

# DESIGN PROVISIONS

A reference guide to designing infrastructure in Wichita



## **Department of Public Works & Utilities**

City of Wichita Engineering Division  
Revisions to 1980 Design Manual

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## General

### Design Agreements

- Permit issuance and costs associated are the responsibility of the consulting engineer and required to be included in design contract fee
  - NOI, City/County Stormwater permit, Railroad, County, Corps of Engineers, FEMA, KDWPT, etc.

### Plan Submittal

- All waterline and erosion control plan sheets including standard details shall be sealed. Sealed detail sheets are available on the City's FTP site and website.
- All new plan submittals (Capital Improvement Project (CIP), Interchange, Petitioned, and Private Projects) shall use NAVD 88 for vertical datum and State Plane for horizontal datum to establish plan coordinate information/points/survey data.
- Survey limits on Arterial and Bridge Projects should extend a minimum of 100' beyond the pavement removal/replacement limits.
- City's plan review comments shall be submitted with any new plan submittal. Unaddressed/unanswered questions from City comments shall be clarified on the previously reviewed plan set or in a summary included.
- Water line plans are submitted to KDHE by City of Wichita staff.
- A list of materials approved for use on City of Wichita construction projects can be found on the City website at (<http://www.wichita.gov/PWU/Pages/Regulations.aspx>). All approved materials shall conform to the appropriate requirements set forth in the Standard Specifications, and shall have been previously approved by the Material Review Board (MRB). Information on obtaining approval for new materials through the MRB is available on the website.
- A traffic control plan should be included with all projects that are impacting an arterial roadway.

### Right-of-way/Easements

- Tract maps are required for all right-of-way and easement acquisitions.
- For all federally funded projects:
  1. TCE's are required when construction limits extend beyond the RW line, regardless of the reason.
  2. For sidewalk within 5' of the RW line the consultant will need to have a measured quantity bid item, "Fence (Temporary Construction)," for the temporary fence at the RW line unless there is an existing fence or wall.
  3. All drives constructed to match at the RW line will need a TCE that extends 5' past the right-of-way and 5' either side, regardless of the presence of sidewalk on either side.
- Tract maps will need to be prepared for all TCE's, to be submitted with RW tract maps.
- Tract maps are required to meet the attached minimum standard. Legal descriptions shall be provided in Word file with Tract map.

## Private Projects

- The Private Project Ordinance (50-385) and all supporting information (coversheets, pamphlets, bond forms, etc.) can be found on the City's website under the Projects and Project Development tab of Public Works and Utilities.

## Benchmarks/Vertical Datum

- Subdivision Benchmarks shall be called out on paving plans in new subdivisions at every fire hydrant.
- All plans must reference two City benchmarks within ½ mile of the project. If there are not two existing then new benchmarks shall be set.
- It is the consultant's responsibility to reset section corners, including filing all necessary reports with the State of Kansas as defined in the design contract with the City of Wichita.

## Utility Coordination

- Consultants shall be required to coordinate utility relocation on all projects.
- All City-let projects except new subdivisions shall go to the ULCC meeting at least once unless approved by the City's project manager. CIP paving projects shall be presented at two different ULCC meetings (field and office check).
- The Consultant Summary (in pdf form) will be required one month after the project is presented at the first ULCC meeting. It shall be updated every month after that meeting and posted to the City FTP site. "No Change" shall be noted on the consultant summary sheet in the upper right corner if no changes are made.
- Examples of ULCC documents and ULCC calendar can be found on the City's FTP Site
- Below are 3 ways to access the FTP server:

1.) You can connect using Internet Explorer via the link below:

[ftp://Utility01:Pw\\*plan7@Files3.cyberlynk.net](ftp://Utility01:Pw*plan7@Files3.cyberlynk.net)

This will allow for dragging/dropping capabilities on any windows machine.

2.) You can also connect to the FTP server using any standard FTP Client such as FTPVoyager, WSFTP, or CuteFTP. To connect using your FTP Client use the settings below.

FTP Host: Files3.cyberlynk.net

Username: Utility01

Password: Pw\*plan7

If you do not have an FTP client you can purchase or download a FREE trial copy via the link (<http://www.ftpclientlisting.com>).

