

INTERDEPARTMENTAL CONSTRUCTION PLAN REVIEW PROCEDURE and CYCLE TIME

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Several City departments review private development construction plans prior to issuance of a Site Permit. The number of departments who will review your plan depends on the existing site conditions and the specific elements of your development. Development review staff focuses primarily on factors that have the greatest impact on:

- Public health, safety, and welfare;
- Long-term maintenance of public infrastructure;
- Ensuring sound engineering principles are used;
- Impact and compatibility with neighboring properties; and
- Compliance with applicable City ordinances and standards

We have found that construction plan reviews minimize field changes and faulty construction, saving time and expense for both the City and Developer. Multiple plan re-submittals for City review typically equal delays in the project schedule, which will, in turn require additional cost and effort.

In an effort to minimize re-submittals and streamline the plan review and approval process, standard procedures for indicating and responding to comments has been established. It is our hope that these procedures will lead to Developers getting Site and Building Permit plan approval quickly and ultimately a certificate of occupancy.

For that reason this section defines the City's policies pertaining to:

- Plan review cycle time
- Initial screening of construction plans;
- Landscaping and screening to be shown on plans;
- Compliance review, how each department provide comments;
- Responding to interdepartmental redline comments.

1.1 Plan Review Cycle Time

Plan review cycle time including initial plan intake, inter-departmental routing and review averages 12 to 14 working days. Allow extra time for submittals that are submitted near and during official City holidays. Please remember: Processing times given are approximate.

Re-submit corrected plans along with the previous redline plans and comment response forms until plans are approved. The time required for plan approval and permitting depends on the design professional time frame for re-submitting plans, responsiveness to comments, and the complexity of the project. Staff can significantly speed up approvals, when applicants provide thorough responses, research as-built conditions, adjacent plat and easements, ensure drawing layers are turned on, correct typographical mistakes and obtain any necessary clarification prior to submitting or re-submitting plans. Applicants are encouraged to review all applicable sections on the [Plan Completeness Checklist](#) in Appendix 2, prior to submitting plans.

If City comments are not addressed or alternate engineering solutions provided with resubmitted plans, comments will be repeated. Plans with extreme deficiencies and omissions will be returned to the submitter without being reviewed. Protracted negotiations involving road modifications and offsite utilities and easement acquisitions could delay final plan approval and permitting. Other causes for delay may occur if the project design changes substantially mid-way through the review. Please limit calls inquiring about plan review status as it takes time away from staff completing reviews and only delays the process.

1.2 Submittal Procedure

Initial Plan Screening

The Engineering Department coordinates the City's interdepartmental review of private development site engineering and public works construction plans for Site Permit.

Prior to distribution of plans to the City review departments, the Engineering Department staff conducts an initial plan screening. This is a quick check, to determine if the submittal contains the minimal information necessary to facilitate a comprehensive City wide interdepartmental review. Plans submitted for review should be to a construction level of detail, i.e. ready to be constructed. Submittals with significant omissions and lacking in details will be deemed incomplete and returned to the design professional within 2 days.

Omissions that will result in a finding of incomplete plans are:

- Lack or insufficient calculations for on- and offsite drainage;
- Incomplete water and sanitary sewer system layout;
- Established development criteria and prior stipulations not addressed;
- Insufficient number of plan sets for a complete interdepartmental routing;
- Failure to adequately address previously identified deficiencies;
- Failure to provide complete comment response sheets.

Plans received after 3pm shall be considered received on the following work day.

1.3 Interdepartmental Compliance Review Procedure

The primary review departments are:

DEPARTMENT	Code
Building Inspection	BI
Electric	GPL
Engineering	E
Fire	F
Health	H
Parks and Recreation	PARD
Planning	P
Solid Waste	SWT
Stormwater	SMW
Streets	ST
Transportation	T
Wastewater	WW
Water	W

Each department will indicate comments directly on the plans. This can include both sketches and written notations. As comments are made, the departmental reviewers will indicate their Comment Code and the sequential number of the comment. Comments for each department will start with "1".

For example:

<u>Comment/Mark-up:</u>	<u>Code and number</u>	<u>Explanation</u>
Add a valve	W1	Water Department's 1 st comment. It relates to the need for an additional valve.
Move service	W2	Water Department's 2 nd comment. It relates to the need for a service line to be relocated.
Indicate Fire Lane	F1	Fire Department's first comments. Indicate fire lane.

This method will be used for the first and all subsequent submittals.

Once the number of comments reaches 20 or more on any sheet in the plan set, the City reviewer reserves the right to stop the review and return plans to the design professional for being incomplete and non-responsive. Reviewing departments may provide additional comments on re-submittals that were not identified on the previous submittal due to the incompleteness of the submittal.

1.3.1 Comment Response Sheet (Developer)

In the past, resubmitted plans frequently had comments that were not adequately addressed or were completely ignored. In an effort to minimize these occurrences and avoid long and protracted negotiations regarding comments, we have instituted a policy of requiring a written or typed response to redlined comments to be submitted with returned plans on the [comment response sheet](#).

As a general rule:

1. Repeating comments from sheet to sheet need only be responded to once;
2. Provide explanations for items that are not readily apparent as to how a particular comment was addressed; or
3. Why a comment was addressed differently than requested; and
4. Why a particular comment or request couldn't be done.

1.3.2 Design Compliance Consultation and Contact List

To reduce the number of re-submittals and save time, the City may schedule a design compliance consultation with the Developer and / or the design professional and all affected City departments to address significant omissions, comments and / or conflicting responses. The Design Compliance Consultation is set up by appointment, not on a walk-in basis. The applicant can also request the meeting from any member of the interdepartmental review team. The purpose of this meeting is for the applicant to be given the opportunity to review plan review comments with interdepartmental plan reviewers. This meeting should help the applicant make all necessary corrections with the first re-submission rather than having multiple revisions and multiple re-submittals.

Applicants are encouraged to summarize the results of the meeting in writing and fax or e-mail action items, conclusions, etcetera to the staff members at the meeting.

Because of the nature of the process, re-submittals will have additional or modified information and comments. Efforts will be made to limit additional and unnecessary comments, however, it also should be understood that comments may be made regarding the new or modified information.

The design professional and Developer should feel free to contact any reviewer for clarification regarding comments.

Contact List

Below are individuals responsible for various aspects of the development review.

Name	Department	Phone No.
Jon Reynolds	Bldg. Inspection / Plans Examiner	972-205-2313
Chris Cox	Bldg. Inspection / Commercial	972-205-2307
Thomas Guillory, P.E.	Engineering	972-205-2173
Jim Spillman, P.E., R.P.L.S.	Engineering	972-205-2846

Mark Robbins	Engineering – ROW Permits	972-205-3622
Glenn Breysacher, R.P.L.S.	City Surveyor	972-205-2157
Michael Meade	Field Operations	972-205-2113
Bill Heinze, P.E.	Field Operations	972-205-2174
Hal Hartman	Fire	972-205-2970
Josue De la Vega	Planning	972-205-2454
Wayne Wolverton	Stormwater / Erosion Control	972-205-2170
Thuan Huynh	Transportation	972-205-2436
Brent Erickson	Wastewater	972-205-3227
Robert Ashcraft	Water	972-205-3209
Cliff York	GP&L	972-205-3713

Contact Engineering Records Division for record drawings, topography and digital data at 972-205-2170.

1.4 **Appendix 1 - Comment Response Sheet**

See form on next page.

1.5 Appendix 2 - Plan Completeness Checklist

The intent of this checklist is to minimize redline comments on plans submitted for Site Permitting and to maintain consistency amongst plan reviewers. The checklist is not meant to be totally inclusive of all possible items that may be needed for proper review and approval, but depicts ordinance requirements and other commonly requested items. Plan approval, and ultimately issuing of the Site Permit depends on compliance with the comments made on the check prints and this checklist. The Engineer or record shall satisfy themselves of the completeness and accuracy of the design. The City may use a modified form of this checklist to indicate where submittals are inadequate rather than providing a detailed redline plan.

