipe shall be sodded or hydro-mulched to prevent erosion.
- ▶ The minimum cross slope on the drive shall be 1/8 inch per foot and meet American Disabilities Act (ADA) requirements, if necessary. The minimum longitudinal slope between the edge of pavement at the street and the valley over the culvert pipe shall be 1/4 inch per foot.

C. Maintenance.

- ▶ Future maintenance of the drive approach and culvert pipe is the responsibility of the property owner.

D. Ditch Grading.

- ▶ During the drive approach installation, all ditch grading upstream and downstream of the proposed driveway culvert is the responsibility of the property owner.

E. Headwalls.

- ▶ Reinforced concrete headwalls shall be required at culvert ends. Headwalls shall be designed and constructed in accordance with TxDOT standards.

4. Approaches – Generally

- A.** Driveway Spacing: Where not otherwise restricted in the City's Unified Development Code, driveways shall contain a minimum spacing of 200 feet from other driveways and street intersections. Driveways cannot impede queuing on turning lanes.
- B.** Driveway approaches at pedestrian crossings:
 - ▶ Driveway approaches shall not be located in street intersections or at established pedestrian crossings.
- C.** Driveway approaches at obstructions:
 - ▶ Driveways shall be kept at a minimum of 5 feet away from obstructions such as street light posts, fire hydrants, traffic signals, etc.
- D.** Driveway approach not to be obstructed:
 - ▶ Driveway approaches shall not be constructed or designed for parking of vehicles or for use as angle parking (or head-in parking).

TRAFFIC SIGNALS

1. In instances where the need for future traffic signals is determined by the City due to development of a tract of land, the Developer shall be required to install same, or to provide payment for same.
2. General
 - A.** All traffic signals shall be designed in accordance with this section. Any necessary variations proposed by the designer for consideration during design shall be approved by the City prior to installation.
 - B.** Minimum Standards – All traffic signal designs shall be done in accordance with current editions of TxDOT's of TMUTCD; Traffic Signals Manual; Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges; and Traffic Signal Standards.
 - (i) Traffic signal poles shall be steel round-type following the 80-mph standard in accordance with TxDOT's current details.
 - (ii) Traffic signal poles and all appurtenances (cabinets, signs, hardware) shall be powder coated black to the City's specifications.
 - C.** Requests for alternative equipment or materials may be considered on a case-by-case basis for review by the City.
 - D.** Traffic Signal Spacing – Signal spacing is an important factor in being able to provide progressive flow for a platoon of traffic. Traffic signal spacing shall be analyzed as part of a detailed traffic study and impact analysis. Final approval of signal spacing is at the discretion of the City. Final analysis and City discretion may preclude some locations from ever being signalized.
 - E.** Equipment Placement – All equipment shall be placed within ROW or appropriate easements.
 - F.** Electrical Service Pedestals – Electrical service pedestals shall be powder coated black, 120V/240V, and meet the electric service provider's specifications.
 - G.** Number of Heads – There shall be a signal head for each through lane and right and left turn heads for any overlaps. A minimum of two (2) signal heads is required for the major movement on each approach of the signalized intersection.
 - H.** Head Mounting – All signal heads shall be mounted in the horizontal orientation to the mast arm. Nearside heads shall be mounted on the right side of the roadway if the distance between the stop bar and signal heads exceed 180 feet. If roadway curvature necessitates mounting the nearside head on the left side of the roadway, the nearside head should be mounted vertically on a signal pole.

SECTION 10. STORM DRAINAGE SYSTEMS:

POLICY

1. The following policy shall govern the design and installation of all storm drainage facilities within the City and its Extraterritorial Jurisdiction (ETJ) area.
2. The following criteria shall govern the design of storm drainage improvements within the City. Improvements shall include streets, alleys, storm drains, channels, culverts, bridges, swales and any other facilities through which stormwater flows. All storm drainage improvements shall be constructed in accordance with City Standards and be in dedicated right-of-way or drainage easements.
3. Developer Responsibility:
 - A. The Developer shall be required to install, at their own expense, all storm drainage structures. This policy is applicable to all required drainage facilities including the channel improvements on the main channels and tributaries. The Developer shall be responsible for excavation and channel liner improvements based on the full urbanized 100-year frequency discharge for the channel.

EASEMENT REQUIREMENTS FOR STORM DRAINAGE

1. Where a subdivision is traversed by a watercourse, stream, drainage way or channel, detention structure, or floodplain, a drainage easement or right-of-way shall be provided, conforming substantially with the lines of such watercourse or improved channel that is to be provided at the time of development. See *Section 14 – Easement Standards* for additional easement requirements.
2. Whenever land which is covered by a floodway designation under flood damage prevention provisions, a drainage easement or right-of-way shall be placed on the Plat covering the floodway area; and the easement or right-of-way shall allow for access, maintenance or alterations of the floodplain area by the City.

REQUIREMENTS

1. At a minimum, all developments must meet the requirements of the Texas Water Code to mitigate adverse impacts to other property owners. A drainage study of the development must be provided for review, including a downstream assessment of properties that could be impacted by the development. The “Zone of Influence” and “adequate outfall point” for the proposed development shall be identified in the study.
2. An adequate storm drainage system, consisting of inlets, pipes and other underground drainage structures with approved outlets, shall be constructed where the adequate containment of stormwater runoff and the prevention of erosion cannot be accomplished satisfactorily by surface drainage facilities in accordance with City requirements.
3. Where there is a question as to the justification of size of facilities required, doubt will be resolved in favor of additional drainage capacity.
4. Unless otherwise approved by the City, all storm drainage shall be carried in storm drainage pipe when a pipe of 60-inches, or smaller, diameter can be used to adequately convey the runoff. In the event that a 60-inch diameter pipe is inadequate to convey the runoff, an open channel drainage system may be considered as an alternate to an enclosed system. All open-channel drainage systems shall comply with the City's storm drainage design requirements and specifications.

BASIS OF DESIGN

1. **Rational Method:** The methods of calculation for storm runoff for drainage areas less than 100 acres will be the Rational Method. The method is expressed by the following equation:
 - ▶ $Q = CIA$
 - ▶ Q = storm discharge at the design point in cubic feet per second
 - ▶ C = runoff coefficient, based on land use
 - ▶ I = average rainfall intensity for the time of concentration at the design point in inches per hour (see iSWM Hydrology Technical Manual)
 - ▶ A = area contributing runoff to the point of design in acres.
2. **Unit Hydrograph Method:** Peak discharges for drainage areas 100 acres, or larger, shall be determined by using the Soil Conservation Service (SCS) unit hydrograph method. The unit hydrograph for this method shall be developed by using the United States Army Corps of Engineers HEC-HMS models. Typically a unit period of 15 minutes should be used for the determination of the unit hydrograph.
3. **Runoff coefficient:** Storm drainage improvements shall be based on the ultimate land use of the drainage areas. Table V-1 below indicates the runoff coefficients for the different land uses.

TABLE 10-1: RUNOFF COEFFICIENT “C”

Land Use	C Value
Single family or duplex zoning districts (>one acre lots)	0.45
Single family or duplex zoning districts (<one acre lots)	0.65
Two-Family Residential or Single-Family Townhomes	0.65
Multi-family districts	0.75
Commercial and Industrial Districts	0.80
Roadway and Right-of-Way	0.95
Detention Ponds	0.30
Retention Ponds	1.00

4. Time of concentration:

- A.** The time of concentration shall be defined as the time required for a drop of water to flow from the upper limits of a drainage area to the point of concentration. Times of concentration shall be calculated for all inlets, pipe junctions, and other critical design points in the proposed storm drainage systems. Time of concentration shall be shown on the drainage area map. TR-55 shall be used to calculate time of concentration and calculations shall be provided to validate the values shown. Maximum sheet flows shall be 100 feet for undeveloped conditions and 50 feet for developed conditions. Shallow concentrated flows shall be limited until the flow regime becomes channelized. Contours will be used to verify the time of concentration and flow regimes. When calculating inlet times, consider overland flow channelized at such time when the distance traveled exceeds 50 feet.

TABLE 10-2: MINIMUM INLET TIME OF CONCENTRATION

Type of Area	Minimum Time of Concentration
Business and Commercial Industrial	10 Minutes
Single-Family Residential	15 Minutes
Multi-Family Residential	10 Minutes
Parks and Open Spaces	20 Minutes

5. Rainfall intensity/duration/frequency:

- A.** The rainfall intensity-duration- frequency shall comply with the minimum standards of the ISWM Criteria Manual and the City's *Unified Development Code*.

6. Design storm frequency (see Table 10-3):

- A.** Storm frequency to be used in design shall be as shown in the following table:

TABLE 10-3: DESIGN STORM FREQUENCY

Type of Facility Storm Drains	Minimum Design Frequency
Storm drains, Driveway culverts	10 years
Street ROW (only if development is above the curb elevation), Culverts (non-driveway), Bridges, Channels, Creeks	100 years
Storm Drain Inlets at Low Points	25 years (with positive overflow), otherwise 100 years

- B.** A storm drain shall be designed to convey flow from the street when the runoff from a 10-year design storm exceeds the capacity of the street to its top of curb, or the spread of water during a 25-year design storm on an arterial/collector street does not leave one traffic lane dry, whichever is more restrictive. The combined capacity of the street and right-of-way and/or drainage easements and the storm drainage pipe shall be adequate to safely convey the runoff from a 100-year

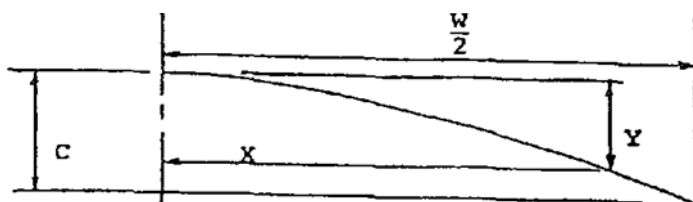
frequency storm. Bridges must provide a 2-foot freeboard to lowest part of structure from 100-year water surface.

7. **Flow in streets:** Street capacity shall be determined by utilizing Manning's equation:

$$Q = \frac{1.486 AR^{\frac{2}{3}} S^{\frac{1}{2}}}{n}$$

- ▶ Q = discharge in cubic feet per second
- ▶ n = Manning's roughness coefficient, use 0.016 for pavement and gutter
- ▶ A = cross-sectional area of flow in square feet
- ▶ R = hydraulic radius in feet (area/wetted perimeter)
- ▶ S = street or gutter slope in feet per feet

8. **For parabolic crown streets, the cross slope shall be represented by the following formula:**



$$Y = (4CX^2) / W^2$$

- ▶ All discharges of runoff from street to an open channel shall be in a flume or through an inlet adjoining pipe and headwall.

9. **Storm drain inlets:** The capacity of a depressed curb inlet on grade will be based on the following equation:

$$Q_i = 0.7 \left[\frac{1}{H_1 - H_2} \right] \left[(H_1)^{\frac{5}{2}} (H_2)^{\frac{5}{2}} \right]$$

- ▶ Q_i = discharge into inlet per foot of inlet opening in cfs./ft. (maximum allowable is 1.0 cfsft.)
- ▶ $H_1 = a + y$
- ▶ $H_2 = a$ = gutter depression in feet
- ▶ y = Depth of flow in approach gutter in feet

10. The capacity of low point or drop inlets will be (maximum allowable is 2.0 cfs/ft) determined based on the broad-crested weir formula:

$$Q_i = 3 (H_1)^{\frac{3}{2}}$$

11. **Storm drain systems:**

- A. Storm drains shall be designed using the continuity equation and Manning equation:

$$Q = AV \quad \text{and} \quad Q = \frac{1.486}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$Q = \frac{1.486}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$$

- ▶ Q = discharge in cubic feet per second
- ▶ A = cross-sectional flow area normal to pipe in square feet
- ▶ V = mean velocity of flow in feet per second
- ▶ n = Manning's roughness coefficient
- ▶ R = hydraulic radius in feet
- ▶ S_f = friction slope in feet per foot

B. The coefficient of roughness to be used in design shall be shown below:

TABLE 10-4: ROUGHNESS COEFFICIENTS

Materials of Construction	Roughness Coefficient
Monolithic concrete structure and concrete pipe	0.015
Corrugated metal pipe	0.022
All roadways	0.015

C. Storm drain pipes shall normally be designed so that the mean velocity of flow is between 2.5 feet per second and 15 feet per second. Pipes may be designed on a horizontal radius provided that the minimum centerline radius is equal to 30 pipe diameters and the cumulative degree on curvature does not exceed 0 degrees between points of entry. Pipes shall not be designed with vertical curves. The minimum pipe size for a main is 24 inches in diameter. The minimum pipe size for a storm drain lateral is 21 inches in diameter. If a lateral does not exceed 50 feet, an 18-inch diameter pipe may be used. Unless otherwise specified on plans, minimum strength Class III reinforced concrete pipe will be required in all new construction.

D. The elevation of the hydraulic grade line for the main storm drain pipe system shall be sufficiently deep to allow for losses in the leads and inlets to produce an HGL elevation below grade/within the pipe considering a 10-year HGL and below the right-of-way elevation when considering the 100-year HGL. Typically, this will require the HGL in the main to be 1.5 to 2-feet below the gutter flow line. The HGL loss for inlets is given below.

(i) The head loss for each structure shall be computed as:

$$h_j = \left(\frac{v_2^2}{2g} \right) - K_j \left(\frac{v_1^2}{2g} \right)$$

- ▶ where; h_j = head loss in feet
- ▶ v_1 = inflow velocity
- ▶ v_2 = outflow velocity
- ▶ g = 32.2 ft./sec²
- ▶ K_j = head loss coefficient

(ii) *Head Loss Coefficients (K) (adjusted to proportional flow relationship between flow before and after inflow point)

- ▶ Manhole or Inlet in line – 0.50
- ▶ Manhole or Inlet with lateral – 0.25
- ▶ Lateral only – 0.75
- ▶ Enlargements or Contractions – 0.30
- ▶ h_j for beginning inlet is $\frac{1.25 (V_2)^2}{2g}$

E. Points of entry into the main storm drain (manholes or junction structures) shall be provided at least every 500 feet. For storm drain diameters exceeding 48-inches, distances greater than 500 feet may be considered on a case-by-case basis and upon approval by the City. Where the storm drain will accommodate a 36-inch diameter lateral, the inlet lateral may be considered an acceptable access point in lieu of a manhole.

12. Open Channels:

- A.** Generally, when the runoff exceeds the capacity of a 60-inch diameter concrete pipe or equivalent cross sectional pipe area, the discharge shall be carried in an open channel, unless approved otherwise by the City. Open channels shall be designed to carry the 100-year frequency storm runoff from a fully urbanized watershed with one foot of freeboard. All open channels will have concrete lined bottoms unless otherwise approved by the City. All open channels shall have a minimum bottom width of eight feet. Surface flumes shall have a minimum of six - foot bottom width. The velocity cannot exceed 6 feet per second in all open channel design.
- B.** The use of existing channels in their natural condition is encouraged. Grading or channelizing an existing wooded natural channel is permitted only with special permission.
- C.** Full concrete lined bottom:
 - (i)* All open ditches in all subdivisions that are used to carry surface runoff from more than two lots shall have concrete lined bottoms, except as otherwise approved by the City. Lining of drainage ditch floors is to be a minimum of 8-feet wide (F.F.) with 6-inch curbs each side. Concrete design shall be provided as recommended by the Geotechnical Report by a licensed professional engineer in the State of Texas. Concrete side slopes may be allowed or required in some cases if approved by the City. Concrete side slopes will be required as necessary at culverts and bridges, bends or other erodible type situations.
- D.** In certain instances for City-maintained channels, a reinforced concrete access ramp may be required for open channel access from a public street. Access ramps shall be a minimum 12-feet wide with a maximum slope of 16%.

13. Bridges and Culverts:

- A.** All bridges and culverts shall be designed in accordance with the current edition of the "Hydraulic Manual" prepared by the Texas Department of Transportation, Bridge Division. All culverts shall have headwalls and wingwalls upstream and downstream. All culverts shall pass the fully urbanized 100-year frequency storm runoff without allowing runoff to pass over the road. All bridges shall have channel bottom and slopes concrete lined. The low point on the bridge structure shall be at least 2 feet above the fully urbanized 100-year frequency storm water surface.
14. Minimum finished floor elevations shall be 2 foot above the 100-year water surface in or adjacent to floodplains of open channels based upon full filling of fringe areas and ultimate development conditions. Otherwise, minimum finished floor elevations in and adjacent to FEMA mapped floodplain areas shall be 2 feet above the BFE (base flood elevation) on map or 2 foot above the BFE after filling of fringe areas based upon a FEMA approved LOMR.

PRELIMINARY DRAINAGE ANALYSIS GUIDELINES

The purpose of a preliminary drainage analysis is to determine the need for drainage facilities and drainage easements either within the proposed development or offsite. These guidelines shall be used as the minimum requirements for a Preliminary Plat. When requested by the City, a preliminary drainage analysis shall be submitted with a replat or short form Plat. The preliminary drainage analysis shall consist of the following items:

1. A topographical map drawn at a legible scale and depicting the watershed which drains to and across the subdivision. The map must include the subdivision and an area extending for 200 feet in all directions from the proposed subdivision as a minimum. The map must also include contour lines as required. LiDAR contours are available on TNRIS Data Hub and may be used unless more accurate data is available.
2. The topographical map shall:
 - A.** indicate any offsite or adjoining areas outside the limits of the area being platted which are relevant to onsite drainage.
 - B.** show any proposed or existing drainage and utility easements, water bodies, streams and railroads, parks, cemeteries, and drainage ditches.

- C. show location of existing utilities including gas and petroleum lines, electric, telephone and television cable, and location of any existing structures located within the area being proposed for subdivision.
- 3. The datum for all topography shall be that of the United States Coast and Geodetic Survey or the City of Aledo datum. The preliminary analysis shall be sealed by a professional engineer licensed by the State of Texas.
- 4. Calculation of the drainage areas, time of concentration, a storm water runoff rate for the 10 and 100-year frequency storms.
- 5. Identification of ultimate floodplain and special flood hazard areas as defined by the current Flood Insurance Rate Map

DRAINAGE STUDY GUIDELINES

A drainage study is required in all cases for the area being developed unless determined to be unnecessary by the City. The following criteria shall be used for the developer's engineer to prepare a drainage study.

1. The study shall analyze the effect of the development to both upstream and downstream watershed components and ensure no adverse impacts. The study shall be sufficient to verify compliance with previously mentioned criteria.
2. The study shall include a topographical map as defined above.
3. Delineation and calculation of drainage areas, together with proposed flow arrows, shall represent flow patterns from runoff after all proposed improvements have been installed. Surface water drainage patterns shall be shown for the private property portion of the proposed subdivision and for public and private property adjacent to the proposed development. Contours must be provided for all off-site and adjacent properties to support delineation areas.
4. Calculations shall include providing parameters and assumptions for the Rational Method, time of concentrations, HEC-HMS assumptions/results, HEC-RAS assumptions/results, cross sections, Manning's equations/results, HGL spreadsheets, rational calculation tables for drainage areas, detention pond calculations (Modified Rational), all calculations required for the downstream assessment, etc. No adverse impacts shall include, at a minimum: no more than a 0.1 foot rise in 100-year water surface elevation, no more than a 5% increase in channel velocity for the 100-year design storm, no increase on existing flooding structures, private property, or roadways, and a 0.0 feet rise for any work in the floodway. Post-development channel velocities cannot be increased by more than 5% above pre-development velocities.
5. The study shall include a pre-development versus post-development runoff analysis and a stormwater runoff routing analysis designed to predict the post-development runoff rate and the downstream drainage system ability to accommodate post development runoff. Existing and Ultimate conditions for the watershed shall be considered. A comparison table shall be provided to compare the pre-developed and post-developed conditions (flow rates, velocity, and depth) of each design point. Overflow paths shall be indicated in the study.
6. *Accommodation of upstream drainage areas:* A culvert, or other drainage facility, shall in each case be large enough to accommodate potential runoff from its entire upstream drainage area, whether inside or outside the subdivision or development in a fully developed condition without detention facilities, unless otherwise directed by the City. There are some watersheds that have been identified to be flood-prone areas and upstream conditions shall be limited to 'existing conditions' (future upstream detention will be required). The developer's engineer shall initially determine the necessary size of the facility, based on the provisions of the construction standards and specifications assuming conditions of maximum potential watershed development permitted by the zoning regulations, subject to approval by the City.
7. *Effect on downstream drainage areas:* The stormwater discharge from the development shall not cause adverse impacts to adjacent or downstream properties or facilities. To establish the zone of influence from a proposed development and to determine the impacts to the downstream properties or facilities, a downstream assessment is required. The developer's engineer, subject to approval by the City, shall study the effect of each development's storm runoff on the existing underground drainage facilities immediately downstream of the development. Where it is determined, existing capacity is not available immediately

downstream, the developer's engineer shall design a drainage system, detention facility, or parallel system to mitigate the deficiency. The City may require the design to include other 'regional detention ponds' to be modeled and included with the drainage study.

8. In addition to those calculations required by the preliminary drainage analysis, this study shall also include:
 - A. Hydraulic calculations to each lateral, manhole, inlet and outlet structure on the pipe.
 - B. Inlet calculations utilizing the minimum time of concentration for the land use is contributing the largest "CA" to the inlet.
9. If any portion of the proposed development or its offsite improvements (including pipes and ditches) fall within the limits of a FEMA floodplain, additional backwater calculations may be required. Additional calculations in the form of a Conditional Letter of Map Revision (CLOMR) may be required if the subdivision includes work within a FEMA floodplain area depending upon how extensive the proposed work may be. Any development within FEMA Zone A designated areas shall be studied to establish elevations for the reach. The Zone A designated shall be submitted to FEMA to change to a Zone AE designation. The study shall extend to the current limits of Study or at the direction of the City. The City may allow for an alternate method of determining the 100-year ultimate floodplain boundary for special cases such as a single residential unit on a large parcel. A floodplain study may be required unless the calculations demonstrate no adverse impacts (as defined above) will be created, or permission, in writing, has been provided from the impacted downstream property owner.
10. Where a CLOMR is required prior to performing work in the floodplain, a Letter of Map Revision (LOMR) will be required prior to issuing building permits. Refer to the City's *Unified Development Code*.
11. The drainage study shall be sealed by a professional engineer licensed in the State of Texas.

FACILITY REQUIREMENTS.

1. All drainage facilities shall be constructed on public rights-of-way or easements dedicated for that purpose. Drainage easements or rights-of-way shall be of sufficient size to permit for maintenance of the drainage facility.
2. The City may require a Developer to construct any storm drainage facility, or to require studies or elevation certification when in the judgement of the City, the facility, study or elevation certification is needed for the proper and orderly development of the area or to verify adequacy of drainage provisions for the area. In general, all drainage systems shall provide 100-year storm frequency capacity. A drainage system includes a street right-of-way, drainage channel or enclosed system considered in combination. A local street shall normally provide a minimum 10-year storm frequency capacity within curbs. A thoroughfare shall normally provide a clear lane in each direction when considered on a 10-year frequency capacity basis.

OFF-SITE DRAINAGE

1. The Developer of the property shall be responsible for accepting all fully developed storm drainage flowing onto his/her property. This responsibility shall include the drainage directed onto the property by prior development, as well as drainage flowing through the property by reason of natural and man-made topography.
2. Adequate consideration shall be given by the Developer to determine how the discharge, leaving the proposed development, will affect downstream property. Generally, new sites will be required to provide on-site detention for increased runoff on a 10- and 100-year frequency. Exceptions may be allowed by the City for small sites (one acre or less) or in other cases where no obvious detrimental effects are perceived.
3. When a proposed development requires off-site grading or includes areas of two or more acres where stormwater has been collected, diverted or concentrated, whether by permanent drainage systems, site or street improvements, it shall only be permitted to drain onto adjacent property through existing creeks, channels, storm drainage, or other street improvements, if the following is provided:
 - A. For proposed developments within the City:

- (i) Proper drainage easements; or
 - (ii) If unable to acquire the necessary off-site easements, the Developer shall provide the City with documentation of efforts made to obtain easements. The documentation shall include evidence of a reasonable offer made to the affected property owner(s). Upon a written request for assistance, the City may attempt to acquire easements through negotiations. If negotiations are unsuccessful, the request may, at the Developer's option, be submitted to the City Council for consideration of acquisition through the eminent domain powers of the City. In either case, the total cost of the acquisition and the cost of the easements shall be borne by the Developer.
 - (iii) In certain unique circumstances where the development is part of long-term development plan where easement locations/sizes may change in the future depending on the development of the property, off-site easements may not be required if the Developer obtains written permission from the impacted property owner(s) and releases the City as part of Hold Harmless agreement.
4. The Developer is responsible for constructing all off-site channelization or underground storm drain with overland relief required to discharge concentrated storm water from the low end of his development to the recognized watercourse, and also to obtain all the necessary easements from intervening land owners. Calculations will be required to show that connecting off-site drainage ways are capable of handling any increase in runoff due to development, concentration or diversion.
 5. Any drainage easements necessary due to the Developer's alteration of existing concentrated discharge locations (i.e., existing creeks, channels, or storm drainage) shall be acquired by the Developer at no cost to the City.

