City of Tulsa
Infrastructure Development Process
Plans Review Checklist

IDP#_____ **IDP Name** _____

General Items

Item #	Complies Y	N	N/A	
				Are Permits Required for any of the following?
1.				Corps of Engineers (Section 404)
2.				Levee Authority
3.				Railroad Crossing
4.				Oklahoma Department of Transportation
5.				Oklahoma Turnpike Authority
6.				Oklahoma Water Resources Board
7.				ODEQ Permit for Construction - Engineering Report Form for Water Line Construction
8.				ODEQ Permit for Construction - Engineering Report Form for Sanitary Sewer Construction
9.				NPDES (SP3 required for all projects disturbing one (1) acre or more (NOI Form also required)
				General Information Required
10.				Was the site previously Platted?
11.				Is the site required to be platted for this proposed development?
12.				Have all TAC recommendations/requirements been adequately addressed?
13.				Have all Predevelopment meeting recommendations/requirements been adequately addressed?
14.				Are any retaining walls with a height of 4’ or higher from the bottom of the foundation required for the project? Walls should be shown in plan and profile. Walls greater than 4’ will require a separate permit for construction. Separate permit plans must be signed and sealed by structural engineer registered in the State of Oklahoma.
15.				Are there any outstanding variance requests?
				General Plan Requirements
16.				Standard plan sheet to be 22’’X 34” (ANSI D).
17.				Plans are to be readable for full and half size text. (All lettering a minimum of 0.10” in height on full size plans.)
18.				New Construction to be shown in bold font.
19.				Sheets are to be numbered according to IDP numbering system.
20.				Drawings at a Common Engineer’s Scale.
21.				North Arrow (Top of page or to the right) on every plan sheet.
22.				Appropriate current Title Block on each sheet. See IDP Manual.
23.				Call OKIE logo with phone number on every plan sheet.
24.				Two permanent/temporary Benchmarks (description, location) required using State Plane Coordinates NAD83 and USGS elevations using NAVD 88. Benchmarks must be referenced back to ADS datum. Benchmark information must be included on all plan sheets.
25.				Existing and proposed Right of Way to be shown with dimension lines and bearings and distances. Reference book and page or plat number.

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General Items

Item #	Complies Y	N	N/A	
				General Plan Requirements (contd…)
26.				Existing and proposed easements to be included with bearings and distances. Reference book and page or plat number.
27.				Is FEMA A-Zone, or Regulatory Floodplain, on the property? If so, then limits of the Floodplain to be shown on each plan sheet.
28.				Erosion control measures and details (for non-City Standards) to be included on the plans.
29.				This note been added to the plans? "All construction to be in strict accordance with current City of Tulsa Standards and Specifications".
30.				Standard note for traffic control & street closures to be provided as necessary. "Traffic access on all streets shall be maintained at all time. Contractor must maintain proper construction signage and traffic control in accordance with the manual on uniform traffic control devices."
31.				Reference City of Tulsa blasting ordinance if rock excavation is expected.
32.				Restoration notes to be provided.
33.				Restoration plan to be included.
				The following Information to be included on the Cover Sheet
34.				IDP Project Number
35.				Legal Description - Verbatim and on Site Plan
36.				Atlas Page(s) No.
37.				List of Sheets. Sheet numbering to comply with IDP Manual.
38.				IDP Description. Quantities of IDP items to be included per IDP Manual.
39.				Engineers Name, Address, Phone Number & Contact Person
40.				Owner's Name, Address, Phone Number & Contact Person
41.				Engineer Seal, Signature and Date
42.				Engineer's statement should include the following: 1. By my signature on these construction documents, I hereby certify that I am familiar with the adopted ordinances and regulations of the City of Tulsa governing the work in the IDP Description; that these plans have been prepared under my direct supervision; the above and foregoing plans comply with all governing ordinances and the adopted standards of the City of Tulsa to the best of my knowledge and belief. 2. Entire project is (is not) within corporate limits of City of Tulsa 3. This project complies with all Oklahoma Department of Environmental Quality (ODEQ) requirements
43.				List of all City of Tulsa Standards used (include STD No. and Verbatim Title)
44.				List of all ODOT Standards used.
45.				Location Map (show Subdivision within the Section and Major Streets)
46.				Location (address, legal, subdivision)

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General Items

Item #	Complies Y	N	N/A	
				Cover Sheet (contd…)
47.				Legend
48.				Table of Impervious Area (existing, proposed, increase/decrease)
49.				List of all Utility Franchise Contacts and Applicable City Contacts
50.				Site Plan, showing and labeling the following: Adjacent subdivisions all adjacent and onsite streets, all existing and proposed Rights of Way and Easements, and all items being constructed by the IDP Project.
51.				A table listing all Separate Instrument Easements required for the project. Table should include the easement type, the owner of the property where the easement exists, the sheet number where the metes and bounds for the proposed easement are found in the plans and a column for the recording information for the easement.
				Easement by Separate Instrument
52.				Call out separate instrument easements
53.				Show metes and bounds – must match documents submitted for separate instrument easement application.
54.				Complete separate instrument application
55.				Offsite separate instrument must be filed and document number provided on plans prior to plan approval.