<u>Project Name</u>	<u>CASE No.</u>
(X) Required	(√) OK (N/A) Not Applicable

1.5.1 General Information

- Recommended sheet layout: 1. Cover w/general notes 2. Plat, 3. Site Plan / dimension control, 4. Paving, 5. Grading, 6. Drainage 7. Water & sewer, 8. Stormwater pollution prevention, 9. Special details.
- Provide cover sheet w/ plans having two or more sheets w/ recorded subdivision name (lot/blk) prominently shown, case number, sheet index, vicinity map, north arrow, graphic scale, owner, design firm and general notes.
- Standard sheet size, 24"x36", with north arrow, graphic scale, title block defining project / sheet name, name of subdivision lot/block, design firm, owner, contact information, case number.
- Identify benchmarks used including primary and secondary/onsite.
- Include legend w/ drawing symbols used with explanations.
- Are improvement plans presented in an uncluttered manner with clear instructions and notes?
Plans depict:
 1. Where improvements go and how they fit in w/ existing conditions and how each piece is built.
 2. Fully indicating the extent of work necessary to create the desired finished product.
 3. Plans show in detail, work conforms to the City's standard construction details with accurate dimensions, and computations to support the issuance of Site Permit.
 4. Prepared at a legible scale and readable at 50% reduction clearly displaying the Engineer's seal.
- Look at the Big Picture, identify and insure design addresses the following questions:
 1. Any foreseeable hazards / adverse conditions affecting end user's safety impairing use and enjoyment of property?
 2. Is Right of Way (ROW) construction subject to cause public interruption and inconvenience?
 3. Are future extensions of water and sanitary, and storm sewers possible?
 4. Identify any conflicts w/ other utilities? Are adjustments required? If so reflect and provide instructions on plans.
 5. Will the project create drainage problems downstream and upstream?
- Provide special details for construction items not covered in the City's standard construction details.
- Is site adjacent to imminent TXDOT, County or City project? Identify if so.
- Plan Revisions 1.Cloud change area 2.Triangle w/ revision number 3. Provide explanation in lower right corner

1.5.2 Site Plan (include w/ non-residential submittals)

Property / Right of Way (ROW) Details

- Use heavy line weight for property lines, label bearings, distances, radii, and area in acres or sq ft
- Provide distance from the center of nearest street intersection to property corner
- Indicate adjacent ownership and /or recorded property information, subdivision name, lot and block
- Show existing improvements on and w/in 15 feet of property line, structures, paving, signs, fences, etc.
- Identify adjoining railroad, alley and street with name, ROW width, pavement, type, curb, and curb cuts on both sides of the street, medians and openings
- Access to divided streets must indicate existing and proposed median openings, 70-ft wide minimum.
- Identify existing driveway widths and radii
- Locate and label existing public/private drainage, utility, pedestrian, traffic control, visibility and common access easements with recording information
- Note location of electric transformers, transmission structures, towers, antennas, etc
- Note location of monitoring and water wells, underground storage tanks, and graveyards
- Plot 100 year flood plain, floodway, wetlands, detention ponds, and jurisdictional US waters

Site Improvement Details (locate and label all applicable information)

- Identify propose driveway widths and radii, provide instruction install to standard driveway per city details and barrier free ramps
- Identify additional right of way, pedestrian, utility, traffic control, visibility, and/or common access easement as required by the project or Major Thoroughfare Plan
- Locate and fully indicate extent of ROW improvements, such as inlet relocation, left and right turn lanes, pavement and sidewalk removal and replacement, etc, provide dimension to clarify limits
- Locate and label proposed public and private sidewalks specify widths and ADA ramps
- Locate proposed off street parking layout with easily identifiable standard, compact, and handicap spaces defined, typical 90 degree stall, 9-ft wide by 18-ft deep with 24-ft aisle.
- Include pavement specifications if used as paving plan (**see 9.2.3.1**)
- Minimum parking lot paving thickness = 5-inches, reinforced concrete over engineered subbase.
- Define dimensions of parking spaces, islands, aisles, drives, review internal circulation
- Provide dimension of improvements from property line
- Verify bumper overhang is a minimum of 2 ft from property line or landscape buffer.
- Raised curbing required to separate parking areas from areas not intended for vehicle movement.
- Identify and label existing and proposed fire lanes and turnarounds (maximum 10% shading)
- Locate, label and dimension loading, service and dock areas w/ screening check w/ Planning, typically required for retail, commercial, industrial use, structures > 5000 SF<25000 SF requires 1- 10 ft x 25 ft area, additional spaces required at 45000 SF
- Specify loading & fire lane paving, as Class "C" concrete w/ reinforcement specs equal city street.
- Identify refuse facilities w/ enclosure, provide 12-foot wide and 16-foot long 6-inch thick concrete pad
- Locate and label light standards, benches, utility poles and other ground mounted structures
- Locate and label landscape buffer width, interior parking lot landscape areas and protected tree clusters. Include prominently displayed note stating: **"No landscaping such as trees, hedges, above and underground structures shall be located within existing or proposed utility easements and right of way."**
- Provide landscape & irrigation plans on a separate sheet, don't show landscaping on Site Plan
- Locate, label, and dimension screening walls, fences and retaining walls. When adjacent to ROW, provide note to construct per City Standard Construction Details or equal
- Define signage location, orientation and width in relation to ROW and utility and drainage easements
- Define existing and proposed structure footprint with square footage noted, tied to property lines

- Indicate additions w/ square footage to existing structures and / or portions to remain or remove
- Indicate front door location on building footprint for addressing
- Show proposed building overhangs / canopies, no encroachment allowed in City easement
- Check driveway intersections for possible hazards, obstructed site distance, danger to pedestrians.
- At aisle intersections, minimum sight triangle 8 ft x 8 ft, with no obstruction > 3.9 ft above surface
- Are circulation / maneuvering areas design to accommodate vehicles normally using the site?

Fire

- Provide exact locations of existing and proposed Fire lanes, hydrants and Fire Department Connection, located out of collapse zone.

Utility Elements

- Locate, label and dimension existing and proposed utility easements with recording information
- Locate and define size of existing water & sanitary sewer lines with flow direction arrow to be connected to
- Locate valves, reducers, meters, manholes, cleanouts, grease traps, etc.
- Locate and label of franchise utilities ground mounted equipment, above grade utility cabinets and easements for gas, cable TV, electric, telecommunication, etc
- Provide a separate utility plan or define on the site plan** the exact location and size of sanitary sewer and water service connections.
- Show water service location from the main to within 5 feet of the structure.
- Where applicable, locate and label fire line tap and backflow device and show line within 5-feet of the structure and from sprinkler room to Fire Department Connection.
- Locate and label domestic and irrigation water service and meter w/in utility easement and backflow devices out of easement.
- Define finish floor elevation; each lot must have an independent sanitary sewer service, show exact service tap location and lateral location from the main to the structure.
- Define / show and dimension any offsite water / sanitary sewer extension / utility easement (15ft min).
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling drainage easement.

Drainage Elements

- Show contours and flow arrows on and within 50 feet of property line for plans w/o separate D.A.M.
- Locate and label natural and man-made channels, existing and proposed detention ponds and drainage easements.
- Locate and label existing and proposed private storm sewer systems and inlets w/sizes and tie-ins to public system, indicate Q into each inlet and bypass flow if any, limit runoff into to public ROW.
- Locate and label beginning and end, top and bottom elevations of all existing and proposed walls.
- Define finish floor elevation, plan must show runoff is directed away from structure or show on D.A.M.
- Define pre- and post-project imperviousness.
- Define / show and dimension any offsite storm sewer extension and drainage easement (20ft min.).
- Provide drainage easement on creeks for the area below 100-year + 1-foot + 10 to 15-foot access.
- Indicate source of flood data, reference effective Flood Insurance Rate Map (FIRM) where applicable.
- Where grade adjustments are proposed along adjacent properties or ROW, provide typical cross section detailing the relationship of the improvements and adjacent property.
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling drainage easement.
- When detention ponds are proposed, verify site / paving plan includes note detention pond must be operational prior to paving.

1.5.3 Paving

1.5.3.1 Driveways

Show existing and proposed ROW, pavement type, access width, radii.