SECTION 11. STREET LIGHT INSTALLATION

GENERAL

1. Refer to the City's *Unified Development Code* for additional requirements.
2. The City will be responsible for requesting normal, overhead metal pole street lighting from the applicable electric utility company at the request of the Developer by the time the work pursuant to the community facilities agreement has been completed and accepted. Any extra or special designed street lighting will be by contract between the Developer and the applicable utility company with written approval of the City, i.e., ornamental poles, etc. street lighting installation must be completed prior to the issuance of any certificates of occupancy.
3. All street-lighting installation shall be in accordance with the following requirements and design criteria:
 - A. A light shall be placed at each street intersection when the block is less than 600 feet in length unless deemed not necessary by the City.
 - B. A light shall be installed at each intersection and any other location required by the City when a block is more than 600 feet long.
 - C. A light shall be installed at the end of a cul-de-sac except if the cul-de-sac is less than 250 feet from a streetlight at an intersection.
 - D. Lamp type and lumen requirements shall be in accordance with the City's *Unified Development Code*.
 - E. Poles – Poles shall be 30-foot-tall round, galvanized steel poles for Arterial streets and 25-foot-tall round, galvanized steel poles for Collector and Local Residential streets.
 - F. Spacing – Streetlights shall be spaced normally at 140-foot intervals, but not further apart than 180 feet for Arterial streets. Streetlights shall be spaced no further apart than 500 feet along tangent sections streets and shall be placed along horizontal curves where the road centerline changes by 30-degrees or more.
 - G. Service wires shall be underground.
 - H. It is required for the Developer's engineer to provide a street light plan in the public improvement plans.

SECTION 12. FRANCHISE UTILITY INSTALLATION

GENERAL

1. Refer to the City's *Unified Development Code* for additional requirements.
2. All electric, telecommunications, and cable television utility lateral and service lines shall be placed underground and in dedicated easements throughout new residential subdivisions in accordance with the City's *Unified Development Code* and subject to the following conditions:
 - A. All electrical transmission lines, meaning those electrical lines operated at normal voltages of 60,000 volts or higher, may be placed overhead.
 - B. Any feeder lines, meaning those lines that emanate from substations or hubs for distribution throughout an area, may be placed overhead.
 - C. Lateral utility/service lines, meaning those lines that emanate from feeder lines and are used for distribution to smaller areas of consumers, must be placed underground in the interior of all residential subdivisions. Lateral lines may be placed overhead in non-residential developments upon approval by the City Council. The Plat shall provide that utility/service companies shall have the right of ingress and egress to perform maintenance on their lines.
 - D. Underground utilities, or adequate underground utility conduit located in or crossing streets shall be placed under or across all streets after the rough grades are made, but prior to the paving being placed. Paving operations will not be allowed to start until all underground utility work is completed and accepted by the City. Otherwise, underground utilities may cross streets only by boring without open cutting of pavement.
 - E. The electrical utility company may plan and construct necessary overhead utility lines on perimeters of subdivisions or property subject to the provisions of this section. Telecommunications and cable television lines may be constructed overhead only where overhead electric utility lines are permitted.
 - F. The City shall not be held financially responsible for any portion of the additional cost to the Developer for underground utility service lines or service connections.
 - G. All electrical, telecommunications, and cable television support equipment (transformers, amplifiers, switching devices, etc.) necessary for underground installation shall be pad-mounted (except for common above ground buried telecommunications line closures/risers) or placed underground.
 - H. The provisions of this section do not alter the requirements of any utility service company franchise agreement in effect on the effective date of this Section.

SECTION 13. LOT STANDARDS

GENERAL

1. Refer to the City's *Unified Development Code* for additional requirements.
2. The dimensions of a lot shall be appropriate for the location of the subdivision and for the type of development and use contemplated and in the case of lots located within the City shall not be less than those specified as minimum standards by the zoning ordinance.
3. Depth and width of properties reserved or laid out for commercial and industrial purposes shall meet the requirements of the City's *Unified Development Code*.
4. Each lot shall front upon a public or private street or public or private easement.
5. Residential lots shall not have direct access onto thoroughfare or arterial streets; and shall be permitted on collector streets only where design conditions do not allow for any other possibility.
6. Double frontage and reverse frontage lots shall be avoided, except where essential to provide separation of residential development from traffic arteries or to overcome specific disadvantages of topography and orientation.

7. Side lots lines shall be substantially at right angles or radial to street lines, unless other arrangements are approved by the City.
8. Where the area is divided into lots that are larger than necessary for normal urban building sites, and, in opinion of the City, any or all of the tracts are susceptible to being re-subdivided, the original subdivision shall be designed to permit the alignment of future street dedications to conform to the general street layout in the surrounding area, and so that the larger tracts may be later subdivided in conformance with the requirements of this Ordinance and in the case of lots located within the City, the minimum standards specified by the zoning ordinance and the City's *Unified Development Code*.
9. The shorter dimension across a residential lot, adjacent to a street, shall designate the front yard orientation of the lot, unless otherwise specified on the face of the Plat.

SECTION 14. EASEMENT STANDARDS

GENERAL

1. All easements and rights-of-way required to serve the project shall be provided to the City at Developer's cost. If a Developer is unable to obtain an off-site easement/right-of-way, the City may exercise its right of eminent domain; but all costs incurred shall be borne by the Developer.
2. Utility easements shall be provided as may be necessary to assure the proper design, installation and maintenance of either underground or aerial utilities.
3. Interior water, sewer and drainage easements shall fall entirely on one lot and future fence construction may not encroach within that easement except for cross fencing with gates if approved by the City.
4. Any public utility, including the City, shall have the right to move and keep moved all or part of any building, fences, trees shrubs, other growths or improvements which in any way endanger or interfere with the construction, maintenance or efficiency of its respective system or any of the easements shown on the Plat.
5. Any public utility, including the City, shall have the right at all times, of ingress and egress upon easements for the purpose of construction, reconstruction, inspection, patrolling, maintaining and adding to or removing all or part of its respective systems, without the necessity of procuring the permission of anyone.
6. Emergency access easements shall be provided where deemed appropriate by the City and shall comply with all the requirements of the City's adopted *Fire Code* and City's *Unified Development Code*. These easements shall be paved in conformance with City standards.
7. When the City finds that easements or rights-of-way in areas adjoining proposed subdivisions are necessary to provide adequate drainage or to serve the subdivisions with utilities, the Developer shall have the responsibility for obtaining the easements or rights-of-way.
8. Public water mains, sanitary sewer mains, or storm drains adjacent to federal, state, or county right-of-way shall be constructed outside the right-of-way in a separate easement or by Plat for new developments in accordance with the City's *Unified Development Code*.
9. **Vertical Clearance.** All easements shall provide sufficient vertical clearance for normal maintenance. No roof overhang or other appurtenant construction such as (but limited to) construction associated with an adjacent building shall encroach into or over the easement.
10. **Centered Mains.** All water mains, sanitary sewer mains, and/or storm drains within a dedicated easement are required to be centered within the easement unless otherwise approved by the City.
11. **Minimum Width.** Minimum widths for easements are shown in **Table 14-1** below.
 - A. Should design of the main(s) require a depth greater than 10 feet to the top of the main, an increased easement width may be required to allow for proper maintenance by the City. This will be evaluated on a case-by-case basis by the City.

**TABLE 14-1: MINIMUM EASEMENT WIDTHS FOR MAINS**

Main Type	Main Size	Easement Width
Water Mains	12-inch or less (adjacent to City ROW)	10'
	12-inch or less	15'
	Larger than 12-inch	20' or larger (determined on a case-by-case basis)
Sanitary Sewer Mains/ Force Mains	15-inch or less (adjacent to City ROW)	10'
	15-inch or less	15'
	Larger than 15-inch	20' or larger (determined on a case-by-case basis)
Storm Drainage	36-inch or less (adjacent to City ROW)	10'
	36-inch or less	15'
	Larger than 36-inch	20'
	Floodplain/Detention Ponds	Varies (must contain 100-year design storm)
	Open Channels	Varies (must contain 100-year design storm plus one foot of freeboard and a minimum 12-foot flat shelf for maintenance access)

SECTION 15. STANDARD CONSTRUCTION DETAILS

PAVING STANDARD DETAILS

- P-01 Major & Minor Arterial Street Section
- P-02 Major & Minor Collector Street Section
- P-03 Reinforced Concrete Local Residential Street Section
- P-04 HMAC Local Street Section
- P-05 Rural Local Street Section
- P-06 Pavement Construction Specification
- P-07 Pavement Intersection Joint Spacing
- P-08 Reinforced Concrete Joint Details
- P-09 Reinforced Concrete Paving Joint Sealants
- P-10 Standard Curb and Gutter
- P-11 Concrete Sidewalk with Parkway
- P-12 Curb Ramp Detail
- P-13 Residential Driveway
- P-14 Commercial-Industrial Driveway
- P-15 Valley Gutter
- P-16 Road Closed Barricade Typical Installation

SANITARY SEWER STANDARD DETAILS

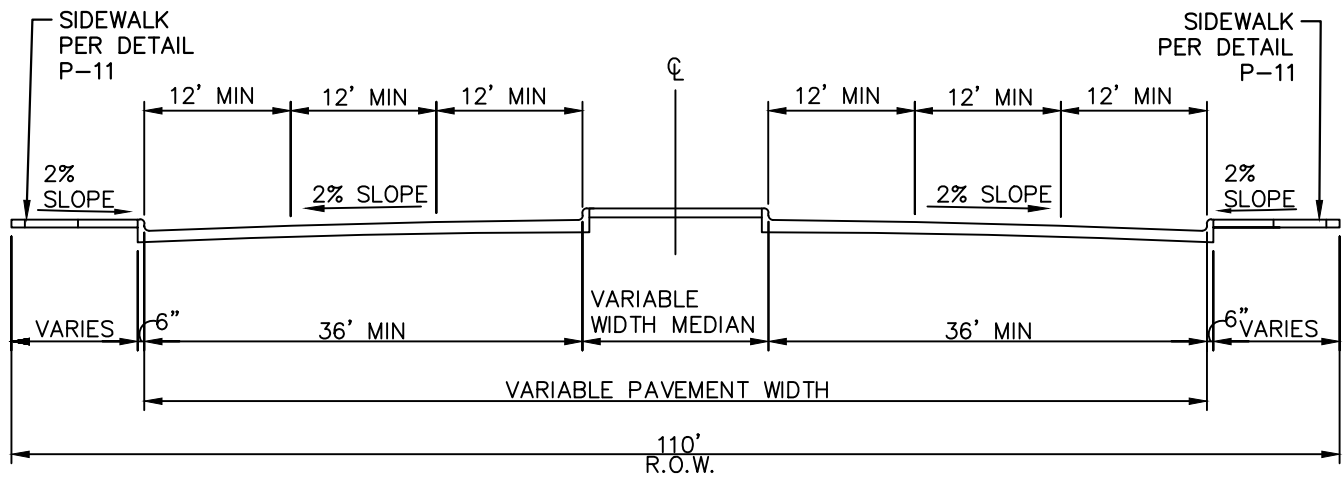
- SS-01 Sanitary Sewer Service
- SS-02 Sanitary Sewer Embedment
- SS-03 Manhole Cast-In-Place & Precast

STORM DRAIN STANDARD DETAILS

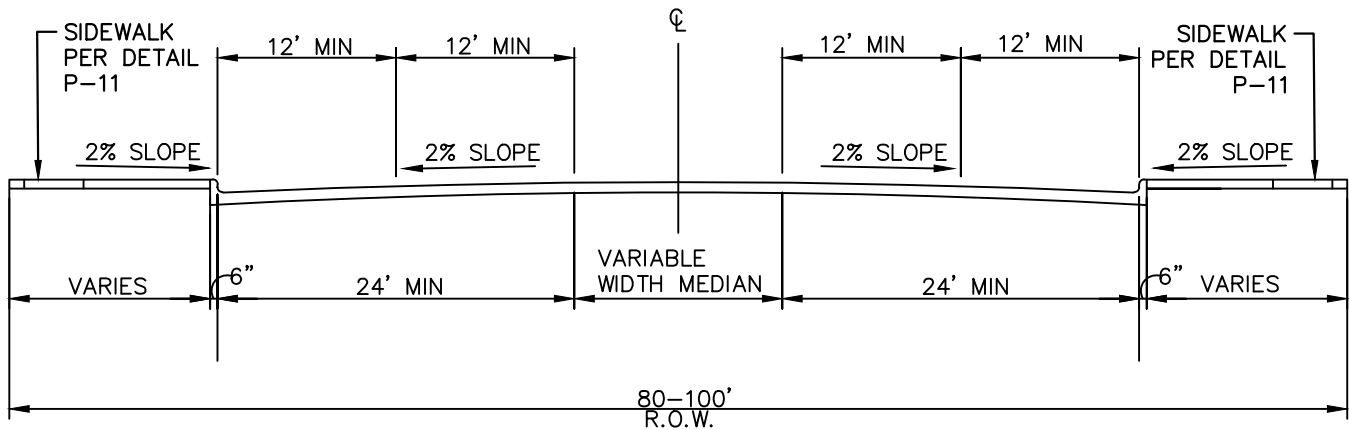
SD-01	Storm Drain Embedment (1 of 3)
SD-02	Storm Drain Embedment (2 of 3)
SD-03	Storm Drain Embedment (3 of 3)
SD-04	Standard Storm Drain Curb Inlet
SD-05	Standard Curb Inlet Throat
SD-06	Recessed Curb Inlet
SD-07	Recessed Curb Inlet Throat
SD-08	Center Support Beam for Inlets
SD-09	Standard 4-Foot Square Storm Drain Manhole
SD-10	Manhole Frame & Cover
SD-11	Standard Drop Inlet

WATER STANDARD DETAILS

W-01	1-inch Water Service
W-02	1.5 & 2-inch Water Service
W-03	Water Main Embedment
W-04	Fire Hydrant Installation
W-05	Horizontal Thrust Blocking
W-06	Water Valve and Box Installation



MAJOR ARTERIAL



MINOR ARTERIAL

NOTES:

1. SEE P-06 FOR STREET CONSTRUCTION SPECIFICATIONS
2. NOT TO SCALE



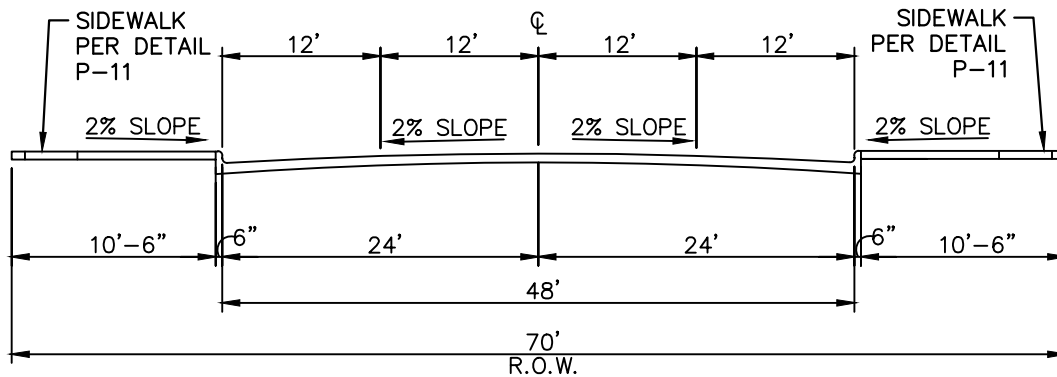
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Construction Standards

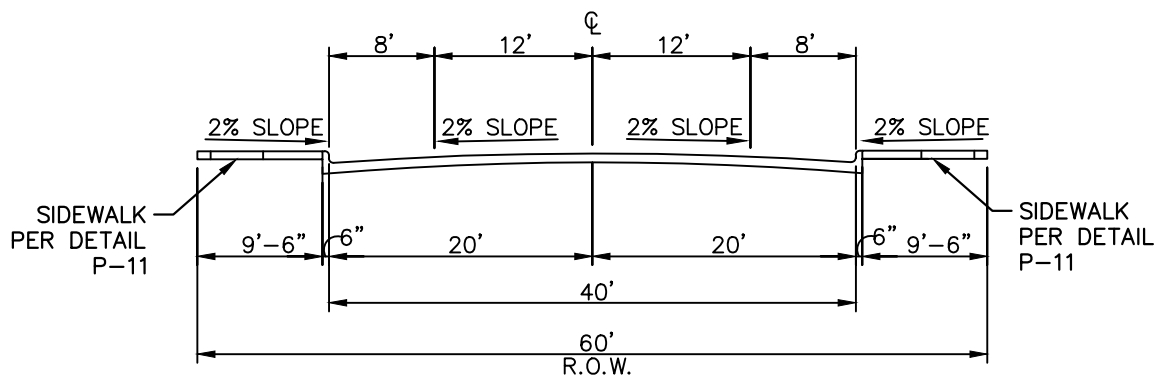
MAJOR & MINOR ARTERIAL
STREET SECTION

REVISED
APR. 2026

P-01



MAJOR COLLECTOR



MINOR COLLECTOR

NOTES:

1. SEE P-06 FOR STREET CONSTRUCTION SPECIFICATIONS
2. NOT TO SCALE



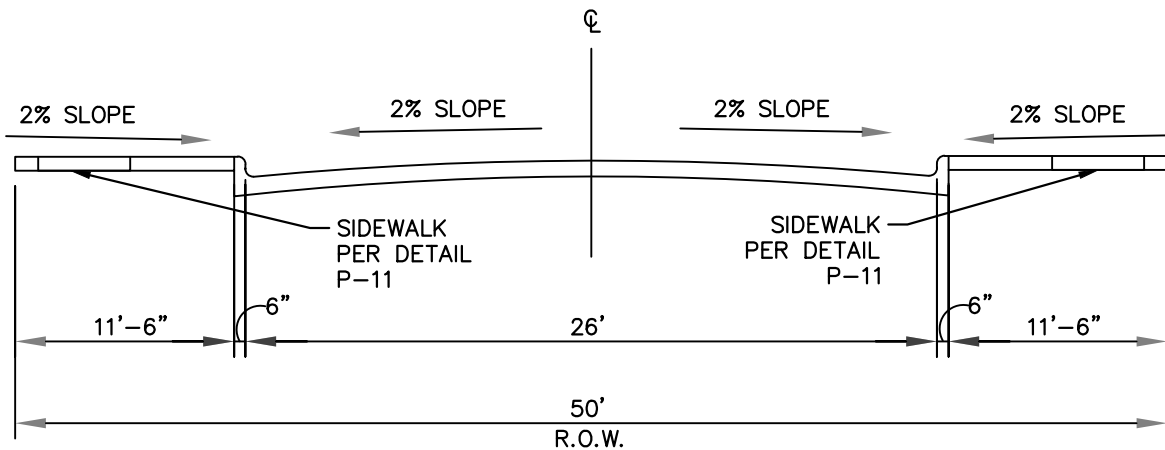
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ALEDO

City of Aledo
Construction Standards

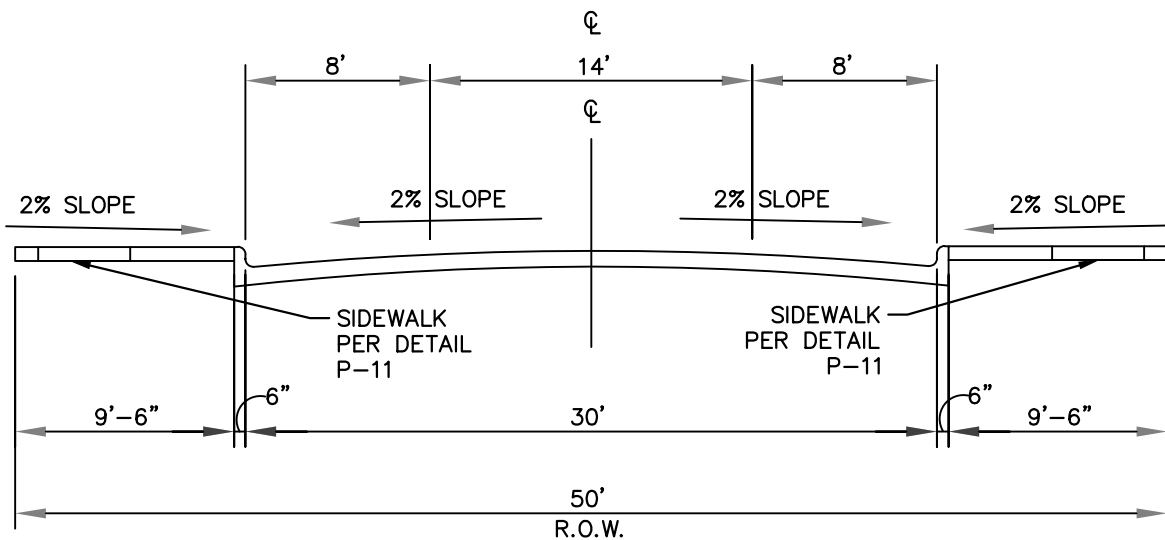
MAJOR & MINOR
COLLECTOR STREET
SECTION

REVISED
APR. 2026

P-02



LOCAL RESIDENTIAL A



LOCAL RESIDENTIAL B

NOTES:

1. SEE P-06 FOR STREET CONSTRUCTION SPECIFICATIONS
2. NOT TO SCALE



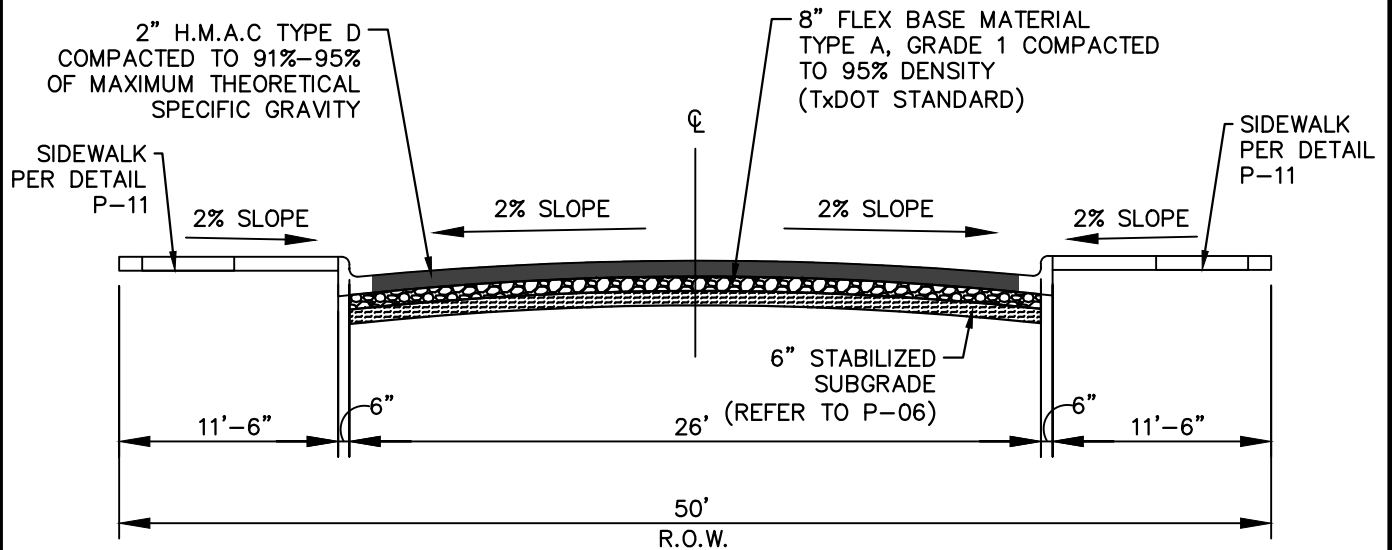
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ALEDO

