



INFRASTRUCTURE REVIEW

Submittal Requirements

Submit the following:

- Three (3) sets of plans shall be submitted for review.
- Copy of Checklist of Included Sheets

Checklist of Included Sheets

Yes	No	N/A	ITEM
Name of Project:			
			The following sheets are generally a part of Infrastructure Plan Submittal. Please check if the following items are included, not included, or not applicable to this project:
			1. Cover Sheet
			2. Plat
			3. Storm Water Management Site Plan
			4. Storm Water Pollution Prevention Plan – During Construction
			5. Storm Water Pollution Prevention Plan – Post Construction
			6. Water and Sanitary Sewer Plan
			7. Sewer Profiles
			8. Water Profiles
			9. Paving Plan and Profile
			10. Median Opening/Auxiliary Lane Plans
			11. Drainage Area Map
			12. Drainage Plan and Profile
			13. Storm Water Detention Design
			14. Streetlight Plan
			15. Grading Plan
			16. Signal Plan
			17. Pavement Marking Plan
			18. Sidewalk Connectivity Plan
			19. Construction Details

If “No” is checked for any of the items above, please explain why it is not included.

Review Checklist

These are the items that the reviewer will complete. All of the following items must be included as applicable.

PROJECT NAME: _____

Yes	No	N/A	ITEM
0. General Requirements			
			❖ Standard items (all sheets)
			<ul style="list-style-type: none"> • Title block with addition name, sheet number, type of facility (street name, drainage line designation, etc.)
			<ul style="list-style-type: none"> • Scale
			<ul style="list-style-type: none"> • North arrow (up or right)
			<ul style="list-style-type: none"> • Engineer's seal, signature and date
			<ul style="list-style-type: none"> • Legend and special drafting symbols
			<ul style="list-style-type: none"> • Note: The contractor shall contact the City's Chief Inspector at 817-917-8966 at least 48 hours prior to beginning construction.
			<ul style="list-style-type: none"> • Note: Construction shall be in accordance with current City of Burleson standard details and specifications and in accordance with the North Central Texas Council of Governments' <i>Standard Specifications for Public Works Construction</i>.
			<ul style="list-style-type: none"> • Use Subdivision Standard Comments
			❖ Additional Studies – The following studies may be required to be submitted with the plat or construction plans. These studies have their own checklists that are available on the City's website.
			<ul style="list-style-type: none"> • Flood Study
			<ul style="list-style-type: none"> • Traffic Impact Analysis
			❖ Planned Developments – If PD zoned, review the PD ordinance for items that affect engineering review (i.e., decorative paving, trails, special lighting, etc.)
1. Cover Sheet			
			❖ Index with sheet numbers
			❖ Location map
			❖ Place subdivision name along right sheet edge
			❖ Consultant, developer name and address
			❖ City approved benchmark information
			<ul style="list-style-type: none"> • Clearly described and shown on plans
			<ul style="list-style-type: none"> • Minimum of two per project; use city control information. Contact the maproom for control information.
2. Plat			
			❖ Copy of most current plat submittal or filed plat
			<ul style="list-style-type: none"> • Verify DAC comments met. Ensure plans are consistent with the plat. Read all DAC comments, in case another department's comments affect engineering review.
			<ul style="list-style-type: none"> • Verify required easements have been dedicated, either by plat or by separate instrument.
			<ul style="list-style-type: none"> • MFF for lots adjacent to creeks/channels. Two feet above fully developed water surface for 100-year storm or three feet above FIRM elevation.
			<ul style="list-style-type: none"> • MFFs may be established at 1' above TC on the high side of lot for the following: <ul style="list-style-type: none"> ○ Opposite of 'T' intersections. Watch side streets with steep grade/high velocity. ○ Outside of curve. Especially if natural ground is lower than curb.