3.) You can also use the Web Based JAVA FTP Client from any Windows computer

(<http://Files3.cyberlynk.net/client>)

Username: Utility01

Password: Pw\*plan7

If you have any questions or problems, please feel free to contact [asmith@wichita.gov](mailto:asmith@wichita.gov).

## Bid Items

- Any item with the unit of measure other than “Lump Sum” or “Cubic Yards” will be bid as a measured quantity item.
- Consultants shall utilize the City’s standard bid item list.
- The following bid items shall be standing bid items on all CIP paving projects (quantities to be discussed with City project manager):
  1. Protection Curb
    - i. Any protection curb required to be 8” or higher shall be designed and included in the plans
  2. Temporary Asphalt
    - i. Utility patch
    - ii. Phase shift
    - iii. Temporary widening (includes rock base)
  3. Message Boards
  4. Tree removal (Large & Small)
- All landscaping items shall be measured quantity items except seeding or sodding which are lump sum items.
- BMP’s will be bid as separate measured quantity bid items on all projects. Note that this is not bid as a “1 LS” bid item.
- All valley gutters shall be bid with full height monolithic edge curb, see PV-109 detail as needed.
  - The unit of measure for retaining walls shall be the square foot of face (sff) constructed. The measurement shall be from the footing to the top of the wall.

## Paving

### Signage

### Pavement

- Median curbs shall be designed with an expansion joint between the curb and the brick, when brick or stamped concrete are being utilized.
- When designing pavement widening on full depth asphalt streets the plans should call out reinforced concrete base when the width is less than 6’. Transverse joints should be called out in the concrete base. The asphalt surface shall be sawed and sealed along the longitudinal joint of the pavement widening and the transverse joints in the concrete base.

## Minimum Pavement Section Information

	<u>Asphalt</u>	<u>Concrete</u>	<u>Width (b-b)</u>
Residential (Infill)	5" AC on 5" RCRB	6" RC on 5" RCRB	31'
Residential Collector	5" AC on 5" RCRB	6" RC on 5" RCRB	35'
Residential (Subdivision)	5" AC on 5" RCRB	6" RC on 5" RCRB	29'
Commercial	7" AC on 6" RCRB		35'
Industrial		8" NRDJ on 5" RCRB	41'
Arterial	7" AC on 8" RCRB	9" RC on 6" RCRB	61'
Arterial (3-lane)	7" AC on 8" RCRB	9" RC on 6" RCRB	41'
Arterial (Mat) *	7" AC on 6" RCRB		26'

**Legend:**

Reinforced Crushed Rock Base	RCRB
Asphaltic Concrete Pavement	AC
Non-reinforced Dowel Joint	NRDJ
Reinforced Concrete	RC

**Valley Gutter and Intersection Information**

		<u>Radii</u>
Residential	7" RC on 5" RCRB	30'
Commercial/Industrial	8" RC on 5" RCRB	
Arterial Intersection	9" RC on 6" RCRB	50'

extends a minimum of 100' beyond end of return

\*where approved under subdivision regulations

- Maximum longitudinal grade for valley gutter is 4% at the crown of the intersecting street; see PV-109 detail.
- Connection of residential streets to arterial roadways shall be concrete regardless of drainage needs.

## Sidewalks & Crosswalks

- Brick crosswalks shall be constructed on all arterial intersection improvements projects, as well as for mid-block arterial street crossings whether signalization is present or not. The brick width shall be 9'-10" wide. (Based on standard 4"x8" Holland concrete pavers, and 3-1/8" thick, charcoal-red.). Maximum sand bedding allowed is 3/4". The use of any other pavers will need to be approved by the City Engineer during design, and the width may change accordingly. Cross walk pavement markings are still required.
- Minimum Sidewalk Widths by Street Type:
  - Arterial – 6'
  - Collectors – 5'
  - Local – 5'
  - Multi-Use Path – 10' (5" standard thickness)
- Any time sidewalk abuts curb it shall be thickened to 12" at the back of curb for a distance of 12", an example detail can be provided upon request from the City's project manager.