City of Aledo
Construction Standards

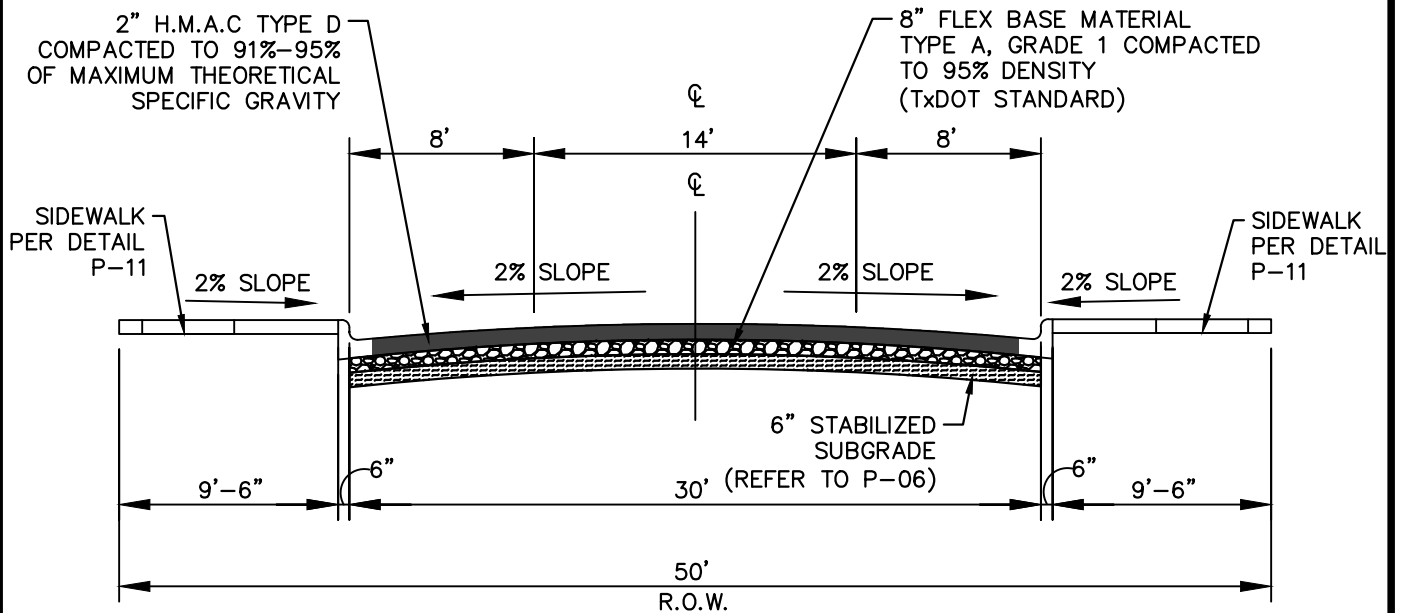
R.C. LOCAL RESIDENTIAL STREET
SECTION

REVISED
APR. 2026

P-03



LOCAL RESIDENTIAL A



LOCAL RESIDENTIAL B

NOTES:

1. SEE P-06 FOR STREET CONSTRUCTION SPECIFICATIONS
2. NOT TO SCALE



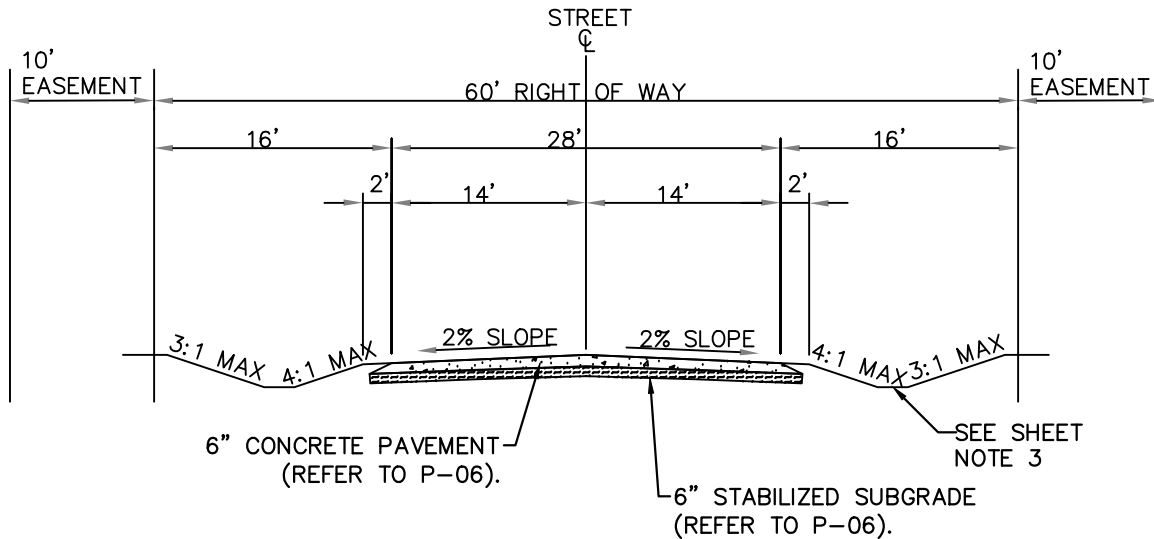
CITY OF
ALEDO

City of Aledo
Construction Standards

H.M.A.C. LOCAL RESIDENTIAL
STREET SECTION

REVISED
APR. 2026

P-04

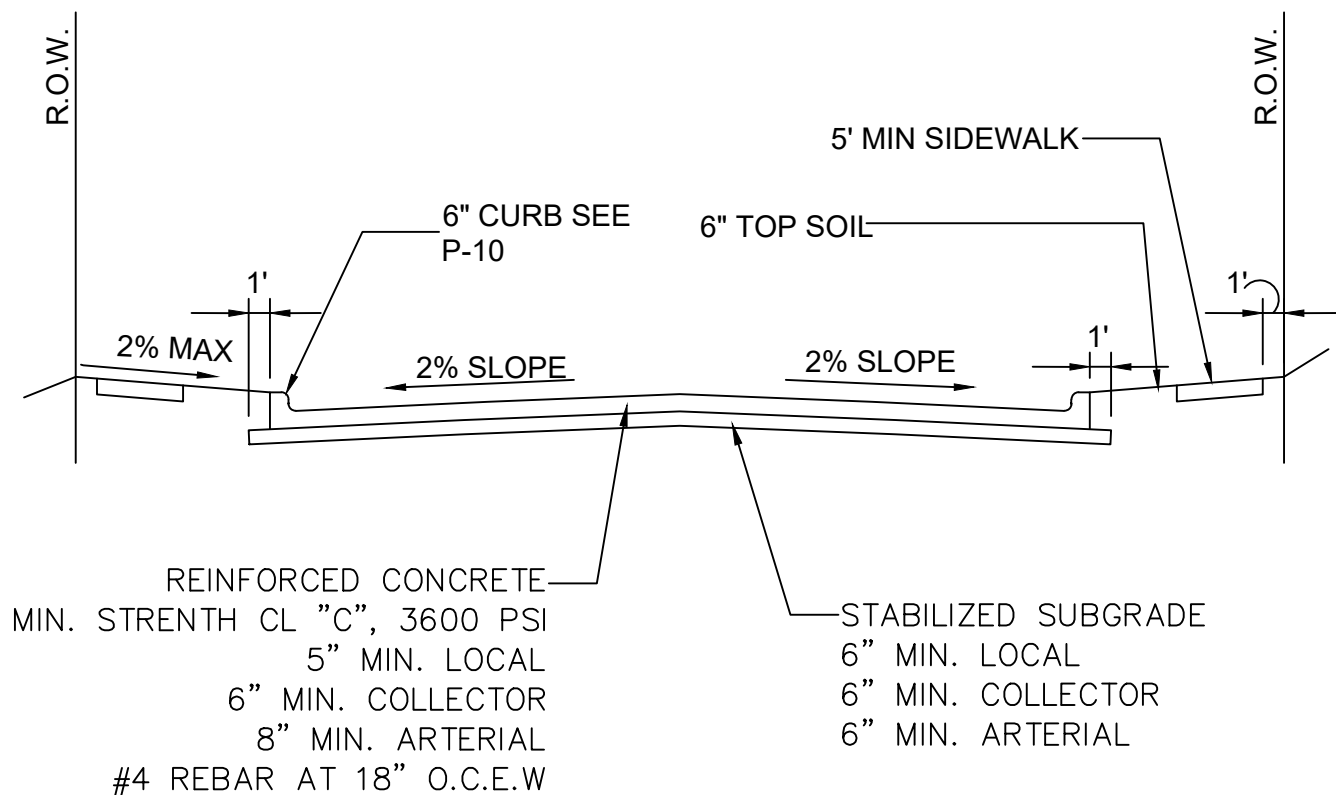


RURAL LOCAL SECTION

NOTES:

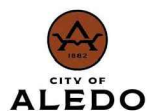
1. TYPICAL DITCH SECTION – ACTUAL DRAINAGE CHANNEL DITCH SHALL BE DESIGNED TO MEET CURRENT CITY STORM WATER DESIGN MANUAL REQUIREMENTS.
2. ADDITIONAL RIGHT-OF-WAY AND/OR EASEMENTS MAY BE REQUIRED TO ACCOMMODATE DRAINAGE DITCH DESIGN.
3. DRAINAGE DITCH SIDE SLOPES SHALL NOT BE STEEPER THAN 4:1 ON THE FRONT SLOPE AND 3:1 ON THE BACK SLOPE WITHOUT SPECIAL CONSIDERATION. DITCHES PROPOSED STEEPER THAN 3:1 SHALL BE CONSTRUCTED FOR SLOPE STABILITY BASED ON A DESIGN AND GEOTECHNICAL REPORT PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS.
4. DRAINAGE DITCHES SHALL BE FULLY STABILIZED WITH ALL PROPOSED DESIGN MEASURES, INCLUDING VEGETATION, PRIOR TO DEVELOPMENT ACCEPTANCE.
5. GRASS-LINED DRAINAGE DITCHES SHALL HAVE A MAXIMUM DESIGN VELOCITY OF 6.0 FEET PER SECOND (FT/S) AND THE GRADE OF THE SLOPE SHALL MATCH THE STREET.
6. DRAINAGE DITCHES DESIGNED WITH VELOCITIES EXCEEDING 6.0 FT/S SHALL REQUIRE EROSION CONTROL COUNTERMEASURES APPROVED BY PUBLIC WORKS. MAXIMUM VELOCITY ALLOWED IS 10 FT/S.
7. DRIVEWAY DRAINAGE CULVERT SIZES, MATERIAL, AND PROPOSED END TREATMENTS SHALL BE REFERENCED ON THE DEVELOPMENT DRAINAGE PLAN FOR EACH LOT AND SUBMITTED FOR APPROVAL TO PUBLIC WORKS. SAFETY END TREATMENTS OR CONCRETE HEADWALLS ARE REQUIRED BOTH UPSTREAM AND DOWNSTREAM OF ALL DRIVEWAY CULVERTS.
8. DRAINAGE CULVERTS UNDER ALL ROADWAYS SHALL BE CLASS III REINFORCED CONCRETE PIPE (RCP), CORRUGATED METAL PIPE (CMP), OR HDPE WITH CONCRETE HEADWALLS UPSTREAM AND DOWNSTREAM. CONCRETE RIP-RAP SHALL BE INSTALLED UPSTREAM OF THE DRAINAGE STRUCTURE. WHERE ADEQUATE COVER IS NOT AVAILABLE OVER PROPOSED RCP, CLASS IV RCP WILL BE REQUIRED FOR TPW APPROVAL.
9. ALL APPLICABLE TEMPORARY EROSION CONTROLS, TO INCLUDE SILT FENCE AND INLET PROTECTION, SHALL BE IN PLACE AS SHOWN IN APPROVED DESIGN DRAWINGS BEFORE CONSTRUCTION CAN COMMENCE.
10. NOT TO SCALE.





NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE ALEDO DESIGN STANDARDS MANUAL AND THE MOST CURRENT EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION NORTH CENTRAL TEXAS" HERIN REFERRED TO AS "N.C.T.C.O.G."
2. A GEOTECHNICAL REPORT SHALL BE PROVIDED FOR SUBGRADE DESIGN. THE GEOTECHNICAL REPORT SHALL BE A RECOMMENDATION ONLY TO DETERMINE IF ANY ADDITIONAL SOIL STABILIZATION IS REQUIRED. REGARDLESS OF THE PAVEMENT TYPE TO BE CONSTRUCTED. ALL SUBBASE MATERIALS SHALL BE MODIFIED BY EITHER LIME STABILIZATION OR CEMENT STABILIZATION PER MINIMUM REQUIREMENTS AS SPECIFIED. THE CITY SHALL APPROVE RECOMMENDED SUBGRADE.
3. LIME STABILIZED SUBGRADE IS REQUIRED WHEN $PI \geq 15$ AT 6% BY WEIGHT (27LBS/SY MIN.)
4. PORTLAND CEMENT STABILIZED SUBGRADE IS REQUIRED WHEN $PI < 15$ AT 5% BY WEIGHT (26LBS/SY MIN.)
5. CONCRETE PAVEMENT SHALL BE MACHINE PLACED EITHER BY MECHANICAL VIBRATORY SCREED OR SLIP FORM PAVER UNLESS OTHERWISE APPROVED BY CITY.
6. PAVEMENT IMPROVEMENTS ADJACENT TO EXISTING CITY STREETS MAY REQUIRE ALTERNATE PAVING DESIGN AS APPROVED BY THE CITY PRIOR TO CONSTRUCTION.
7. VARIATIONS FROM THIS DETAIL ARE NOT ALLOWED UNLESS APPROVED BY THE CITY.
8. NOT TO SCALE

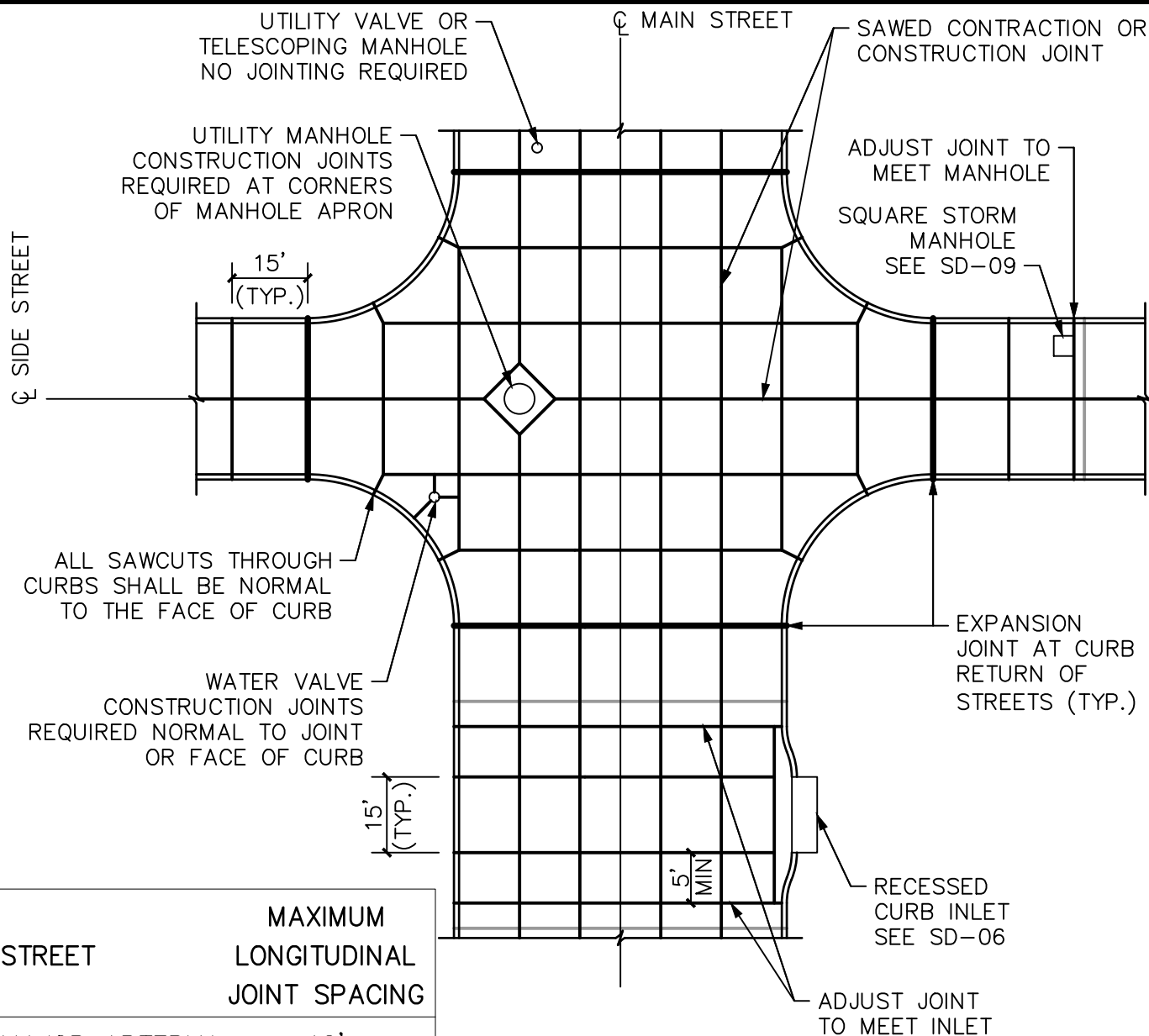


City of Aledo
Construction Standards

PAVEMENT CONSTRUCTION
SPECIFICATION

REVISED
APR. 2026

P-06



STREET	MAXIMUM LONGITUDINAL JOINT SPACING
MAJOR ARTERIAL	12'
DIVIDED/COLLECTOR	13'
LOCAL	15'

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. REFER TO P-06 AND NCTCOG ITEM 303.3 FOR CONCRETE PAVEMENT.
3. MAXIMUM TRANSVERSE JOINT SPACING IS 15'.
4. LONGITUDINAL JOINT SPACING SHALL MATCH LANE LINES UNLESS NOTED OTHERWISE.
5. ALL PAVEMENT JOINTS SHALL BE SEALED IN ACCORDANCE WITH P-09.
6. MINIMUM 5' JOINT SPACING.
7. EXPANSION JOINTS SHALL BE SPACED AT 600' MAX.
8. NOT TO SCALE



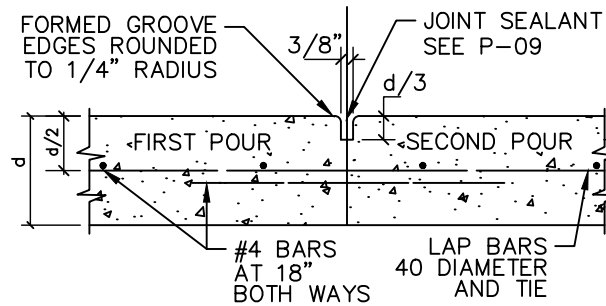
CITY OF
ALEDO

City of Aledo
Construction Standards

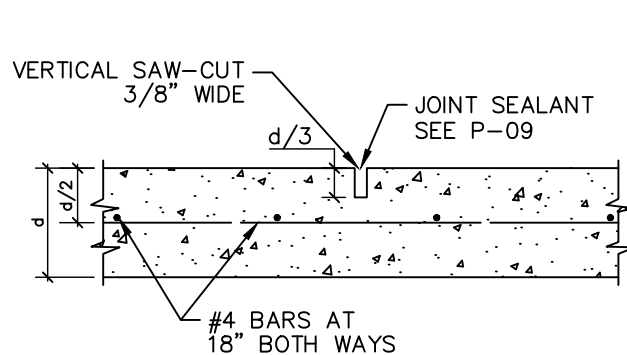
PAVEMENT INTERSECTION JOINT
SPACING

REVISED
APR. 2026

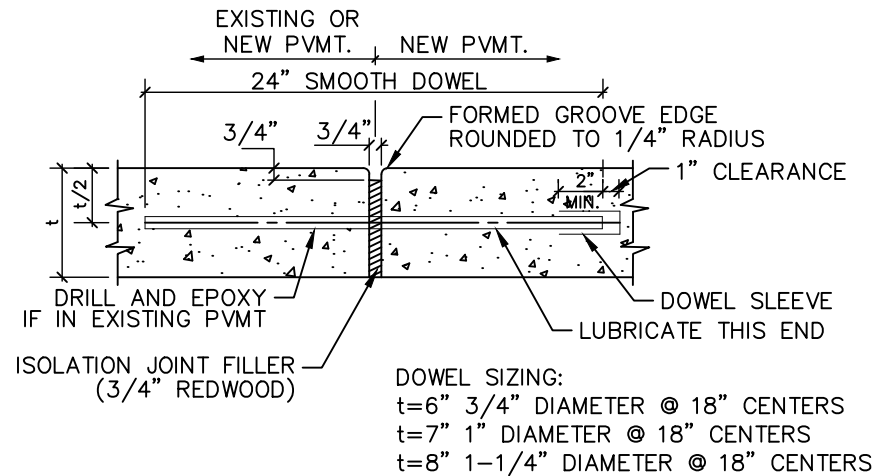
P-07



TRANSVERSE OR LONGITUDINAL
CONSTRUCTION JOINT



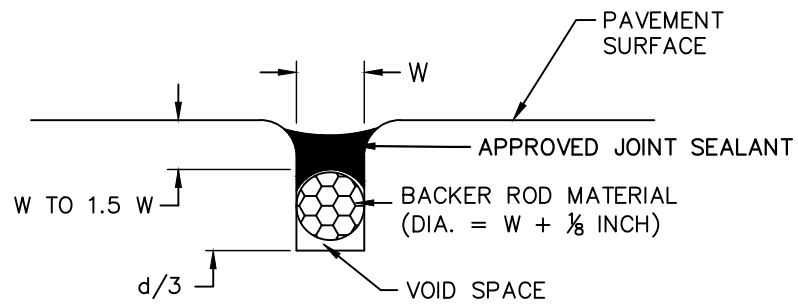
TRANSVERSE OR LONGITUDINAL
SAWED CONSTRUCTION JOINT



EXPANSION JOINT

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. ALL ISOLATION JOINTS SHALL EXTEND THROUGH THE CURB SECTION.
3. THE SAW-CUT OF ALL TRANSVERSE CONTRACTION JOINTS SHALL EXTEND THROUGH THE CURB SECTION.
4. AT ALL TRANSVERSE CONSTRUCTION JOINTS THE CURB SECTION SHALL BE SAW-CUT.
5. APPROVED DOWEL SUPPORT BASKET SHALL BE PROVIDED TO ENSURE SPECIFIED DEPTH AND ORIENTATION FOR EXPANSION JOINTS.
6. EXPANSION JOINTS SHALL BE SPACED AT 600' MAX.
7. NOT TO SCALE



SILICONE JOINT SEALANT (COLD POUR)

NOTES:

1. d = THICKNESS OF PAVEMENT
2. METHODS AND MATERIALS FOR JOINT CLEANING AND SEALING TO FOLLOW TXDOT ITEM SPECIFICATION 713.
3. TXDOT CLASS 8 JOINT SEALANT TO BE USED PER TXDOT DMS-6310.
4. NOT TO SCALE



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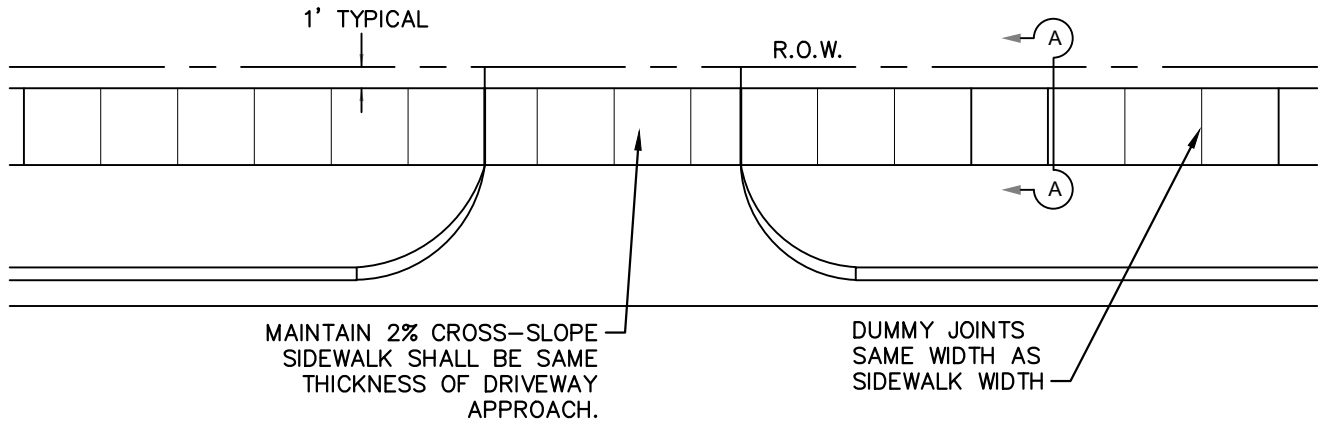
City of Aledo
Construction Standards