<input type="checkbox"/> Driveway widths:	Min (ft)	Max (ft)	R min (ft)	R max (ft)
Single family	10	25	5	10
Multi-family	20	30	15	30
Office / Retail	24	30	15	30
Service Stations	24	40	15	30
Industrial	30	45	25	50
One Way	20	25	15 out	30 out

8 % maximum retail/office driveway grade, 10% maximum industrial.

Driveways aligned w/ median openings, minimum 40-ft wide back to back with 20-ft radius.

Verify longitudinal butt joint called out when proposed paving connects to existing.

Verify driveway grades provide for maximum 2% cross fall walkway per ADA requirements.

Sec. 33.65 Steps, fences, walls, buttresses, projections, etc., prohibited in streets and alleys.

Sec. 33.70 (B) Driveways shall not be constructed w/in curb return of street

(F) Public parkway shall not be used at any time for parking.

(G) Entrances/exits on street right of way shall be confined within property frontage.

(I) Common driveways may be approved w/ permanent access easement filed for record w/ Dallas County. If used, submit access easement with first plan submittal.

(J) All driveway approaches shall be constructed in accordance w/ City of Garland specifications.

Verify note provided on plans

(M) Vehicular access to nonresidential uses shall not be permitted from alley.

Check driveway culvert verify w/ D.A.M. Provide station, offset, size, min 21-inch RCP in ROW, fit to conditions, install 6:1 TXDOT headwall.

Sec. 31.132 requires the property owner to construct curb when / at abandoned driveway.

Sidewalks (General)

Sidewalk width is based on zoning, residential 4 ft, and other zoning districts 6 ft.

Verify barrier free ADA conforming ramps are present at driveways & street intersections.

Are corner clips required for barrier free ADA conforming ramps at street intersections?

31.28F Sidewalks waived by Plan Commission require escrow payment to the City, equal to cost of sidewalk.

Residential Sidewalks

Residential subdivisions, developer is required to construct sidewalks at 1) non-buildable lots or 2) along streets abutting subdivision's screen wall.

Include and verify that standard verbiage regarding sidewalk construction is on all paving sheets: The Developer will install sidewalks and barrier ramps along all non-buildable lots in accordance w/ current American w/ Disability Act rules and regulations. All other intersections w/in the subdivision will have lay down curbs to facilitate the construction of barrier free ramps by homebuilders.

1.5.3.2 Street Paving

Provide plan and profile for dedicated streets and alleys defining:

<input type="checkbox"/> Centerline stations	<input type="checkbox"/> Typ. street cross section	<input type="checkbox"/> Property information	<input type="checkbox"/> Proposed sidewalks
<input type="checkbox"/> ROW dimension	<input type="checkbox"/> Exist. & propose top of curb elevations @ begin /end of project and other critical points of interest	<input type="checkbox"/> Manholes & fire hydrants	<input type="checkbox"/> Barrier free ramps
<input type="checkbox"/> Tangent length & bearings	<input type="checkbox"/> Utility/drainage easement intersecting & adjacent to	<input type="checkbox"/> Ditch/gutter spot elev	<input type="checkbox"/> Utility poles/structures
<input type="checkbox"/> PC, PRC &, PT's	<input type="checkbox"/> Sight visibility easements	<input type="checkbox"/> Flow direction arrows	<input type="checkbox"/> Fences & manholes
<input type="checkbox"/> Horizontal curve data		<input type="checkbox"/> Existing & prop. curb	<input type="checkbox"/> Inlets & ditches
<input type="checkbox"/> Benchmark		<input type="checkbox"/> Ex & prop driveways	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Street Name(s)		<input type="checkbox"/> Existing sidewalk	

1. Show /provide details where required to clarify beginning and end project, intersections and intersecting street w/ flow arrows, provide instructions regarding conflicts.
2. Provide instructions to install longitudinal butt joint when proposed paving connects to existing.
3. Each paving sheet has the proper detail for the type of street / arterial to be constructed.
4. Show sufficient area to clarify drainage transitions, use flow arrows, flow paths should be clear.
5. Retaining walls adjacent to right of way are required to reference City standard construction details and / or provide equal detail.
6. Residential sidewalks 4ft wide placed 1ft from property line, non-residential sidewalks – 6 feet.
7. Opposite each inlet label per D.A.M., w/ type, size, paving station, top of curb & flowline elevation.
8. Valley gutters cross lower classified street.

- Min local street radius = 250 ft residential, 350 ft commercial / industrial, minimum grade = 0.50%, desired maximum 7.0%, maximum local street grade =10.0%, within 100 ft of intersection 5%.
- Cul da Sac >300 ft min paving radius of 61 ft plus 10' PUE, <300 ft, 50ft ROW, 5ft P.U.E. and 45 ft paving radius.
- Type "F" 60 ft ROW 37 b-b 6" thick pavement, local
- Type "G" 50 ft ROW 27 b-b 5" thick pavement
- Type "E" 80 ft ROW 45ft-b 7" thick pavement
- Include vegetation note for all ROW areas:
PUBLIC RIGHT OF WAY, EASEMENTS, AND COMMON AREAS MUST BE STABILIZED W/ PERENNIAL VEGETATION COVER, FULLY ESTABLISHED W/ 100% COVERAGE, OR OTHER APPROVED STABILIZATION METHOD.
- City streets – provide instruction: Install 2-type III barricades until street acceptance by City.
- Show existing driveway widths and define type of paving, remove approach no longer used, install curb / gutter / sidewalk.
- Verify propose street conforms to Thoroughfare Plan, and reasonable extension of existing streets.
- Intersect cross streets < 1200 ft w/ 50 ft min ROW and 80 to 100° intersection angle (31.25).
- At street stubs, show positive drainage grading on plan and profile, provide typical cross section w/ Q, v, d, slope (1% minimum), and erosion control measures.
- Verify placement of pavement headers on all street and alleys stubs.
- Check for utility conflicts between water/sanitary/storm sewers/ other utilities & structures.
- Check cul da sac grades in relation to undeveloped adjacent properties. Does grade match?
- Check / verify paving grade of streets and around cul da sac bulb are ≥ 0.5%.
- Check for vertical and horizontal sight distance conflicts, provide visibility easement where required.

- Check centerline stationing on plan view with curve table information and critical points.
- Compare elevations on plan versus profile views, especially at intersections and low points.
- Compare / verify flow arrows in plan view to profile on both sides of grade breaks.
- Verify low point inlets labeled w/ positive overflow easement, coordinate w/ plat D.A.M.

Intersections

- Type A & B intersection provide additional ROW - future right turn lane (11 ft), typically 19 ft.
- Type C, D, or E streets provide additional ROW - right turn lane at Type E's and above intersections.
- Dedicate add ROW or P.U.E. for minimum parkway, measured from curb face - Type A, B, C-20 ft, Type D-15 ft.
- Intersection of Local Street w/ Type A, B, C, or D, typically requires additional ROW or easement and construction of Type F collector extending 75 ft w/ 5 ft P.U.E.
- Intersection radius – 25ft local to local-arterial, 30ft collector-to-collector and arterial.
- Maximum / Minimum street intersection angle 100/80°. (31.25).
- Check visibility triangle-length along each projected curb line for streets, 45ft, and alleys-25 ft.
- Check cross slopes, investigate need for drainage inlets where finish grade <2%.

Alleys

- Residential subdivision lots shall be served by alleys at the rear w/ minimum 20ft ROW (31.27 (A)).
- Provide /show additional two feet of alley paving at alley intersections and curves per City details.
- At street intersections, verify 16- to 10-ft paving flare is properly shown within 20-ft.
- Curb required at alleys adjacent to unimproved roadway or drainage way.
- Compare / verify plan versus profile elevations, verify alley invert elevations at approaches.
- If alley slopes to ROW, then 0.50ft difference in gutter elevation to invert elevation at ROW.
- If alley slopes away from ROW, 0.75ft difference in gutter elevation to invert elevation at ROW.