## Drive Approaches

- Approach width shall be a minimum of 12' and a maximum of 30' regardless of existing width.
- Reference PV-126 for dimensioning:

<u>Use of Approach</u>	<u>Type of Street</u>	<u>Drive Required</u>	<u>Radius</u>
Commercial/Industrial	Arterial/Collector	Full radius, 8" thick reinforced	20'
Residential	Arterial/Collector	Full radius, 8" thick reinforced	20'
Commercial/Industrial	Residential	Full radius, 8" thick reinforced	20'
Residential	Residential	Radius ramp, 6" thick	see detail
Residential (back of curb to front of walk 3' or less)	Residential	Full ramp, 6" thick	see detail

## Traffic

- All projects that include adding or replacing a traffic signal shall require an approved detection system including one complete spare detection device and corresponding processing unit.
- Current ADA rules require all projects that impact intersections shall be upgraded to meet applicable standards including pedestrian push buttons, countdown timers, and connection of new sidewalk, or replacement of existing.
- Consultant will be required to verify power supply need and location with design of signal.
- Signal pole bases and service boxes need to be shown on the intersection plan to confirm clearances with utilities.
- When arterial traffic will be significantly impacted message boards shall be a required bid item.

## Water

- DICL is required for any length of pipe 11' or less and should be called out as such.
- Any fire hydrant deeper than 7' shall meet the extension requirements referenced in the detail WL – 101.
- Fire hydrant table on the detail is required to be filled out with all applicable information.
- Contractors shall perform taps on concrete water mains and any tap larger than 12" with bid item included.
- All water lines 16" and larger must be restrained joint and specified on the plans.
- Neighborhood main replacement plans need to be drawn at 1" = 20' scale.

## Sewer

### Pipe

- A bid item for air testing ("Air Testing, SS Pipe") shall be included and bid in lf of pipe.
- All sanitary sewers shall not exceed 3% slope, with 2% being optimal maximum.
- The minimum slopes allowed can be found in the following table:

Sewer Diameter (in.)	Minimum Slope (ft/100ft)
8	0.4
10	0.28
12	0.22
15	0.15
18	0.12
21	0.1
24	0.08
27	0.067
30	0.058
36	0.046

- Upsizing of sewer mains shall only be allowed with approval of the City Engineer and shall not be permitted unless more than 10% of the pipe capacity can be maintained. The following requirements shall be followed for upsizing:
  - 10" pipe requires a minimum of 1100 connections
  - 12" pipe requires a minimum of 1500 connections
- DICL pipe is not permitted to be used for sanitary sewers.
- Private sewer service lines shall not be allowed in street right-of-way except for connection to manhole/clean out. If a property needs to be served on the opposite side of the street a new lateral/main has to be extended to a MH (required for non-residential uses) or clean-out (residential).



## Manholes

- For manholes greater than 12' deep or in groundwater joint wraps shall be required. The description "MH, Joint Wrap" shall be used and bid in If as a final measured quantity. It shall be determined if groundwater is present based on historical data. Joint Wrap standards can be found in the Special Provisions on the City's website (<http://www.wichita.gov/PWU/Pages/Regulations.aspx>).
- Sanitary sewer manhole diameters relative to depth and pipe size should match the standard detail (table below), be called out on the plans, and be reflected on the bid items.

<b>Sanitary Sewer Manhole Diameters</b>		
<b>Diameter</b>	<b>Depth</b>	<b>Pipe Size</b>
4' (shallow)	0'-6'	8"-18"
4'	>6'-15'	8"-18"
5'	>15'-30'	21"-30"
6'	>30'	36"-60"

- A manhole lining system is required for 15" pipe size or greater. A lined MH bid item shall be included.