REINFORCED CONCRETE PAVING
JOINT SEALANTS

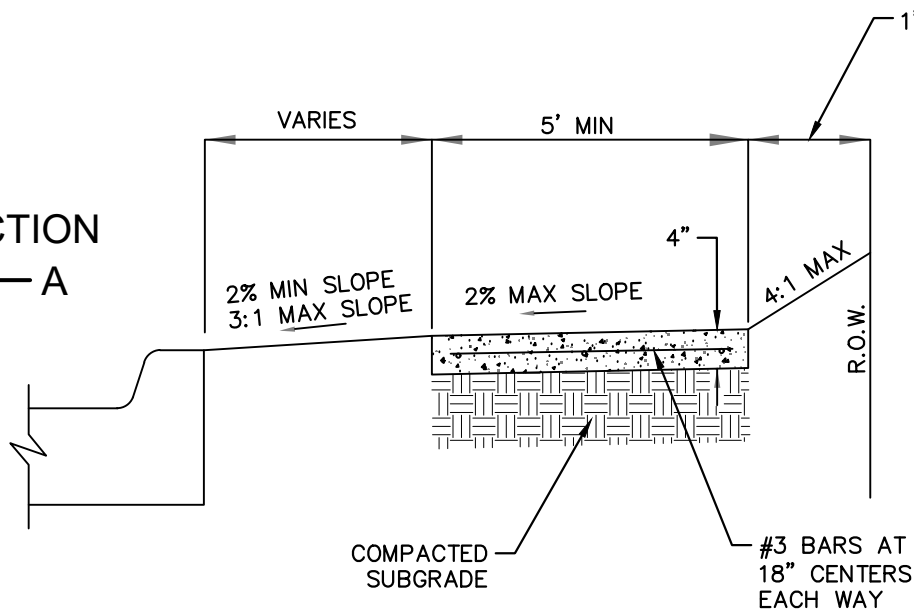
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APR. 2026

P-09

P-10



SECTION A—A



NOTES:

1. SIDEWALK SHALL BE 4" THICKNESS, CLASS "A", 3000 PSI PER ITEM 303.3.
2. REINFORCEMENT SHALL BE #3 BARS @ 18" EACH WAY.
3. 1/2" EXPANSION JOINTS SHALL BE SPACED AT 30' MAXIMUM INTERVALS OR AS OTHERWISE SPECIFIED.
4. ALL SIDEWALKS CROSSING DRIVEWAYS SHALL BE SAME THICKNESS OF DRIVEWAY APPROACH.
5. ALL SIDEWALK CONSTRUCTION SHALL CONFORM TO THE LATEST A.D.A. RULES AND GUIDELINES AND TEXAS ACCESSIBILITY STANDARDS.
6. FOR ITEMS NOT SPECIFIED IN THIS DETAIL PLEASE REFER TO N.C.T.C.O.G. PUBLIC WORKS CONSTRUCTION STANDARDS.
7. OWNER/CONTRACTOR SHALL OBTAIN A R.O.W. CONSTRUCTION PERMIT PRIOR TO ANY WORK OR CONSTRUCTION. CONTACT PUBIC WORKS TO OBTAIN A PERMIT.
8. NOT TO SCALE



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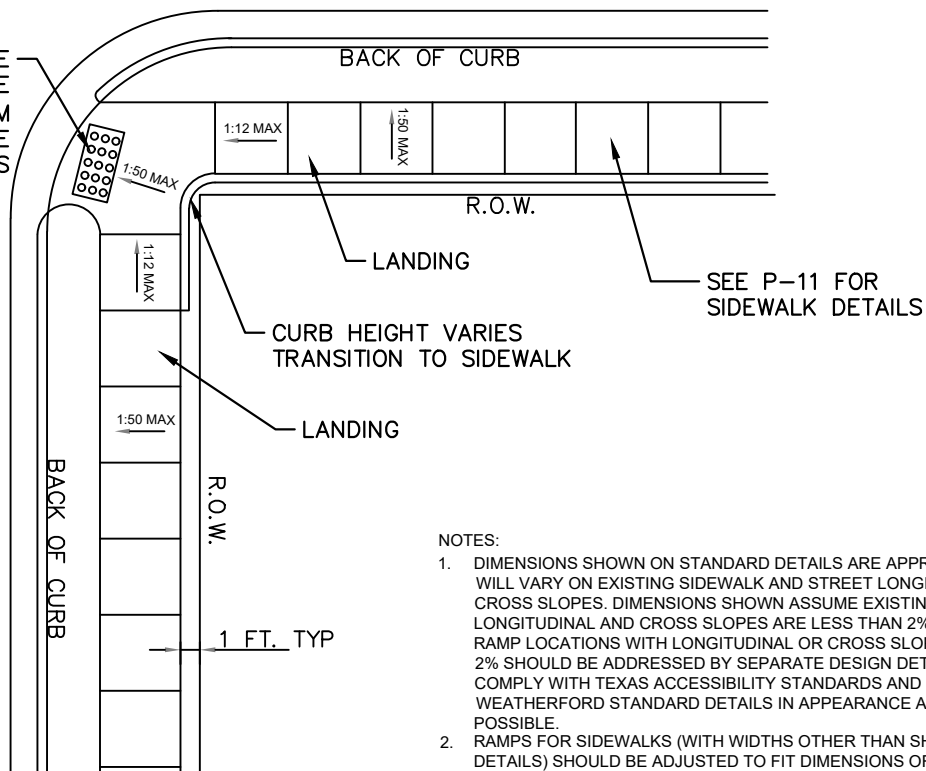
City of Aledo
Construction Standards

CONCRETE SIDEWALK WITH
PARKWAY

REVISED
APR. 2026

P-11

INSTALL DETECTABLE
WARNING SURFACE
A MINIMUM OF 6" FROM
BACK OF CURB. SEE
NOTES



NOTES:

1. DIMENSIONS SHOWN ON STANDARD DETAILS ARE APPROXIMATE AND WILL VARY ON EXISTING SIDEWALK AND STREET LONGITUDINAL AND CROSS SLOPES. DIMENSIONS SHOWN ASSUME EXISTING LONGITUDINAL AND CROSS SLOPES ARE LESS THAN 2%. RAMP LOCATIONS WITH LONGITUDINAL OR CROSS SLOPES EXCEEDING 2% SHOULD BE ADDRESSED BY SEPARATE DESIGN DETAILS THAT COMPLY WITH TEXAS ACCESSIBILITY STANDARDS AND MATCH CITY OF WEATHERFORD STANDARD DETAILS IN APPEARANCE AS MUCH AS POSSIBLE.
2. RAMPS FOR SIDEWALKS (WITH WIDTHS OTHER THAN SHOWN ON THESE DETAILS) SHOULD BE ADJUSTED TO FIT DIMENSIONS OF THE APPROACH SIDEWALKS CALLED FOR ON PLAN SHEETS.
3. FULL LENGTH OF RAMP (SLOPE 1:12) NOT TO EXCEED 6' IN LENGTH.
4. THE CONTRACTOR MUST NOTIFY THE CITY PRIOR TO INSTALLATION OF CONCRETE IF THE APPROACH SLOPE OF THE EXISTING SIDEWALK EXCEEDS 1:20 (5%) OR HAS A CROSSFALL GREATER THAN 1:50 (2%) AND NO DESIGN DETAILS ARE PROVIDED FOR THAT SPECIFIC LOCATION.
5. CONTRACTOR TO VERIFY ALL SLOPES PRIOR TO POURING CONCRETE. ALL SLOPES SHOULD BE IN COMPLIANCE WITH APPLICABLE STANDARDS FROM THE TEXAS DEPARTMENT OF LICENSING AND REGULATION.
6. LANDING PAD SHALL BE A MINIMUM 48" WIDTH AND 60" LENGTH AND MATCH SIDEWALK WIDTH. NO LANDING PAD SHALL BE LESS THAN THIS DIMENSION UNLESS OTHERWISE DIRECTED BY CITY. CROSS SLOPE SHALL NOT EXCEED 1:50 (2%) AT ANY DIRECTION.
7. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ENSURE SLOPES MEET REQUIREMENTS OF THE TEXAS ACCESSIBILITY STANDARDS.
8. CONTRACTOR SHALL CONTACT PUBLIC WORKS FOR INSPECTION PRIOR TO ANY PLACEMENT OF CONCRETE IN R.O.W.
9. A CURB SHALL BE CONSTRUCTED AT THE BACK OF THE WHEELCHAIR RAMP WHEN ELEVATION DIFFERENCE EXCEEDS 6".
10. CURB RAMPS SHALL BE CONSTRUCTED WITH SAME SPECIFICATIONS FOR SIDEWALK CONSTRUCTION UNLESS OTHERWISE NOTED.
11. FOR SIDEWALK DETAILS AND SPECIFICATIONS REFER TO P-11
12. ADA REPLACEABLE (WET SET) COMPOSITE TACTILE WARNING SURFACE UNIT (RED) AVAILABLE FROM ADA SOLUTIONS SHALL BE INSTALLED FOR ALL ADA RAMPS. DETECTABLE WARNING SHALL BE 24" LENGTH BY 48" WIDTH TRUNCATED DOMES THAT ARE TAS APPROVED. CONTRACTOR SHALL PROVIDE A MINIMUM 4" CONCRETE THICKNESS BENEATH THE ADA REPLACEABLE COMPOSITE TACTILE WARNING SURFACE UNIT.
13. NOT TO SCALE

CONVERSIONS

- 1:12 - APPROXIMATELY 8.3%
1:20 - APPROXIMATELY 5%
1:50 - APPROXIMATELY 1/4" PER 1' OR 2%



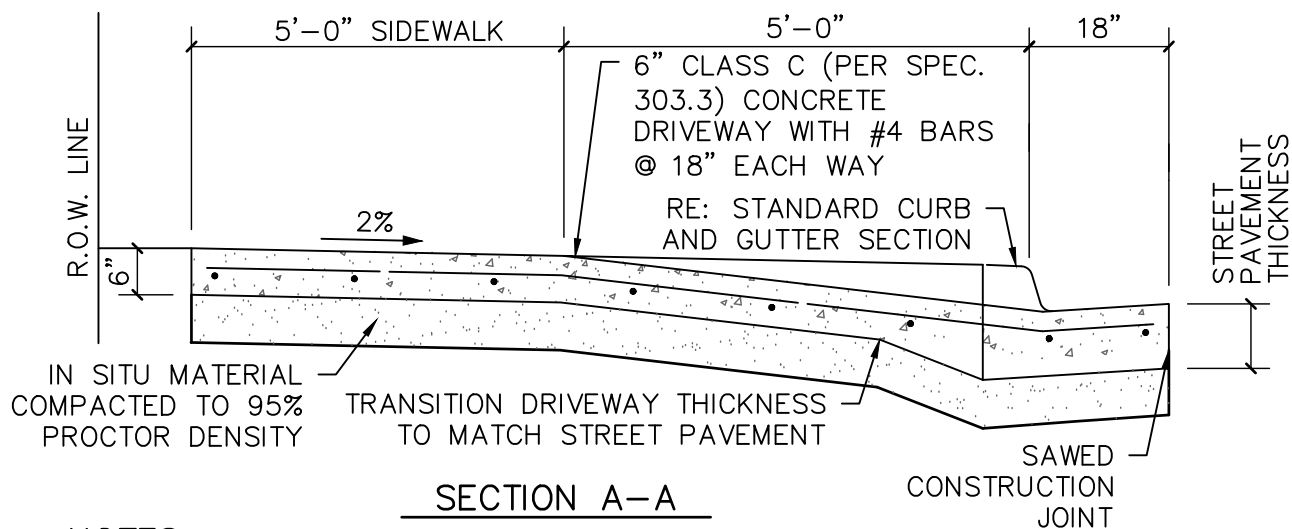
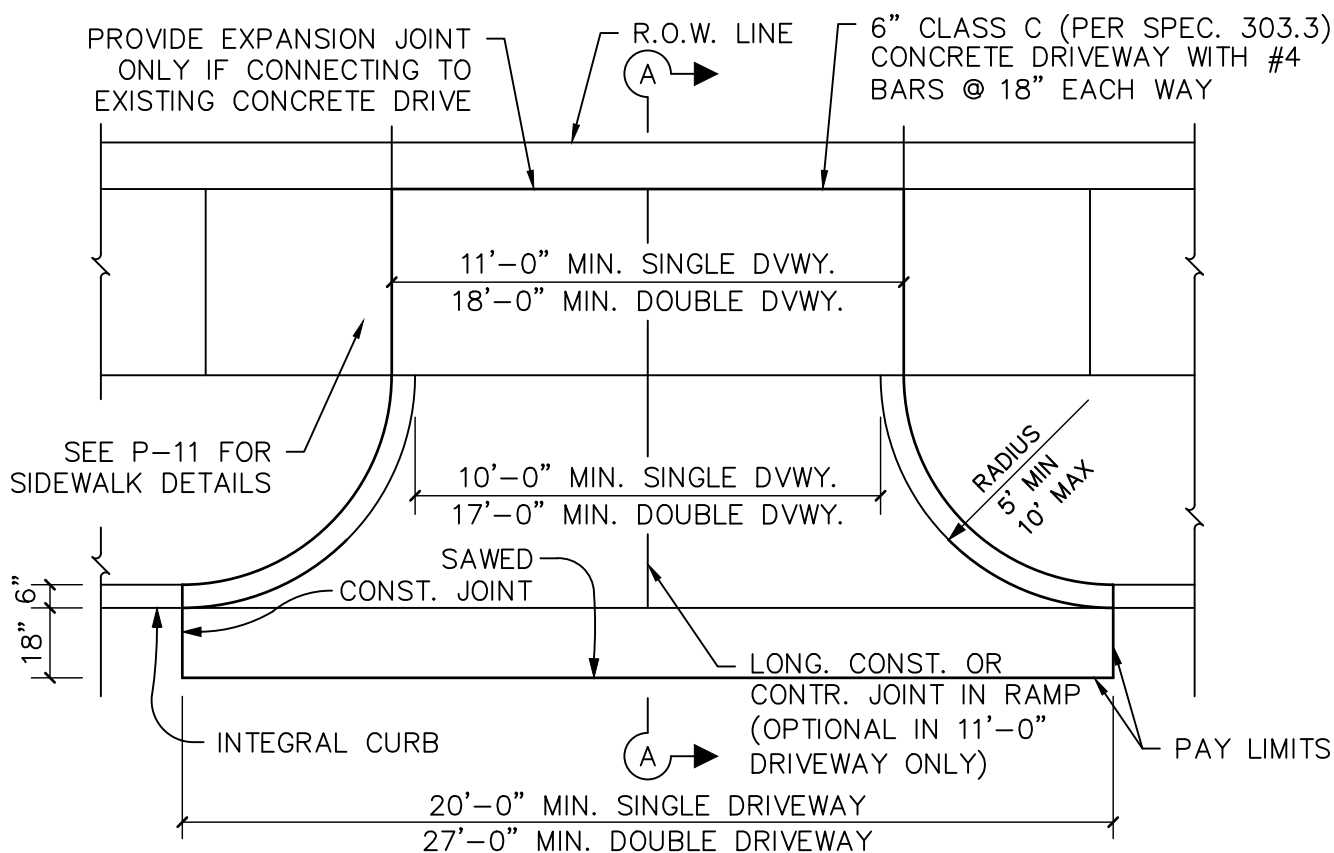
CITY OF
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City of Aledo
Construction Standards

CURB RAMP DETAIL

REVISED
APR. 2026

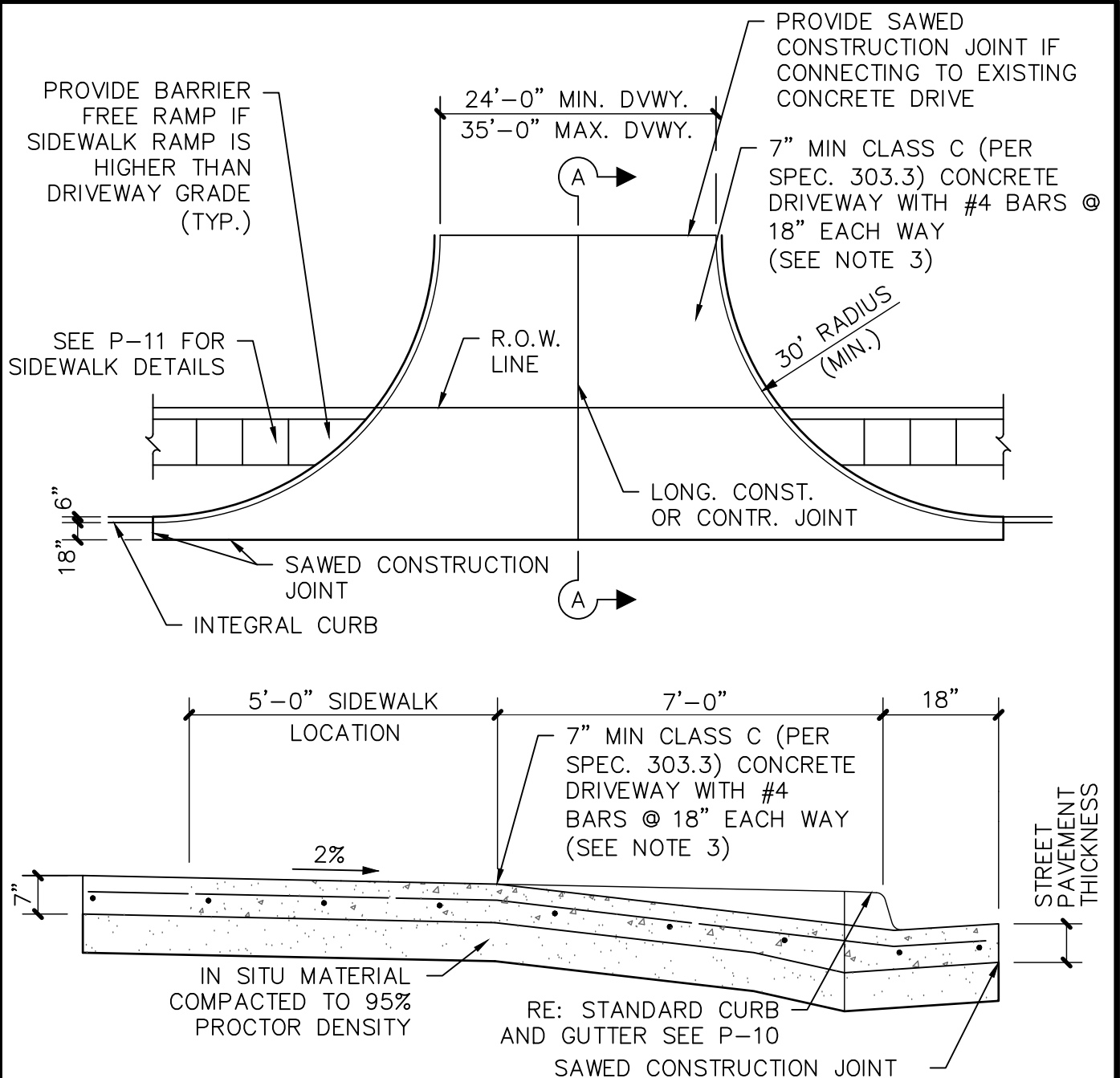
P-12



NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. SIDEWALK SECTION THROUGH DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED).
3. EXISTING CURB AND GUTTER SHALL BE VERTICALLY SAWCUT. HORIZONTAL SAWCUTTING OF CURB NOT ALLOWED.
4. NOT TO SCALE





SECTION A-A

NOTES:

1. EXISTING CURB AND GUTTER SHALL BE VERTICALLY SAWCUT. HORIZONTAL SAWCUTTING OF CURB NOT ALLOWED
2. SIDEWALK SECTION THROUGH DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED).
3. MATCH EXISTING DRIVEWAY THICKNESS OR AS DICTATED BY GEOTECHNICAL REPORT IF EITHER IS GREATER THAN 7".
4. NOT TO SCALE



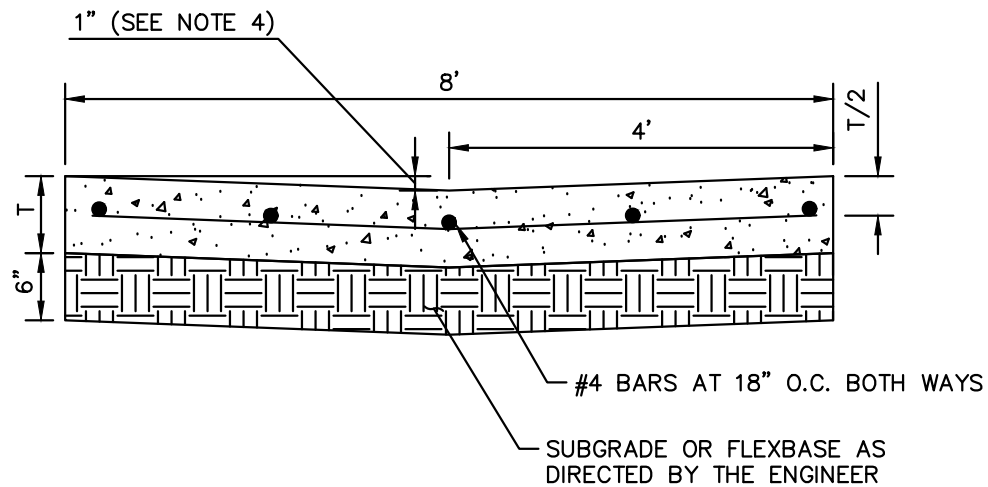
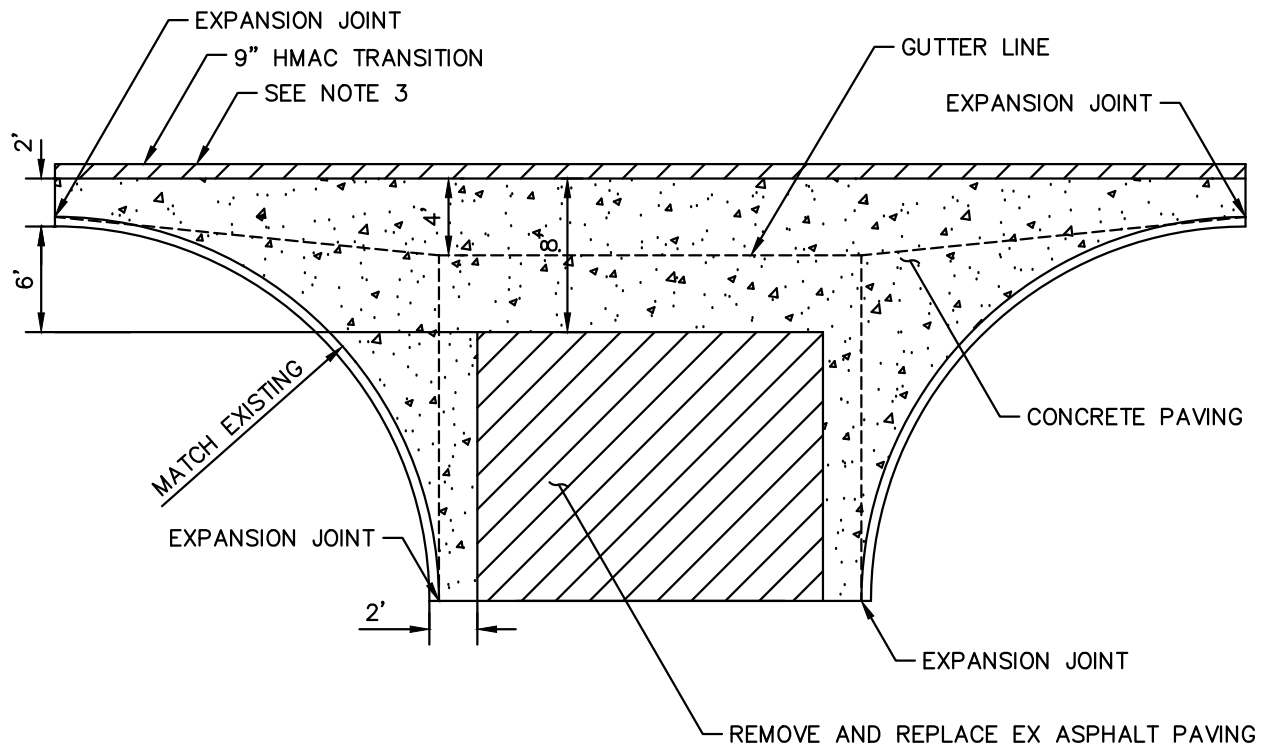
CITY OF
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City of Aledo
Construction Standards