Profiles

- Profiles show:

<input type="checkbox"/> Left / right top of curb	<input type="checkbox"/> Begin/end project grades	<input type="checkbox"/> PVC, PVI, PVT	<input type="checkbox"/> Manholes
<input type="checkbox"/> Existing ground at ROW	<input type="checkbox"/> Critical points of interest	<input type="checkbox"/> Compacted Fill 95% Std. Proctor Density	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Proposed ground at ROW	<input type="checkbox"/> Intersecting utility grade	<input type="checkbox"/> Hatch fill	
<input type="checkbox"/> Grades @ every 100 ft, intersections & PI's	<input type="checkbox"/> Intersecting storm grade	<input type="checkbox"/> Benchmark	
<input type="checkbox"/> Curb return grades	<input type="checkbox"/> Vertical curve	<input type="checkbox"/>	
	<input type="checkbox"/> high/low point station, k		

- Compare all elevations from profile to plan view, check for unequal curbs, drainage complications.
- Is there a change in existing road grade? Are existing driveway profiles needed to reflect adjustments within ROW? Review /check parkway and access grade, drainage issues
- Verify vertical curves provided, at grade difference > 1%, minimum length = 100 ft, 4% maximum change at intersections.
- Check sag inlets, does it correspond to low point station? Check for any locations where water may pond. Minimum K values:

	Crest	Sag
Alley (20ft ROW, 8"-5"-8", 10ft wide)	10	20
Residential Collector (60ft ROW, 6", 37ftb-b)	30	40
Commercial Collector (7" 45b-b)	50	50

Divided Streets / Collectors

- Cross sections required for divided thoroughfares and collectors, use same inside top of curb.

- Review top of curb / ground elevation at ROW. Will improvement create future access problem?
- Street lights and bases check with GP&L and TXU for requirements.
- Buttoning, barricading, signalization and conduit requirements refer to Transportation Dept.
- Check w/ Parks Department if water service required to medians.

Left/Right Turn Lane

<input type="checkbox"/> Typical section thickness / subgrade	<input type="checkbox"/> Positive drainage	<input type="checkbox"/> Longitudinal butt joint instructions	<input type="checkbox"/> Irrigation system & conduit
<input type="checkbox"/> Street lights	<input type="checkbox"/> Monolithic concrete median nose	<input type="checkbox"/> Existing trees	<input type="checkbox"/> Transition & storage
<input type="checkbox"/> Pull box & traffic loops	<input type="checkbox"/> Traffic signals	<input type="checkbox"/> Proposed trees	<input type="checkbox"/> Buttons

- Reference standard barricading detail.
- Left turn lane configuration conforms to standard details w/ 10' pavement.
- Right turn lanes configuration conforms to standard details w/ 11' pavement.
- Along divided street, verify access to median opening provided for each platted lot, easement?
- Verify w/ Parks need for water service and conduit through crossover at medians.

1.5.4 Grading

Fundamentals:

1. Provide suitable access from and to abutting street,
2. Immediate diversion of surface water away from buildings and off of site,
3. Avoid concentrating runoff onto neighboring properties,
4. Minimize disruption to adjacent properties, erosion and ponding.

- Provide grading / drainage plans for other than 1 to 2 family residential (31.24 (A)).
- Grading plan show contours on and w/in 50 ft of property, including the following applicable on- and offsite features:

<input type="checkbox"/> Inlets & grates w/ size	<input type="checkbox"/> Flow arrows	<input type="checkbox"/> Structure locations	<input type="checkbox"/> Street layout
<input type="checkbox"/> Offsite drainage areas	<input type="checkbox"/> Sag & on grade inlets	<input type="checkbox"/> Paving, curbs, streets	<input type="checkbox"/> Street names
<input type="checkbox"/> Spot elevations at high points intersections, and sags.	<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Sidewalks, & pathways	<input type="checkbox"/> Right of way
<input type="checkbox"/> 100-year flood plain	<input type="checkbox"/> Proposed & existing utilities & easements	<input type="checkbox"/> Driveways & fences	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Trees	<input type="checkbox"/> Landscape buffers	<input type="checkbox"/> Detention & amenity ponds	<input type="checkbox"/> Property lines

- Indicate north, and provide numeric and graphic scale and if warranted Legend.
- Indicate source of base contours if not City topography.
- Locate protected trees and/or outline perimeter of wooded areas per Tree Preservation Plan.
- Show existing topography minimum 2 ft contour interval, and proposed contours using distinctly different line type, supplement w/ finish grade spot elevations, preferably shown in boxes.
- Connect proposed to existing contours. Show existing and proposed finish floors ((31.24 (A) (1)).
- Provide flow direction arrows indicating primary flow paths on, adjacent to and through the property.
- Show all onsite building footprints and / or buildings on and w/in 15 feet of property line.
- Show and verify flow arrows are provided to depict existing / proposed drainage patterns.
- Plan demonstrates how positive runoff of surface waters is accomplished and means of ultimate runoff disposal to public right of way or easement.
- Show and provide cut/fill toe and top of slope grades, and easement limits defined.
- On all dead end streets and alleys, show grade out at 1.0% min, provide erosion control measures, and specify type and dimensions, etc.
- Check grading w/ paving plan and D.A.M. verify locations coordinated at

<input type="checkbox"/> Inlet	<input type="checkbox"/> positive overflows	<input type="checkbox"/> divides	<input type="checkbox"/> flow directions.
<input type="checkbox"/> Sags	<input type="checkbox"/> easements	<input type="checkbox"/> swales	<input type="checkbox"/> property lines

- Verify lot minimum finish floor elevation, 1) 2 ft above 100-year flood plain or 2) 2 ft above lowest curb when draining primarily to front, and/or 3) if to the rear 2 ft above lowest alley (31.24B(2)(b)).
- Verify design ensures drainage protects structures and prevents adjacent property damage (31.24(A) (1)).
- Maintain positive drainage around and away from pad and sidewalks, minimum pad elevation = 0.3' above swale, verify usable yard no slope exceeding 3:1.
- At sags trace overflow path, check and verify adjacent lot finish pad and floor are > low point.
- Check / verify grades at property line? Matches existing / Cut / Fill? How is transition made at property line? Retaining wall, slope to/or away?
- Verify no offsite grading, lot-to-lot drainage, diversion, obstruction or constriction of adjacent surface water flow patterns is created w/out an agreement or easement.
- Verify 1.0% minimum grade for grass swale, lesser slopes used paved swale minimum 0.5%.
- Compare with paving plans / verify same top of curb shown at ROW.
- Check access drive maximum grades residential < 12%, non-res 10%. Provide grade transitions at steep drives.
- Residential - Verify lots at alley T's are higher than alley ROW.

Walls

- >4 feet – structural engineered plan required, showing type, reinforcement, expansion/construction joint spacing, backfill, % compaction, and drainage specs, weep hole diameter and spacing.
- Define beginning, end, length and top/bottom elevations. Include detail showing high side swale and where applicable property line or adjacent utilities and easements.
- Show and provide details for all walls adjacent to ROW or provide reference to construct per City standard construction details.
- Walls greater than 2.5 feet adjacent to public space require fence or 42" high railing.
- Verify walls are not w/in and paralleling City utility or drainage easements.
- Is there adequate room to construct footing / wall? Identify any special maintenance requirements?

1.5.5 Drainage

General

- Is drainage coming in or going out? How is it handled? Are public drainage easements needed?
- Is it shown that all site runoff leaves in public ROW, easement, storm sewer, natural or manmade channel?
- Review and verify receiving system capacity and adequacy to carry the design discharge.
- Is detention or offsite improvements required? *See detention for additional requirements.*
- Check perimeter of project, verify project does not cause damage, increase erosion, divert, constrict, and impound runoff or other unforeseen problems.
- Check zoning for ultimate land use; insure storm sewers sized for fully developed conditions.
- Check for encroachments into and paralleling drainage easement such as walls, signs, poles, private lines, structures, etc.
- Compare plat versus storm sewer plans; insure storm pipe center line is a minimum 10-foot from the edge of right of way or easement.
- Verify future extension stub out sized for ultimate condition w/ public drainage easement.
- Verify drainage easement adequacy, minimum 20-feet, provide extra width for deep lines.
- Grade to drain points verify adjacent grades above WSEL, provide typical cross section with Q, slope, depth, velocity and drainage easement defined.

- Check need for Flood Plain Development permit when work is adjacent to FIRM designated creeks.
- Any significant changes to the FIRM designated flood plains must have a flood study included with first submittal and subject to submittal to FEMA for a Conditional Letter of Map Revision.
- Provide special details for all structures not in City's standard details.

Drainage Area Map (D.A.M.)

- Identify north, graphic scale, minimum 2-ft contour interval, provide legend where necessary. Locate and label:

<input type="checkbox"/> Existing storm sewers(dash)	<input type="checkbox"/> Inlets & grates w/ size, designations, Q100 and Q bypass	<input type="checkbox"/> Intersection flow arrows	<input type="checkbox"/> Street names
<input type="checkbox"/> Proposed storm (solid)	<input type="checkbox"/> 100-yr flood plain	<input type="checkbox"/> Flow arrows	<input type="checkbox"/> Street layout
<input type="checkbox"/> Size & line designation	<input type="checkbox"/> Detention and amenity ponds	<input type="checkbox"/> Crests & sags,	<input type="checkbox"/> Right of way
<input type="checkbox"/> Subareas and divides		<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Offsite drainage areas		<input type="checkbox"/> Stock tanks & lakes	<input type="checkbox"/> Property lines
			<input type="checkbox"/> Points of concentration

- Clearly identify and label natural and / or man made drainage facilities located w/in 50 ft of site affecting stormwater flow such as lakes, ponds, creeks, etc.
- Indicate runoff for all subareas including:

<input type="checkbox"/> Alleys	<input type="checkbox"/> dead end street stubs	<input type="checkbox"/> offsite drainage areas	<input type="checkbox"/> onto adjacent properties	<input type="checkbox"/> points of flow concentration
<input type="checkbox"/> streets				

- Compare D.A.M. divides to lot grading and paving plan, check / verify crest, sags and valley gutter locations.
- Verify offsite drainage area/topography extends to a point where crest can be clearly identified.
- Verify all subareas are picked up. Does D.A.M. and storm sewer plans agree?
- For residential subdivisions, Check and Verify
 1. Flow crosses minor street, No flow through major intersections
 2. Runoff versus street capacity, Ensure flow does not exceed right of way.
 3. No street drainage enters alley, and
 4. Review need for curb at steep alley "T" intersections or flattening of steep advancing grades.
- Provide subarea inlet table with designations and $Q=CaCIA$ variables defined, $Ca=1.25$ for $C<0.7$, $Ca=1.0$ for $C>0.7$.
- Verify design based on projected ultimate watershed development w/ zoning map (31.30 (C)).
- C for Parks, 0.15-0.35; Residential 0.45-0.60; Multi-family 0.60-0.85; Industrial, Commercial (I/C) (light) 0.50-0.80, I/C (heavy) 0.75-0.90. Show composite C calc's church 0.80, school 0.70.
- Residential minimum time of concentration $TC=15$ min, Non-residential minimum $TC=10$ min.
- Check time of concentration calculations if greater than minimums, state / review assumptions, show existing and proposed flow paths on DAM, review travel time equation and variables
- Check cumulative runoff calculations, verify capacity and adequacy of downstream system,
 - When connecting to existing sewers, review record drawing D.A.M. for allowable discharge from outside ROW such as for a parking lot.
- Check depth & spread of flow in street & alley, ensure flow in ROW and one dry lane on arterial.
- Check size and position of inlets such that drainage doesn't cross over street crown. Avoid flow concentrations across City sidewalks except at driveways.

Inlets

Curb inlet on constant street grade capacities

<input type="checkbox"/> 1.0% = 1cfs/ft	<input type="checkbox"/> 1%-2% = 0.85cfs/ft	<input type="checkbox"/> 2-4% = 0.70 cfs/ft	<input type="checkbox"/> 4.0-7.0% = 0.6 cfs/ft	<input type="checkbox"/> >7%=0.5cfs
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- Standard curb inlets are 5-, 10-, 15-, & 20- ft wide and between 4- and 4.5 feet deep.

- Size and position on grade curb inlets so runoff does not exceed street capacity or interfere w/ pedestrians. Check gutter spread and depth.
- Locate upstream of pedestrian crossings, intersections & prior to alley approach when added alley Q exceeds street capacity.
- Locate inlets at sags, 10 feet from street curb returns (unless site constraints dictate otherwise).
- On paving plan, opposite each public inlet provide station, size, type, D.A.M. designation, top of curb / flowline elevation, and Q100 to and bypass.
- Avoid junction box inlets and inlets located on curves near intersections, place upstream of intersection.
- Grate and combination inlets are not allowed on the City system w/o prior consent from the Street and Engineering Department
- Provide recessed inlets on divided roadways & collectors, where parking is not expected.
- Provide Y inlet in ditches and for undeveloped areas, locate min 20 ft from street, insure grading allows runoff to get to inlet.
- Provide 10-ft curb on both sides alley inlet include note "Warp alley pavement to inlet throat".
- Check alley inlet placement avoid future driveway conflicts, placement on property line is best.
- Compare and verify D.A.M. inlet locations and sizes w/ inlet sizing chart and grading plan.
- Check sizing chart Insure 100% collection at sags, on grade capacities conform to criteria and all flow is accounted for.
- Private systems check curb and grate inlet capacities against D.A.M. subarea flow. Insure flow doesn't enter / bypass to public right of way and structures, verify blockage accounted for in design.
- Check properties opposite steep streets and alleys, verify finish pad above TC.
- At sags verify inlets / overflow at low point and placement of concrete flume are w/in easement.

Storm Sewers

- Provide plan / profile for all connections to and from public storm sewers. Show:

<input type="checkbox"/> Existing storm sewers(dash)	<input type="checkbox"/> Stationing & 100ft tick marks	<input type="checkbox"/> Right of way	<input type="checkbox"/> Easement(s)
<input type="checkbox"/> Proposed storm (solid)	<input type="checkbox"/> PC, PT & curve data	<input type="checkbox"/> Fences & manholes,	<input type="checkbox"/> Street names & layout
<input type="checkbox"/> Diameters & line designation	<input type="checkbox"/> Creeks & ditches	<input type="checkbox"/> Sprinkler systems	<input type="checkbox"/> Pavement & curbs
<input type="checkbox"/> Water/sewer lines	<input type="checkbox"/> 100-yr flood plain	<input type="checkbox"/> Valves & meters	<input type="checkbox"/> Driveways
<input type="checkbox"/> Other existing utilities	<input type="checkbox"/> Detention / retention	<input type="checkbox"/> Back flow devices	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Inlets & grates w/ size & designations	<input type="checkbox"/> Label private lines	<input type="checkbox"/> Above ground features w/in ROW	<input type="checkbox"/> Property lines
<input type="checkbox"/> Q100 & Q bypass	<input type="checkbox"/> Trees & signs,		<input type="checkbox"/> Water & sanitary sewer lines

- Provide pipe calculation chart for all sewers connecting to public system.
- Minimum 21-inch Class III RCP required in ROW, specify Class IV RCP when crown w/in 2 foot from top of pavement and at RR crossing.
- Provide details for connections using different pipe materials.
- Avoid bends unless site conditions warrant, use radius < 48" point connections and outfalls downstream.
- Intersect laterals w/ factory 60 degree wye connection for pipe sizes \leq 48" diameter.
- Specify rim elevation at junction boxes
- At flumes indicate paving station and elevation, size, Q100, and drainage easement width.
- At sags verify positive overflow is at low point, adjacent lot minimum finish floor elevations and easement width.
- At grade to drains, provide swale/ditch cross section, Q, n, velocity, depth and slope, 1 % minimum required for grass lined swales.
- Check plan view and grades with as-built / record drawing.

- Check placement w/in right of way or easement and verify 10-ft minimum from centerline alignment.
- Check stationing by scale from know PT and PC, review curve data.
- Compare inlet locations and sizes to D.A.M. for accuracy.
- Check / verify paving station opposite each inlet, define size, type, D.A.M. designation, TC / FL elevation, Q100 to and bypass.
- Check top of curb elevation at inlets against paving plan/profile, verify standard inlet depth used.
- Minimum 20 foot drainage easement required for public lines, verify NO retaining walls, post, signs, private lines, structures, etc allowed w/in easement.
- Verify system extends to and captures offsite contributing drainage area.
- Check outfall flowline, point downstream, and grading coordinated w/ drainage easement.
- Specify / Verify headwall types are per City standard details, Type A, B, 42-inch handrail at outfalls > 30" drop near rights of way.
 - 1) For velocities > 8 fps, provide downstream erosion protection for riprap specify diameter and pad dimensions, check gradation spec's, specify thickness of blanket and filter fabric.
 - 2) Verify downstream easement sized to convey fully developed flow.