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Stormwater Review

Item #	Complies Y	N	N/A	
				Stormwater Runoff System
				HAVE ALL GENERAL AND COVER SHEET ITEMS BEEN ADDRESSED?
56.				Site grading to be checked for the following: - water will not back up into any buildings - emergency overflow path - drainage from street will not flow to site at entrances - Overland drainage easement requirements.
57.				Only City approved pipe materials to be used for all public storm sewer systems.
58.				All drainage facilities/improvements to be designed in accordance with the current adopted Storm Water Management Criteria Manual.
59.				Maximum angle of deflection at storm structures: 15"-30" – 90º 36"-48" – 60º 54" and up – 45º
60.				All public storm sewers are to be backfilled with State ODOT Type A aggregate or flowable fill per COT Standard 751.
61.				Times of Concentration to be determined in accordance with the current adopted Storm Water Management Criteria Manual.
62.				Drainage areas boundaries to be clearly labeled with flow paths for all onsite and offsite areas for both existing and proposed conditions.
63.				Standard drainage summary chart(s) to be used and checked for the following: runoff coefficients in accordance with the current adopted Storm Water Management Criteria Manual; appropriate clogging factors used; flow depth in street to be 0.38 feet or less; and no overland reaches greater than 150 feet.
64.				Public stormwater systems to be placed in ROW or proper easements as required per IDP manual.
65.				Profiles to be shown for all public storm sewers systems and ditches and include: - pipe size, type, slope and length - top of rim/top of grate for all structures - invert elevations for all pipes and structures - Q100, V100, HGL/EGL/WSE100 on all pipes and ditches - Inlet/manhole type and name – callout needs to match plan and detail callouts.
66.				All utility crossings to be shown on the Storm Sewer Profiles.
67.				All storm sewers identified, on the plans and profiles, as public or private. A general note stating "ALL STORM SEWERS ARE PUBLIC UNLESS OTHERWISE NOTED" may be shown on each plan and profile sheet.

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IDP#_____ **IDP Name** _____

Stormwater Review

Item #	Complies Y	N	N/A	
				Stormwater Runoff System (contd…)
68.				Vertical and horizontal separations between storm sewers and water lines to be maintained per ODEQ water requirements. - Outside faces of storm pipes to be at least 6" clear of inside of walls of storm structures. - Outside faces of storm lines to maintain at least 1' separation from outside face of adjacent storm pipes, measured at the inside face of manholes or junction boxes.
69.				Manholes/junction boxes to be located in accordance with the current adopted Stormwater Management Criteria Manual.
70.				Table of State Plane coordinates to be included for all proposed storm structures.
71.				All curb inlets to be placed outside of curb returns.
72.				Inlets to be located near property lines to avoid complication during driveway construction.
73.				Grading plans to include on-site/offsite contours to establish limits of drainage basins.
74.				City of Tulsa Erosion Control details to be referenced. Details for non-City Standard Erosion control measures to be included on the plans.
75.				Details for all non-standard storm structures to be included in plans.
				Detention Facilities Plan
76.				Is storm water detention required? If Yes continue checklist below, if No go to Item # 98.
77.				The Detention facilities to be placed in a Reserve Area and/or Detention Easement.
78.				The detention facility to be designed in accordance with the current adopted Storm Water Management Criteria Manual using HEC-HMS-SCS method.
79.				The appropriate freeboard provided.
80.				The detention "Summary Charts" to be shown on the plans, including: - Stage/discharge - Pre-Development vs. Post-Development runoff at design points
81.				A concrete trickle channel having a minimum slope of 0.5% to be provided in grassed detention facilities.
82.				The bottom of a grass lined pond to have a minimum slope to the trickle channel of 2%.
83.				The side slopes to be no steeper than 4:1 (3:1 with approval)
84.				All-weather access to be provided to the pond/facility (specifically the outlet structure and other critical components) in accordance with the current adopted Storm Water Management Criteria Manual.
85.				The top width of earthen dike(s) to be in accordance with the current adopted Storm Water Management Criteria Manual with an all-weather surface providing access to the outlet structure (along top berm).

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Stormwater Review

Item #	Complies Y	N	N/A	
				Detention Facilities Plan (contd…)
86.				Typical Cross sections (minimum of 2) to be provided with representative dimensions and proposed elevations for flow lines and top of berm, wall, etc.
87.				Permanent Bermuda Solid Slab Sod is required vegetation for the bottom and embankment side slopes of detention pond.
88.				Details of the Outlet Structure and Emergency Overflow Spillway to be included in the plan set by referencing City of Tulsa Standards or providing special details.
89.				Computational details to be included for all non-standard structures.
90.				Outlet structure pipe to have proper erosion control.
91.				Plan view to be provided with representative dimensions, trickle channel locations, side slopes, and structure locations.
92.				Procedures for development of time of concentration, lag time and curve numbers to be per current adopted Storm Water Management Criteria Manual.
93.				Existing (Pre-developed) and proposed (Post-developed) drainage maps to be provided on plans.
94.				Existing (Pre-developed) and proposed (Post-developed) HEC-HMS models to be prepared and provided in Detention/Drainage Report
95.				Perform analysis for 24-hr durations 2-Yr, 5-Yr, 10-Yr, 50-Yr and 100-Yr storm events, utilizing a balanced rainfall to demonstrate detention facility attenuates increased flows to at or below existing flow.
96.				All drainage areas to be accounted for in both existing and proposed drainage areas.
97.				Storm Sewer discharging into detention pond (s) to begin EGL/HGL calculation at 100-yr water surface elevation.
				Floodplain
98.				Is the property in the FEMA floodplain? (a). Is work being proposed in the floodplain? _____ (b). Will proposed grading require a CLOMR? _____ (c). When completed will a LOMR be required? _____
99.				Is the property in the City Regulatory floodplain? (a). Is work being proposed in the floodplain? _____ (b). Will proposed grading require a T-CLOMR? _____ (c). When completed will a T-LOMR be required?
100.				All new or modified floodplain areas (FEMA and/or COT Regulatory) through a development must be placed in a Reserve Area or Overland Flow Easement