COMMERCIAL - INDUSTRIAL
DRIVEWAY

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APR. 2026

P-14



NOTES:

1. REFER TO P-06 AND N.C.T.C.O.G. ITEM 303.3 FOR CONCRETE PAVEMENT.
2. 9" AND 24" HMAC TRANSITION SUBSIDIARY TO CONCRETE VALLEY GUTTER.
3. GUTTER TO BE SHAPED TO CONFORM WITH CONCRETE VALLEY (OR PAVEMENT).
4. IF VALLEY GUTTER IS ADJACENT TO BARRIER FREE RAMPS, CROSS SLOPE SHALL BE ADA COMPLIANT.
5. NOT TO SCALE



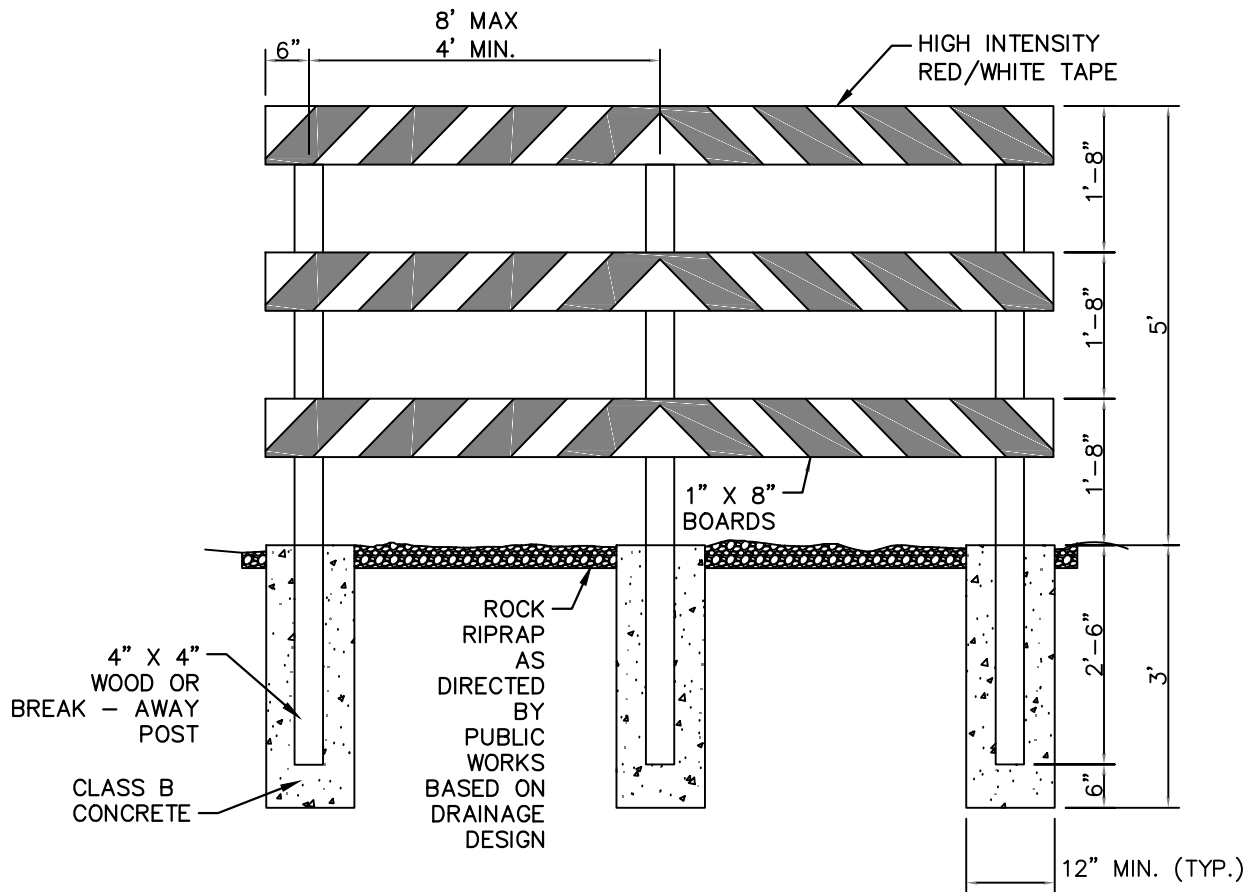
CITY OF
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City of Aledo
Construction Standards

VALLEY GUTTER

REVISED
APR. 2026

P-15



TYPICAL INSTALLATION

ROAD CLOSED BARRICADE

NOTES:

1. ALL BARRICADES SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE STANDARD HIGHWAY SIGN DESIGN FOR TEXAS (SHSD).
2. BARRICADE MUST COVER ENTIRE WIDTH OF PAVED ROADWAY OR FIRELANE SURFACE.
3. ALL 1" X 8" AND 4" X 4" WOOD POSTS MUST BE PAINTED WHITE.
4. BARRICADES SHALL BE DESIGNED AND CONSTRUCTED TO THE STANDARDS OF THE COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICE LIST.
5. BARRICADE STRIPING MATERIAL SHALL BE RED AND WHITE HIGH INTENSITY REFLECTIVE SHEETING.
6. DIAGONAL STRIPING SHALL BE PLACED IN A MANNER THAT DIRECTS TRAFFIC IN THE APPROPRIATE DIRECTION OF TRAVEL.
7. PROPOSED BARRICADE STRIPING SHALL BE APPROVED BY THE CITY PRIOR TO PLACEMENT OF BARRICADE.
8. NOT TO SCALE



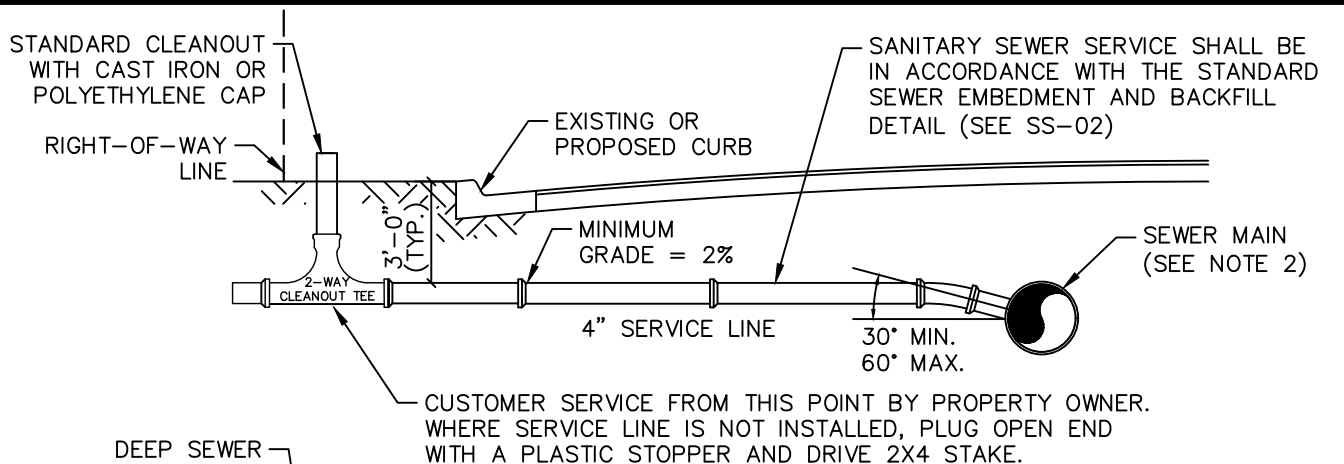
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Construction Standards

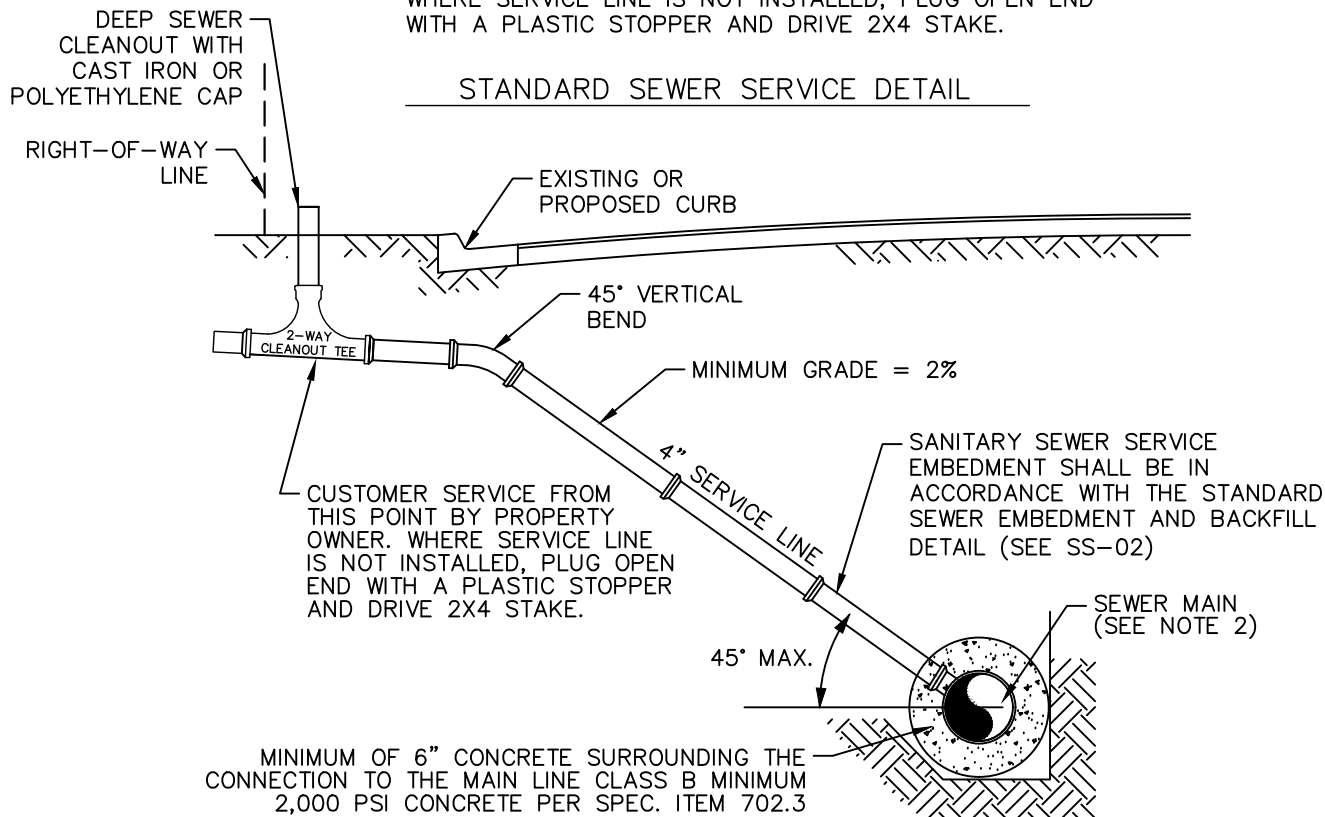
ROAD CLOSED BARRICADE
TYPICAL INSTALLATION

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APR. 2026

P-16



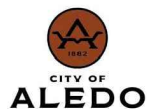
STANDARD SEWER SERVICE DETAIL



DEEP SEWER SERVICE DETAIL

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. EITHER A WYE FITTING OR A TEE WYE FITTING MAY BE USED FOR CONNECTION TO SEWER MAIN. NO TEES OR WYE SADDLES WILL BE ALLOWED. ALL CONNECTIONS TO BE MADE AT THE TWO O'CLOCK OR TEN O'CLOCK POSITION.
3. CONNECTIONS TO SEWER MAINS FROM 0' TO 7' DEEP SHALL CONFORM TO THE STANDARD SEWER CONNECTION DETAIL. CONNECTIONS TO SEWER MAINS DEEPER THAN 7' SHALL CONFORM TO THE DEEP SEWER CONNECTION DETAILS.
4. MARK SEWER SERVICE LINE LOCATION WITH RED VINYL TAPE AT LEAST 3" WIDE AND 10 MIL THICK. ATTACH TAPE TO THE END OF THE SERVICE AND EXTEND THROUGH THE BACKFILL AT THE POINT OF THE HOUSE SERVICE CONNECTION BEHIND THE CURB.
5. SANITARY SEWER SERVICE LOCATIONS SHALL BE MARKED ON THE FACE OF CURB WITH AN "S" CUT.
6. NOT TO SCALE

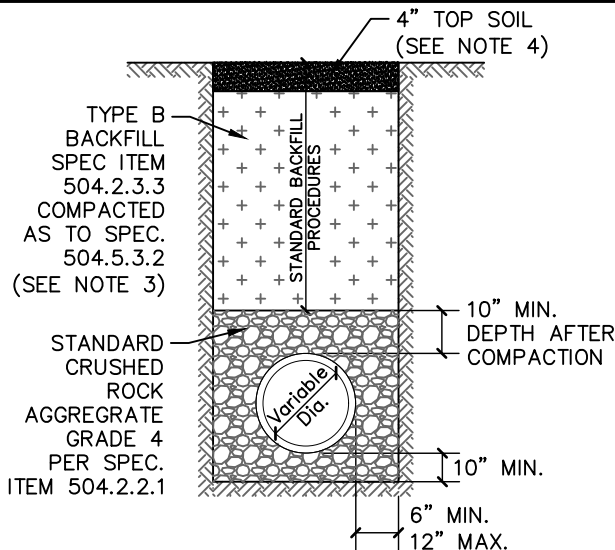


City of Aledo
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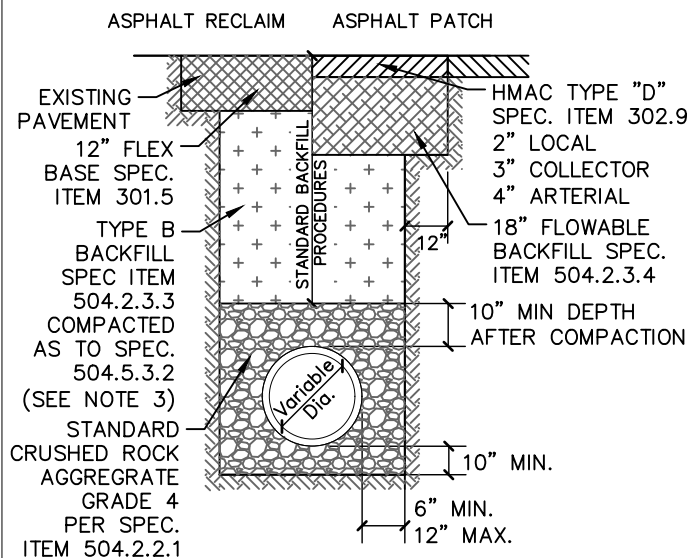
**SANITARY SEWER
SERVICE**

**REVISED
APR. 2026**

SS-01

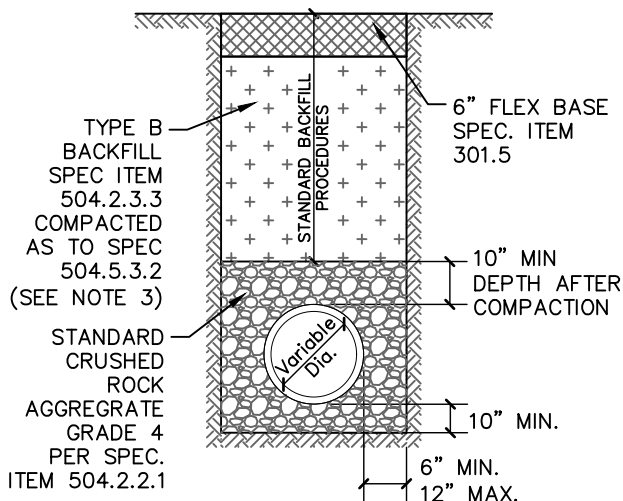


UNPAVED AREA

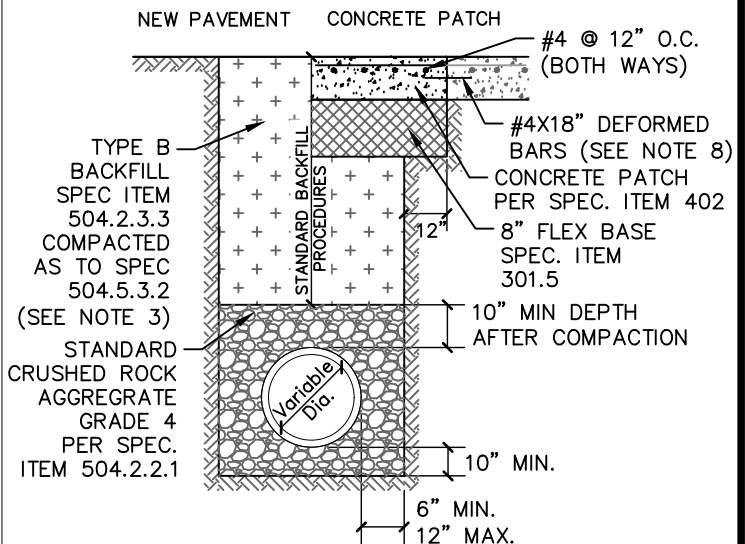


NOTE: FOR NEW STREETS, BACKFILL MAY BE EXTENDED TO THE TOP OF THE TRENCH

ASPHALT PAVEMENT



GRAVEL SURFACE



CONCRETE PAVEMENT

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE CITY TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
3. ROCKS GREATER THAN 3" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
4. TOPSOIL SHALL BE 4" IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLOUDS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
5. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC. ITEM 402.3.
6. SEWER LINE WARNING TAPE OF MIN 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
7. A MAXIMUM OF 50 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY.
8. DEFORMED BARS DOWELED AND EPOXYED MIN. 6" INTO EXISTING PAVEMENT @ 12" O.C. (TYP).
9. IF GROUND WATER IS IN SUFFICIENT QUANTITY TO CAUSE SAND TO PUMP, THEN USE CRUSHED ROCK AS EMBEDMENT.
10. NOT TO SCALE



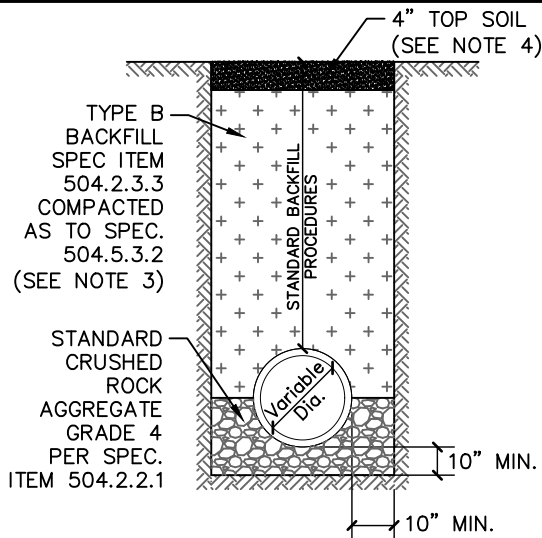
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Construction Standards

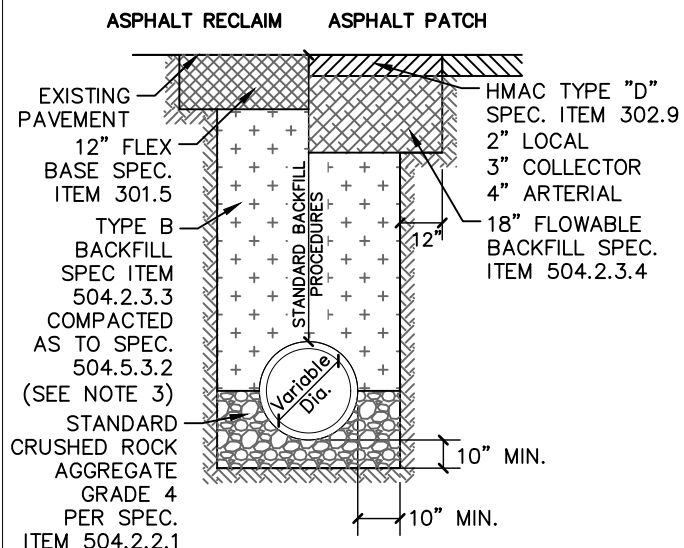
SANITARY SEWER
EMBEDMENT

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APR. 2026

SS-02

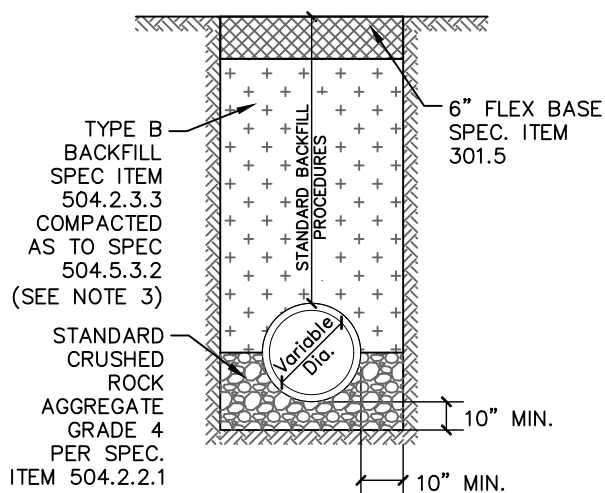


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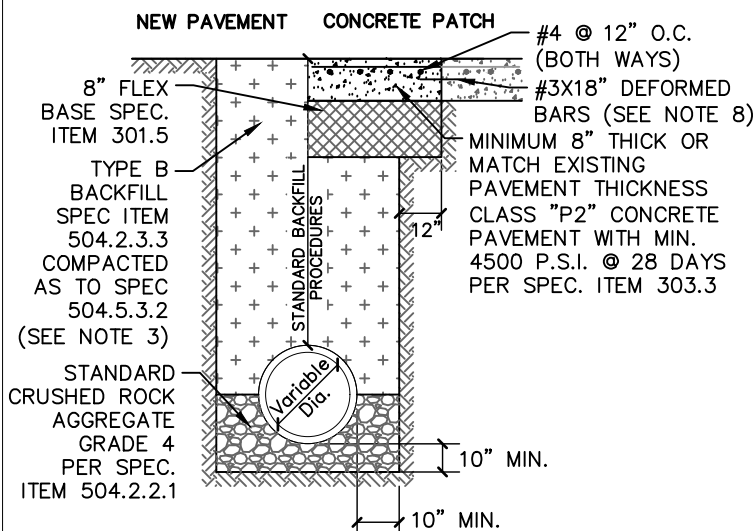


NOTE: FOR NEW STREETS, BACKFILL MAY BE EXTENDED TO THE TOP OF THE TRENCH

ASPHALT PAVEMENT



GRAVEL SURFACE



CONCRETE PAVEMENT

NOTES:

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3. ROCKS GREATER THAN 3" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
4. TOPSOIL SHALL BE 4" IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
5. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC. ITEM 402.3.
6. STORM LINE WARNING TAPE OF MIN 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
7. A MAXIMUM OF 50 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY.
8. DEFORMED BARS DOWELED AND EPOXYED MIN. 6" INTO EXISTING PAVEMENT @ 12" O.C. (TYP).
9. CONTRACTOR TO FILL STANDARD CRUSHED ROCK AGGREGATE TO TOP OF PIPE IF MINIMUM TRENCH WIDTH IS NOT MET DURING THE INSTALLATION OF RCP.
10. IF GROUND WATER IS IN SUFFICIENT QUANTITY TO CAUSE SAND TO PUMP, THEN USE CRUSHED ROCK AS EMBEDMENT.
11. NOT TO SCALE



