



**Date:** December 7, 2016  
**To:** Infrastructure Review and Advisory Board  
**From:** Public Works – Engineering (Storm Drainage)  
**Subject:** Proposed Updates to the following:

- Engineering Design Standards - Chapter 11 Drainage Improvements
- Engineering Design Standards - Chapter 12 Erosion & Sediment Control
- Supplemental Standard Specifications for Storm Sewer Construction – Section 200

**Engineering staff propose the following updates to Engineering Design Standards.**

### **11.1 REQUIREMENTS FOR STORM DRAINAGE PLANS**

#### 11.1.8 Review by Other Agencies

All open channel construction and existing drainageway modifications will be reviewed by the City and other appropriate county, state, or federal agencies.

[Recommend to review with Sioux Falls Airport Authority for compliance with Federal Aviation Administration Advisory Circular 150/5200-33B Hazardous Wildlife Attractants on or near Airports.](#)

### **11.8 BEST MANAGEMENT PRACTICES**

#### 11.8.1.2 Step 2. Provide Water Quality Capture Volume

A fundamental requirement for any site addressing storm water quality is to provide water quality capture volume (WQCV). One or more of five types of water quality basins, each draining slowly to provide for long-term settling of sediment particles, may be selected to provide WQCV as shown in Figure 11.48. [The WQCV shall be contained with a minimum of one foot of freeboard.](#) These five BMPs are described in detail in the following sections:

**11.8.9.5 BEST MANAGEMENT PRACTICES – RETENTION POND DESIGN PROCEDURE AND CRITERIA**

e Step 5. Outlet Control

Provide outlet controls that limit WQCV to depths identified in Chapter 11 Appendix to 2 feet or less. Use a water quality outlet that is capable of releasing the WQCV in no less than a 12-hour period. Refer to Figures 11.62, 11.63, 11.64, and 11.65 (Appendix) for schematics pertaining to structure geometry; grates, trash racks, and screens; outlet type; orifice plate or perforated riser pipe; cutoff collar size and location; and all other necessary components.

FIGURE 11.7C ALLOWABLE SHEAR STRESSES FOR CHANNEL LININGS

<b>FIGURE NO. 11.7C - ALLOWABLE SHEAR STRESSES FOR CHANNEL LININGS <u>AND OUTLET PROTECTION</u></b>		
<b>LINING TYPE</b>	<b>COMMENTS</b>	<b>SHEAR STRESS, Td (Lbs/Square Foot)</b>
WOVEN PAPER NET	SUBMITTED BY DESIGN ENGINEER	0.15
JUTE NET	SUBMITTED BY DESIGN ENGINEER	0.45
FIBERGLASS ROVING	SUBMITTED BY DESIGN ENGINEER, SINGLE	0.60
FIBERGLASS ROVING	SUBMITTED BY DESIGN ENGINEER, DOUBLE	0.85
STRAW WITH NET	SUBMITTED BY DESIGN ENGINEER	1.45
CURLED WOOD MAT	SUBMITTED BY DESIGN ENGINEER	1.55
SYNTHETIC MAT	SUBMITTED BY DESIGN ENGINEER	2.00
VEGETATIVE, CLASS A	WEEPING LOVEGRASS, YELLOW BLUESTEM	3.70
VEGETATIVE, CLASS B	BERMUDA, BLUE GRAMA, NATIVE GRASS MIXTURES	2.10
VEGETATIVE, CLASS C	BERMUDA, KENTUCKY BLUE, CENTIPEDE	1.00
VEGETATIVE, CLASS D	BERMUDA, BUFFALO, GRASS LEGUME	0.60
VEGETATIVE, CLASS E	BERMUDA	0.35
<del>GRAVEL RIPRAP</del>	<del>D50 STONE SIZE – 1 INCH</del>	<del>0.33</del>
<del>GRAVEL RIPRAP</del>	<del>D50 STONE SIZE – 2 INCH</del>	<del>0.67</del>
<del>ROCK RIPRAP</del>	<del>D50 STONE SIZE – 6 INCH</del>	<del>2.00</del>
<del>ROCK RIPRAP</del>	<del>D50 STONE SIZE – 12 INCH</del>	<del>4.00</del>
<u>ROCK RIPRAP</u>	<u>D50 STONE SIZE – 0.95 FEET (CLASS A)</u>	<u>4.00</u>
<u>ROCK RIPRAP</u>	<u>D50 STONE SIZE – 1.30 FEET (CLASS B)</u>	<u>5.00</u>
<u>ROCK RIPRAP</u>	<u>D50 STONE SIZE – 1.80 FEET (CLASS C)</u>	<u>7.80</u>

## 12.4 DRAINAGEWAY PROTECTION

### 12.4.3 Outlet Protection

The outlets of slope drains, culverts, sediment traps, and sediment basins shall be protected from erosion and scour. Outlet protection shall be provided where the velocity of flow will exceed the maximum permissible velocity of the material where discharge occurs. This may require the use of a riprap apron at the outlet location. The use of Class A rip-rap or smaller shall only be allowed if approved by the City Engineer's office.

**Engineering staff propose the following updates to Supplemental Standard Specifications for Storm Sewer Construction – Section 200.**

## 2.2 PIPE JOINT MATERIALS

### 2.2.1 Reinforced Concrete Pipe:

2.2.1.1 Gasketed Joints: Concrete pipe shall comply with ASTM C443 Standard Specification for Joint for Concrete Pipe and Manholes, Using Rubber Gaskets and ASTM C1628 Standard Specification for Joints for Concrete Gravity Flow Sewer Pipe, Using Rubber Gaskets.

2.2.1.2 Tongue and Groove Joints: If concrete pipe tongue and groove joints are tight and true, as determined by the Engineer, they need not be grouted; but when such joints are open and/or skewed, they shall be mortared both inside and outside. The specified joints shall be jointed with cement mortar composed of one (1) part Portland cement and two (2) parts of sand and enough water to make a workable mixture, unless otherwise stipulated on the plans or by the Special Information. All lift holes in RCP Storm Sewer shall be plugged with a concrete mortar plug and sealant or with a flexible butyl lift hole patch. ~~All~~ RCP storm sewer pipe with tongue and groove joints shall be sealed with mastic material or butyl rope.