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Stormwater Review

Item #	Complies Y	N	N/A	
				FEMA Regulatory Flood Plain Development – (Item# 101 – 103)
				Note: All FEMA Floodplains Subject to COT Floodplain Criteria.
101.				All Backwater Analysis Required to use HEC-RAS
102.				Is the project proposing to modify the floodplain? (If no skip this section) (a). Floodplain worksheet showing all cross section locations to be prepared. _____ (b). Existing/Duplicate Effective, Modified/Corrected Effective and Proposed Effective Models to be prepared. _____ (d). FEMA discharges to be used in models. _____ (e). Required Hydraulic Analysis Report to be prepared. _____ (f) . Applicable Existing/Duplicate Effective, Modified/Corrected Effective and Proposed Effective mapping to be prepared. _____
103.				Is the project proposing to modify the floodway (FW)? (If no skip this section) (a). Has floodplain worksheet showing all cross section locations been prepared? _____ (b). Have Existing/Duplicate Effective FW, Modified/Corrected Effective FW and Proposed Effective FW Models been prepared? _____ (d). Have FEMA discharges been used in models? _____ (e). Has required Hydraulic Analysis Report been prepared? _____ (f) . Have applicable existing and proposed mapping been prepared?____
				COT Regulatory Floodplain Development – (Item# 104 - 106)
104.				All Back Water Analysis Required to use HEC-RAS
105.				Is the project proposing to modify the floodplain? (If no skip this section) (a). Floodplain map worksheet showing all cross section locations to be prepared. _____ (b). Existing Effective/Duplicate, Modified/Corrected Effective and Proposed Effective Models to be prepared. _____ (c). COT discharges to be used in models. ____ (If No see Item#106 below) (d). Compensatory floodplain calculations to be prepared. _____ (e). Required Hydraulic Analysis Report to be prepared. _____

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Stormwater Review

Item #	Complies Y	N	N/A	
106.				Have new proposed discharges been prepared for floodplain analysis?(If no skip this section) The SCS Method Will be used for hydrologic calculations all Regulatory Floodplain Analysis (HEC-HMS required for Analysis) (a). Drainage boundary map to be prepared. _____ (b). Flow paths to be delineated on drainage maps. _____ (d). Snyder (appropriate?)Coefficients used for analysis. _____ (e). Routing of hydrographs have to be used from node to node._____ (f). 24-hour duration storm has to be used. _____ (g). Balanced rainfall to be used in analysis. _____ (h). Hydrologic Report, presenting all data to be prepared. _____

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Waterline Review

Item #	Complies Y	N	N/A	Water Main Extension
				HAVE ALL GENERAL AND COVER SHEET ITEMS BEEN ADDRESSED?
107.				Provide a table / list of total quantities to be installed by contractor
108.				Note to be included: "Testing; chlorinating and flushing notes performed in accordance with General Specifications, Section 109.3"
109.				Note to be included: "Testing and Chlorination to be performed by City of Tulsa"
110.				Note to be included: "No Water Service Connections will be allowed under IDP scope of work."
111.				Note to be included: "WATER OPERATIONS SHALL OPERATE ALL VALVES ON TRANSMISSION MAINS (16" AND LARGER). CONTRACTOR SHALL OPERATE ALL VALVES ON DISTRIBUTION MAINS (SMALLER THAN 16") WITH THE COORDINATION OF FIELD ENGINEERING AND WATER OPERATIONS AND IN THE PRESENCE OF A FIELD ENGINEERING INSPECTOR. A. ATTEMPTS WILL BE MADE WITH ASSISTANCE FROM THE CONTRACTOR TO NOTIFY ALL AFFECTED CUSTOMERS 48-HOURS IN ADVANCE, PARTICULARLY IF COMMERCIAL OR INDUSTRIAL CUSTOMERS ARE INVOLVED. PRIOR TO SHUTDOWN, FIELD ENGINEERING WILL NOTIFY WATER OPERATIONS, AT 918-596-9488, GIVING AN ESTIMATED DOWNTIME. WATER OPERATIONS WILL NOTIFY THE FIRE DEPARTMENT OF ALL FIRE HYDRANTS OUT OF SERVICE AND WHEN THEY ARE BACK IN SERVICE, BY STREET ADDRESS OR INTERSECTION. B. WHERE COMMERCIAL, INDUSTRIAL, OR CRITICAL CUSTOMERS ARE AFFECTED, AND FOR ALL LINES 16-INCH AND LARGER IN SIZE, FIELD ENGINEERING WILL REQUEST WATER OPERATIONS TO SHUT DOWN THE MAIN. THERE WILL BE A MINIMUM OF 48-HOUR NOTICE TO WATER OPERATIONS.

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Waterline Review

Item #	Complies Y	N	N/A	
				Design Criteria
112.				The most current Design Standards Manual for Water Distribution Systems to be used.
113.				Water and Sanitary Sewer separation (per ODEQ and COT Req.) Title 252.626 Public Water Supply Construction Standards - 2' Vertical separation outside to outside of pipes - 10' horizontal separation outside to outside of pipes - Pipe joints must be equidistant from water pipe crossing. - Unable to meet separation, met special condition (pressure pipe) requirement ODEQ 252.626.19-2.H.3
114.				Water and storm sewer separation (per ODEQ and COT Req.) - 2' vertical separation outside to outside of pipes - 5' horizontal separation outside to outside of pipes. - Unable to meet separation, met special condition (pressure pipe) requirement ODEQ 252.626.19-2.H.3
115.				Water separation from other buried utilities (per ODEQ and COT Req.) (Raw WL, petroleum lines, natural gas lines and other buried utility lines); - 2' vertical separation outside to outside of pipes. - 5' horizontal separation outside to outside of pipes - Unable to meet separation, met special condition (pressure pipe) requirement ODEQ 252.626.19-2.H.3
				Construction Plan and Profile Sheets
116.				The design engineer shall provide current flow data (taken at a fire hydrant) in a table on the plans. (static pressure; residual pressure and fire hydrant gallons per minute of existing hydrants near the development site.)
117.				Show existing utilities and features in the profile sheet with stations and flow line or top of pipe elevations.
118.				Waterline standard locations is 8 feet from property line (Right of Way): If 8 feet cannot be met, provide for the following: - 5 feet is minimum clearance from water line to property line/right of way; - 3 feet minimum clearance from waterline to back of curb.
119.				Entire trench under all paved driving surfaces to be backfilled with aggregate base and compacted to 95% modified proctor density.
120.				Existing Utilities and features to be shown on plan.
121.				Waterlines to be located on the east and south side of the street.

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Waterline Review

Item #	Complies Y	N	N/A	
				Construction Plan and Profile Sheets (contd…)
122.				Pipe Sizing for Distribution Mains: The prescribed minimum requirement: 12-inch mains in major streets 8-inch mains in collector streets 6-inch mains in local streets It is developer's responsibility to determine actual flow requirements.
123.				Pipe type, size and length to be shown. Distribution mains 6-inch through 12-inches in diameter may be ductile iron pipe (DIP), polyvinyl chloride (PVC) or high-density polyethylene (HDPE) in accordance with COT Standard Specifications and Standard Details.
124.				Minimum pipe size is 6".
125.				Vertical scale 1" = 10' / 1"= 5'
126.				Horizontal scale shall be from 1"=20' to 1"=50', (600' maximum distance per sheet).
127.				Fire hydrant shall be spaced to meet ODEQ and International Fire Code requirements: ODEQ – 500'/400' -Single Family Residential -Max Spacing 500 (feet). -Townhouses and Apartments-Max. Spacing (300). -Commercial / Industrial including shopping centers) Max. Spacing 300 (feet)
128.				First valve in all directions on existing water lines shall be located and noted on plans.
129.				Valves shall be added as necessary to allow for isolating portions of waterlines. Recommend 400' for flexibility. ODEQ requirements must be met.
130.				Valve, fire hydrant, fitting, air release valve or other appurtenance to be shown with station number and size.
131.				Plan to include sufficient survey detail to construct proposed water line, including existing utilities, walls, etc. for connections on both sides of the street.

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Waterline Review

Item #	Complies Y	N	N/A	
				Construction Plan and Profile Sheets (contd…)
132.				All fittings shown as restrained with limits of stationing.
133.				Minimum cover from top of pipe over the waterline is 36" with the following exceptions: - 4' is required below pavement, ditches and creek crossing. - 4' is required in arterial street ROW - 4' for distribution mains 12 to 16-inches in diameter.
134.				Maximum waterline depth to be 8'-0" unless approved by COT Water Design Section.
135.				Ductile Iron Pipe to be used for the following: - Channel or creek crossing (restrained joints required) (HDPE with approval) - All paved areas - Along arterial streets Right of Way even if unpaved
136.				Under Water Crossings (channel/creek) ODEQ regulations Section 252:626-19-2(9)(B) to be used: - Provide valves at both ends of water crossings so that the section can be isolated for testing or repair. The valves must be easily accessible and not subject to flooding. The valve closest to the supply source must be in a manhole, and - Make permanent taps on each side of the valve within the manhole to allow insertion of a small meter for testing to determine leakage and for sampling purposes - Provide restrained joints and fittings a minimum of 20 feet into each bank of crossing. - Bank stabilization (Riprap per COT Standard Spec. 214) - Design the pipe for river crossings and have flexible watertight joints.
137.				Taps on waterlines larger than 12" must have approval.
138.				Independent valves required on fire hydrant lines 12" or larger.
139.				Meter vault locations with reference to appropriate COT standard detail sheet - New/replacement residential meters located within Right-of-Way and 2' off property line - Separate meter box for residential service pressure reducing valve (PRV) shall be located on private property.
140.				All dead ends require approval and a fire hydrant or blow off assembly.
141.				Pipe must be level where valves and fire hydrant are to be installed.

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Waterline Review

Item #	Complies Y	N	N/A	
				Construction Plan and Profile Sheets (contd…)
142.				Standard Details to be used. The following circumstances require special details: - Air/vacuum/release valves for water lines 16" or larger - Air/vacuum/release valves for elevation changes of 15' or more - Specials (Booster Pump Station, Water Towers, River Crossings, Storage Tanks) - All structures not covered by Standard Details
143.				Separate Instrument Easements - Public Water Main Line - Public Domestic Meter & Vault - Public Irrigation Meter & Can - Public Fire Suppression Meter Can/Vault - Public Fire Hydrant Main Diameter 12" and Less Min. Easement Width 20 (feet)
144.				Minimum Easement / Clearance for Appurtenances Appurtenances — Clearance Air Relief — 3 feet on all sides Fire Hydrant — 3 feet clear from outside of hydrant Meters 2 inches and smaller — 3 feet on all sides Meters 3 inches and larger — 3 feet on all sides of meter vault Miscellaneous — 6 feet on all sides
				Fire Line Systems (Item # 145 and 146)
145.				Include this note for all Private Fire Lines: A fire line is a private pipe system connected directly to the City water system. All maintenance of the private fire line is the responsibility of the property owner and begins from the building structure up to the public right-of-way, utility easement or water easement. A fire line, by the nature of its function and use, is susceptible to backflow. Consequently, it is subject to the requirements for backflow prevention. A fire line shall be utilized for fire protection only and shall serve only a single property. Typically, a fire line is a connection for on-site private hydrants or an interior fire sprinkler system for a building. Permitting review and approval interest is limited only to that portion to be constructed in the ROW or water easement.

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Waterline Review

Item #	Complies Y	N	N/A	
146.				**Acceptable Pipe Materials** All fire line installations shall conform to the applicable COT Standard Specifications and Standard Details. A fire line sized 4-inch and larger shall be constructed of ductile iron pipe (DIP) from the public main to detector check/control valve vault. All fire line inside the vault needs to be DIP.
147.				Properly sized conduit with 3/8" steel wall thickness installed level

Waterline Conduit Sizing (inches)								
Carrier Pipe Size	6	8	12	16	24	30	36	42
Conduit Size	18	20	24	30	42	48	54	60

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Sanitary Sewer Review

Item #	Complies Y	N	N/A	
				Sanitary Sewer Extension
				HAVE ALL GENERAL AND COVER SHEET ITEMS BEEN ADDRESSED?
				Construction Notes/Schedule of Quantities/Miscellaneous
148.				Note to be included: "Contractor will be required to vacuum test all manholes according to current City of Tulsa Standards and Specifications. Existing manholes shall be vacuum tested prior to any modifications and after work is complete."
149.				Note to be included: "Contractor shall submit professional engineered trench excavation plan for all excavations in excess of 20 feet."
150.				Note to be included: "If any active existing service lines are cut off by removal of sanitary sewer line and manhole, then they must be reconnected to the main for service at the developer's expense."
151.				Note to be included: "Sewers and manholes to be abandoned shall be securely blocked at any points of intake or discharge with a bulkhead or preformed plug and shall be completely filled with clean sand, cellular concrete or flowable fill."
152.				Add Note: Frames and covers from any structures scheduled for abandonment shall be returned to the City Sewer and Operations Maintenance at 9319 E. 42nd Street North between 7:30 am and 3:00 pm Monday thru Friday. At a minimum all structures shall be completely removed to a point three (3) feet below the final grade, or the depth noted on the drawings. Sand or flowable fill shall be used to fill the structure.
153.				When tying to existing manhole add note: "The developer shall make any needed modifications to existing manhole in order to comply with current City of Tulsa Standards or maintenance requirements. The developer shall be responsible for cost associated with internal inspection, rehab plan preparation and construction."
154.				When Water and Sewer separation of 10' cannot be maintained, add note "Sanitary sewer must be installed and Tested for Pressure and Leakage in accordance with COT Standard specification Part 203 and ODEQ Standard 252:626-19-2(e)"
155.				Schedule of Quantities to be provided. Current COT Standard Specifications to be referenced for the quantities.
156.				Oklahoma Department of Environmental Quality Engineer's report to be provided for all new or rerouted public sewer main construction.
157.				Pothole all high-pressure gas pipelines at all crossings. Coordinate with the Gas Line Owner.
158.				Plan note: Contractor shall pothole all utility crossings. Contractor is responsible for coordinating with utility owners.
159.				Check all utility crossings to avoid conflicts during construction.

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Sanitary Sewer Review

Item #	Complies Y	N	N/A	
				Construction Notes/Schedule of Quantities/Misc. (contd…)
160.				Manhole numbering: Existing manhole numbers from Atlas Page must be included. Existing MHs connections to use Capital Letters. Proposed MHs to begin with #1 at the lowest end.
161.				Table of State Plane Coordinates for both the existing and proposed manhole locations (MH #, X, Y, Z) to be included.
162.				Manholes must be drawn to scale on plan.
163.				Manhole spacing to be no greater than 300 feet in residential areas, or 400 feet in open areas. Longer spacing may be allowed on sewers 18" I.D. and greater per ODEQ specifications.
164.				Manholes with less than 4.0' depth shall require a special structure (5' I.D. Flat Top MH).
165.				For MHs located in FEMA and/or City of Tulsa regulatory100-year floodplain, provide standard 5' diameter manhole elevated 1' foot above grade and add note: The manhole lid should be 3200 Series Composite Utility Access Cover with Quarter Turn Paddle locks manufactured by GMI composites.
166.				Internal diameter of proposed manholes to be appropriate for the pipe size (8"-12" pipe: 4ft ID; 15"- 21" pipe: 5ft ID; 22" - 36" pipe: 6ft ID).
167.				Manholes, associated with mains 15" ID and larger, to be designed with interior epoxy coating.
168.				For drop manholes, drop to be placed outside the manhole.
169.				Heavy wall SDR26 PVC is the minimum gravity sewer pipe requirement and the engineering consultant shall submit design deflection calculations for earth (dead) loading and live loading (H-20 traffic loads for example) for all depths greater than 16 feet.
170.				Sewers to project a minimum of 15.0 feet into the property to be served and must terminate in a manhole. Lamp-holes are not allowed.
171.				Safety considerations at schools, playgrounds, etc. shall be included.
				Plan and Profile sheets
172.				Profile to be shown with rising grade from left to right.
173.				Pipe length, type, I.D. and slope to be identified on profile.
174.				Service tees to be shown in the profile with station measured from downstream manhole, size and direction facing.
175.				Contour lines (minimum2-foot contours) to be shown on plan view (existing [dashed] and proposed [solid]).
176.				Flow Direction Arrows to be shown in plan for all sewer lines.
177.				Limits of pavement removal and replacement to be shown on plan view.
178.				Special backfill requirements to be shown in profile.
179.				Existing utilities and features to be shown on both the Plan & Profile. Stationing of features must be included in the profile view.

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Sanitary Sewer Review

Item #	Complies Y	N	N/A	
				Plan and Profile sheets (contd…)
180.				Drainage Basin Map, clearly defining all areas tributary to the subject property, and the proposed sewer main to be included.
181.				Does the Ordinance Flow Equation, **based on Title 11C Chapter 6, Section 600(G),** ($Q_m=A^{0.8169}$ x 0.01467) show sufficient capacity to serve the entire upstream drainage basin? Include calculations and show entire drainage basin on the plan.
182.				If described in the Waste Water Compendium (Comp Study), (latest addition) is capacity provided to serve other basins? Are stub-outs provided per the study?
183.				Type A aggregate backfill compacted to 95% Standard Proctor Density to be shown in profile and provided for the entire trench under the following: - paved driving surfaces (streets, parking lots, driveways, etc.) - full ROW width of arterial streets - Commercial and residential driveways
184.				For channel or creek crossings: - Rip rap the channel over the cut - If less than four (4) feet of cover, then steel conduit to be placed 10' beyond the upper toe of each bank. See conduit chart below for conduit size.
185.				For rip rap add note: Rip rap design and installation shall comply with the more stringent of the following: 1. ODOT Standard Specifications adopted by the City of Tulsa 2. Current City of Tulsa Stormwater Management Criteria Manual
186.				Aerial Crossings are discouraged and require approval by the Engineering Director. If an aerial crossing is unavoidable, the following is required: - Design calculations, both static and dynamic structural design, (including impact stability during flooding) prepared by a PE experienced in sewer/structural design - Restrained joint non-metallic sewer pipe (bell harness megalugs on SDR26 PVC or Fused DR17 HDPE) - Geotech report showing the strata and depth the deep foundations are penetrating or bearing on. - Type of deep foundations in center and type of deep or shallow footing into banks (H piles, concrete piers, drilled shafts, spread footings, etc.) - Maximum spacing of foundations - Pile cap design showing strap and anchor bolt material and sizes - Must conform to ODEQ regulation 252:656-5-4 (d)

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Sanitary Sewer Review

Item #	Complies Y	N	N/A	
				Plan and Profile sheets (contd…)
187.				Conduit to be provided from ROW to ROW of arterial streets. See chart below for size.
188.				Water and sanitary sewer separation (outside to outside of pipes) to be minimum two (2) feet vertical & 10' horizontal per ODEQ regulations. When it is impossible to obtain above clearances the sanitary sewer shall be designed and constructed equal to water pipe. Include plan note: "Sanitary sewer shall be pressure tested it to ensure water tightness of joints adjacent to the water line after backfilling."
189.				Service connections to be at less than 16' depth.
190.				Depth of the sewer main must be sufficient to serve all intended properties. Finished Floor elevations to be provided.
191.				Service connections can only be provided on mains 12" ID and smaller.15" ID allowed only with Underground Collections approval.
192.				Add note: Service Tees shall be constructed as part of IDP. Service connections to buildings shall be done separately as a sewer tap permit.
193.				Locations where backflow prevention must be installed (if building site is below the upstream/downstream manhole rim+ 1') to be provided in a backflow preventer table.
194.				Minimum distance from outer diameter of manhole to any permanent structure to be ten (10') feet.
195.				Offset dimensions of sewer line from property line to be shown. Sewer line to be located: - 12.5' from property line within a 17.5' perimeter easement. - seven (7) feet south or west of the property line within back to back 11foot easements - for side lot easements, pipe to be centered within 15' easement.
196.				Design must provide sufficient pipeline slope considering minimum velocity of 2.0 FPS for pipe smaller than 15"; minimum 3.5 FPS for pipes 15" or larger -. (Max. slope 8%) See chart below.
197.				Restoration details of retaining walls, improved channels, and other special structures to be provided.
198.				Contact Sewer Operations and Maintenance for condition report where connections are being proposed to existing public manholes and public mains.
199.				Redevelopment involving the demolition of existing residential or commercial structures shall include a complete rehabilitation of all existing sewer facilities servicing the redevelopment. Add note on plan: The developer shall be responsible for the cost associated with internal inspection, rehab plan preparation, and construction.

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Sanitary Sewer Review

Item #	Complies Y	N	N/A	
				Plan and Profile sheets (contd…)
200.				If applicable, include proper reference to Rehabilitation Specifications (Chapter 400)
201.				For all rehabilitation methods that reduce cross sectional area, flow capacity calculations to be included to confirm sufficient capacity exists.
202.				Private sanitary sewer service lines, 8 inch I.D and larger, shall be required to be designed according to City of Tulsa, Public Mainline Standards and shall be reviewed by Development Services as an IDP project. The service line must be clearly labeled "Private Service Line" on the plans.
				Detail Sheet(s)
203.				Existing and proposed MHs to be shown to scale, including manhole diameter, pipe O.D, minimum radius of invert (per Standard 366), location of manhole steps, and deflection angles.
204.				Minimum of 1' clear space to be maintained outside to outside of adjacent pipes in a manhole.

Sanitary Sewer pipe size versus minimum slope requirements									
Pipe Size (inches)	8	10	12	14	15	16	18	21	24
Min. %Slope*	0.40	0.29	0.22	0.17	.44	.41	.35	.28	.235

*8"-14" pipes are designed to velocity of 2 fps. 15" and up are designed to 3.5 fps

Conduit Sizing (inches) Wall Thickness minimum 3/8"														
Carrier Pipe Size	6	8	10	12	14	15	16	18	20	24	30	36	42	48
Conduit Size	20	20	24	24	30	30	30	36	36	42	48	54	62	68

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Transportation Review

Item #	Complies Y	N	N/A	
				Transportation
				HAVE ALL GENERAL AND COVER SHEET ITEMS BEEN ADDRESSED?
				General Information
205.				New driveway and curb cut locations are required to go through the Change of Access Process.
206.				Private improvements in or over the ROW require a License Agreement with the City.
207.				Are sidewalks required for this project? (via plat, zoning code, ordinance…)
208.				Modification of a public roadway median must go through the Change of Access Process.
				Paving Plan
209.				Street layout, locations, and geometrics, including collector streets, must conform to Major Street and Highway Plan, existing or proposed plat, PUD, etc.
210.				Street names to be provided on each street segment on plan sheets.
211.				Ave., Pl., St., and Ct., often get confused. Verify Street names and provide key map.
212.				Provide note on plan "ALL STREETS ARE PUBLIC UNLESS OTHERWISE NOTED". Private Streets to be labeled "Private".
213.				All "Limits of No Access" to be shown on the plan.
214.				Existing and Proposed Right of Way lines to be shown with dimension lines, bearings and distances. Reference Plat or Book and Page number.
215.				Existing median locations and openings on adjacent streets to be shown.
216.				Paving width in proposed street to be called out from gutter line to gutter line.
217.				Asphalt street pavement sections to conform to Standard No. 726 Type 4. Alternative asphalt pavement sections can be considered and require a Geotechnical Report for review.
218.				Type of pavement on existing streets to be called out on plans. (AC, APC, PCC)
219.				Existing and proposed curb and gutter, driveways, sidewalks, and ramps to be clearly identified and dimensioned and referenced to appropriate City of Tulsa Standard detail.
220.				Transitions from curbed to uncurbed sections to be properly detailed, including section showing compacted subgrade and base material extending 2 ft. beyond edge of uncurbed pavement.
221.				Radii at returns to conform to Subdivision Regulations. (25' for residential streets, 30' at intersections with arterials, 40' for industrial districts)
222.				Cul de sac radius to conform to subdivision regulations.
223.				All curb geometry to be provided .

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Transportation Review

Item #	Complies Y	N	N/A	
				Paving Plan (contd…)
224.				Sidewalks and ramps to be shown and labeled as to whether their construction is included in the IDP contract or will be by individual lot builders.
225.				Sidewalk to be placed minimum 2' from back of curb or 18" from property line.
226.				If any part of public sidewalk is on private property it must be placed in a sidewalk easement.
227.				Sidewalks, curb cuts and ramps to be compliant with Public Rights of Way Accessibility Guidelines (PROWAG) and Americans with Disabilities Act Accessibility Guidelines (ADAAG)
228.				If there is an obstruction in the sidewalk, minimum of four feet to be available on at least one side.
229.				Call out type of accessible ramp for each ramp. Landing area and ramp dimensions, spot grades, slopes and orientation to be provided. Tactile dome location and orientation shall be shown on the plans and per PROWAG and ADAAG.
230.				Type B and Type D accessible ramps shall not be used without approval.
231.				Concrete bus pads to be located behind curb and connected to sidewalk at Bus Stop locations. If there is only a sign or bench at the location concrete pad to be 10'X10' minimum. Facility to be compliant with PROWAG.
232.				Ties of new to existing pavement to be clearly explained in a construction detail.(At minimum, include note: "Full Depth Saw Cut," and "Match Existing")
233.				All storm water curb inlets to be shown on paving plans. Aprons around curb inlets shall be per City Standard 764.
234.				Driveways shall meet City Standards (commercial driveways width to be between 24'– 36'with radius of returns minimum 15'). Off-tracking should be considered when determining driveway radii.
235.				Pavement type and thickness for driveways to conform to COT Driveway Standards.
236.				On projects with public asphalt paving following note to be included: Failure to reach density of 92% to 97% per lot will result in a rejection of work.
237.				Driveway spacing and geometry to conform to Access Management Standard Detail. Changes in access shall be approved by Traffic Engineering. Driveway and intersection spacing in relation to adjacent driveways and intersections not covered by the Access Management Standard Detail shall be approved by Traffic Engineering.
238.				Gated entry at a private street or parking lot to have adequate queuing storage for two vehicles (50') waiting for access.
239.				Turn around to be provided prior to gates on private streets.

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Item #	Complies Y	N	N/A	
				Paving Plan (contd…)
240.				If existing public pavement is concrete or asphalt overlay over concrete proposed driveway to be shown as concrete.
241.				Sidewalk slope including across driveways to be 1.7%.
242.				Maximum grade of driveway entrance in Right of Way to be 8%.
				Street Profiles
243.				Design speed to be used: 25 mph for residential and collector streets.
244.				Stationing to be clearly shown on paving plan sheets.
245.				All match lines shall have stations shown.
246.				Profiles to be shown directly below plan view.
247.				Horizontal scale 1'=20' (no smaller); Vertical scale 1"=5' (no smaller).
248.				Each profile to be captioned with the correct street name.
249.				All street intersections to be shown with stationing equations and proper street name labels.
250.				Profiles to extend at least 100 ft. beyond ends of paving construction to show tie-in to existing or future pavement or ground topography.
251.				Proposed top of pavement profile at centerline to be clearly labeled on each profile. Gutter flowlines that deviate from the typical cross slope to be shown and labeled.
252.				Elevations to be shown at all 50 ft. stationing increments and at called out features.
253.				Vertical curves to provide elevations at PC, PI, PT, high and low point.
254.				All grades must conform to the minimum 0.75% and maximum 8%.
255.				Vertical curves to be sufficiently distanced (min. 50 ft.) from an arterial street curb line.
256.				Vertical curves to be symmetrical, no asymmetrical curves to be used.
257.				4% maximum grade of intersecting residential streets to be maintained.
258.				Requirements for maximum grade and distance of residential street from arterial street to be maintained (max. 2% for a min. 100 ft. from arterial curb line).
259.				Vertical curve data to be provided to show conformance with design standards.
260.				All vertical curves to conform to City of Tulsa requirements for design standards according to the current edition of the AASHTO Guide (minimum k-value, design speed 25 mph) for Design of Pavement Structures.
261.				All utilities to be shown in plan and profile with cautionary notes included as applicable.
				Intersection Details
262.				Intersection details to be provided for all intersections, transitions to existing and other area that do not conform to typical horizontal or vertical street layout. Intersection details shall extend 150' beyond center

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Transportation Review

Item #	Complies Y	N	N/A	
				Intersection Details (contd…)
263.				All intersection details to be captioned with their correct street names.
264.				Reference stationing to be provided in all details for locating curb returns, street centerlines, medians, islands, and other constructed features.
265.				Top of pavement (TP) spot elevations to be provided at center lines, curb and gutter returns, access ramps and inlets to verify positive drainage in all directions**.**
266.				Positive drainage to be provided, including the minimum 0.75% along the curb line of the full arc length of each curb return and "eyebrow" intersection.
267.				At intersections, the design philosophy shall be "table top" design. The crown from side streets into arterials shall transition to meet through gutter line. Smooth transitions with vertical curves. No grade breaks.
268.				Arrows to be provided showing direction of drainage flow.
269.				Storm water curb inlets must be shown on the intersection details.
270.				Special paving features and transitions to be properly labeled and referenced to a corresponding construction detail.
				Traffic Signals, Pavement Markings, Traffic Signs, Street Lighting
271.				Are there any pedestrian and/or vehicular signals and/or traffic signal equipment being added or affected by this project? If no go to #277
272.				If the project is located within 500 feet of a traffic signal, or within 200 feet of any other active traffic control or warning device that is supplied with electrical service or solar power, the equipment shall be shown on the plans. Add notes that any traffic equipment, (loops, conduits, wires, controller cabinet, traffic signals, school zone flashers, RRFB's etc.) shall be replaced with new equipment if damaged or being relocated.
273.				If a railroad is located with 200ft of the project, extra care shall be taken not to damage any existing railroad equipment, railroad pre-emption, or quiet zone equipment. If any is damaged or needs to be relocated, it shall be replaced with new equipment that meets the requirements of the railroad and the City of Tulsa. Please be aware that railroad equipment, railroad pre-emption, and railroad quiet zones, can be very expensive.
274.				Include traffic signal sheets (signal plan, phasing and sequencing, and wiring diagram)
275.				Cover sheet shall list the correct COT standards and specifications for traffic signals.
276.				Include traffic signal notes on plans.
277.				Are there any pavement markings being added, removed, or affected by this project? If no go to #283
278.				Pavement markings and signs shall be shown on the same sheets.

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Transportation Review

Item #	Complies Y	N	N/A	Traffic (contd…)
279.				Include the colors, line widths, and dimensions on the plans
280.				Include pavement marking notes on the plans, (pavement markings shall be extruded thermoplastic).
281.				Pavement markings to be shown where necessary (e.g., gore areas, at traffic circles, major transitions, turn lanes), with material and application specifications.
282.				Consider if signage and/or pavement markings specific to school will be required.
283.				Are there any signs being removed, added or affected by this project? If no go to #290
284.				Pavement markings and signs shall be shown on the same sheets.
285.				COT standards and specifications shall be listed on cover sheet for traffic signs.
286.				Include sign notes on plans.
287.				Include a sign summary in the plans
288.				Include street marker signs for new streets in the sign summary.
289.				Private street signs should be replaced with black street signs and not red per MUTCD.
290.				Are any street lights or highway lights being added, removed or affected by this project? If no go to #294
291.				Include COT standards and specifications for lighting on the cover sheet.
292.				Include plan notes for street lighting in plans.
293.				Existing lights that are taken down for the project to be replaced pole for pole.
294.				Relocated or new driveways need to be approved by the city traffic engineer.