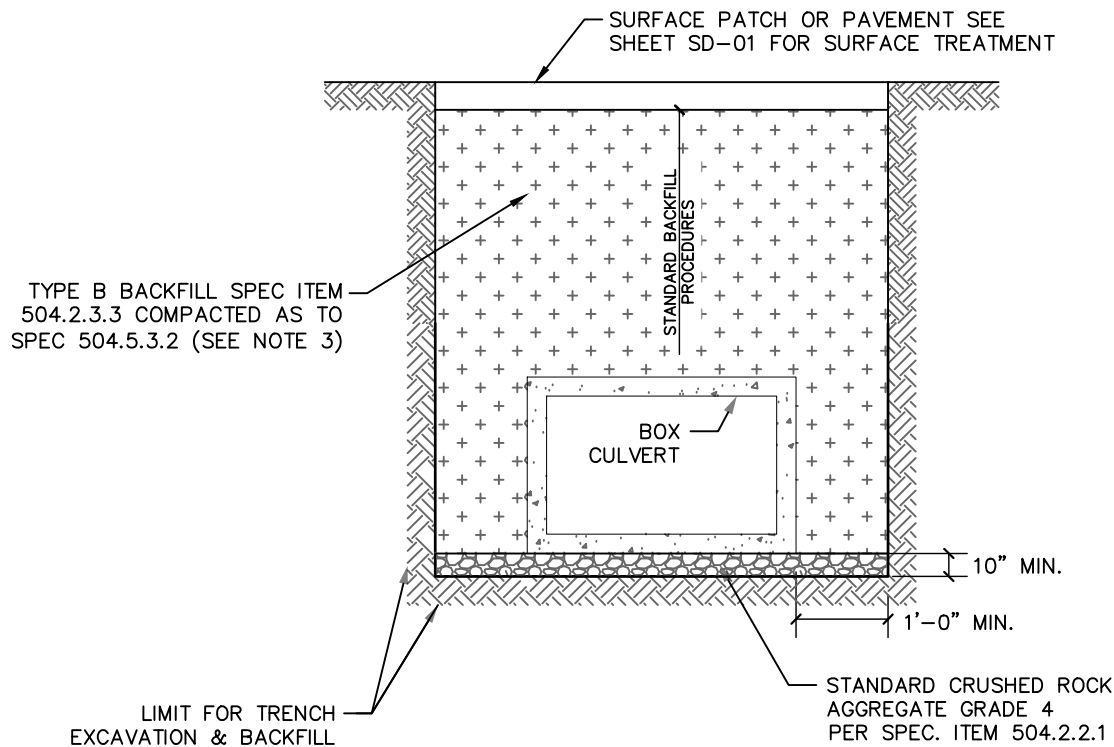
CITY OF
ALEDO

City of Aledo
Construction Standards

STORM DRAIN
EMBEDMENT (1 OF 3)

REVISED
APR. 2026

SD-01

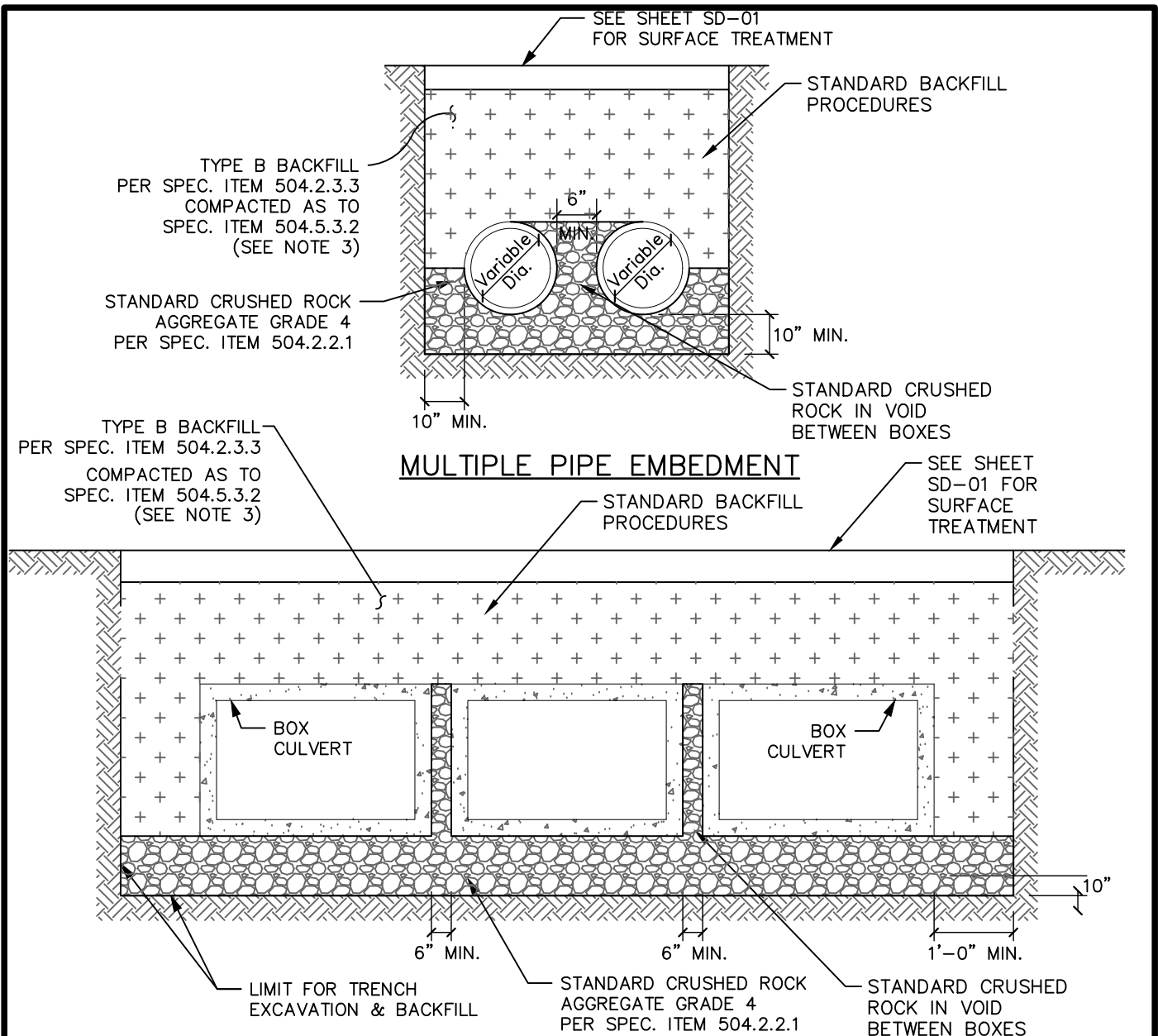


BOX EMBEDMENT

NOTES:

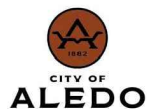
1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE CITY TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
3. ROCKS GREATER THAN 3" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
4. TOPSOIL SHALL BE 4" IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
5. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC. ITEM 402.3.
6. STORM LINE WARNING TAPE OF MIN 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
7. A MAXIMUM OF 50 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY.
8. CONTRACTOR TO FILL STANDARD CRUSHED ROCK AGGREGATE TO TOP OF BOX IF MINIMUM TRENCH WIDTH IS NOT MET DURING THE INSTALLATION OF RCB.
9. IF GROUND WATER IS IN SUFFICIENT QUANTITY TO CAUSE SAND TO PUMP, THEN USE CRUSHED ROCK AS EMBEDMENT
10. NOT TO SCALE

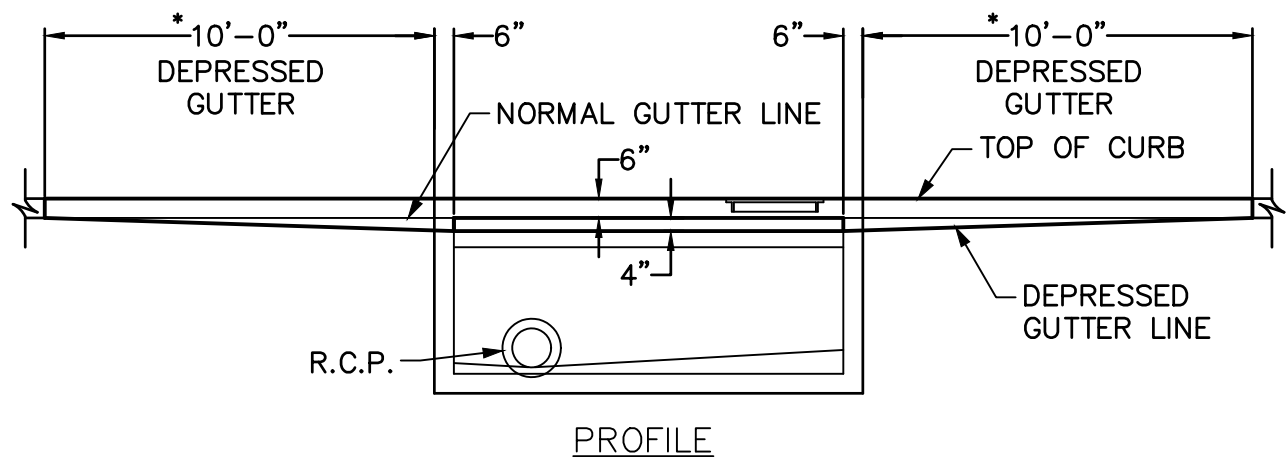
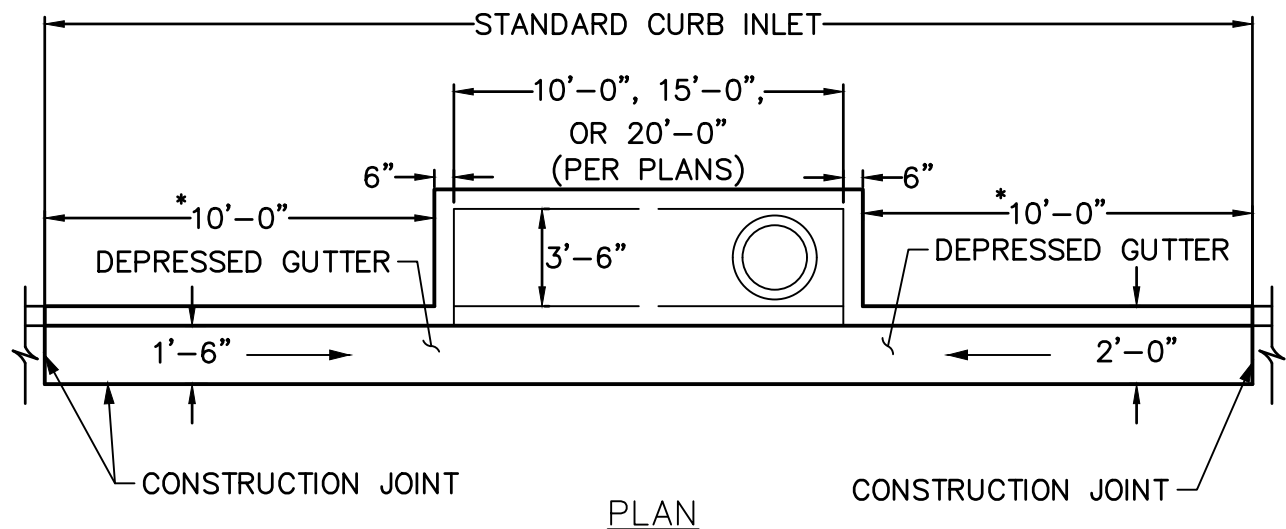




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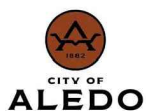
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3. ROCKS GREATER THAN 3" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
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5. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC. ITEM 402.3.
6. STORM LINE WARNING TAPE OF MIN 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
7. A MAXIMUM OF 50 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY.
8. CONTRACTOR TO FILL STANDARD CRUSHED ROCK AGGREGATE TO TOP OF PIPE / BOX IF MINIMUM TRENCH WIDTH IS NOT MET DURING THE INSTALLATION OF PIPE / BOX.
9. IF GROUND WATER IS IN SUFFICIENT QUANTITY TO CAUSE SAND TO PUMP, THEN USE CRUSHED ROCK AS EMBEDMENT
10. NOT TO SCALE

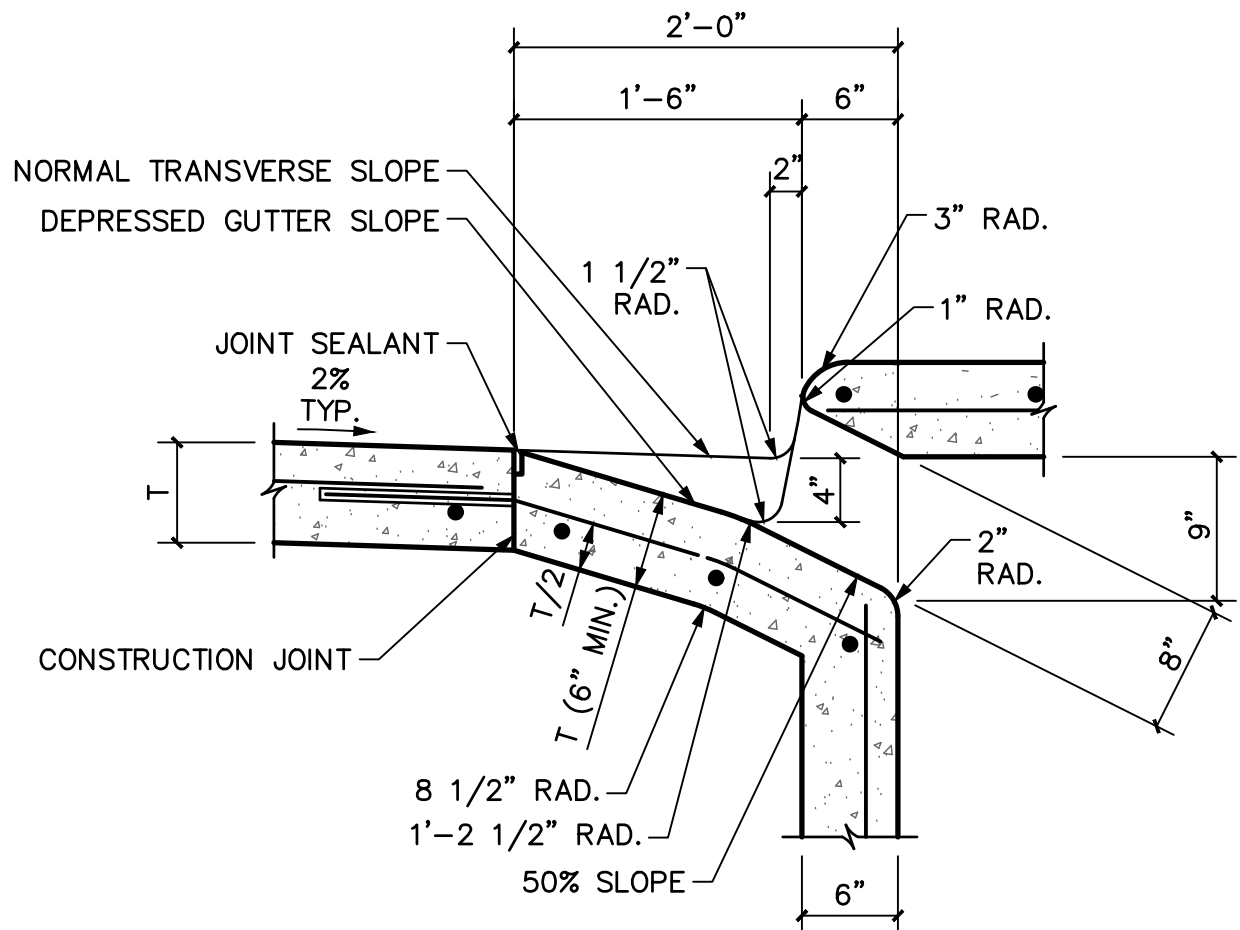




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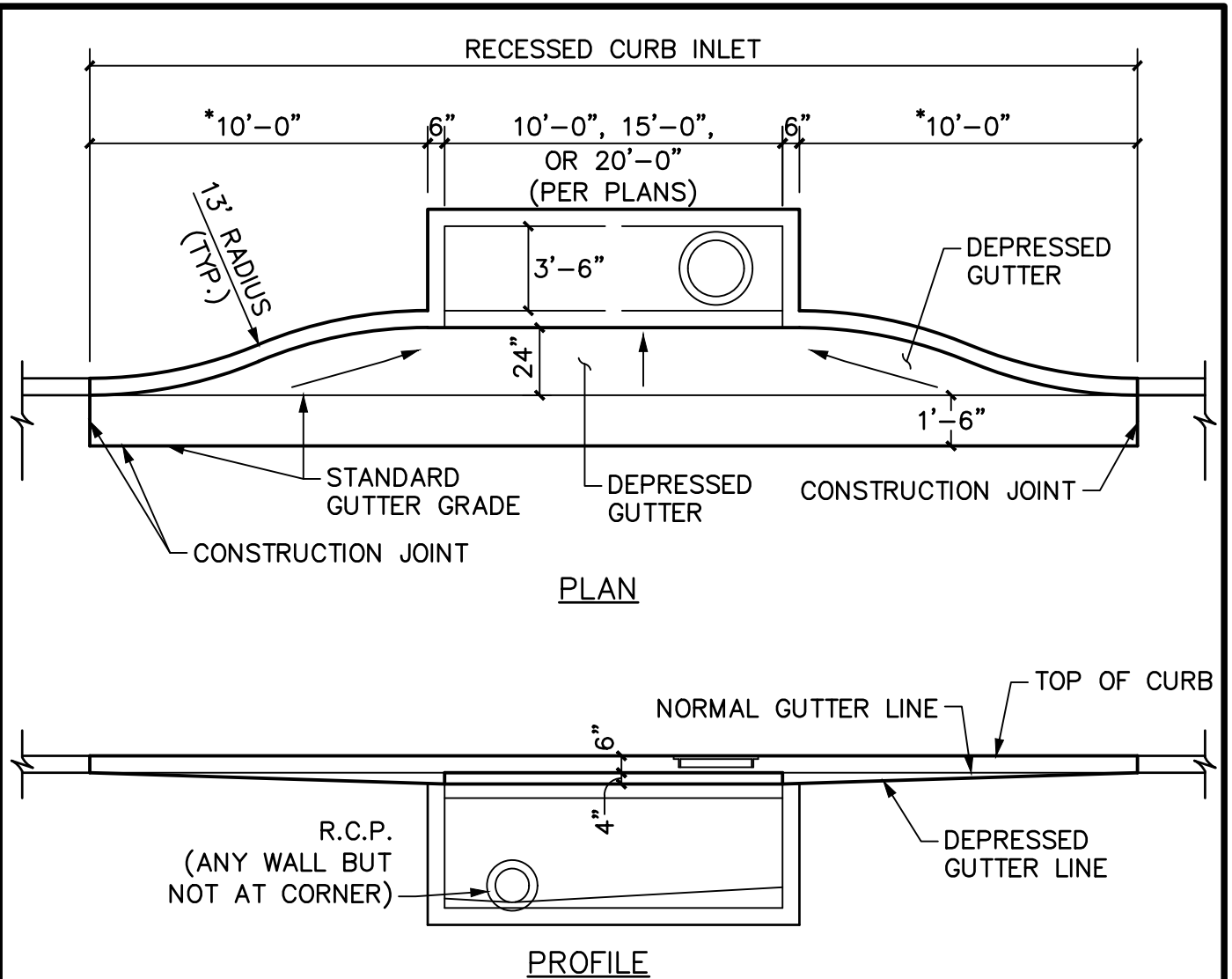
1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. CONCRETE SHALL BE 3,600 PSI, CLASS F (PER SPEC. 702.3).
3. TOP OF INLET TO SLOPE 2% TOWARDS STREET OR PER PLAN.
4. CENTER SUPPORT BEAM REQUIRED FOR 15' AND 20' STANDARD CURB INLETS.
5. ADDITIONAL REINFORCING STEEL TO BE PLACED AROUND MANHOLE OPENING.
6. WING LENGTH MAY BE DECREASED BASED UPON SITE SPECIFIC CONDITIONS. CITY MUST APPROVE SHORTER LENGTH.
7. PIPE SHALL BE PLACED AT DOWNSTREAM END INLET. MANHOLE COVER SHALL BE PLACED AT UPSTREAM END AT INLET.
8. MANHOLE COVERS INSIDE OPENING SHALL BE 30". INLET TOP WILL NEED TO BE CAST IN PLACE IN ORDER TO ACCOMMODATE 30" OPENING/COVER.
9. TWO MANHOLES ARE REQUIRED ON 15' AND 20' INLETS.
10. NOT TO SCALE





NOTES:
1. NOT TO SCALE





NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. CONCRETE SHALL BE 3,600 PSI, CLASS F (PER SPEC. 702.3).
3. TOP OF INLET TO SLOPE 2% TOWARDS STREET OR PER PLAN.
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5. ADDITIONAL REINFORCING STEEL TO BE PLACED AROUND MANHOLE OPENING.
6. WING LENGTH MAY BE DECREASED BASED UPON SITE SPECIFIC CONDITIONS. CITY MUST APPROVE SHORTER LENGTH.
7. MANHOLE COVERS INSIDE OPENING SHALL BE 30". INLET TOP WILL NEED TO BE CAST IN PLACE IN ORDER TO ACCOMMODATE 30" OPENING/COVER.
8. TWO MANHOLES ARE REQUIRED ON 15' AND 20' INLETS.
9. NOT TO SCALE



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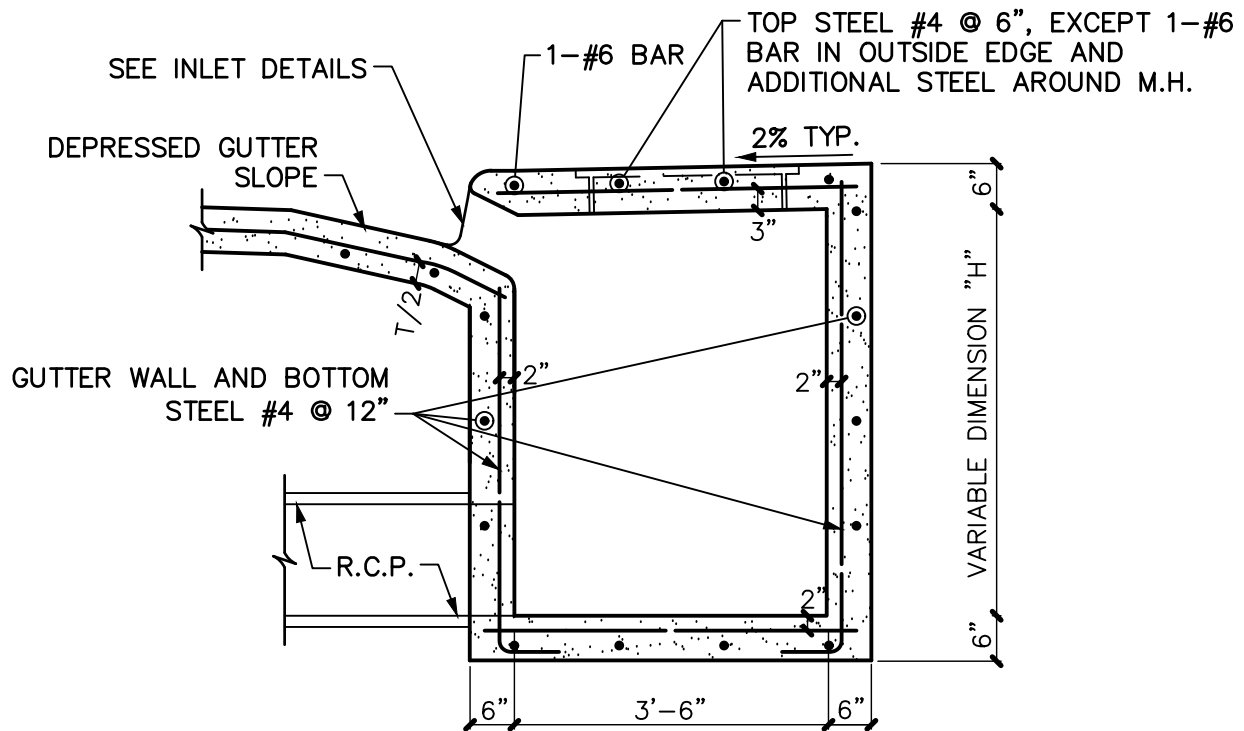
City of Aledo
Construction Standards

RECESSED CURB INLET

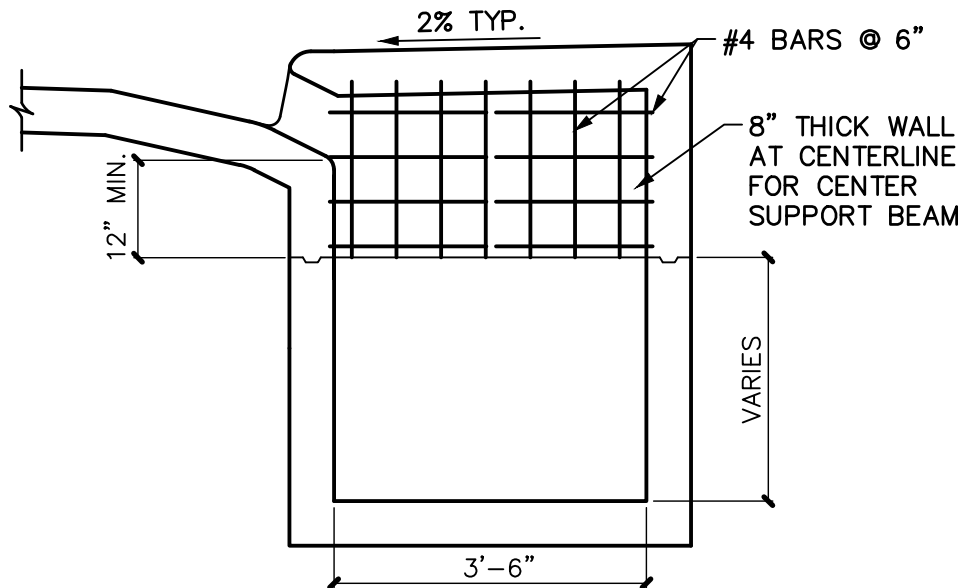
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APR. 2026