## Stormwater

### General

- All Stormwater designs shall meet the requirements of the City/County Stormwater Design Manual (SDM).
- All projects disturbing 1 acre or more shall be required to file a NOI with KDHE and a Stormwater Permit through the City of Wichita. Water quality structures shall be required, except where the Offsite BMP Program may be utilized.
- The consultant should fill out a City/County Stormwater Permit application to document what is being done to meet the requirements and include a 'Stormwater compliance statement' on the private project cover or in the plan set on public projects that describes the project's land disturbing activity in acres and how the project satisfies Chapter 16.32 of the City Code. ([https://www.municode.com/library/ks/wichita/codes/code\\_of\\_ordinances?nodeId=TIT16SESE\\_DIDR\\_CH16.32STPOPR](https://www.municode.com/library/ks/wichita/codes/code_of_ordinances?nodeId=TIT16SESE_DIDR_CH16.32STPOPR)).
- The consultant shall provide all acreage calculations for land enrolled in the offsite BMP Program for public and private projects.
- Drainage reports shall be submitted for all public projects, the area in the drainage report shall account for the upstream flow and the drainage basin. Post-development flow shall not be greater than pre-development flow.
- If a site is less than one acre and part of a larger development requiring water quality, then water quality treatment is required.

## Stormwater Regulations

### Water Quality

- Redevelopment Sites
  - The water quality requirement may be met with a reduction of 20% of the existing impervious cover planned by the site redevelopment.
  - 30% of the existing impervious area may be treated in a drainage inlet with a SNOUT device with an efficiency of 80% TSS removal. This is the equivalent of the entire existing impervious area being treated at a 24% TSS removal efficiency.
  - SNOUTS are considered to provide a 50% TSS removal per ½ acre draining into the inlet.
  - The water quality requirement for ½ acre of redevelopment pavement can be met with one SNOUT and one acre of redevelopment pavement can be treated with two SNOUTS installed in series.
- New Development Sites:
  - New development sites can achieve the water quality requirement for their new land disturbance if 2 SNOUTS are installed in series per one acre of development area.
  - A hydrodynamic separator with an 80%TSS reduction performance can be used to meet the water quality requirement. The effective drainage area shall be in accordance with the manufacturer's recommendation to meet the TSS removal efficiency.
  - A dry pond with an approved BMP grassed swale in advance of the pond can be used as the treatment train to meet the water quality requirement. See page 4-47 (SDM).
  - If wet ponds are planned, prepare a volume calculation to show the water quality volume needed (page 4-41, SDM) is within the first few inches on the static water level of the pond.
  - If a project site is less than one acre in area, but is part of a larger development in excess of one acre, the project site will require its water quality treatment method to be provided by the overall site's water quality treatment mechanism or the project site will provide the treatment.

### Channel Bank Protection

- Required in areas identified in the Stormwater Design Manual.
- Required on site developments of 5 acres or more.
- A minimum of 48 hours should pass before the pond's water level returns to the static level.

### Detention

- Detention is required if more than one acre of new impervious area is being added to the site.
- Post development detention pond discharge rate shall not exceed the pre-development runoff rate during 2, 5, 10, 25 and 100 year storms.
- Detention requirement can be waived if the 10% rule is applicable. See page 4-38 (SDM).
- The professional engineer designing the Stormwater controls for the project assumes the professional responsibility to prepare the project plans in accordance with the City's Stormwater

regulations found on the website (<http://www.wichita.gov/PWU/Pages/Regulations.aspx>) in the Stormwater section.

## Pipe

- Underdrain pipe for inlets shall be bid on every inlet as a final measured quantity under “Inlet Underdrain”.
- All publically owned and maintained pipe shall be designated as “RCP” on the plans unless the conditions allow for use of other pipe materials as defined in Standard Specifications and Special Provisions to City specs (Section 800); in which case pipe shall be designated as “SWS pipe”.
- End sections need to be restrained unless approved by the City Engineer.

## Structures

### *Water Quality Structures*

- The consultant should design a proprietary water quality BMPs, such as a HydroWorks unit to treat runoff pollution prior to discharging to stream, creek, pond, and/or downstream storm drainage system. A road or bridge project will likely use multiple proprietary devices in series to achieve the treatment objective. The units are best located behind the curb and not more than 15 feet from the street, to allow for City cleaning crews to easily remove debris from the structure. Larger treatment units should use an EJIW 1986, 2228 or equivalent Frame & Cover to make access to the structure easier for City staff and equipment. The BMPs will need to treat 80% TSS for the disturbed areas associated with the public project.
- Ponds are an acceptable way to treat water quality.