Profiles

- Storm sewer profiles line up directly under plan view (1"=40ft > h, 1"=4ft > v).
- Show existing and proposed ground at storm sewer centerline, utility crossing station / elevation.
- Provide station / elevation at every 100 ft, size and grade change, manholes in/out flowlines.
- Where connections are made to existing system storm drain, match soffits, indicate starting hydraulic grade line, reference and verify source of information or assumptions made.
- Note to install concrete collars at proposed to existing pipe connection locations.
- Where sewer outfalls to creeks, indicate and verify 100-year water surface elevation used.
- For each segment indicate pipe diameter, % grade, class and hydraulics between interception points Q100, Q cap, S (ft/ft), V, V2/2G, elevations to 0.01 at minimum 100' intervals.
- For full flow, define hydraulic grade line elevations at size / grade changes, laterals and junctions.
- Define start and end of partial flow provide pipe hydraulic data / Check v partial at outfalls.
- Fill areas - show hatching and specify minimum 95% compaction, standard proctor density.
- Specify / verify Type A or B headwalls located at outfalls, check / review grades and grading.
- Verify outfall pipe and swale bottom elevations are coordinated, place outfalls maximum 2 feet above creek flowline or onto stable rock.
- Velocities > 8fps, verify riprap diameter and dimensions are adequate, check gradation spec's, specify thickness of blanket and filter fabric.
- Verify outfall easement and grading / elevation is sized to convey fully developed flow.
- Use TXDOT 6:1 sloped end headwalls on driveway culvert in City ROW.
- Compare plan/profile stations, elevations, pipe sizes, designations, and utility locations.
- Compare/ verify pipe segment hydraulic data, Q100, Q cap, S, V, V2/2G on profile is same as storm sewer sizing chart, headloss calc's, TC at interception points, and Q100 along sewer.
- Verify HGL, 2 ft below top of curb at inlets, check 1.5V2/2g for full flow laterals.
- Verify profile shows lateral size, station and elevation, w/ centerline to centerline connection.

Laterals

- On plan, indicate designation, length, % slope, slopes > 33% requires flowable backfill in ROW.
- Lateral profiles required for full flow and/or crossing City utility.
- Lateral profiles required for partial flow laterals when crossing City utility.
- Insure collection of stormwater at full pipe flow; verify HGL min 2 ft below curb check 1.5V2/2g.

Creeks

- Provide paved ramps w/ driveway and bollards at end of each major segment 31.29(D).
- Development adjacent to Creek – Is it on a previously studied creek? Is a study needed? >600ac requires Unit Hydrograph method.
- Creek study sealed by PE and include
 - hydrology parameters
 - assumptions
 - methodology
 - HEC-1 & 2 digital file
- Submit computer files and other programs used to develop discharges with first plan submittal.
- Work along FEMA floodplains requires a Flood Plain Dev. Permit. Is a 404 permit needed?
- Review offsite drainage work or points of flow concentration point in excess of pre-project conditions. Is an easement necessary?
- Easement sized to convey fully developed flow, provide metes / bounds to City surveyor.
- Check topography and cross-sections of man made channels and swales.
- Review / check capacity, slope, depth, velocity calculations, easement, maintenance requirements, and adequacy of erosion protection.
- Include note on plan: PRIOR TO CITY ACCEPTANCE CLEAR UNDER BRUSH, DEBRIS AND PLACE IN MAINTAINABLE CONDITION. PRIOR TO CITY ACCEPTANCE DETENTION / RETENTION FACILITIES, CHANNELS, DRAINAGE WAYS, AND OUTFALLS SHALL HAVE ESTABLISHED PERENNIAL VEGETATION W/ 100% COVERAGE.
- Curb alleys adjacent to creeks and open bodies of water.
- Verify creek w/in easement per plat w/access width, typical 100yr+1ft+10 horizontal if creek bank is 4:1 or flatter, 15ft if creek bank is 3:1 or steeper 31.29 (C) 4. If 100-year is less than bank full place easement at top of bank + sufficient horizontal access.
- Verify lot and rights of way are outside erosion hazard area, 4:1 projection from toe of slope.
- Spring & Rowlett Ck -use fully developed WSEL per 1989Rowlett and Spring Creek FPM Study.
- Spring Creek Forest Preserve criteria: 1 / no alteration/channelization within ecological boundary. 2/ maintain by +/- 10% adjoining surface drainage patterns volume and velocity 3/ Runoff rates approximate predevelopment use detention.4/ Use pre-determined utility corridors per Master Plan for utility construction.

1.5.6 Detention Basins

- Required for contributing sites > 0.95 acres or in areas of known flooding and inadequate downstream drainage systems.
- Provide standard detention pond general notes on plans.
- Include note on plan: Prior to City acceptance DETENTION/RETENTION FACILITIES, CHANNELS, DRAINAGE WAYS, AND OUTFALLS SHALL HAVE ESTABLISHED PERENNIAL VEGETATION W/ 100% COVERAGE.
- Side slopes no steeper than 4:1, unusual height or poor soil requires slope stability study by P.E.
- Provide / check paved low flow flume minimum 0.5% between inlet / outlet and at point discharges to pond bottom.
- Provide all-weather access to ROW, 15ft wide minimum, 20% maximum slope.
- Provide pond typical cross section(s), showing emergency spillway, outlet structure, excavated side slopes (4:1 or flatter), level access path with width specified, pond bottom slope and low flow swale.
- Define / verify benchmark number, location and elevation.
- Show / review detention pond grading and layout of outlet structure w/ respect to property lines and easement shown.
- Verify location, elevation, adequacy of emergency overflow spillway Bottom width= $0.36Q-0.7ZD / D3/2$ (Dallas).

- Check / insure outfall pipe and swale bottom elevations are coordinated.
- Are offsite flows entering the site? If so, have provisions been made to bypass flows?
- Review / verify pre- and post-project composite c values, time of concentration calculations, review assumptions, show existing and proposed flow paths on D.A.M., review travel time equation and variables
- Show / verify detention storage calculation, use modified rational method up to 25 ac, > 25 ac unit hydrograph method.
- Define / check site pre-project 10- and 100-yr runoff and/or available downstream capacity = allowable release rate.
- Define outlet structure location / dimensions, horizontal control from property line, provide trash rack and low flow dewatering device 4-inch minimum diameter.
- Define top of lid or grate and invert elevations of all pipes, structures, inlets, and manholes.
- Provide / Verify 10-foot minimum unobstructed access around pond. Can outlet structure be reasonably accessed for maintenance? Check drainage easement.
- Provide restrictor hydraulic calculations, design, orifice diameter or weir length, elevation, details.
- Define / verify maximum design WSEL for 10 and 100-year and the first 1-inch of rainfall.
- Provide minimum one (1) foot of freeboard above the design 100-year water surface elevation.
- Provide outlet detail for restrictor / weir and elevation versus discharge table on plans.
- Review elevation versus storage table and check dimensions / area / depth / volume.
- Verify design includes water quality features, detains first flush volume = (0.08 ft) c (A) or storm screening device used.
- When storm water screening device used, provide plan and details.
- When using perforated riser for water quality, spec number, spacing and diameter of perforations per NCTCOG. Verify water quality feature design used 1yr, 6-hr intensity of 0.35 in/hr (*iSMM*).
- Define outfall pipe flowlines, diameter, velocity, length, and slope.
- Does tail water effect pond? Is an anti-seepage collar needed? If so provide design.
- Provide structural details and calculations for any item not in City standard construction details.
- Landscaping and irrigation are required, landscaping subject to the approval of the Planning Dept.

1.5.7 Water

- Provide overall layout of existing / proposed water and sanitary sewer, w/ sufficient street and lot including:

<input type="checkbox"/> Line designations & diameters	<input type="checkbox"/> Manholes & cleanouts	<input type="checkbox"/> Utility poles
<input type="checkbox"/> Flow directions	<input type="checkbox"/> Right of way & easements	<input type="checkbox"/> Fences
<input type="checkbox"/> Trunk line tie ins & service taps	<input type="checkbox"/> Dash in storm sewers alignment	<input type="checkbox"/> Sprinkler systems
<input type="checkbox"/> Valves, tees, crosses,	<input type="checkbox"/> Creeks & 100yr flood plain	<input type="checkbox"/> Structures
<input type="checkbox"/> Plugs, bends, reducers	<input type="checkbox"/> Stationing & 100ft tick marks	<input type="checkbox"/> Trees & signs
<input type="checkbox"/> Meters & fire hydrants	<input type="checkbox"/> PC, PT& curve data	<input type="checkbox"/> Label private lines
<input type="checkbox"/> Back flow devices	<input type="checkbox"/> Benchmark	<input type="checkbox"/> Retaining walls
	<input type="checkbox"/> Property lines	<input type="checkbox"/> North & graphic scale
	<input type="checkbox"/> Pavement & curbs	<input type="checkbox"/> Other above ground features w/in ROW

- Locate, label and dimension existing and proposed utility easements with recording information.
- Locate and define size of existing water lines to be connected to, and proposed lines.
- Locate and label existing and proposed sanitary, storm sewer lines with flow direction arrow.
- Review and verify existing water, storm and sanitary sewers w/ as-builts / record drawings.
- Verify capacity / adequacy of existing lines to serve proposed use.
- For commercial developments, are mains of sufficient size to provide total fire flow required?

- Mains 6 to 12-inches, PVC DR-18 (C900) located north and east of street centerline, 6ft from ROW.
- Water lines > 12-inches RCCP, Note on plans: Taps made by Hanson Products Personnel Only.
- Minimum cover 6" & 8"=4.0ft, 10" & 12"=5.0ft, > 12"=6.0ft, verify properly shown on storm and sanitary sewer profiles.
- Water mains greater than 12-inch diameter requires profile.
- Each development must have two sources of water, no closed loops allowed.
- Use 45 deg bends where possible avoid 90 degree bends.
- Minimum 5-foot separation required between structures and 10-feet between parallel lines.
- Define domestic and irrigation tap sizes and meter locations.
- Locate and label all fittings used to connect to existing and proposed mains.
- Locate and label all proposed valves, bends, crosses, tees, fire hydrants, reducers, etc.
- Verify no trees, retaining walls; post, signs, private lines, structures, etc are w/in utility easement.
- Verify utility crossing on existing concrete streets specified by other than open cut.
- Verify development facilitates future extensions. (31.47, 51.32 (7))
- At creek crossing plans must note, "Install concrete cap per City standard construction details".
- At sanitary sewer crossings, verify 18 LF pipe encasement is shown on profile when separation is < 9 ft or specify SDR26 PVC.

Dead End Lines

- Maximum length equals 150 feet (31.48).
- Locate valve at end of main, provide instruction extend one full joint past valve.

Valves

- Valves spacing 1000 feet - residential, 500 feet - non-residential
- Locate 6" valves adjacent to all fire hydrants and fire service lines.
- Place valve after last tap and extend one joint of pipe.
- Provide air release/blow off valves at high points and creek crossings.
- Butterfly valves required on 16" and larger size mains.
- Where required to establish a loop system - verify cut in valves are specified, between taps on existing mains up through 12".
- Verify valve placement, allows block shut down w/ 2 but not more than 3 valves and no more than 1 fire hydrant out of service.

Water Services

- Minimum size for all zoning is ¾" service line, installed from main to property line.
- Maximum service line length from main to meter is 70-feet.
- Provide irrigation service / meter / easement / backflow device to detention ponds.
- Residential plans must show water/sewer connection detail w/ ¾" min. water service, 4" sanitary.
- For residential subdivisions: Indicate no taps on lines in utility easements.
- Residential, verify water service shown at center of each lot 10 ft upstream of sanitary sewer.
- Show existing water meters, if removal spec-plug service at main, return meter to Water Dept.
- Verify meters located out of driveways and sidewalks, in ROW or easement and allows for free impeded access.
- Standard size taps on City side 1-, 2-, 3-inch, etc. no half sizes allowed.
- Non-residential taps, specify domestic or irrigation service, plan must locate and label back flow device on private property (51.61(B)), 51.74 (3).
- Services allowed off of fire hydrant lead only if double valved, not allowed off of fire line.

Fire Hydrants

- Locate and label exact locations of existing and propose hydrants, verify in easement and/or ROW.
- Fire hydrants leads - 50 feet or less = 6" and single valve. Leads > 50ft double valve and 8".
- Max dead end water line = 150 feet, if greater lines must be looped.
- Existing fire hydrants can only be relocated with approval of the Water and Fire Departments.
- Specify: Install two way blue reflector button in center of fire lane or street opposite hydrant.
- Spacing, check with Fire Department for current requirements.
- Check for conflicts w/ sidewalks, driveways, and utilities.
- Verify location is at least 10 feet pass curb returns, fire hydrants are not allowed in radius.
- Verify fire hydrant protection, 2.5 - 8 feet from curb or fire lane, if no curb specify bollard protection.

Fire

- Fire lanes (10% max shading allowed on Site Plan), specify 6-inch minimum thickness, Class "C" concrete, 24-ft wide, turnaround required at dead ends >150 feet.
- Fire line tap 6-inch minimum with valve for commercial and industrial applications.
- Show exact location fire line w/in 5 ft of structure, and backflow device shown on private property.
- Fire Department Connection w/in 50ft of fire hydrant, on private property not w/in utility easement.
- Verify fire lane grades are less than 10%.

Water Profiles (nearest 0.10-foot)

- Indicate:

<input type="checkbox"/> Existing & propose water, sanitary and storm sewer, gas, electric, phone, others	<input type="checkbox"/> Stationing of	<input type="checkbox"/> Fire hydrants
<input type="checkbox"/> Size, slope & line designation	<input type="checkbox"/> Tees, crosses, plugs bores, & sleeves,	<input type="checkbox"/> Right of way
<input type="checkbox"/> Valves, tees & ends, to be tied to	<input type="checkbox"/> Wet tap connections	<input type="checkbox"/> Manholes,
<input type="checkbox"/> Street, creek, railroad xings	<input type="checkbox"/> Bends & reducers	<input type="checkbox"/> Other below ground features w/in ROW
	<input type="checkbox"/> Easements	<input type="checkbox"/> Benchmark

- At creek crossing, specify embedment per City standard construction details.

1.5.8 Sanitary Sewer

- Provide overall plan view of existing / proposed water & sanitary sewer layout w/

<input type="checkbox"/> Line designations & diameters	<input type="checkbox"/> Manholes & cleanouts	<input type="checkbox"/> Other utilities	<input type="checkbox"/> Pavement & curbs
<input type="checkbox"/> Flow directions	<input type="checkbox"/> Right of way & easements	<input type="checkbox"/> Fences, signs	<input type="checkbox"/> Benchmark
<input type="checkbox"/> Trunk line tie ins & service taps	<input type="checkbox"/> Dash in storm sewers alignment	<input type="checkbox"/> Sprinkler systems	<input type="checkbox"/> Property lines
<input type="checkbox"/> Valves, tees, crosses,	<input type="checkbox"/> Creeks & 100yr flood plain	<input type="checkbox"/> Structures, poles	<input type="checkbox"/> Other above ground features w/in ROW
<input type="checkbox"/> Plugs, bends, reducers	<input type="checkbox"/> PC, PT& curve data	<input type="checkbox"/> Trees & signs	<input type="checkbox"/> Retaining walls
<input type="checkbox"/> Meters & fire hydrants		<input type="checkbox"/> Label private lines	
<input type="checkbox"/> Back flow devices		<input type="checkbox"/> North & graphic scale	
<input type="checkbox"/> Stationing & 100ft tick marks			

- Dash in proposed and existing water, storm sewers, and other utility lines crossing over or under sanitary sewer.
- Mains - residential / duplex 6-inch min. (31.49) all others uses - 8" min w/ double cleanout at ROW.