SD-06





INLET SECTION FOR RECESSED AND STANDARD INLETS



CENTER SUPPORT BEAM FOR 15' AND 20' RECESSED AND STANDARD INLETS

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. CONCRETE SHALL BE 4,200 PSI, CLASS F (PER SPEC. 702.3).
3. TOP OF INLET TO SLOPE 2% TOWARDS STREET OR PER PLAN.
4. REINFORCING STEEL LAYOUT APPLICABLE TO BOTH RECESSED AND ON-GRADE CURB INLETS.
5. NOT TO SCALE



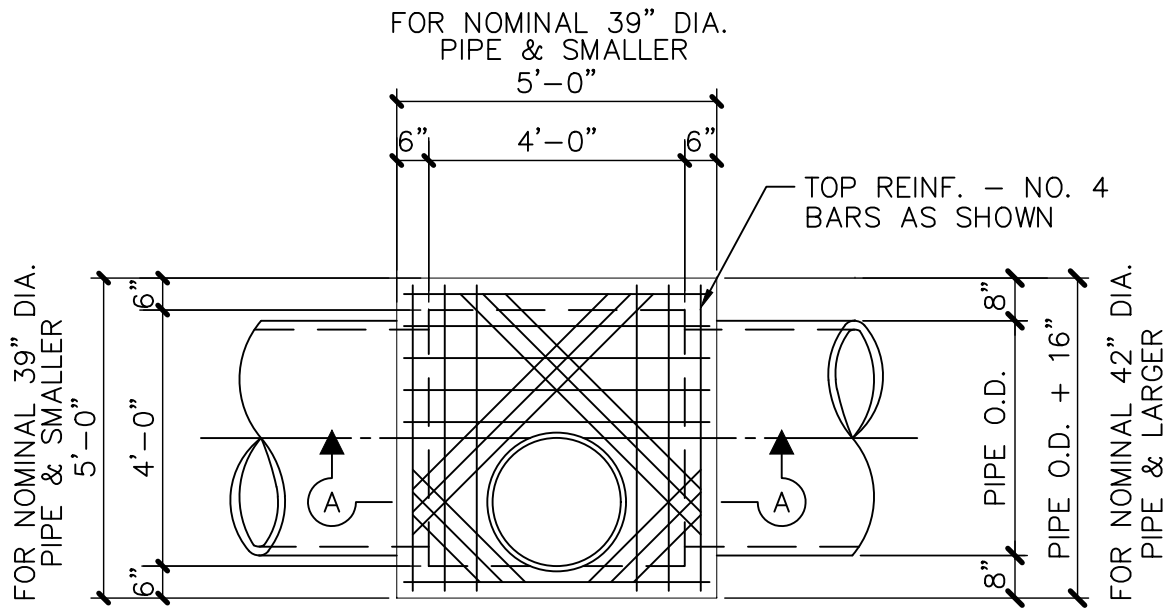
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Construction Standards

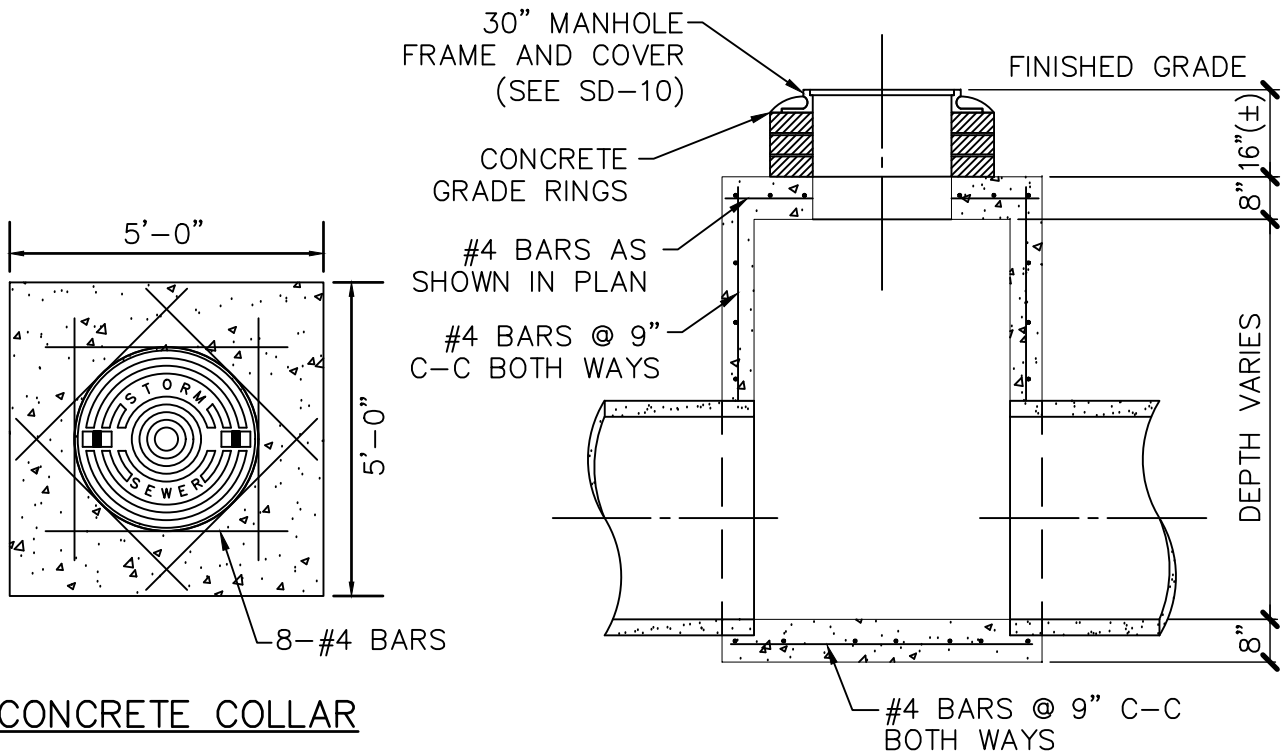
CENTER SUPPORT BEAM
FOR INLETS

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APR. 2026

SD-08



PLAN VIEW



CONCRETE COLLAR

SECTION A-A

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. CONCRETE SHALL BE CLASS F (PER SPEC. ITEM 702.3).
3. 5'X5' CONCRETE COLLAR OF 6" 3600 PSI CLASS "C" CONCRETE SHALL BE PROVIDED FOR MANHOLE LIDS LOCATED IN ASPHALT PAVING OR OUTSIDE OF PAVING LIMITS.
4. NOT TO SCALE



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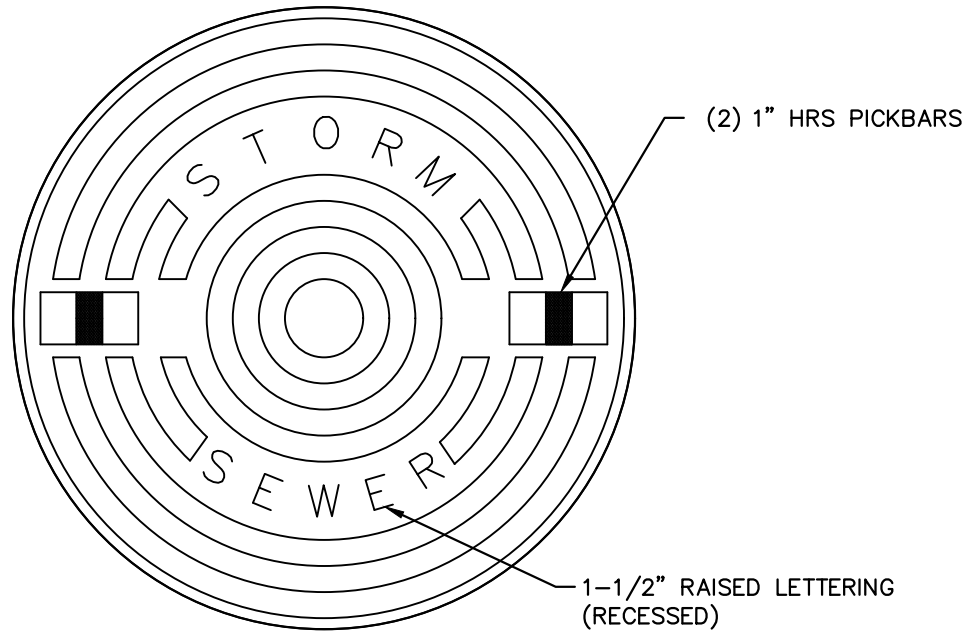
City of Aledo

Construction Standards

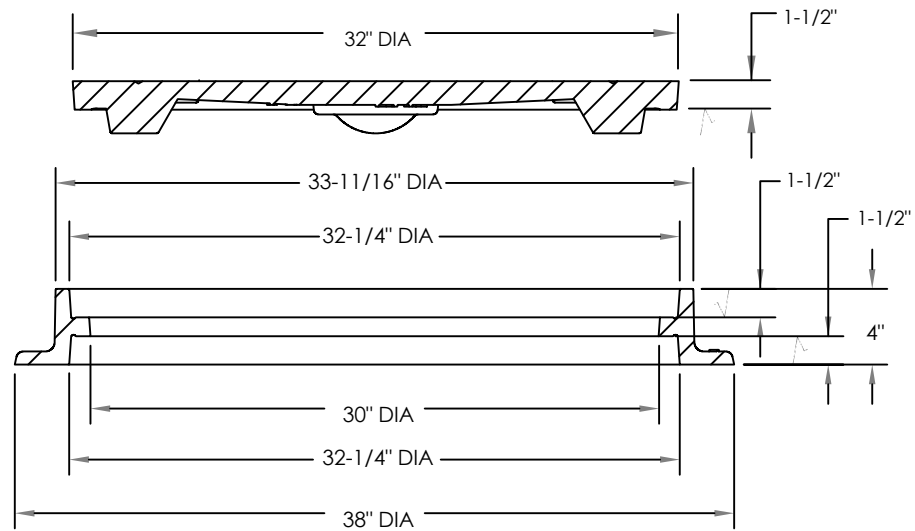
STANDARD 4-FOOT
SQUARE STORM DRAIN
MANHOLE

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APR. 2026

SD-09



TOP VIEW



SECTION VIEW

NOTE:
1. NOT TO SCALE



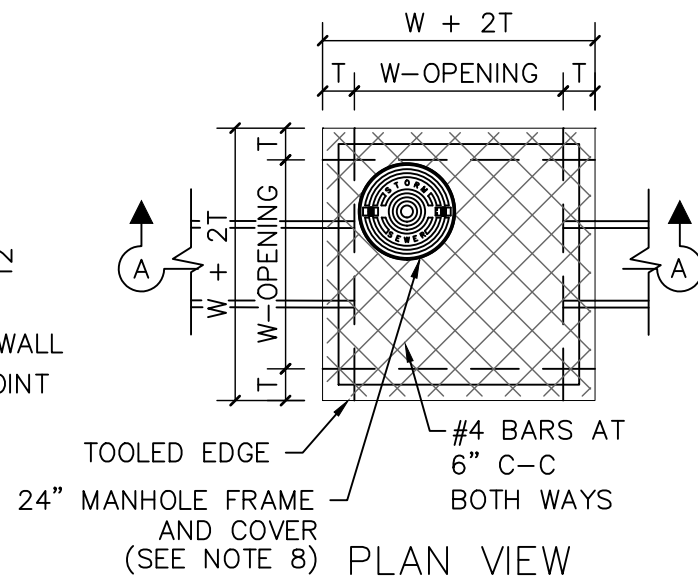
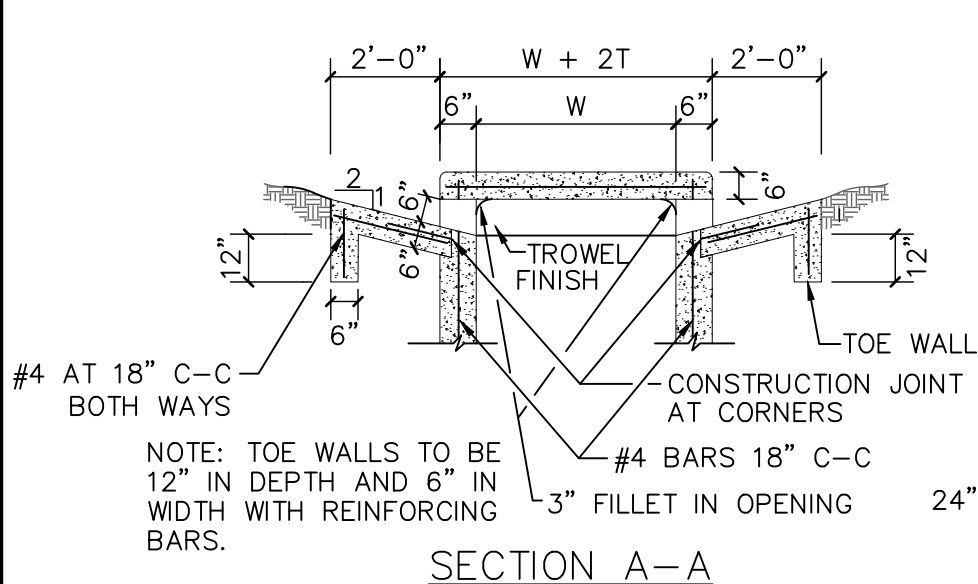
CITY OF
ALEDO

City of Aledo
Construction Standards

MANHOLE FRAME &
COVER

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SD-10

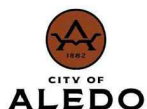


NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. CONCRETE FOR DROP INLETS SHALL BE CLASS F (PER SPEC. ITEM 702.3).
3. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
4. FOR DETAILS OF REINFORCING TO LOWER PORTIONS OF INLET, SEE APPROPRIATE SQUARE MANHOLE DETAILS.
5. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH SHALL BE SHOWN ON PLANS AT LOCATION OF INLET.
6. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS SHOWN ON PLANS.
7. DECK MAY BE REINFORCED THE SAME AS STANDARD SQUARE STORM DRAIN MANHOLE.
8. NOT TO SCALE

INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"
7' SQUARE	9"	7'-0"
8' SQUARE	9"	8'-0"

FOR LOWER PORTION OF 2' SQUARE DROP INLET USE REINF. STEEL DETAILS OF 4' SQUARE MANHOLE AND ELIMINATE

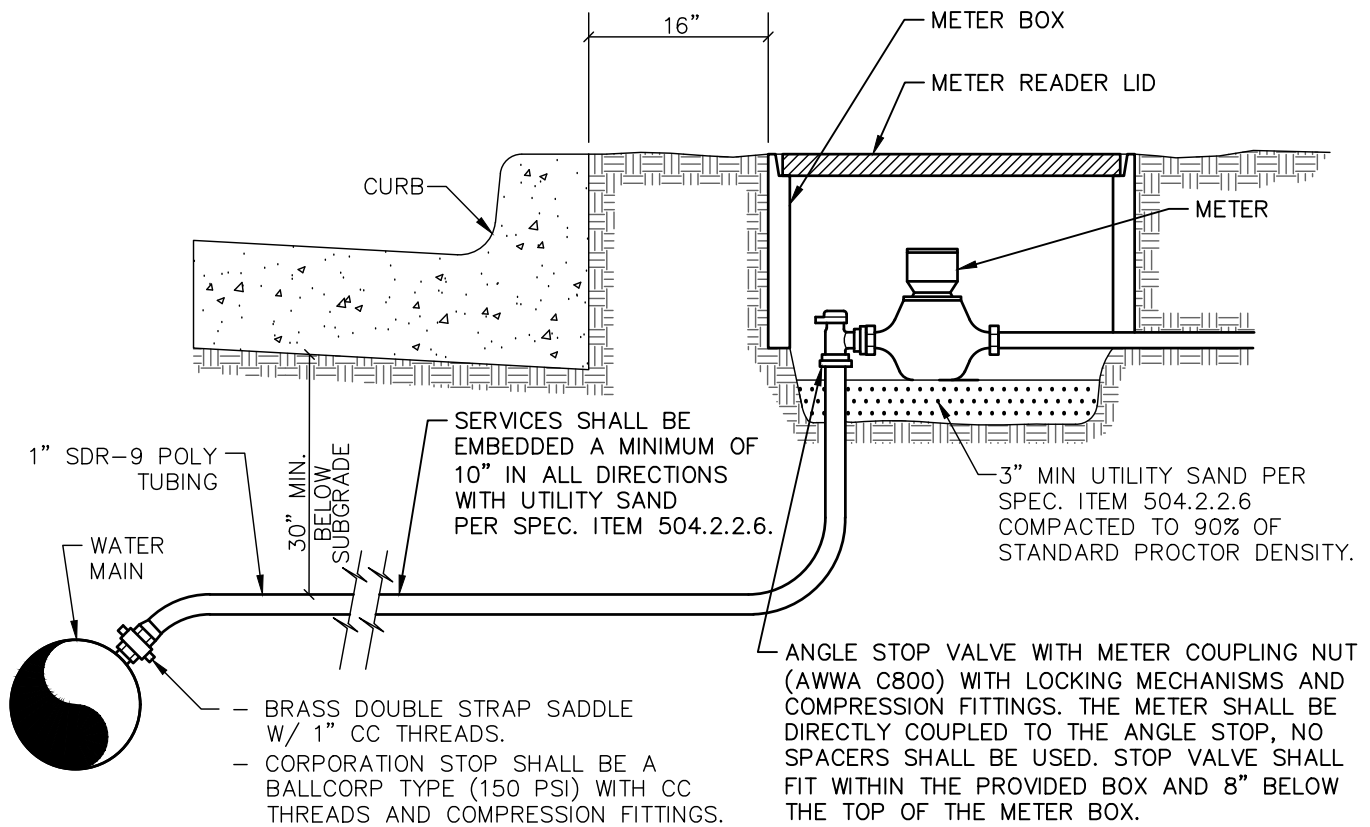


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STANDARD DROP INLET

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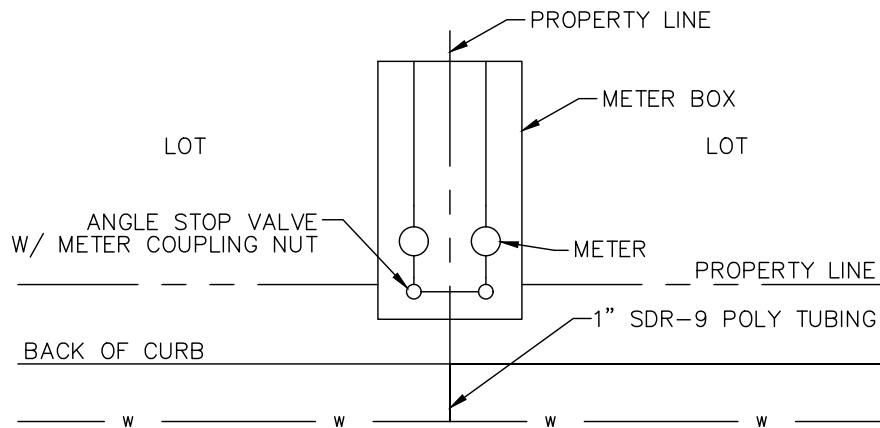
SD-11



SINGLE METER SERVICE LAYOUT

NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. ALL RESIDENTIAL SERVICES SHALL BE 3/4" BULLHEAD ASSEMBLY SET ON PROPERTY LINE.
3. NO FLARED FITTINGS ALLOWED.
4. DO NOT USE PIPE DOPE OR GLUE.
5. INDICATE LOCATION OF WATER SERVICE WITH A 3" TALL "W" INSCRIBED IN THE FACE OF THE CURB.
6. BULLHEAD CONNECTIONS SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
7. METER BOX SHALL BE H-20 RATED IF IN DRIVEWAY.
8. NOT TO SCALE



BULLHEAD SERVICE LAYOUT



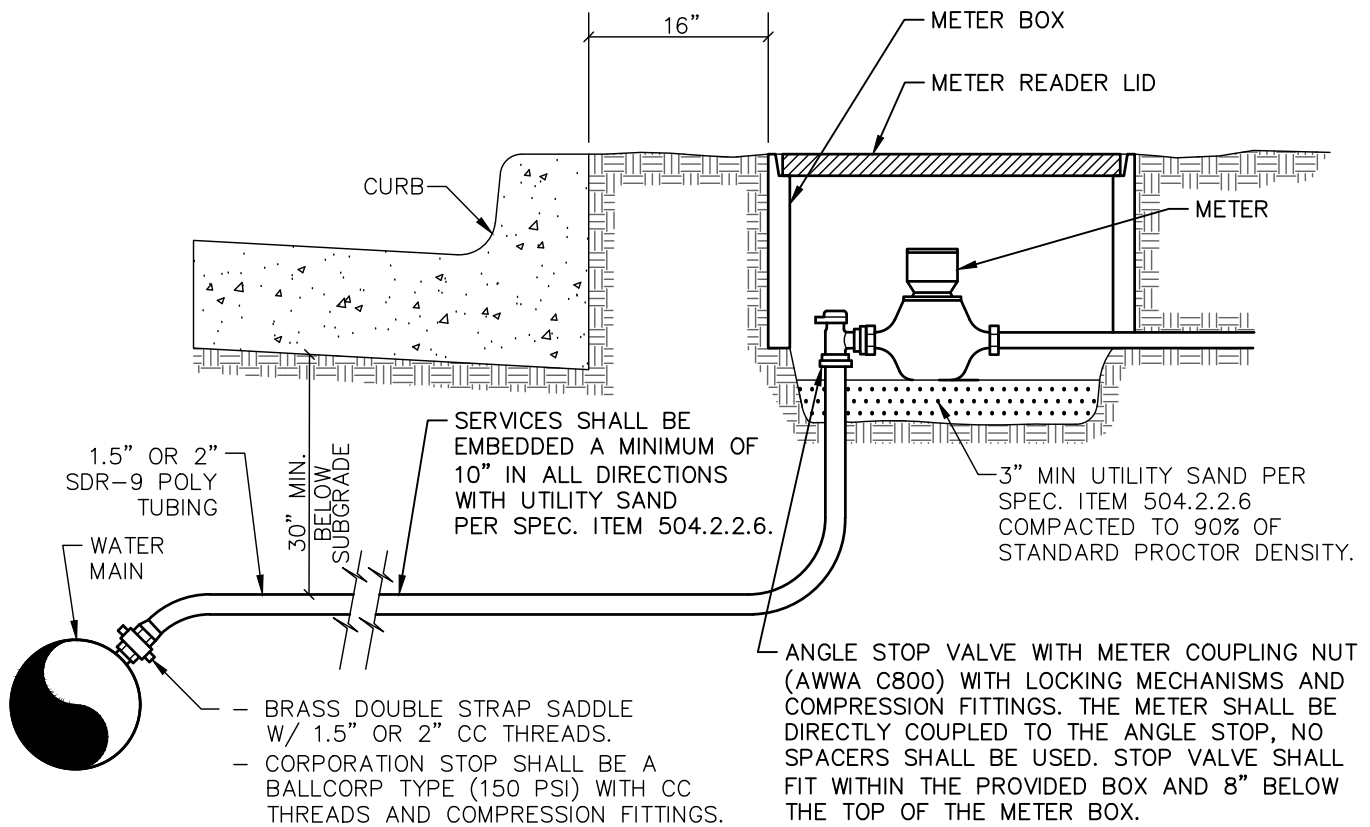
CITY OF
ALEDO

City of Aledo
Construction Standards

1-INCH WATER SERVICE

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APR. 2026

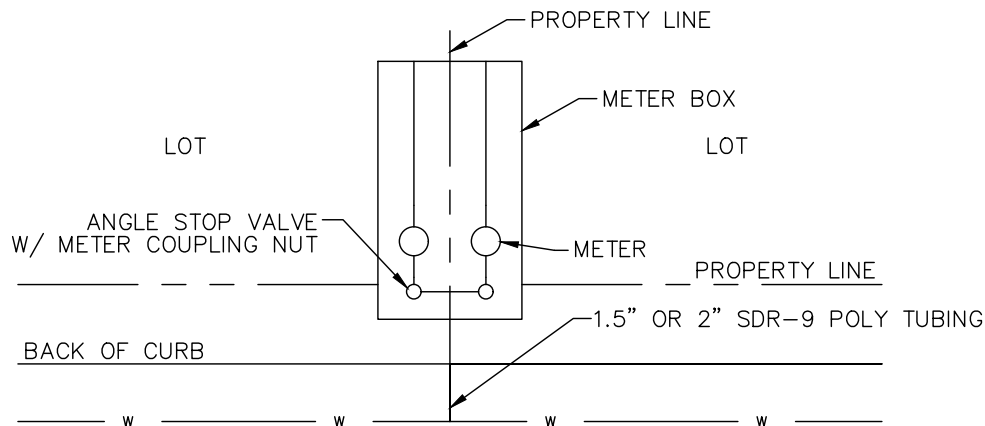
W-01



SINGLE METER SERVICE LAYOUT

NOTES:

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3. NO FLARED FITTINGS ALLOWED.
4. DO NOT USE PIPE DOPE OR GLUE.
5. INDICATE LOCATION OF WATER SERVICE WITH A 3" TALL "W" INSCRIBED IN THE FACE OF THE CURB.
6. BULLHEAD CONNECTIONS SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
7. METER BOX SHALL BE H-20 RATED IF IN DRIVEWAY.
8. NOT TO SCALE



BULLHEAD SERVICE LAYOUT



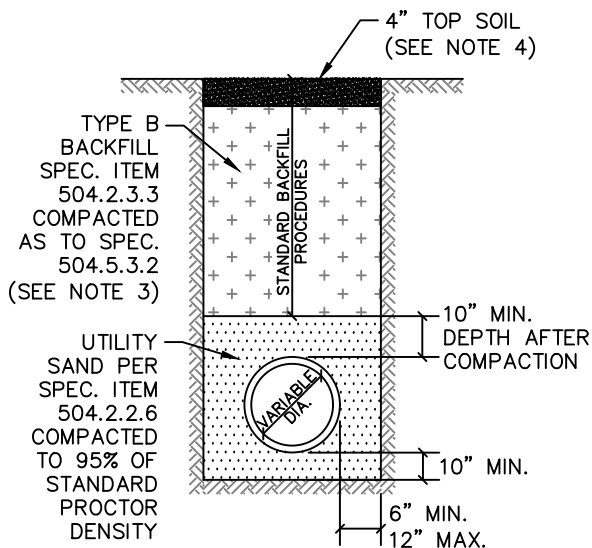
CITY OF
ALEDO

City of Aledo
Construction Standards

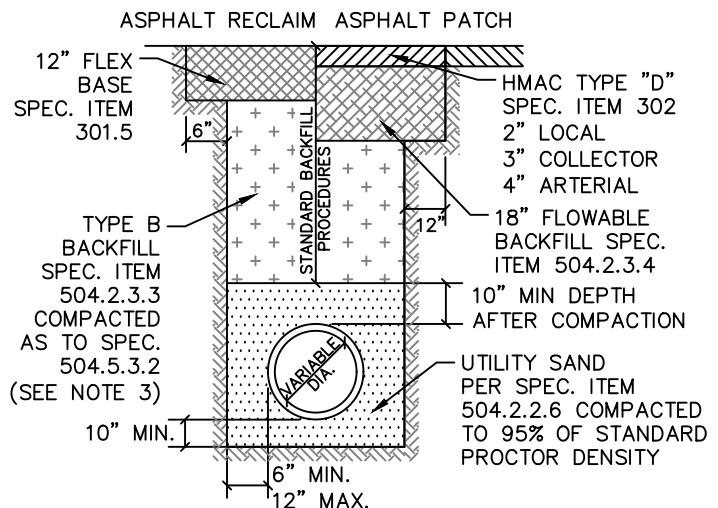
1.5 & 2-INCH WATER
SERVICE

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APR. 2026

W-02

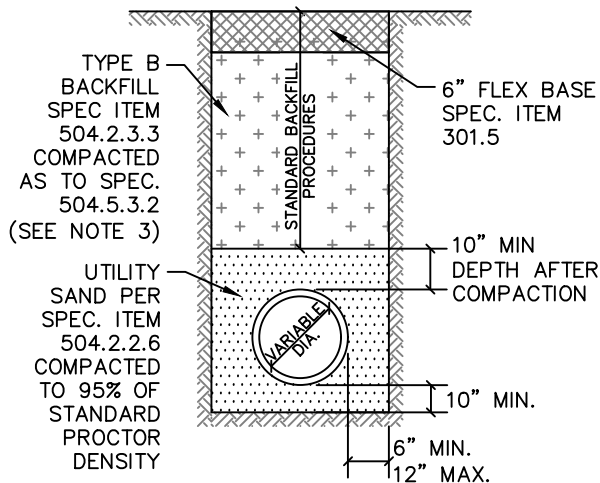


UNPAVED AREA

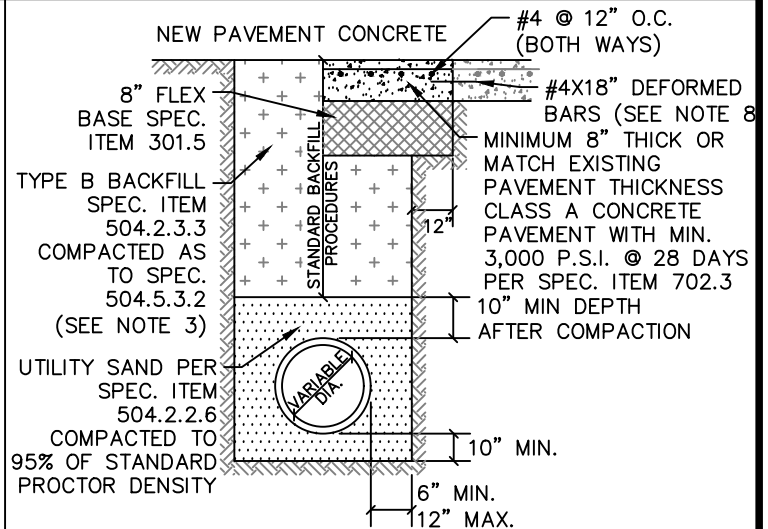


NOTE: FOR NEW STREETS, BACKFILL MAY BE
EXTENDED TO THE TOP OF THE TRENCH

ASPHALT PAVEMENT



GRAVEL SURFACE



CONCRETE PAVEMENT

NOTES:

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3. ROCKS GREATER THAN 3" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
4. TOPSOIL SHALL BE 4" IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
5. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC. ITEM 402.3.
6. BLUE UNDERGROUND WATER LINE WARNING TAPE OF MIN 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
7. A MAXIMUM OF 50 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY.
8. DEFORMED BARS DOWELED AND EPOXYED MIN. 6" INTO EXISTING PAVEMENT @ 12" O.C. (TYP).
9. IN ACCORDANCE TO NCTCOG 506.7.3, ALL NEW WATER LINES SHALL BE PURGED (PIGGED AND/OR FLUSHED) AS DIRECTED BY THE INSPECTOR.
10. IF GROUND WATER IS IN SUFFICIENT QUANTITY TO CAUSE SAND TO PUMP, THEN USE CRUSHED ROCK AS EMBEDMENT.
11. NOT TO SCALE



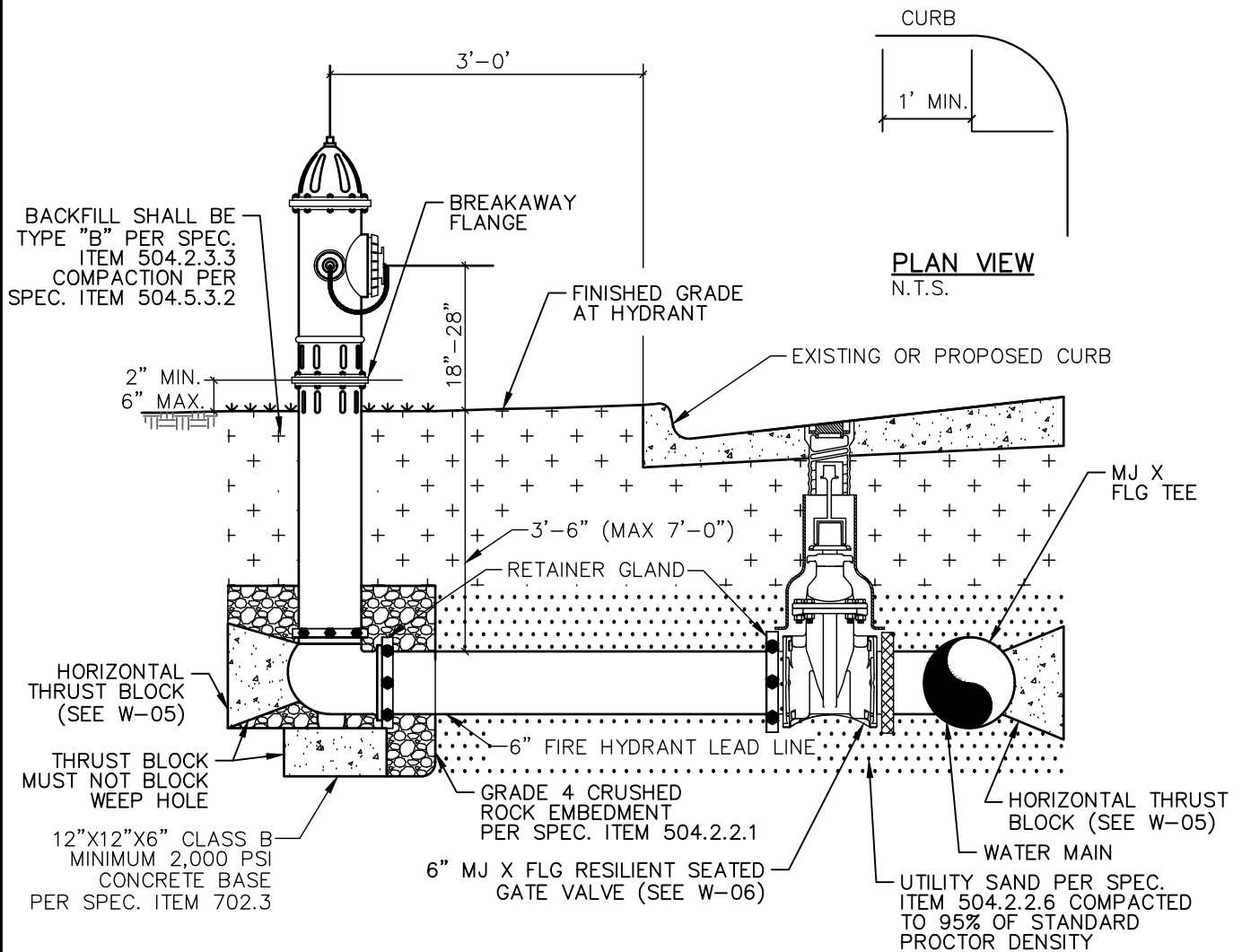
CITY OF
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Construction Standards

WATER MAIN EMBEDMENT

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APR. 2026

W-03



NOTES:

1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. ALL FIRE HYDRANTS SHALL CONFORM TO AWWA C502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN VALVE OPENING AND AN INSIDE BARREL DIAMETER OF APPROXIMATELY 7". ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
3. ALL BELOW GROUND IRON ASSEMBLES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
4. RESILIENT SEATED GATE VALVE SHALL CONFORM TO AWWA C509.
5. FIRE HYDRANT LEADS GREATER THAN A SINGLE PIPE JOINT REQUIRE JOINT THRUST RETAINERS.
6. FIRE HYDRANT SHALL BE PLACED ON THE EXTENDED LOT LINE WHEN POSSIBLE.
7. FIRE HYDRANT SHALL BE LOCATED A MINIMUM 1 FT. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADIS AT THE INTERSECTIONS. (SEE PLAN VIEW)
8. FIRE HYDRANT NO CLOSER THAN 12" TO EXISTING OR PROPOSED SIDEWALKS.
9. ALL FIRE HYDRANTS SHALL BE AT LEAST 42 INCHES FROM ANY ABOVE GROUND OBSTRUCTIONS, SUCH AS GUARDRAILS, RETAINING WALLS, BOLLARDS, ETC.
10. FIRE HYDRANT SHALL BE OPEN LEFT, COUNTER-CLOCKWISE.
11. 4" BLUE RAISED PAVEMENT MARKER SHALL BE PROVIDED AND INSTALLED AT THE STREET CENTERLINE ADJACENT TO THE FIRE HYDRANT.
12. NOT TO SCALE



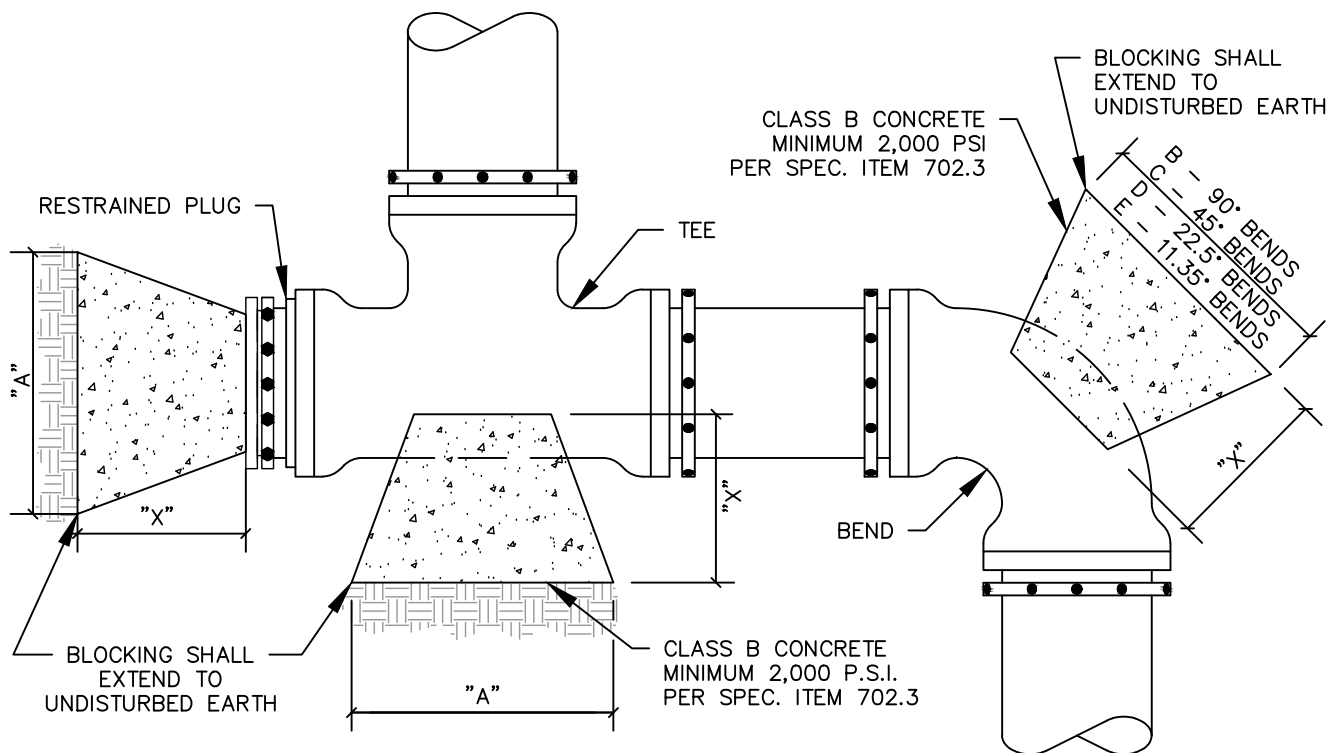
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Construction Standards

**FIRE HYDRANT
INSTALLATION**

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APR. 2026**

W-04



HORIZONTAL BLOCKING TABLE

PIPE SIZE	"X" DIM.	PLUGS & TEES		90° BENDS		45° BENDS		22.50° BENDS		11.25° BENDS	
		"A"	MIN. AREA (sf)	"B"	MIN. AREA (sf)	"C"	MIN. AREA (sf)	"D"	MIN. AREA (sf)	"E"	MIN. AREA (sf)
6"	1'-6"	1'-9"	3.18	2'-1"	4.50	1'-7"	2.43	1'-1"	1.24	1'-0"	1.00
8"	1'-6"	2'-5"	5.65	2'-10"	8.00	2'-1"	4.33	1'-6"	2.21	1'-1"	1.11
10"	1'-6"	3'-0"	8.84	3'-6"	12.50	2'-7"	6.76	1'-10"	3.45	1'-4"	1.73
12"	1'-6"	3'-7"	12.72	4'-3"	17.99	3'-1"	9.74	2'-3"	4.96	1'-7"	2.49
16"	2'-0"	4'-9"	22.62	5'-8"	31.99	4'-2"	17.31	2'-12"	8.83	2'-1"	4.43

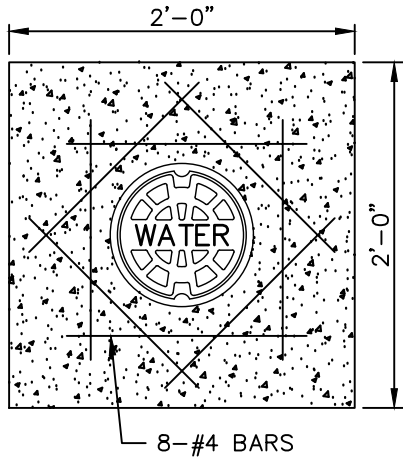
DIMENSION "X" TO BE A MINIMUM OF 1'-6", BUT IS TO BE INCREASED WHERE NECESSARY TO PROVIDE BEARING AGAINST UNDISTURBED TRENCH WALL.

NOTES:

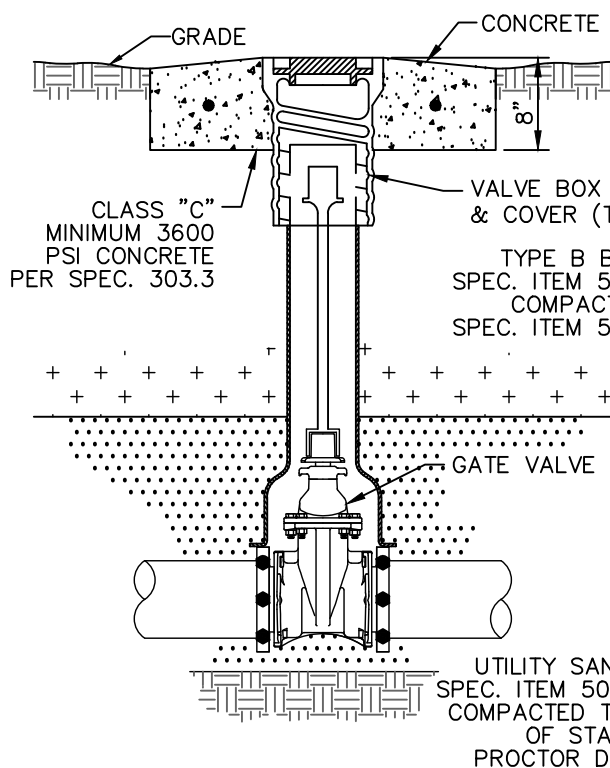
1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. BEARING AREAS SHOWN ARE BASED ON 225 PSI TEST PRESSURE, 3,000 PSF ALLOWABLE SOIL BEARING PRESSURE, AND 1.5 SAFETY FACTOR.
3. THE ENGINEER SHALL PROVIDE A SEPARATE BLOCKING TABLE WHEN THE CONDITIONS DO NOT MEET THE ABOVE ASSUMPTIONS.
4. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
5. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED.
6. BLOCKING FOR LINES LARGER THAN 16" SHALL BE DESIGNED FOR THE SPECIFIC LOCATION AND SHOWN ON THE DRAWINGS.
7. NOT TO SCALE

NOTES:

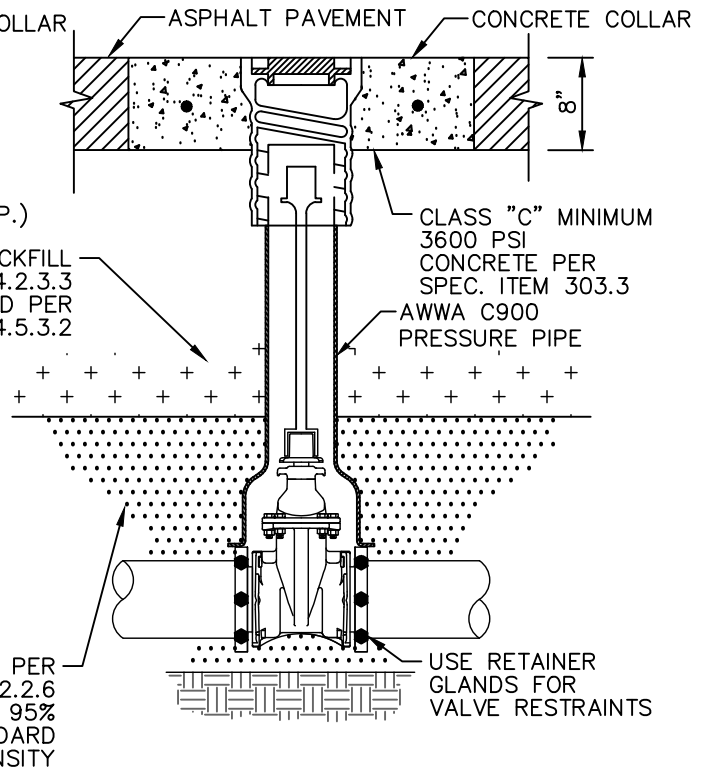
1. ALL SPEC. ITEM NUMBER REFERENCES SHALL REFERENCE THE 5TH EDITION OF THE NCTCOG STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
2. GATE VALVE SHALL BE RESILIENT SEAT TYPE WITH A NON RISING STEM, A 2-INCH SQUARE OPERATOR, AND A FULLY ENCAPSULATED WEDGE. RESILIENT SEAT GATE VALVE SHALL CONFORM TO AWWA C509.
3. THE VALVE AND JOINT ASSEMBLIES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
4. THE JOINT TYPE SHALL BE MECHANICAL JOINT UNLESS OTHERWISE SPECIFIED IN THE PLANS.
5. STEM EXTENSIONS ARE REQUIRED WHEN THE DEPTH TO THE TOP OF THE OPERATING NUT EQUALS OR EXCEEDS 3 FEET.
6. BOX TOP INSETS ARE REQUIRED IN ALL BOX INSTALLATIONS.
7. 16" AND LARGER GATE VALVES REQUIRE CONCRETE BLOCK UNDER THE VALVE BODY. CONCRETE BLOCK SHALL BE 12"X12"X6" CLASS B MINIMUM 2,000 P.S.I. CONCRETE BASE PER SPEC. ITEM 702.3.
8. MARK LINE SIZE AND DIRECTION IN BASE BLOCK WITH LETTERS A MINIMUM OF 1-INCH IN HEIGHT.
9. GATE VALVE SHALL BE OPEN LEFT, COUNTER-CLOCKWISE.
10. CONCRETE COLLARS ARE NOT REQUIRED IN CONCRETE PAVEMENT.
11. WATER VALVE LOCATIONS SHALL BE MARKED ON THE FACE OF CURB WITH A "V" CUT.
12. WATER VALVE BOX LIDS SHALL BE DOMESTIC ONLY.
13. NOT TO SCALE



CONCRETE COLLAR



**VALVES IN YARDS OR OTHER
AREAS NOT SUBJECT TO TRAFFIC**



**VALVES WITHIN ROADWAYS OR
OTHER PAVED OR SURFACED AREAS**



CITY OF
ALEDO

City of Aledo
Construction Standards

**WATER VALVE AND BOX
INSTALLATION**

**REVISED
APR. 2026**

W-06



APPENDIX

DESIGN STANDARDS MANUAL

City of Aledo TIA Worksheet

Complete and submit this worksheet (with a site plan) to the City to determine traffic impact analysis (TIA) requirements.

Section 1 - General Information	
Project Name:	Date:
Preparer Name:	Preparer Email:
Preparer Company:	Preparer Phone:

Section 2 - Proposed Land Use and Trip Information			Intensity	ITE Units	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
Land Use	ITE Code	In				Out	Total	In	Out	Total	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
Total:											
Submittal Type (Based on Trip Generation)											
☐ TIA Worksheet Only - Less than 100 peak hour trips						☐ TIA Required - 100+ peak hour trips					
<i>Note: TIA may be required at the City's discretion to evaluate potential operational and/or safety concerns in the site's vicinity.</i>											

Section 3 - TIA Worksheet Approval (City Use Only)		
Reviewer Name:	Review Date:	
Approved?	☐	Yes, comments:
	☐	No, comments: