



## Civil Engineering Plans Checklist

The following items must be submitted for the application to be considered complete.

### Required for All Projects:

- 1.1 Project Narrative: Written proposal for the project including all proposed and existing utilities
- 1.2 Provide a copy of the City of Denton's Owner Authorization Form, available online at [www.cityofdenton.com/landdevelopment](http://www.cityofdenton.com/landdevelopment)
- 1.3 All plan sheets shall be 24" x 36" with a plan view scale not smaller than 1" = 100' with exception to the drainage area map which may be at a smaller scale.
- 1.4 All plan sheets shall be sealed by the engineer of record including registration number
- 1.5 All documents are required to be PDF files; each sheet will be a single item and uploaded into ProjectDox.
- 1.6 Construction plans sets greater than one (1) sheet shall contain a cover sheet showing the name of the project, the engineer of record including address and phone number, the name of the developer or owner including address and phone number.
- 1.7 Provide Street Tree Plan

### Required for Transportation Related Improvements:

- 2.1 Label the area of the lot in square feet and acres including width and depth; subdivision name, block, and lot; deed record
- 2.2 Plan and profile of all streets at 1" = 40 or larger horizontal and 1" = 4' vertical or larger scale. Each profile view shall line up directly under the corresponding plan view
- 2.3 Street curb return elevations shall be shown
- 2.4 Display and dimension elevation spacing on all profile views every 100 feet, every 25 feet along the vertical curve, changes in centerline slope, and the back of the curb on both sides of the street.
- 2.5 Display and dimension percent grades on all profile views

- 2.6 Label edge of pavement
- 2.7 Display and dimension connections to existing street network, including: barricade removal, pavement patching
- 2.8 Display and dimension horizontal and vertical curve data
- 2.9 Display and dimension all sidewalk ramps, flume entrances, and driveway locations that will be constructed with public street improvements
- 2.10 Display and dimension all existing and proposed public sidewalks and bicycle path
- 2.11 Display and dimension all barrier free ramps, surface color, and texture treatment
- 2.12 Include all details for sidewalks, bike paths, ramps and pavement cross-sections
- 2.13 Display and dimension all existing and proposed guardrails and barricades
- 2.14 Include pavement marking and signage plans
- 2.15 Include traffic control plans that are designed in accordance with, at a minimum, the Texas Manual of Uniform Traffic Control Devices
- 2.16 Display and dimension street centerline at proposed street curvature points, beginning, and end sections on each sheet

### **Required for Utility Related Improvements:**

- 3.1 Display and dimension casing and conduit for future utility crossings.
- 3.2 Display and dimension all existing utility and drainage features on plans views. Adjacent utilities and drainage crossings shall be shown for reference in the profile view
- 3.3 Display and dimension all manholes, junction boxes, valve boxes, inlets, and other surface features in plan view
- 3.4 Display and dimension all environmentally sensitive areas (ESA). If encroachment is proposed for the purposed for constructing roadways identified in the City's Mobility Plan a separate plan shall be provided to restore the ESA and minimize erosion and promote the recovery of the ESA

### **Required for Sanitary Sewer:**

- 4.1 Include an overall plan view of the sanitary sewer system layout for the entire development
- 4.2 Display and dimension sanitary sewers in all plan and profile views including stationing (1" = 40' or larger horizontal and 1" = 4' or larger vertical scales)
- 4.3 Specify size and type of pipe material in profile views
- 4.4 Display and dimension all flow line invert elevations in the profile view every 100

feet including: all manhole entrances, exits, and connections to existing systems

- 4.5 Display all proposed ground elevations over sanitary sewer
- 4.5 Display and dimension the stationing of all proposed manholes, clean outs and service lines
- 4.6 Display and dimension all existing and proposed utilities and storm drains that will cross the sanitary sewer
- 4.7 Display and dimension the location of lot lines, easement lines, Rights of Way (ROW) limits, proposed and existing water main, storm sewers, and other utility lines in the plan view
- 4.8 Display and dimension the location of any environmentally sensitive areas (ESAs), proposed encroachments, method of pipe installation (boring or open trench). If boring is proposed, provide profile views indicating enter and exit points, and distance between bottom of channel and upper limit of pipe casing

### **Required for Water Mains:**

- 5.1 Include an overall plan view of the water system layout for the entire development.
- 5.2 Display and dimension water mains in all plan and profile views including stationing
- 5.3 Display and dimension the location of lot lines, easement lines, Rights of Way (ROW) limits, proposed and existing sanitary sewer, storm sewers, and other utility lines in the plan view
- 5.4 Label location stationing of all valves, bends, crosses, tees, fire hydrants, reducers, and other fittings and appurtenances in the plan and profile view
- 5.5 Display and dimension stationing of all proposed water mains 12 inches in diameter or larger in the plan profile view (1" = 40' or larger horizontal and 1" = 4' or larger vertical scales)
- 5.6 When profile views are required, show flow line invert elevations of proposed water mains on 100 foot intervals, bends, and connections to existing water mains
- 5.7 Specify size materials in plan and profile views
- 5.8 Display and dimension the location of any environmentally sensitive area (ESAs), proposed encroachments, method of pipe installation (boring or open trench).  
If boring is proposed, provide profile views indicating enter and exit points, and distance between bottom of channel and upper limit of pipe casing

### **Required for Drainage Area Map:**

- 6.1 Use 1" = 100' scale for on-site, and 1" = 200' for off-site. Scale may be reduced to

1" = 200' onsite and 1" = 400' for larger watersheds

- 6.2 Display and dimension existing and proposed storm drains and inlets with different line type designations. Describe in legend or label existing improvements
- 6.3 Label sub-areas for alley, street, and off-site areas. Display flow arrows within each sub-area
- 6.4 Label design points of flow concentration for cumulative areas on Drainage Plan and list the design point on the Drainage Calculations Table
- 6.5 Include approved zoning designation or future land use designation for each area shown
- 6.6 Include peak runoff rate at all inlets, dead-end streets, and alleys. Include adjacent acreage flows crossing the property. Map
- 6.6 Label peak discharges accumulated in the storm sewer system at each analysis point
- 6.7 Include runoff calculations for all areas showing acreage, runoff coefficient, and inlet time. ( $Q = CIA$  Table or FORM A). List the "C Value Adjustment factors used in the calculations
- 6.8 Label all crests, sags, street, and alley intersections with flow arrows
- 6.9 Provide open channel calculation table and formula used, provide Manning's "N" values
- 6.10 Label limits of 100-year fully developed flood plain and floodway. List Flood Insurance Rate Map (FIRM) panel reference number and date, and/or Letter of Map Revision (LOMR) Case Number and effective date
- 6.11 Label the 100-year flood (base flood) elevations at identified cross sections from FIRM
- 6.12 Include how the flood plain limits were transferred from FIRM panel, (i.e. either by scaling distances or by interpretation of elevations onto the site topography)
- 6.13 Provide inlet capacity formulas and inlet design computation table

### **Required for Storm Sewers:**

- 7.1 Display and dimension stationed plan and profile of all storm sewers (1" = 40' or larger horizontal and 1" = 4' or larger vertical scales)

- 7.2 Specify diameter, size, slope, and type of material for all pipes
- 7.5 Include culvert design calculations and tail water condition
- 7.6 Include a detail for all headwalls and flumes at storm sewer outfalls
- 7.7 Include a list the riprap rock size, specifications, and underlying blanket thickness. Include for riprap: hydraulic data, sizing calculations, and dimensions
- 7.8 Provide calculations and construction details for energy dissipaters
- 7.9 Provide compaction, testing specifications, and frequency where fill is proposed for open cut trenches in creeks or outfall ditches
- 7.10 Display and dimension easements for downstream properties
- 7.11 Display and dimension ESA limits at all pipe outfalls

**Required for Storm Sewer Plan and Profile:**

- 8.1 Display and dimension property lines, lot lines, and easements with dimensions along storm sewers
- 8.2 Provide separate plan and profile of storm sewers
- 8.3 Label pipe sizes, curb inlets, manholes, junction boxes, etc. in plan and profile
- 8.4 List hydraulics on each segment of pipe profile to include:  $Q_{100}$ ,  $C = \text{Manning}$  full flow capacity;  $S$ ,  $V$ ,  $V^2/2g$ . Plot and label HGL elevations
- 8.5 Display and dimension curve data for all storm sewer system
- 8.6 Show all existing utilities in plan and profile view
- 8.8 Display and dimension existing and proposed ground line on profile views.
- 8.9 Show future streets, grades, drainage system layout, and connection points
- 8.10 Display and dimension flow line invert elevations of storm sewers on profile view at 100-foot stations, pipe slope (percent grade), manhole and junction box connections
- 8.11 dimensioned details of all non-standard junction boxes, headwalls, storm sewers, flumes, and manholes

- 8.12 Label water surface elevation at storm drain outfall in profile
- 8.13 Display and dimension “daylight” drainage outfall flowline points of connection to existing grade
- 8.14 Display and dimension minimum finished floor elevations at sags in pavement
- 8.15 Provide cross sections for design water surface, road, railroad, and ditches with profiles and hydraulic computations for open channels

**Required for Laterals, Inlets at Intakes:**

- 9.1 Display and dimension laterals on trunk profile with stations
- 9.2 Include lateral profiles if longer than 25 feet and when crossing utilities
- 9.3 Include the hydraulic grade line and calculations for laterals and inlets on profile
- 9.4 Display runoff and direction of flow concentrating at all inlets and direction of flow
- 9.5 Show runoff for all stub outs, pipes and intakes
- 9.6 Display size of inlet, lateral size, top-of-curb elevations, station, and inlet designation number

**Required for Detention or Retention Pond:**

- 10.1 Include drainage area map and show all computations for runoff affecting the detention basin
- 10.2 Display existing and proposed contours for the detention basin and for structural measures
- 10.3 Include embankment section for water storage impoundment and compaction specifications with profile of the controlling outflow structure
- 10.4 Include structural details and calculations for detention items
- 10.5 Include detention basin volume calculations including water quality volume (WAQAv) per Integrated Stormwater Management (iSWM) methodologies
- 10.6 Include detention elevation versus storage curve
- 10.7 Include hydraulic calculations for outflow structure
- 10.8 Include elevation versus discharge curve for outflow structure
- 10.9 Include routings or modified rational determination of storage requirements,

demonstrating that critical duration is used

- 10.10 Provide calculations as outlined in the Stormwater Design Criteria Manual for all proposed detention and retention ponds
- 10.11 Display and dimension fencing if proposed around detention area

### **Required for Bridge:**

- 11.1 Display and dimension geotechnical soil boring locations on plans and provide supporting reports or other documentation.
- 11.2 Display and dimension upstream and downstream stream channel sections
- 11.3 Display hydraulic calculations on all channel sections
- 11.4 Display structural details and calculations with dead load deflection diagram
- 11.5 Display and dimension skew angle, vertical and horizontal centerline alignment
- 11.7 Include bridge scour analysis, may be in a separate supplemental report referenced on the plans.
- 11.8 Display and dimension the location of all environmentally sensitive areas (ESAs)
- 11.9 Include vertical bench mark description

### **Required for Grading Plan:**

- 12.1 Include grading plan that shows proposed contours and spot elevations that address lot to lot drainage.
- 12.2 Delineate the proposed limits of land disturbing activities
- 12.3 Include cross section of typical swale, berm, channel, etc. as a component of grading plan
- 12.4 Where reclamation of the 100-year floodplain is involved, provide a note on grading plan that states: Upon completion of public improvements, submission of all documents necessary to obtain a Letter of Map Change (LOMC) from FEMA shall be submitted to the City of Denton. The LOMR will then be reviewed and sent to FEMA prior to acceptance of the subdivision. The LOMR is necessary to remove any lot within the floodplain from the Flood Insurance Rate Map. All changes or additional data, as requested by FEMA upon its review of the LOMR, are the responsibility of the owner and/or developer

### **Required for Channels:**

- 13.1 Include typical section for channel improvements with additional typical section

where the channel changes its dimensions or configuration

- 13.2 Include plan and profile showing existing contours and proposed centerline, top-of-bank, flow line elevations, stationing and 100-year water surface elevation
- 13.3 Include hydraulic calculations for all channel sections
- 13.4 Provide structural details for channel typical sections that display and dimension lining treatment such as: seeding, sodding, concrete, gabions, paving material, etc.

**Required for Erosion Control Plan:**

- 14.1 Display and dimension the limits of clearing, grubbing and land disturbing areas.
- 14.2 Display and dimension the limits of existing critical area boundaries and related setbacks, such as Environmentally Sensitive Areas, floodplains and waterways, septic tanks and drainfields, other underground tanks, water wells and corresponding wellhead protection areas
- 14.3 Display and dimension locations and details of temporary erosion / sediment control devices and best management practices (BMPs) for all phases of development
- 14.4 Display and dimension natural drainage features for both existing and proposed conditions
- 14.5 Display and dimension locations of construction exit(s), stockpiles and concrete washout
- 14.6 Display and dimension permanent stabilization detail
- 14.7 Display and dimension location and details of temporary sediment basin(s), required if disturbed drainage area is 10 acres or greater. Provide sediment basin drainage calculations, de-watering times, basin dimensions, and an outlet/dewatering structure compliant with iSWM Technical Manual Standards
- 14.8 Include General erosion control notes per the Stormwater Design Criteria Manual
- 14.9 Include iSWM Construction Controls per the Stormwater Design Criteria Manual

**Additional Submittal If Applicable:**



□ 15.1 ALTERNATIVE MATERIAL REQUESTS:

All construction materials to be used on public improvements shall be compliant with the approved materials list. Alternative material requests may be submitted for consideration prior to issuance of the Notice to Proceed. All alternative material requests shall be reviewed and sealed by the engineer-of-record prior to submittal. Please refer to the Alternative Materials Request Form available online at [www.cityofdenton.com/landdevelopment](http://www.cityofdenton.com/landdevelopment) for additional details.