- Indicate on both plan and profile line designations, existing and propose size, stationing, and flow directions.
- Check curve data w/ stationing and alignment shown.
- Verify capacity / adequacy of existing lines and locations w/ record drawings.
- Verify development facilitates future extension complies w/ standard details, traffic control, TCEQ regulations, SH 190 & E. Garland Master Plan and other plans where applicable(31.47,51.32 (7)
- Verify no trees, retaining walls, post, signs, private lines, structures, etc within and/or paralleling utility easement.

Profile

- Profile views should line up directly under the plan view, typical scale (1"=40' H, 1"=4' V).
- Profiles required for lines greater than 4-inch, specify:
Invert elevations (nearest 0.01 ft) at every 100 ft, manholes in/out (0.1 ft min. fall), tie ins, clean-outs, proposed and existing water / storm / utility crossings. Indicate pipe % grade, flow direction, diameter, total footage, ground above pipe, fill area hatching w/ 95 % compaction note.
- Profile private sanitary sewers systems when crossing public water / storm sewer lines.
- Show benchmark on all profile sheets.
- Sanitary sewer slopes per TCEQ regulations
 - 6" - minimum 0.50%, maximum 12.35%,
 - 8" - minimum 0.33%, maximum 8.40%,
 - 10" - minimum 0.25%, maximum 6.23%.
- Minimum grades sufficient to provide gravity flow of sewage at velocity of < 2 fps, maximum 8 fps.
- Indicate/note sanitary sewers SDR-35 PVC pipe<15 ft deep, Depths > 15 ft SDR-26 PVC.
- Aerial crossings use ductile iron, pier and spacing design required, 2 feet above 100 yr WSEL.
- Check service conflicts and need for parallel system when > 12 feet.
- Compare and verify line designations, and slope is > TCEQ minimum % grade requirements.
- Specify 18 LF pipe encasement or Class 150 pipe per TCEQ spec's at water crossing ≤ 9 ft.
- Verify stations / elevations in plan and profile views are the same.
- Compare and verify all station / elevations of water / storm and utility crossing on plan and profile views, compare existing line location with as-builts / record drawing.
- Check manhole top of rim elevation against paving profile, provide 0.10 ft drop across manhole.
- Provide instructions where required, to adjust existing manhole tops to finish grade.
- Check proposed elevation above the line w/ grading / paving plan every 100 ft and at critical points.

Services

- All sewer services > 4-inch shall tie into manhole.
- Trunk depths greater than 12 feet require parallel line.
- Services sized per uniform plumbing code, common services are not allowed.
- Check and verify that service laterals are provided to all platted lots, 4-inch minimum (31.49).
- Check / avoid conflicts w/ walls, storm sewers, inlets, fire hydrants, etc. Extend services past walls.
- Verify service laterals will not conflict w/ storm sewer.
- For shallow lines check finish floors and verify structures can be serviced.

Manholes

- Provide false bottom when connecting to existing manhole, note "to remove prior to acceptance".

- Cleanout required at dead end < 100 feet from manhole, > 100 feet requires manhole.
- Sealed manholes required in creeks, drainage easements, and 100-year flood plains.
- Manholes spacing \leq 500 ft, locate at pipe size and direction changes, junctions.
- Standard manhole = 4' diameter w/ 0.10 ft drop, depths \geq 15' - 5' diameter manholes required.
- Internal drop manhole connection required when distance between connections \geq 4'.

Special Structures

- Provide reference on plan to construct special structures such as, retaining walls, junction boxes and headwalls per City standard construction details or include separate equivalent detail.
- Show proposed grading contours at headwalls and culvert - confirm slopes w/in easement or ROW.
- Provide culvert design using TXDOT procedure; specify inlet or outlet control, calculations, details, boring logs, etc.
- Ensure culvert conveys 100-yr, w/ minimum 1 foot of freeboard from top of curb. Show Q, V, S, length, tail- and head water and flowline elevations.
- Provide gabion specifications when used.

1.5.9 Stormwater Pollution Prevention Plans / Narrative

	Accept	N/A
1. Total area of site----- acres	able	
2. Area to disturbed----- acres	0	0
3. Nature of activity -----	0	0
4. Sequence of major construction-----	0	0
5. Description of potential pollutants-----	0	0
6. Estimated project start date-----	0	0
7. Estimated project completion date-----	0	0
8. Name of receiving waters-----	0	0
9. Soil data-----	0	0
10. Impervious area sheet (commercial only)-----	0	0
11. Structural practices proposed-----	0	0
12. Non-structural practices proposed-----	0	0
13. Stabilization practices proposed -----	0	0
14. Waste management practices proposed-----	0	0
15. Runoff coefficient before and after construction-----	0	0
16. Inspection/maintenance procedures for cntrl measures-----	0	0
17. Acknowledgement that historic places considered-----	0	0
18. Onsite batch plant considered-----	0	0
19. Operator certification-----	0	0
20. Engineers seal-----	0	0
21. Notice of Intent / Site Notice from Operator/s-----	0	0
22. Copy of TPDES permit attached-----	0	0
 <u>Site Plan (Map)</u>		
1. Drainage patterns (pre-construction contours) -----	0	0
2. Location of disturbance -----	0	0
3. Location of structural controls -----	0	0
4. Location of construction entrances-----	0	0
5. Location of onsite & adjacent surface waters -----	0	0
6. Location of stormwater discharges -----	0	0
7. Tree Survey with summary table-----	0	0
8. Approximate slopes after grading -----	0	0
9. Location of on site and adjacent wetlands-----	0	0
10. Location of stabilization practices-----	0	0
11. Location of off site material waste, borrow, fill, or equipment storage-----	0	0
12. Location of sanitary facilities-----	0	0
13. NCTCOG details attached -----	0	0

Stormwater Pollution Prevention Plan Checklist

DEVELOPMENT/ADDRESS: _____

SWPPP Sheets 1-5 are part of the site engineering and public works construction plans. All data fields must be filled out. If not applicable, indicate "N/A". Please do not alter the original contents and format of these SWPPP sheets. The standard SWPPP sheets are available via email by contacting the Engineering Department at 972-205-2170.

SWPPP Narrative sheet 1:

- Indicate areas of responsibilities of operators if a shared SWPPP.
- Provide "intended sequence or sequence of activities that will disturb soils".
- Provide "description of potential pollutants", as described on the TCEQ permit.
- Provide "description of locations where stormwater discharges from the project will drain directly to surface water bodies (Waters of the U.S. or Waters of the State).
- For 10 acres and larger development, provide temporary sediment basin or provide written explanation (on letterhead) of why basin not feasible.

➤ **For SWPPP Narrative Sheet 2:**

- Provide "Sequence and Timing of Indicated Erosion Control Practices and/or Features".
- Provide detailed description of BMP maintenance protocols.
- Provide description of methods to modify pollution controls if existing controls are inadequate.
- Provide Operator's signatures per TCEQ General Permit TXR15000 requirements.

➤ **Sheet 3, Erosion Control Plan**

- Show location of onsite and adjacent surface waters.
- Show location of onsite and adjacent wetlands. Obtain information from National Fish and Wildlife website at <http://www.fws.gov/>
- Locate proposed stabilization practices, (seed, sod, paving...) on erosion control plan.
- Indicate proposed location of sanitary facilities.

➤ **For 5 acres and larger development:**

- Provide an executed copy of Owner/Operator N.O.I. on TCEQ form.
- Provide an executed copy of Contractor/Operator N.O.I. on TCEQ form.

➤ **Other related items**

- Place erosion and sediment control details on Sheet 4.
- Place housekeeping details on Sheet 5.
- For other than single-family residential developments, provide impervious area status sheet with the correct development address.
- For 1 acre and larger development, provide an executed copy of the TCEQ Site Notice, ("Attachment 2" of the TCEQ permit).
- Provide a tree survey with summary table or a letter addressed to Stormwater Manager, on the Engineer's letterhead indicating that no trees are on site or that no trees are cut and removed from this project.

Obtain preliminary SWPPP approval prior to final plan submittal. All questions related to stormwater comments should be address to Wayne Wolverton and Albert Lawrence at 972-205-2170.