Yes	No	N/A	ITEM
			○ Flow in street significant and natural ground is low
			○ Where there is a sudden change in street grade
			○ At low points
3. Storm Water Management Site Plan (SWMSP) – Sections 4.3.A (Residential) and 5.3.A (Commercial) of the Design Standards Manual			
			Complete the checklist included in Appendix A of the Design Standards Manual.
4. Storm Water Pollution Prevention Plan – During Construction – Sections 4.3.B (Residential) and 5.3.A (Commercial) of the Design Standards Manual			
			• Existing and proposed contours
			• Construction phasing
			• All Best Management Practices (BMPs) shown on the erosion control plan.
			• No silt fence used in areas of concentrated flow. Use rock check dams.
			• Inlet protection is a method of last resort and requires specific approval. BMPs shall be installed to prevent silt conveyance to inlets. If inlet protection must be used, it shall be by inlet inserts rather than hay bales, socks or other external methods.
			• Construction entrance location shown.
			• Details provided.
			• Complete the checklist provided in either Appendix B (small projects) or Appendix C (large sites)
			• A copy of the SWPPP for the site shall be provided. Include a copy of the appropriate SWPPP checklist from the Design Standards Manual (Appendix B or C)
			• A copy of the NOI for the project must be submitted for sites greater than 5 acres.
			• Construction Site Notice must be submitted for sites between 1 and 5 acres.
5. Storm Water Pollution Prevention Plan – Post Construction – Sections 4.3.B.6 (Residential) and 5.3.C.6 (Commercial) of the Design Standards Manual			
Residential			
			• Plan sheet showing what will be installed after the streets are installed to prevent erosion until the homes are constructed.
			• Notes stating how final stabilization will be achieved. Final stabilization occurs with a density of 70% of native background vegetative cover.
Commercial – Typically, the final stabilization of the site will be done prior to a Certificate of Occupancy, so the Post Construction SWPPP may be combined with the During Construction SWPPP.			
6. Water and Sanitary Sewer Plan			
Water and sewer layout may either be on the same sheet or on separate sheets.			
A. Water – Section 4.4.B (Residential) or 5.4.C (Commercial) of the Design Standards Manual			
			❖ Water Plan
			• Check Master Plan to ensure that proposed lines conform to size requirements
			• Check preliminary utility plan (if applicable) to ensure that proposed lines conform to size requirements.
			• 3 valves at cross
			• 2 valves at tee
			• Standard Notes: <ul style="list-style-type: none"> ○ No vertical facilities or meter boxes will be allowed to be located within the sidewalks. ○ There shall be a minimum cover of 42 inches over the water pipe as measured from the top of the pipe to the existing ground. Existing ground may be the flow line of the bar ditch, natural ground on the low side of a county-type road, or the proposed finished grade, whichever is lowest.

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> ○ The minimum horizontal separation between any water main and sanitary sewer main shall be nine feet measured from outside edge of pipe to outside edge of pipe. ○ When a water main crosses over a sanitary sewer main and the vertical separation is less than nine feet, then the sanitary sewer shall have one joint (20 feet) of PVC pipe conforming to ASTM D-3035, SDR-26 installed centered on the water line. In addition, the joint shall have a minimum of 12 inches of cement stabilized (two-sack minimum backfill directly above the sanitary sewer pipe. ○ When a water main must cross under a sanitary sewer main, the minimum separation shall be 24 inches. In addition, the sanitary sewer shall have installed one joint (20 feet) of ductile iron pipe centered on the water main. ○ 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. ○ All waterline fittings shall incorporate megalug mechanical joint restraints or approved equal.
			<ul style="list-style-type: none"> ● Minimum 8" line size
			<ul style="list-style-type: none"> ● Placed in parkway.
			<ul style="list-style-type: none"> ● Show all waterline easements. Minimum easement width = 10'
			<ul style="list-style-type: none"> ● Water needs to be extended to and through the site. Extend to adjacent tracts.
			<ul style="list-style-type: none"> ● Looping opportunities taken in Residential. In Commercial, waterline must be looped.
			<ul style="list-style-type: none"> ● Automatic flush valves located at all permanent dead ends.
			<ul style="list-style-type: none"> ● Class 150, AWWA C900, DR 18
			<ul style="list-style-type: none"> ● Check Pressure – Use pressure contour map or: <ul style="list-style-type: none"> ○ Take water tower elevation within pressure plane system is located in. ○ Subtract elevation where trying to determine pressure. ○ Divide by 2.31 (2.31' = 1 psi) ○ This gives pressure. ○ Minimum pressure = 30 psi ○ We would like around 50 psi. ○ Maximum pressure = 70 – 80 psi ○ Above maximum, need PRV
			<ul style="list-style-type: none"> ● For water facilities from a provider other than the City, see the requirements in Section 4.4.B.7.d (Residential) or 5.4.C.6.d (Commercial) of the Design Standards Manual
			<ul style="list-style-type: none"> ● Make sure no cross-connection between pressure planes.
			<ul style="list-style-type: none"> ❖ Service Requirements
			<ul style="list-style-type: none"> ● No residential connections to lines 16" or greater
			<ul style="list-style-type: none"> ● Check that all lots have service
			<ul style="list-style-type: none"> ● Service stationing
			<ul style="list-style-type: none"> ❖ Fire Hydrant Requirements
			<ul style="list-style-type: none"> ● Hydrant spacing – lay of hose less than 500' to front entrance for residential or 300' to front entrance for commercial.
			<ul style="list-style-type: none"> ● Fire Hydrant placed at all dead end lines/cul de sacs
			<ul style="list-style-type: none"> ● Blow-off valves are allowed only on dead end lines that are temporary and do not contain services.

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> • Check pressure of hydrants if using existing hydrants. Request fire flow test from water department. Requirements: <ul style="list-style-type: none"> ○ 35 psi static ○ 20 psi residual ○ 1500 gpm
			<ul style="list-style-type: none"> ❖ Commercial Facility Requirements: <ul style="list-style-type: none"> • Fire Department Connection (FDC) required for buildings larger than 6000 square feet. • Fire Hydrant and FDC must be on a looped line. • Fire hydrant must be within 150' of the FDC. • All public waterline on commercial sites must be looped.
			<ul style="list-style-type: none"> ❖ Boring Requirements
			<ul style="list-style-type: none"> • Bore all concrete streets and driveways
			<ul style="list-style-type: none"> • Bore HMAC streets that have been resurfaced within 5 years.
			<ul style="list-style-type: none"> • If open cut, provide pavement repair detail.
B. Sewer – Section 4.4.C (Residential) or 5.4.D (Commercial) of Design Standards Manual			
			<ul style="list-style-type: none"> ❖ Sewer Plan
			<ul style="list-style-type: none"> • 8" minimum size
			<ul style="list-style-type: none"> • Check Master Plan to ensure that proposed lines conform to size requirements
			<ul style="list-style-type: none"> • Check preliminary utility plan (if applicable) to ensure that proposed lines conform to size requirements.
			<ul style="list-style-type: none"> • Service for each lot
			<ul style="list-style-type: none"> • Service stationing
			<ul style="list-style-type: none"> • 10' minimum easement width
			<ul style="list-style-type: none"> • Check capacity of downstream system
			<ul style="list-style-type: none"> • Manholes every 500 feet
			<ul style="list-style-type: none"> • Extended to borders of subdivision
			<ul style="list-style-type: none"> • Connections greater than 4" diameter must occur with a manhole
			<ul style="list-style-type: none"> • Sampling Manholes required for automotive repair, food handling facilities and any use deemed to discharge "abnormal sewage". Sampling manholes may be 4' in diameter.
			<ul style="list-style-type: none"> • Lines must end with manhole.
			<ul style="list-style-type: none"> • No curved sewer pipe allowed for pipe sizes greater than 8". Maximum curvature is 200'.
7. Sewer Profile – Section 4.4.C (Residential) or 5.4.D (Commercial) of Design Standards Manual			
			<ul style="list-style-type: none"> • Drop manholes when greater than 18" drop.
			<ul style="list-style-type: none"> • Deep enough for drainage area to be serviced
			<ul style="list-style-type: none"> • No vertical curves
			<ul style="list-style-type: none"> • Parallel lines required for depths greater than 15'.
			<ul style="list-style-type: none"> • Sewer main material. Generally SDR 35. SDR 26 when deeper than approximately 12'.

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> Flowline and top of ground/pavement elevations provided at 50' intervals.
			<ul style="list-style-type: none"> Minimum grades maintained.
			❖ Boring Requirements
			<ul style="list-style-type: none"> Bore all concrete streets and driveways
			<ul style="list-style-type: none"> Bore HMAC streets that have been resurfaced within 5 years.
			<ul style="list-style-type: none"> If open cut, provide pavement repair detail.
8. Water Profile – Section 4.4.B (Residential) or 5.4.C (Commercial) of Design Standards Manual			
			<ul style="list-style-type: none"> Profile of lines 12" and larger
			<ul style="list-style-type: none"> Profile of lines located outside ROW
			<ul style="list-style-type: none"> Air release valves at high points
			<ul style="list-style-type: none"> Flowline and top of ground/pavement elevations provided at 50' intervals.
			<ul style="list-style-type: none"> Fire hydrants and valves shown with stationing.
9. Paving Plan and Profile – Section 4.5.I (Residential) or 5.5.I (Commercial) of the Design Standards Manual			
A. Plan			
			❖ General information
			<ul style="list-style-type: none"> Adjoining property information in accordance with recorded plat <ul style="list-style-type: none"> Property lines on all lots Easements-type and size Block numbers Lot numbers Sheet matchline stationing Flow arrows, especially at intersections Street names with beginning and ending stations Place note on plans stating Traffic Control Plan required prior to construction of tie-ins.
			❖ Existing features
			<ul style="list-style-type: none"> Location of existing improvements (should be ghosted) <ul style="list-style-type: none"> paving - type and size storm sewer curb inlets manholes culverts fire hydrants water lines sanitary sewer lines major utilities, such as pipelines and telephone conduits
			❖ Proposed streets
			<ul style="list-style-type: none"> Pavement information <ul style="list-style-type: none"> Concrete or asphalt Width (b/b) ROW width

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> • Baseline/centerline stationing of specific reference points <ul style="list-style-type: none"> ○ P.C., P.T., P.R.C., P.C.C. ○ Intersecting streets
			<ul style="list-style-type: none"> • Curve information
			<ul style="list-style-type: none"> • Stationing and offset to proposed improvements <ul style="list-style-type: none"> ○ Curb inlets . Watch location relative to lot lines (i.e. transitions conflicting with curb return of drives or future streets)-transitions/gutter depressions are 6' up and downstream of inlet. ○ Manholes/junction boxes ○ Culverts, bridges, headwalls ○ Median noses/turn lanes ○ End of pavement
			<ul style="list-style-type: none"> • Radius sizes for: <ul style="list-style-type: none"> ○ Curb returns ○ Median noses/turn lanes ○ Cul-de-sac (min. 40' pavement radius with 8" crown, from high side. Minimum ROW is 50' radius.)
			<ul style="list-style-type: none"> • Connecting to county type facility. Check to see when the existing street is proposed to be reconstructed. <ul style="list-style-type: none"> ○ Type of transition (concrete or asphalt) ○ Show culverts. If a culvert cannot be provided must have a concrete valley gutter. ○ Provide headwalls or sloped end treatments
			<ul style="list-style-type: none"> • Valley gutters <ul style="list-style-type: none"> ○ Transverse valleys shall not be used in lieu of underground drainage system without DES approval. 25' crown transition in both directions. ○ Valley gutters at intersections (if asphalt). 8' wide for full width of the street. ○ Look at valley gutter or dip locations with respect to stop signs. Try to place valleys where stop signs will be.
			<ul style="list-style-type: none"> • Sidewalks <ul style="list-style-type: none"> ○ Required to be constructed with street paving when not abutting residential lot or when lot backs up to existing improved street where sidewalks do not currently exist. Make sure notes are added to the plans that make it clear who's constructing sidewalks. ○ Connectivity Plan. Coordinate with preliminary connectivity plan provided with preliminary plat. ○ 4' wide, 1-foot off property line (preferred). May vary to avoid obstructions such as power poles, fire hydrants, telephone/electric risers. If less than 2' to the curb, sidewalk shall be 6' wide and adjacent to curb. No vertical facilities or meter boxes located within sidewalk. ○ All runs longer than 200' shall contain 5' x 5' passing area. ○ Mid-Block ramp locations shown. ○ Access ramps
			<ul style="list-style-type: none"> • Dead end streets/turnarounds <ul style="list-style-type: none"> ○ Dead end streets allowed if < 150' in length. Install header and barricade. Provide details. ○ Turnarounds required for dead ends $\geq 150'$ and serving more than 2 lots <ul style="list-style-type: none"> ➢ Considered "temporary" until street is extended or permanently cul-de-sac'd. Need to be at least 6" HMAC on stabilized subgrade. ➢ Curb and gutter not required on turnaround

Yes	No	N/A	ITEM
			➤ All other design criteria are required
			➤ Preferred offsite to development
			➤ Easement required (50' radius)
			○ Drainage must be maintained
			➤ Detail outfall, grade to drain
			➤ Notarized Letters of Permission required
			● Pavement markings. Req'd when constructing portions of arterials. Pavement markings must be buttons.
			● Private Gated Entry. Coordinate with Fire Marshal for approval.
			○ Verify turn-around requirements
			○ Verify stacking requirements
			○ May require Decel lane
			○ Knox box required
			○ See Appendix E of the Design Standards Manual for typical layouts
			B. Paving Sheets - Profile View
			❖ Existing features
			● Profile of existing ground. Watch where significant fill (or even a pond/low area existed) is proposed. Need density tests.
			○ Centerline
			○ Right/left property lines
			● Existing or proposed utilities, with description
			○ Major utilities, such as petroleum pipelines or telephone conduits
			❖ Proposed streets
			● Top of curb profile
			● Curb grade/slope
			○ Minimum grade 0.5%.
			○ Watch grades around cul-de-sacs, bulbs and vertical curves where an extended portion of the curve will be below 0.5%. This usually occurs in long vertical curves. May consider using a PI or compound curve.
			○ Maximum grade
			➤ Local residential = 10%
			➤ Collector = 8%
			➤ Arterial = 6%
			○ Start/match line/end elevation
			○ Curb returns and P.I. elevations at intersecting streets
			○ Top of curb elevations shown on 50' stations
			○ High and low point elevations and stations
			○ Maximum side slopes in right-of-way or easement - 3:1
			○ Vertical curve. Watch visibility of intersecting streets & potential drives.
			○ Culvert invert or overflow
			10. Median Opening/Auxiliary Lane Plans – Section 4.5.1.6&7 (Residential) or Section 5.5.F.4&5 (Commercial) of Design Standards Manual
			❖ Turn Lanes/Decel Lanes – Section 4.5.1.7 (Residential) or 5.5.F.4 (Commercial) of the Design Standards Manual
			● Match existing street section. Provide typical section.
			● Type of subgrade modification, density-same as street (2 and 3 below are options)
			1. Lime stabilization. Difficult for small areas.
			2. Flexible base (at least 6" depth)-TxDOT Type A, Grade 1
			3. Thickened pavement (additional 4") on compacted base

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> • Match cross slope. Offset joint from gutter line.
			<ul style="list-style-type: none"> • Additional ROW (12') required either by plat or by separate instrument
			<ul style="list-style-type: none"> • Verify storage/transition
			❖ Median Openings – Section 6.5.I.6 (Residential) or 5.5.F.5 (Commercial) of Design Standards Manual
			<ul style="list-style-type: none"> • Requires property owner notifications
			<ul style="list-style-type: none"> • Requires construction of left turn lane
			<ul style="list-style-type: none"> • 600' from major intersection. 600' spacing on principal arterial. 450' spacing on minor arterial.
			<ul style="list-style-type: none"> • Verify opening width requirements
			<ul style="list-style-type: none"> • Medians < 8' width, must be paved.
			<ul style="list-style-type: none"> • Median landscaping/irrigation (≥ 8' width). Coordinate with Parks Department or must be maintained by HOA or PID.
11. Drainage Area Map – Section 4.6.A (Residential) or 5.6.A (Commercial) of Design Standards Manual			
			❖ Drainage area map – Section 4.6.A (Residential) or 5.6.A (Commercial) of Design Standards Manual.
			<ul style="list-style-type: none"> • Coordinate with Preliminary Drainage Plan
			<ul style="list-style-type: none"> • Contours (min. 5' interval)
			<ul style="list-style-type: none"> • Existing facilities/features (natural or man-made)
			<ul style="list-style-type: none"> • Proposed facilities: Analyze downstream systems for capacity of additional developed condition flow. May require detention or offsite improvements. May not worsen downstream problems.
			<ul style="list-style-type: none"> • Major watershed area, including contributing offsite areas
			<ul style="list-style-type: none"> • Drainage areas (min. scale 1" = 200')
			<ul style="list-style-type: none"> • Sub areas for mains, laterals, streets – note drainage area designations
			<ul style="list-style-type: none"> • Drainage flow arrows for streets
			<ul style="list-style-type: none"> • Show information on adjacent property, such as contours, existing systems, easements, city limits, floodplain/ floodway and creeks
			<ul style="list-style-type: none"> • For creeks/channel – See requirements below
			❖ Drainage criteria/table
			<ul style="list-style-type: none"> • Method of analysis
			<ul style="list-style-type: none"> • Drainage area designations. Show sub-areas for curb inlet design.
			<ul style="list-style-type: none"> • Drainage area acreage
			<ul style="list-style-type: none"> • Runoff coefficient(s)
			<ul style="list-style-type: none"> • Time of concentration. Minimum time is 10 minutes for residential and 5 minutes commercial.
			<ul style="list-style-type: none"> • Design frequency(s): 5-year and 100-year
			<ul style="list-style-type: none"> • Intensity - TP-40
			<ul style="list-style-type: none"> • Flow rate
			❖ Street/ROW capacity calculations
			<ul style="list-style-type: none"> • Local/minor collectors less than curb deep for 5-year storm
			<ul style="list-style-type: none"> • Leave 2 lanes dry during 5-year event on arterial.
			<ul style="list-style-type: none"> • Combined street and ROW must contain 100-year event and shall not exceed 0.2' above lowest top of curb.
			<ul style="list-style-type: none"> • 'n' value, 0.016 for pavement
12. Drainage Plan and Profile – Section 4.6 (Residential) or 5.6 (Commercial) of the Design Standards Manual			
			❖ Watch low points which are intercepting significant flow. May need to intercept more flow upstream if runoff is leaving the street and creating flooding.

Yes	No	N/A	ITEM
			❖ Plan view
			<ul style="list-style-type: none"> • Label and show size/type (i.e. Line 'A'-21" RCP Class III). RCP required under pavement. HDPE pipe may be used if not under paving and not between small lots. Minimum size is 18".
			<ul style="list-style-type: none"> • Show all easements (offsite and onsite) including easement width. Minimum width of a drainage easement is 15'. When combined with other utilities, the minimum width is 20 feet. Easement may be required to be larger to accommodate systems when pipe sizes are larger than 60" or the line is deep.
			<ul style="list-style-type: none"> • Centerline of storm drain referenced to the easement, ROW, or street centerline
			<ul style="list-style-type: none"> • Centerline data <ul style="list-style-type: none"> ○ Stationing along centerline of pipe with equations to street paving centerline (if applicable) or stationing along centerline of street with offsets ○ Beginning/ending station ○ Bends/curves. Bends and wyes shall be prefabricated. Horizontal radius minimum is 30 pipe diameters. Curves shall be in accordance with manufacturers recommendations. ○ Wyes-location, angle of laterals ○ Junction structures. Provide detail. ○ Collars. Provide detail.
			<ul style="list-style-type: none"> • Curb inlets- station and designation number <ul style="list-style-type: none"> ○ Minimum size is 10 feet. ○ Recessed required for 41-foot and larger streets ○ On-grade inlets designed for 5 year event ○ Low-point inlets designed for 100-year event. ○ Culverts, bridges, channels, underpasses, creeks and streets = 100-year design. ○ Include inlet calculation chart ○ Grate inlets not allowed in public systems
			<ul style="list-style-type: none"> • Bar ditch culverts – 5 year design. Provide profile or show flow line/top of pavement elevation. <ul style="list-style-type: none"> ○ Size ○ Verify minimum cover ○ Sloped end treatment.
			<ul style="list-style-type: none"> • Proposed creek culverts and bridges – 100- year design plus 2 foot freeboard <ul style="list-style-type: none"> ○ Stations and offset ties ○ Skew angle ○ Handrail/guardrail. Need for guardrail? Especially on upstream (traffic flow) end. ○ Headwall details
			<ul style="list-style-type: none"> • Entrance/outfall structures, including velocity/erosion control. System shall be extended to flow line of the creek. <ul style="list-style-type: none"> ○ Type ○ Size/dimensions/cross-section ○ Toe walls (2' minimum) ○ Connection details. Provide detail.
			<ul style="list-style-type: none"> • Location of water and sewer lines
			<ul style="list-style-type: none"> • Provide access approximately every 500' or upsize a lateral to at least a 36" pipe.
			<ul style="list-style-type: none"> • Laterals-in lieu of main through inlets
			<ul style="list-style-type: none"> • Drop/Y type inlets. Grate inlets are not allowed for public systems. <ul style="list-style-type: none"> ○ Need concrete reinforced apron with a min. 2' toe wall on all sides (Detail D-3) ○ May be utilized in rear yards to intercept multiple lot to lot drainage situations. 12"

Yes	No	N/A	ITEM
			pipe may be used in rear yards only on a case by case basis.
			○ May be utilized to intercept offsite flow. May need to construct swale to direct flow to inlet
			○ Easement by separate instrument if constructed off-site.
			● Positive Overflow Flumes. Evaluate 100-year water surface to establish MFF.
			○ Must provide positive overflow at low points. Generally require flume because it will prevent people from fencing across overflow.
			○ Cross-section/capacity
			○ Transition vertical walls from sidewalks (overflow flume may begin at sidewalk)
			● Flumes as primary drainage feature – not generally allowed unless special circumstances
			○ Provide calculations for ponded depth at entrance. Ponded depth shall be less than curb height or berms around entrance shall be required to contain flow in street.
			○ Need 4:1 flare at entrance
			○ Transition through sidewalks shall be accomplished using plates. Must meet ADA/TDLR requirements.
			➢ Must be minimum 3/8" thick
			➢ Edges must be reinforced.
			➢ Ends must be bolted down
			○ Bollards are required for flumes 6' & wider when sidewalk is not constructed.
			○ Provide cross section. Must have an invert with 7% cross slope
			❖ General Notes (to be placed on the plans, if applicable)
			● All bends and wyes should be prefabricated. If a field connection is authorized, the lateral diameter cannot be greater than one half the diameter of the main. Do not allow a field connection when lateral slope is greater than 10%. Provide collar detail.
			❖ Profile view-mains and laterals
			● Natural and proposed ground profile over centerline of proposed storm drain. If pipe is placed < 3' deep or if cover is ≥ 13', Class IV pipe is required.
			● For proposed storm drains, including laterals. Extend pipes until they daylight to defined low area. Do not allow grade to drain to be shown to "daylight". If a grade to drain area is needed, require profile.
			○ Designation and size/type and class (Line 'A'- Class III 21" RCP)
			○ Length
			○ Grade (slope)-with elevs.-min. 50' intervals
			○ Match soffits (inside top of pipe)
			○ Design flow
			○ Velocity
			○ Hydraulic grade line. HGL should not be more than 1 pipe size above top of pipe.
			➢ Shall remain 1 ½ - 2 feet below gutter elevation.
			➢ Shall be lower than t/c at inlet for 5-year event.
			➢ Shall be lower than ROW at inlet for 100-year event
			➢ Begin at inside top of pipe or HGL of connecting feature, whichever is higher
			○ Outfall structures
			● Junction box and curb inlet locations
			● All proposed or existing utilities which cross the proposed storm drain facilities
			● Creek Culverts
			○ Size of openings
			○ Length

Yes	No	N/A	ITEM
			○ Type of operation under design conditions. Inlet or outlet control? For inlet control, ponded depth at entrance may require revising entrance conditions.
			○ Flow line elevations for both ends of culvert
			○ Culverts must pass 100-year event with two foot freeboard.
			○ Design frequency
			○ Outfall structure
			○ Grade to drain - indicate size, slope, water surface, velocity, typical section, side slopes 4:1, vegetation, letter of permission for offsite grading. Need to design as non-erosive. Acceptable slope may vary depending on soil type and the situation, whether sedimentation or erosion is a concern.
			● Flumes/overflow flumes with 100-year WS. Continue flumes to flow line of creek with gabion transition at outfall and on the edges along the creek bank.
			❖ Channels
			● Channel contains 100-year event plus one foot of freeboard.
			● Easement width for open channels shall be at least 24' wider than top of channel for 12' maintenance shelf on each side.
			● Show 100-year water surface on plan.
			● MFF for lots adjacent to creeks/channels. One foot above fully developed water surface for 100-year storm.
			● Tie-down centerline, top left/right bank.
			● Expansions/Contractions, prefer 4:1 or longer transitions.
			● Provide calculations to determine channel capacity, including roughness coefficient. See Flood Study Requirements
			● Show where typical cross-section is located.
			● Pilot channel with 1" invert. 8' minimum bottom width. Change in grade may require drop structure.
			○ 6" thick, 3000 psi concrete with #3 bars at 18" centers both ways. 2" weep holes with filter fabric at 25' spacing
			○ May require transition material between pilot channel and side slopes for erosion control
			● Erosion protection upstream and downstream at connection/transition to closed system or natural channel.
			● Vegetated 4:1 side slopes
			● Storm drain connections. Need to evaluate impacts. Angle the connection on larger pipes/flows to reduce impacts. May need to armor channel bank and/or outfall area.
			● If a FEMA designated floodplain, requires submittal for CLOMR/LOMR.
			❖ Profile View
			● Natural ground along drainage easement both sides
			● Top of left/right channel
			● Channel gradient (flowline)
			● Continuous water surface profile of design flow & 100-year event. Must provide one-foot of freeboard above the 100-year frequency event.
			● Flow and velocity for each change in flowrate/slope
			❖ Natural Creeks
			● Easement for floodplain
			● Label 100-year water surface on plan and profile
			● MFF for lots adjacent to creeks
			● Plot of cross-sections
			● Hydraulic analysis to justify data, include a disk

Yes	No	N/A	ITEM
			<ul style="list-style-type: none"> • Tie-in/transition to permanent structures
			<ul style="list-style-type: none"> • Storm drain connections
			<ul style="list-style-type: none"> • If a FEMA designated floodplain, requires submittal for CLOMR/LOMR if modifying the floodway.
			<ul style="list-style-type: none"> • Check erosion clear zone. 4:1 slope from toe. No structures allowed without improvements. Prefer no fences.
			<ul style="list-style-type: none"> • Maintenance Agreement required.
13. Storm Water Detention Design – Section 4.6.J (Residential) or 5.6.I (Commercial) of Design Standards Manual			
			<ul style="list-style-type: none"> • Grading plan for the detention facility
			<ul style="list-style-type: none"> • Pre-developed runoff calculations
			<ul style="list-style-type: none"> • Post-developed runoff calculations
			<ul style="list-style-type: none"> • Required flowrate for detention
			<ul style="list-style-type: none"> • Method of Analysis
			<ul style="list-style-type: none"> • Pond capacity required
			<ul style="list-style-type: none"> • Pond capacity provided
			<ul style="list-style-type: none"> • Design of discharge facility
			<ul style="list-style-type: none"> • Will the detention pond be shared with multiple lots? If so, a private drainage easement must be dedicated.
14. Streetlight Plan – Section 4.5.B (Residential) or 5.5.B (Commercial) of the Design Standards Manual			
			<ul style="list-style-type: none"> • Light placed at each intersection. Make sure lights are provided at intersections with existing streets.
			<ul style="list-style-type: none"> • 600' spacing (200' spacing on Arterials)
			<ul style="list-style-type: none"> • Place light at end of cul de sacs longer than 200'
			<ul style="list-style-type: none"> • Lights shall be placed in severe curves or areas of poor sight visibility.
			<ul style="list-style-type: none"> • Add notes: <ul style="list-style-type: none"> ○ Lamps of not less than 7000 lumen shall be installed. ○ All lights will be 100 watt HPS ○ Service wires shall be underground.
			<ul style="list-style-type: none"> • If Planned Development, check to see if special lighting is required.
15. Lot and Block Grading Plan (Residential) – Section 4.6.N of Design Standards Manual			
			❖ Consistent with drainage area map?
			<ul style="list-style-type: none"> • Prefer to ghost in DA's on plan
			<ul style="list-style-type: none"> • Check slope along lot lines to ensure flow traverses as intended
			<ul style="list-style-type: none"> • Runoff through no more than 3 lots before constructing system. <ul style="list-style-type: none"> ○ Utilize berms in rear yards to redirect flow ○ Flumes or private rear lot systems may be required to convey water lot to lot. ○ Use retaining walls/curbs to redirect flow
			❖ Prefer a minimum 2% slope on grass swales
			❖ Coordinate grading with adjacent development.
16. Signal Plan			
17. Pavement Marking Plan			
18. Connectivity Plan – Section 4.5.I.9 (Residential) or 5.5.I.6 (Commercial) of the Design Standards Manual			
			❖ Coordinates with the preliminary connectivity plan that was provided with the preliminary plat.
			❖ Shows all standard width sidewalk, all connectivity sidewalk and all trails.

Yes	No	N/A	ITEM
			❖ Shows any cross-walks
			❖ Detail of pavement treatment for cross-walks.
19. Construction Details (Appendix R of the Design Standards Manual)			
			❖ Utilize city typical details, if available
			❖ All sheets must be sealed, signed, and dated
			❖ Are all applicable details shown
Miscellaneous			
			❖ Drive Approaches within TxDOT ROW – Section 3.5.A of Design Standards Manual
			• City sends 3 copies of 11” x 17” plans, and a cover letter to the state
			• City completes form 1058 if public street connection is proposed.
			• Owner completes form 1058 if private street or drive is proposed.
			❖ Utility work within TXDOT ROW - Section 3.5.A of Design Standards Manual
			• Owner completes the form found in Appendix P of the Design Standards Manual
			• City will submit the permit request to TXDOT electronically.
			❖ Coordinate plans with adjacent street/subdivision plans
			❖ Easements by separate instrument – Section 3.1.C of Design Standards Manual
			• Engineer/Owner provides metes and bounds and exhibit
			• City will prepare standard easement language and forward to engineer/owner
			• Owner will execute and forward back to city.
			• Owner pays filing fee.
			• City files the easement with the county