

SIOUXTM CITY

Supplement
to

Iowa Statewide
Urban Standard Specifications
for Public Improvements



January 1, 2008

S
p
e
c
s

**SIOUX CITY SUPPLEMENT TO THE URBAN STANDARD SPECIFICATIONS FOR PUBLIC
IMPROVEMENTS MANUAL**

TABLE OF CONTENTS

DIVISION 1	GENERAL PROVISIONS AND COVENANTS
	SECTION 1010 GENERAL CONDITIONS
	Testing
DIVISION 2	EARTHWORK
	SECTION 2010 CLEARING, EXCAVATION, AND EMBANKMENT
	Sec. 2.05 Compaction Equipment
	Sec. 3.05 Embankment Construction
DIVISION 3	TRENCH, BACKFILL AND TUNNELLING
	SECTION 3010 TRENCH AND BACKFILL
	Sec. 1.08 Measurement for Payment
	Sec. 2.01 Excavated Materials
	Sec. 2.04 Class II Backfill Material
	SECTION 3020 TUNNELLING & CASING
	Sec. 3.02 Excavation
DIVISION 4	SEWERS AND DRAINS
	SECTION 4010 SANITARY SEWERS
	Sec. 2.01 Sanitary Sewers
	Sec. 2.02 Sanitary Sewer Force Main
	Sec. 2.03 Sanitary Sewer Services
	Sec. 3.07 Tolerances
	SECTION 4040 TESTING
	Sec. 1.04 Measurement for Payment
	Sec. 3.05 Sanitary Sewer Infiltration Testing
	Sec. 3.06 Sanitary Sewer Exfiltration Testing
DIVISION 5	WATER MAINS AND APPURTENANCES
	SECTION 5010 PIPE AND FITTINGS
	Sec. 2.01 Water Main Pipe
	Sec. 2.05 Special Fittings
	Sec. 2.08 Corporation Stops
	Sec. 2.09 Curb Stops and Valve Boxes for Curb Stops
	Sec. 3.10 Service Taps and Connections
	SECTION 5020 VALVES, HYDRANTS AND APPURTENANCES
	Sec. 1.08 Measurement for Payment
	Sec. 2.01 Valves
	Sec. 2.02 Fire Hydrants
	Sec. 3.04 Valve Lock Outs
	SECTION 5030 TESTING AND DISINFECTION
	Sec. 3.01 Sequence of Operation
	Sec. 3.03 Fire hydrant
	Sec. 3.05 Flushing After Disinfection is Complete

Sioux City Supplement to the SUDAS Specifications

DIVISION 1 GENERAL PROVISIONS AND COVENANTS

Sec 1010—General Conditions

- Owner shall pay for all initial testing with retesting charged to the contractor

DIVISION 2 EARTHWORK

Sec. 2010 Part 2—Products

- Sec. 2.05 Compaction Equipment—Not applicable under Sioux City Specifications

Sec. 2010 Part 3—Execution

- **Sec. 3.05 Embankment Construction**

E. Compaction: Unless otherwise specified by contract documents, compaction of embankments within street right-of-way should be compacted to a minimum of 92 percent of Standard Proctor Density, except for the top 12 inches within pavement area and 2 feet outside of the paved surface edge shall be compacted to a minimum of 95 percent of Standard Proctor Density. Material shall be compacted to a moisture content as specified below:

1. Moisture requirements for cohesive soils with liquid limits greater than 45 percent shall be from optimum moisture to 4 percent above optimum moisture.
2. Moisture requirements for cohesive soils with liquid limits less than 45 percent shall be such that proper compaction can be achieved, but moisture content shall be no greater than 2 percent above optimum.
3. There is no moisture control for granular material.

DIVISION 3 TRENCH, BACKFILL, & TUNNELING

Sec. 3010 Part 1—General

- **Sec. 1.08 Measurement for Payment**

A. General: Pipe bedding shall be bid and paid on a per ton basis. No separate payment will be made for unclassified excavation. Include trenching, placing backfill, compaction and dewatering in the costs in the unit bid for all pipe and structures except as follows: (See SUDAS Specifications Manual)

Sec. 3010 Part 2—Products

- **Sec. 2.01 Excavated Materials**

D. Sand shall be an acceptable material for bedding under rigid pipes and in areas where sand is native and areas with firm soils. See Figure 3010.1, Sheet 3 of 3 in the Sioux City Supplement for Pipe Embedment Details.

- **Sec. 2.04 Class II Backfill material (Storm Sewers, Sanitary Sewers, and Water Mains)**
 - D. Compaction: Unless otherwise specified by contract documents, compaction of embankments within street right-of-way should be compacted to a minimum of 92 percent of Standard Proctor Density, except for the top 12 inches within pavement area and 2 feet outside of the paved surface edge shall be compacted to a minimum of 95 percent of Standard Proctor Density. Material shall be compacted to a moisture content as specified below:
 1. Moisture requirements for cohesive soils with liquid limits greater than 45 percent shall be from optimum moisture to 4 percent above optimum moisture.
 2. Moisture requirements for cohesive soils with liquid limits less than 45 percent shall be such that proper compaction can be achieved, but moisture content shall be no greater than 2 percent above optimum.
 3. There is no moisture control for granular material.
 - E. Class II material may be specified in the contract documents by Jurisdictional Engineer between pipe embedment zone and top 3 feet of final backfill when trench is under pavement.

Sec. 3020 Part 3—Execution

- Sec. 3.02 Excavation: B. Remove and stockpile top 6” of topsoil, when practical, for subsequent reuse.

DIVISION 4 SEWERS AND DRAINS

Sec. 4010 Part 2—Products

- Sec. 2.01 Sanitary Sewers
 - A. Solid Wall Polyvinyl Chloride Pipe (PVC) 8”-15”
 1. SDR-35 is not an approved construction material in Sioux City.
- Sec. 2.02 Sanitary Sewer Force Main:
 - B. Polyvinyl Chloride Pipe 4”-12”—Min. DR 14
 - C. Polyvinyl Chloride Pipe 14”-24”—Min. DR 14
 - D. Sewage Air Release Valve
 1. Schedule of sizes and parameters:

Model	Size Inches		Height		Major Diameter	Operating Pressure psi	Orifice Diameter	Venting Capacity CFFAM
	Inlet	Outlet	Valve	W/A				
400	2" NPT	1/2" NPT	17-1/2	24	7-1/2	0-50	5/16	55
	3" NPT					51-150	1/4 STD	90
	4" NPT					151-300	3/32	25
450	2" NPT	1" NPT	20	27	9-1/2	0-150	1/2	350
	3" NPT					151-300	7/16	520
	4" NPT							

2. Valve inlet size-inch diameter unless otherwise shown on plans.

3. Manufacturer: APCO Valve and Primer Corporation, Schaumburg, Illinois, or approved equal
 4. Model: APCO Model 400 or 450, furnished from manufacturer with inlet valve, blow off valve (two required), 5' of rubber blow off hose and compressed air quick-connect fitting on top of valve body: use Model 400 unless otherwise noted on plans.
 5. Tapping saddle: Bronze, with two stainless steel clamping bands.
 6. Pit: As shown on plans.
- Sec. 2.03 Sanitary Sewer Service
 - C. Service Pipe: Products as required by local plumbing code or regulations, if applicable, otherwise use the following:
 1. PVC:
 - a. Approved materials also include SDR 26 and Schedule 40 as specified for sanitary sewers (gravity)
 3. VCP:
 - a. As Specified for Sanitary Sewers (gravity)

Sec. 4010 Part 3—Execution

- Sec. 3.07 Tolerances:
 - A. Sewer should be online and grade and pass a jurisdiction camera inspection. The sewer will also be inspected at the end of construction to check for debris in the line.

Sec. 4040 Part 1—General

- Sec. 1.04 Measurement for Payment:
 - A. Testing and inspection of sanitary sewers, storm sewers and pipe rehabilitation is incidental to construction.
 - B. Include costs of testing and inspection in bid prices for sewer construction and pipe rehabilitation.

Sec. 4040 Part 3—Execution

- Sec. 3.05 Sanitary Sewer Infiltration Testing
 - A. Testing required on new construction only.
- Sec. 3.06 Sanitary Sewer Exfiltration Testing
 - B. Testing required on new construction only.

DIVISION 5 WATER MAINS AND APPURTENANCES

Sec. 5010 Part 2—Products

- Sec. 2.01 Water Main Pipe
 - B. Ductile Iron Pipe:
 1. Minimum Thickness Class
 - a. 4-inch through 24-inch sizes: Pressure Class 350 per ANSI/AWWA C151/A21.51
- Sec. 2.05 Special Fittings
 - A. Flange Adapter:

1. Utilize where noted on drawings to allow for ease of dismantling piping in future.
 2. Manufacturer: Dresser Manufacturing Division, Bradford, Pennsylvania.
 3. Model: Style 127.
 4. Substitutions: approved equal.
- B. Pipe Coupling
1. Utilize where noted on drawings to allow for ease of dismantling piping in future, unless grooved fittings are furnished.
 2. Manufacturer: Dresser Manufacturing Division, Bradford, Pennsylvania.
 3. Model: Style 38, 138, or 162.
 4. Substitutions: approved equal.
- Sec. 2.08 Corporation Stops
 - A. Corporation stops shall be Mueller 300 Ball Corporation Valves, ¼ turn open, AWWA taper (Mueller “CC”) thread on the inlet side, compression fitting for CTS OD Tubing on the outlet.
 - Sec. 2.09 Curb Stops and Valve Boxes for Curb Stops
 - A. Curb stops shall be Mueller 300 ball curb valve with ¼ turn check, compression fitting for CTS tubing on each end, no reduced port valves.
 - B. Valve boxes for curb stops shall be ARMOR Access boxes part #110183-14, 2 ½” curb service box. Material shall be a rigid combination of polyolefin with fibrous inorganic component reinforcing and UV stabilizer additives to assure resistance to material degradation from ultraviolet light. Valve box shall be a telescoping two-piece (Screw style) with polycarbonate ring, pentagon bolt and Superflexon cover that is adjustable to 72”. Upper sections shall be locatable electronically and magnetically with ring riveted to the top section. Lower section shall be a full threaded shaft 2.35” ID over a Buffalo style arch, 4” wide by 7” high and saddle, 3 1/3” wide by 4” high.

Sec. 5010 Part 3—Execution

- Sec. 3.10 Service Taps and Connections
 - C. Jurisdiction water staff will make all taps on jurisdiction owned water mains. All tapping saddles for 4” and larger taps, shall be full wrap stainless steel saddles. Size on size taps are not allowed. Taps must be a minimum of one size smaller than the existing main.
 - D. Stop box: distance to back of curb to be 8.5 feet unless otherwise shown on plans.

Sec. 5020 Part 1—General

- Sec. 1.08 Measurement for Payment
 - D. Fire Hydrant Assembly

1. Fire hydrant includes fire hydrant with barrel extensions sufficient to achieve specified design depth of unit.
2. Count each fire hydrant installed.
3. Components to connect fire hydrant to water main, includes up to 8 feet of pipe, fittings including the auxiliary valve with box, except tapping valve assembly if used, shall be considered to be integral parts of fire hydrant assembly, and no separate or additional payment shall be made therefore. The mainline tee shall be bid as a separate bid item from the hydrant assembly. Payment shall be at the unit bid for each size of tee installed.
4. Fire hydrant extensions shall be bid separately from the hydrant assembly. Payment shall be at the unit bid for each size installed.

Sec. 5020 Part 2—Products

- Sec. 2.01 Valves
 - A. General:
 3. All valves 4” and larger, including service line valves, must open clockwise.
 - D. Tapping Valve Assemblies: Tap, sleeve, and valve shall be provided by the contractor. The City shall receive a fee from the contractor for performing the tap.
- Sec. 2.02 Fire Hydrant—All new hydrants, public or private, shall come equipped with a Storz quick connect on the 5” steamer.
 - B. Manufacturers and Model
 1. Mueller Centurion
 2. Clow Medallion
 3. American Darling B84B or B62B
 - C. Features
 1. Break-away stem coupling
 2. Operating nut: 1.5 inch pentagonal
 3. Inlet nominal size: 6 inch
 4. Inlet connection type: mechanical joint
 5. Hose nozzle: Two 2 ½”
 6. Steamer nozzle: 4 inch
 7. Nozzle threads:
 - a. Hose thread
 - b. Male Dia. – 3.290
 - c. Pitch Dia. – 3.146
 - d. Root Dia – 3.002
 - e. Female OD – 3.340
 - f. Pitch Dia. – 3.196
 - g. Root Dia. – 3.052
 - h. 60 Degree Sharp V Thread
 8. Steamer thread:
 - a. 6 threads per inch

- b. ID – 4.180
 - c. Male thread OD – 4.860
 - d. Pitch Dia. – 4.752
 - e. Root Dia. – 4.643
 - f. Female thread OD – 4.875
 - D. Substitutions: None, unless approved in writing by Jurisdictional Engineer
 - E. Bury Depth: nominal 6 feet, refer to plans
 - F. Painting:
 1. Shop coating: per ANSI/AWWA C502
 2. Field coating above grade:
 - a. Public – safety yellow
 - b. Private - red
- Auto Flush Units—The specified unit is the Hydro-Guard, HG-4 Long Neck™ Sub-Surface Discharge Unit or approved equal.

Sec. 5020 Part 3—Execution

- Sec. 3.04 Valve Lock Outs
 - A. The Contractor shall contact the City if at any time more than one connection is made to a live water main. The City will place a valve lock out on the valve and maintain possession of the key.

Sec. 5030 Part 3—Execution

- Sec. 3.01 Sequence of Operation
 - A. New Water System Construction: Perform operations in the following sequence:
 1. Perform initial flush
 2. Perform pressure and leak testing
 3. Perform disinfection
 4. Flush after disinfection
 5. Make all service taps
- Sec. 3.03 Fire Hydrant
 - C. Position auxiliary valve at least 2’ 6” (clearance) away from the hydrant, where possible.
- Sec. 3.05 Flushing After Disinfection is Complete
 - E. The environment to which the chlorinated water is to be discharged shall be inspected by the City representative designated as the “Operator-in-Charge” of the water distribution system. If there is any question that the chlorinated discharge will cause damage to the environment, a de-chlorinating agent shall be applied to the water as it exits the piping system to neutralize the chlorine residual.

State regulatory agencies should be contacted to determine special provisions for the disposal of highly chlorinated water.

The contractor shall be responsible to reimburse the City for any financial penalties imposed on the City by state or federal regulatory agencies as a result of such disposal.

DIVISION 6 STRUCTURES FOR SANITARY AND STORM

Sec. 6010 Part 3—Execution

- Sec. 3.04 Placing
 - F. Concrete shall not be placed when the air temperature is less than 40 degrees Fahrenheit without the approval of the Jurisdictional Engineer and unless properly protected according to Sec. 7010 section 1.07.

Sec. 6020 Part 1—General

- Sec. 1.08 Measurement for Payment
 - A. Payment for Storm Sewer Manholes will be for base, ring, and cover (1 item) and vertical feet. Payment for Sanitary Sewer Manholes will be for base, ring, cover, and chimney seal (1 item) and vertical feet.

Sec. 6020 Part 2—Products

- Sec. 2.01 Manholes
 - C. Wall thickness:
 - 1. Precast, minimum: 5 inches.
 - 2. Cast in place, minimum: 6 inches.
 - D. Barrel coating:
 - 1. Sanitary sewer manholes, interior coating: two coats of Hi-build epoxy liner or equal.
 - 2. Storm sewer manholes: none required.
 - E. Top configuration:
 - 1. Eccentric top except as noted on plans or detailed drawings.
 - 2. Total manhole depth 6 feet or more use cone top section.
 - F. Joints, barrel:
 - 1. Male and female ends.
 - 2. Sanitary and storm sewer manhole:
 - a. Seals, rubber ring gasket, flexible joint, per ASTM C443.
 - b. Apply bituminous joint compound to all exterior joints.
 - H. **Base:**
 - 1. Sanitary sewer system:
 - a. Precast manhole: integral base and riser section or poured base.
 - b. Cast-in-place manhole: base riser section embedded at least 3 inches into poured-in-place base or embedded in mortar.
 - c. Cast-in-place base with formed invert.
 - I. **Pipe connection:**
 - 1. Sanitary sewer:

- a. Drop connection where required on plans. Drop connections shall be constructed with material that is consistent with the material and size of the mainline sewer. See also detailed drawings.
- b. Grout internal joint space; non-shrink grout.
- 2. Storm sewer:
 - a. Precast manholes: factory fabricated openings.
 - b. Poured in place structures; structure wall poured around pipe stub.
- J. **Manhole steps: (All Sanitary and Storm Manholes are required to have steps)**
 - 1. Space steps at 12 inches to 16 inches, comply with ASTM C478. Align with vertical side of eccentric cone top section.
 - 2. Manhole steps shall be plastic coated steel.

2.02 MANHOLE ADJUSTMENT RINGS (Grade rings)

- A. Comply with ASTM C478.
- B. Inside dimension not less than bottom inside diameter of frame.
- C. Install at least two rings per manhole on unpaved areas.
- D. **Maximum height of adjustment ring stack:** 12 inches for new construction, 24 inches maximum stack for manhole adjustment on existing manhole.
- E. Grout inside of manhole between ring and stack.

2.03 CASTINGS (Ring and Cover)

- A. **Gray cast iron:** ASTM A48, Class 35.
- B. **Minimum weight:** refer to detailed drawings, Figure 6-4.
- C. **Sanitary and storm sewer manhole ring and covers:**
 - 1. All rings and covers shall be Neenah No. R1642 or equal with bearing surfaces ground so cover will fit solidly in all positions and insure a tight fit.
 - 2. Sanitary manhole covers shall be Neenah R1642 Type C or equal.
 - 3. Storm manhole covers shall be Neenah R1642 Type B or equal.
 - 4. Provide different type if shown on plans.

Sec. 6020 Part 3—Execution

- Sec. 3.04 **Chimney Seals (Required on all Sanitary and Storm Sewer Manholes)**
 - A. Install **internal chimney seals** on all manholes
- Sec. 3.05 Abandoned Manholes
 - A. Remove top and walls of structure to a minimum of 3 feet below sub-grade.

Sec. 6030 Part 2—Products

2.01 INTAKES

- **Storm Inlet Labeling:** In accordance with the City of Sioux City Municipal Separate Storm Sewer System Permit Number 97-78-0-02, Part II, Paragraph B, Sub-paragraph 2 “Storm Drain Labeling” all new inlets constructed in the City must be labeled. These labels shall read one of the following; “No Dumping-Drains to River”, “No Dumping-Drains to Missouri River;”, “Dump No Waste-Drains to Fresh Water”, or other wording as approved by the Jurisdiction. For

new construction a Neenah Foundry Company plate NF-T1043 (or approved equal) with environmental notice shall be installed in the top of inlets that have concrete tops. For area intakes, alley drop inlets, or curb type inlets the label may be ordered as part of the grate or casting from the manufacturer. The cost to label inlets shall be included in the cost to construct the inlet.

F. Concrete:

1. Precast: comply with ASTM C478.
2. Cast in place:
 - a. Refer to Section 6010.
 - b. Minimum concrete reinforcing cover: 2 inches.
 - c. Minimum total section thickness: see detailed drawings.

G. Base:

1. May be poured in place or precast.

I. Manhole steps: Space steps at 12 inches, comply with ASTM C478.

2.02 INTAKE ADJUSTMENT RINGS (Grade rings)

- A. Comply with ASTM C478.
- B. Inside dimensions not less than bottom inside dimensions of casting.
- C. **Maximum height of ring stack:** 12 inches.

2.03 CASTINGS (Covers and Grates)

- A. **Gray cast iron:** ASTM A48, Class 35.
- B. **Type:** Section 6020, 2.03, Figure 6-8.

Sec. 6040 Part 3—Execution

- **Details for the Special Inlet of SWS-8 and DWS-12 are located in the appendix of the Supplement**
- Sec. 3.04 Sanitary Sewer Manhole Testing
 - H. Vacuum Test—Vacuum Testing shall not be required by the City of Sioux City.

DIVISION 7 STREETS AND RELATED WORK

Sec. 7010 Part 1—General

- Sec. 1.08 Measurement for payment
 - M. **Concrete thickness pay factor:**
 1. Bid amount for Portland cement concrete pavement shall be adjusted by a "Concrete Thickness Pay Factor" before final payment is made.
 2. On basis of core lengths, street pavements will be classified in the following bands:

BAND LIMITS	
Band 1	Pavement of design or greater thickness or deficient by not more than 0.25 inch.
Band 2	Pavement deficient in thickness by more than 0.25 inch, but not more than 0.50 inch.

N. Thickness cores:

9. On basis of core lengths, pavement or various sections of pavement shall be classified in following bands. Core lengths shall be measured as outlined in IM 347.

Pay Factor for Concrete Thickness	
Band	Pay Factor
1	1.00
2	.90

10. Jurisdictional Engineer shall study extent and severity of deficiencies of pavement areas thinner than Band 2. Depending on severity, Jurisdictional Engineer shall require one of following procedures.
 - a. Deficient areas shall be removed at Contractor's expense and replaced with pavement meeting contract requirements. Payment for replacement shall be as provided above.
 - b. An extended guarantee period for area in question may be negotiated with Contractor which is mutually agreeable to Jurisdictional Engineer.
 - c. Deficient pavement may be left in place with no payment.

O. Pavement smoothness:

1. Local streets and minor collectors: costs of correcting smoothness and associated traffic control shall be incidental to cost of pavement. No pavement smoothness incentive will be provided.
2. Arterials and major collectors: cost of correcting smoothness and associated traffic control shall be incidental to cost of pavement. Price reductions imposed for noncompliance with specifications will be according to Schedule B of Iowa DOT 2316. No pavement smoothness incentives will be provided unless specified in contract documents.

Sec. 7010 Part 2—Products

2.03 MIXES: IOWA DOT IM 529

- A. **Mix design:** unless otherwise specified, mix design shall be City of Sioux City (CSC) 4,000 psi limestone mix or Class C-4 mix with air entraining. If a different mix is specified in contract documents or if Contractor requests a mix different than C-4, Contractor shall submit to Jurisdictional Engineer paving mix design for approval 2 weeks prior to starting paving operations. Submittal shall contain mix number as described below and admixtures in accordance with 2.03 E. Unless otherwise specified, minimum compressive strength of mix shall be 4,000 pounds per square inch.

- B. Mix number:** mix numbers designate numerous aspects of particular mix. Following is an explanation of various aspects of mix number. For example: C-4WR-C10.
1. First letter designates class of concrete as designated in contract documents.
 2. Number indicates relationship of coarse aggregate to fine aggregate. A mix with a 4 is a 50/50 mix. The following chart shows the number within mix number and proportions of aggregates for each number:
 - 2 is composed of 40 percent fine and 60 percent coarse.
 - 3 is composed of 45 percent fine and 55 percent coarse.
 - 4 is composed of 50 percent fine and 50 percent coarse.
 - 5 is composed of 55 percent fine and 45 percent coarse.
 - 6 is composed of 60 percent fine and 40 percent coarse.
 - 7 is composed of 65 percent fine and 35 percent coarse.
 - 8 is composed of 70 percent fine and 30 percent coarse.
 3. The letters WR indicate water reducer is used in this mixture.
 4. When a C or an F is shown toward the end of the mix number, fly ash is a part of mixture and C-fly ash or F-fly ash, respectively, is used. The percentage of fly ash being used in mixture shall be designated at end of mix number.
- C. Concrete mixes:** shall meet following design targets, as per Iowa DOT 2301, IM 529. When concrete base (machine or hand finish) is specified, Class A-4 may be used as the mix with approval of Jurisdictional Engineer.

Mix	W/C Basic	W/C Max.	Cement* Min.	Water*	Entrained* Air	Fine* Aggregate	Coarse* Aggregate
City Mix (CSC)	0.337	0.3826	0.143	0.051	0.050-0.070	0.428	0.378
IDOT Mixes							
C-4	0.430	0.488	0.118	0.159	0.060	0.331	0.332
C-4WR	0.430	0.489	0.112	0.151	0.060	0.339	0.338
M-4	0.328	--	0.156	0.161	0.060	0.312	0.311
* Basic absolute volumes of materials for unit volume of concrete.							

- D. Consistency and workability:** the amount of materials used shall produce a concrete of uniform consistency, workability and satisfactory surface finish.

Paving	Type of Concrete	Slump-in		% Air Content		
		Min.	Max.	Target	Min.	Max.
Machine Finish	CSC, C-4	1/2	2-1/2	7	6	8
Hand Finish	CSC, C-4	1/2	4	7	6	8
Curb & Gutter	CSC, C-4	--	3	6-1/2	5-1/2	7-1/2
Patches with CaCl	M-4	1	3*	5	3	7
Patch with CaCl	M-4	1	3*	6-1/2	5	6
As per Iowa DOT 2301, 2511, 2512, 2529, and 2530.						
* May be increased to 4 inches if allowed to cure more than 12 hours.						

- E. Use of fly ash:** Contractor shall notify Engineer prior to making concrete mixture changes which have been approved. Mix proportions for the various mixes using fly ash are included in the Iowa DOT Materials I.M. 529.

The fly ash substitution rates shall be as follows:

FLY ASH SUBSTITUTION RATES		
Time Period	Cement Type	Fly Ash Substitution Rate by Weight
March 16 through September 14***	Type I and Type II	Not more than 15 percent
March 16 through September 14***	Type IP and Type I(PM)	Not more than 5 percent*
September 15 through October 15	Type I and Type II	Not more than 15 percent
September 15 through October 15	Type IP and Type I(PM)	None
October 16 through March 15	Type I, Type II, & Type III	None
October 16 through March 15	Type IP and Type I(PM)**	None
March 16 through October 15	Type I, Type II, or Type III used in Class M, Class F, or Class FF mixtures	Class C fly ash only at not more than 10 percent
<p>* If the cement manufacturer provides the Jurisdictional Engineer with satisfactory concrete strength and freeze-thaw durability test results equivalent to concrete with the same Type IP or Type I(PM) cement without fly ash, the substitution rate may be increased to 10 percent. The testing and acceptance criteria shall be in accordance with Materials I.M. 401.</p> <p>** Proportions of Type IP and Type I(PM) shall be increased 15 percent, by weight, during this time period.</p> <p>*** The March 16 through September 14 substitution rate may be used at any time the maturity method for monitoring concrete strength is utilized.</p>		

Fly ash shall be transported, stored, hauled, and batched in such a manner to keep it dry.

Sec. 7010 Part 3—Execution

3.04 REINFORCING PLACEMENT

E. Joint steel:

1. All joints shall be constructed of type, dimensions, and at locations required by plans or special provisions.
2. Contractor shall provide adequate means to ensure that load transfer devices and tie bars for key type joints are properly secured to maintain correct position and alignment during placement of concrete.
3. Tie bars shall be placed in such a manner as to ensure the bars are located in reasonably close conformity with specifications.
4. Care should be taken to prevent disturbance or damage of joint assembly. Bars must be supported by approved chairs or method approved by Jurisdictional Engineer.

3.14 TESTING FOR PORTLAND CEMENT CONCRETE

TESTING FREQUENCIES FOR PORTLAND CEMENT CONCRETE (Minimum Frequencies)

This table replaces the Plastic Concrete section of the table in Division 7 Section 7010 Sub-section 3.14

MATERIAL OR CONSTRUCTION ITEM	TESTS (as per IDOT requirements)	METHODS OF ACCEPTANCE OF SAMPLING & TESTING	FIELD SAMPLING & TESTING			REMARKS
			FREQUENCY (minimum)	DESIGNATED RESPONSIBLE AGENT	REPORT	
Plastic Concrete	Air Content	Field Testing	1/100 CY or min. 1/day (2)	Jurisdiction	IDOT Form 830224	1/350 CY on primary roads
	Slump	Field Testing	1/100 CY or min. 1/day (2)			
	Cylinders 6" non-primary roads	Field Testing	2/500 CY or 2/day (2)(3)		Field Book/Lab Report	
	Cylinders 6" (Structures)	Field Testing	1 per 3 structures or min 1/day (2)	Jurisdiction/ Contractor		
	Beams (Paving)	Field Testing	1/2000 CY or 2/day (2)(3)		IDOT Form 830224	May be required on federal, state and county projects
	Beams (Structures)	Field Testing	2 per section (4)		Field Book	
	Thickness	Field Testing	1/200 CY	Jurisdiction		

- (1) Gradation submittal may be required by Jurisdictional Engineer on local projects.
- (2) Use most restrictive frequency.
- (3) The two samples will be collected at the same time.
- (4) Pours greater than 25 CY per day and 75 CY per week.
- (5) If maturity method is desired, the contractor shall be responsible for developing the maturity curve for the specified mix, taking maturity readings, and delivering a copy of the results to the Jurisdictional Engineer.

3.15 DEFECTS OR DEFICIENCIES

- A. Pavement containing excessive cracks, fractures, spalls, or other defects shall be removed and replaced or repaired at no cost to Jurisdiction. Remedy to be determined by Jurisdictional Engineer. In lieu of above, an extended warranty may be approved by Jurisdictional Engineer.
- B. **Pavement thickness deficiency:** see Section 7010, 1.08
- C. **Pavement smoothness:**
 - 1. Local streets and minor collectors: finished pavements on local and minor collectors shall be checked with a 10 foot straightedge placed parallel to centerline. Areas showing high spots of more than 1/2 inch in 10 feet, shall be marked and ground down with an approved grinding tool to an elevation where area or spot will not show surface deviations in excess of 1/8 inch when tested with a 10 foot straightedge. Surface corrections will follow procedures of Iowa DOT 2316. Cost of correcting smoothness and associated traffic control shall be incidental to cost of pavement.
 - 2. Arterials and major collector projects: if required by Jurisdictional Engineer, pavement smoothness on arterial and major collectors will be measured by a profilograph, as denoted in contract documents and will follow Schedule B and related requirements of Iowa DOT 2316 and I.M. 341. No incentives for pavement smoothness will be allowed unless specified in contract documents.

Sec. 7030 Part 2—Products

- Sec. 2.07 Detectable Warnings
Detectable Warning devices installed in Sioux City shall be from ADA Solutions and yellow in color.

Sec. 7040 Part 1—General

- Sec. 1.08 Measurement for Payment
 - L. Saw cuts in existing pavement shall be paid by lineal foot. All sawcuts shall be full depth sawcuts.
 - M. Dowel bars shall be paid by each.

DIVISION 9 SITE WORK AND LANDSCAPING

Sec. 9010 Part 1—General

- Sec. 1.07 Scheduling
 - A. Notify Jurisdictional Engineer at least 24 hours prior to start of seeding operations.
 - B. Perform seeding operations after grading and planting operations (and irrigation if specified in contract) are complete as approved by Jurisdictional Engineer.

Sec. 9010 Part2—Products

- Sec. 2.01 Seed
 - C. Seed Quality: The seed provided shall exceed the following minimum requirements of purity and germination stated on a certified tag. The following mix shall be used on City Projects.

Kind of Seed	Purity	Germination
Park Kentucky Bluegrass	29.67%	85%
Kenblue Kentucky Bluegrass	9.34%	90%
Boreal Creeping Red Fescue	27.78%	90%
Brightstar II Perennial Ryegrass	26.66%	90%
VNS Annual Ryegrass	5.12%	90%
Other Crop Seeds	0.01%	
Inert Matter	1.41%	
Weed Seeds	0.01%	

Sioux City Seeding Mix	Application Rate (lb/acre)
Seed mix (Listed above)	300
13-13-13 Fertilizer	300
Wood Fiber Mulch	1,800
Tackifier	40

Sec. 9010 Part 3—Execution

- Sec. 3.05 Application of Seed-All seeding done within the City limits shall be hydraulically seeded unless otherwise specified on the plans or in the bid documents.
- Sec. 3.06 Watering-Watering not required unless specified on the plans or in the bid document.
- Sec. 3.09 Final Acceptance of Seeding
 - A. Areas seeded shall be given an initial acceptance, prior to warranty period, based upon following criteria:
 1. All requirements for completed installation and a minimum of 45 days maintenance have been provided.
 2. Seeded areas shall be in a live, healthy, growing, and well-established condition without eroded areas, bare spots, free of weeds, undesirable grasses, disease, or insects.
 3. Reseeding operations are completed.
 - B. Final acceptance may be given by Jurisdictional Engineer upon fulfillment of all items completed as required under the warranty.

Sec. 9020 Part 1—General

- Sec. 1.07 Scheduling
 - D. Notify Jurisdictional Engineer at least 24 hours prior to start of sodding operations.
 - E. Perform sod installations after planting and other work affecting the ground surface (and irrigation if specified in contract) are complete as approved by Jurisdictional Engineer.

Sec. 9020 Part 2—Products

- Sec. 2.01 Sod

- D. Mow at height of 2 inches prior to cutting. Sod to be machine cut at uniform soil thickness of approximately 5/8 inch to 3/4 inch. Thickness measurement shall exclude top growth.

Sec. 9030 Part 1—General

- Sec. 1.07 Scheduling
 - A. Notify the Jurisdictional Engineer at least 24 hours prior to start of installation of plant material

Street Lighting

Only lights that are approved and maintained by MidAmerican Energy Co. may be installed on projects/developments in Sioux City.

Pipe Embedment Details--Figure 3010.1 Sheet 3 of 3

Revised
3.6.06

		Allowable Depth of Fill above Top of Pipe						
Type of Pipe	Material	Use	**Type D Embed.	Type C Embed.	Type B Embed.	CSE Embed.	Type A-1 Embed.	
Rigid	RCP; ASTM C 76 Class III; 12"-24"	Storm, Gravity	Up to 10'	Up to 15'	Up to 19'	*	Up to 27'	
	RCP; ASTM C 76 Class III; 27"-84"	Storm, Gravity	Up to 10'	Up to 13'	Up to 18'	*	Up to 25'	
	RCP; ASTM C 76 Class IV; 12"-24"	Storm, Gravity	Up to 15'	Up to 22'	Up to 28'	*	Up to 41'	
	RCP; ASTM C 76 Class IV; 27"-84"	Storm, Gravity	Up to 15'	Up to 21'	Up to 27'	*	Up to 38'	
	RCP; ASTM C 76 Class V; 12"-21"	Storm, Gravity	Up to 23'	Up to 34'	Up to 42'	*	Up to 60'	
	RCP; ASTM C 76 Class V; 24"-84"	Storm, Gravity	Up to 23'	Up to 32'	Up to 47'	*	Up to 57'	
	RCAP; ASTM C506 (Class A III); 18"-84" Equiv.	Storm, Gravity					Up to 13'	
	RCEP; ASTM C507 (Class HE III); 18"-84" Equiv.	Storm, Gravity					Up to 9'	
	RCEP; ASTM C507 (Class VE II); 36"-84" Equiv.	Storm, Gravity					Up to 13'	
		Ductile Iron; AWWA C151 (Class 52); 4"-64"	Sanitary, Gravity					Up to 50', No Bedding Required
Semi-Rigid	Ductile Iron; AWWA C151 (Class 52); 8"-54"	Sanitary, Gravity					Up to 50', No Bedding Required	
	Extra Strength, VCP; ASTM C 700 8"-10"	Sanitary, Gravity	Up to 11'	Up to 15'	Up to 19'	Up to 22'	Up to 28'	
	Extra Strength, VCP; ASTM C 700 12"-21"	Sanitary, Gravity	Up to 9'	Up to 13'	Up to 18'	Up to 25'	Up to 24'	
	Extra Strength, VCP; ASTM C 700 24"-42"	Sanitary, Gravity	Up to 13'	Up to 21'	Up to 30'	Up to 30'	Up to 30'	
	PVC; ASTM D 3034 (SDR 23.5); 8"-15"	Sanitary, Gravity				Up to 30'	Up to 30'	
	PVC; ASTM D 2680 (Truss); 8"-15"	Sanitary, Gravity				Up to 30'	Up to 30'	
	PVC; AWWA C900 (DR18); 4"-12"	Sanitary, Force Main					Up to 30', No Bedding Required	
	PVC; AWWA C905 (DR18); 14"-24"	Sanitary, Force Main					Up to 30', No Bedding Required	
	PVC; ASTM D 3034 (SDR 35 & 26); 8"-15"	Sanitary, Gravity					Up to 30'	
	PVC; ASTM F 679 (T-1 Wall); 18"-27"	Sanitary, Gravity					Up to 30'	
Flexible	PVC; ASTM F 949; 8"-36"	Sanitary, Gravity					Up to 30'	
	PVC; ASTM F 1803 (Closed Profile); 21"-36"	Sanitary, Gravity					Up to 30'	
	PVC; ASTM F 949; 12"-36"	Storm, Gravity				Up to 30'	Up to 30'	
	HDPE; AASHTO M 294; 12"	Storm, Gravity					Up to 11'	
	HDPE; AASHTO M 294; 15"-36"	Storm, Gravity					Up to 11'	

The Fill Height for RCP is based on:

1. A soil weight of 120 lbs/ft³
2. AASHTO HS20 live load
3. Embankment Installation

* =Engineer to design and submit calculations

The Fill Height for VCP is based on a Factor of Safety of 1.2

Effective January 1, 2008

**Type D Embedment is a no bedding option

SOP for Disinfection and Bacteria Testing of New Water Mains

The basic disinfection procedure consists of:

1. Preventing contaminating materials from entering the water main during storage, construction, or repair.
2. Removing, by flushing or other means, those materials that may have entered the water main.
3. Chlorinating any residual contamination that may remain, and flushing the chlorinated water from the main.
4. Protecting the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures.
5. Determining the bacteriological quality by laboratory test after disinfection.
6. Final connection of the approved new water main to the active distribution system.

Methods of Chlorination

There are three methods of Chlorination that AWWA recognizes as acceptable. They are the tablet method, continuous-feed method, and the slug method. The method to be used for a given situation shall be determined using the following factors: length and diameter of the main, type of joints present, availability of materials, equipment required for disinfection, training of the personnel who will perform the disinfection, and safety concerns. The tablet method gives an average chlorine dose of approximately 25 mg/L; the continuous-feed method gives a 24 Hr chlorine residual of not less than 10 mg/L; and the slug method gives a 3 Hr exposure of not less than 50 mg/L free chlorine.

Tablet Method

Calcium Hypochlorite tablets shall be attached by a food-grade adhesive to the top of the main, with equal numbers of tablets at each end of the pipe length. The number of 5 g calcium hypochlorite tablets that shall be placed in each pipe during construction shall be calculated using the formula $0.0012 d^2L$ rounded to the next highest integer, where d is the inside pipe diameter in inches and L is the length of the pipe section in feet. At least one tablet shall be placed in each hydrant, hydrant branch, and other appurtenance. After installation the main shall be filled slowly at a velocity no more than 1 ft/s as to not dislodge the tablets before they dissolve. Ensure that all air pockets are removed. The chlorinated water shall remain in the main for at least 24 Hrs. If the water temperature is below 41°, the water shall remain in the main for at least 48 Hrs. There must be a detectable chlorine residual at each sampling point after the 24 or 48 hour period. This method should be used only if the pipe and appurtenances are kept clean and dry during construction.

Continuous-Feed Method

Before being chlorinated, the main shall be flushed to remove air pockets and particles at a minimum velocity of 2.5 ft/s. The dose of chlorine shall be fed at a constant rate so that the water will have not less than 25 mg/L free chlorine and shall be entered at a point of no more than 10 ft downstream from the beginning of the new main. Chlorine application shall continue until the entire main is filled with heavily chlorinated water and shall be retained in the main for at least 24 Hrs. After 24 Hrs the treated water shall have a residual of not less than 10 mg/L free chlorine.

Slug Method

Before being chlorinated, the main shall be flushed to remove air pockets and particles at a minimum velocity of 2.5 ft/s. The dose of chlorine shall be fed at a constant rate so that the water will have not less than 100 mg/L free chlorine and shall be entered at a point of no more than 10 ft downstream from the beginning of the new main. The “slug” of chlorinated water shall expose all interior surfaces to a free chlorine concentration of 100 mg/L for at least 3 Hrs. The chlorine concentration must be measured in the slug as it moves through the pipe. If at any point in the flow the concentration drops below 50 mg/L the feed shall be relocated to the head of the slug and resumed to restore the free chlorine to not less than 100 mg/L.

Clearing the Main of Heavily Chlorinated Water

Heavily chlorinated water should not remain in the pipe for more than 96 hours as it could cause damage to the pipe lining or corrosion of the pipe itself. After the appropriate retention period, the main shall be flushed until the chlorine concentration of the flush water is no greater than what is allowed in the distribution system. Which are 0.3 mg/L of free chlorine at a minimum and a maximum total chlorine level of 4.0 mg/L. The chlorinated water must be neutralized if it will reach any body of water (stream, creek, river, pond, etc). There should be no chlorine residual at the discharge of a storm sewer into a body of water. All chlorinated water being discharged to overland flow shall flow for a minimum of 1000' before entering a body of water. All chlorinated water being discharged to the storm sewer shall flow for a minimum of 2000' before being discharged to a body of water to allow for dissipation of the chlorine.

Bacteriological Tests

After final flushing, two consecutive samples taken 24 Hrs apart shall be collected from the new main after the final flushing water has set in the new main at least 16 Hrs and the chlorine residual is within the allowable levels. One sample must be collected from each hydrant located on the new main. The maximum distance between sample sites is 1200' and samples must also be collected from each end of the line and each branch.

Bacteriological samples shall be collected in sterile bottles containing sodium thiosulfate to neutralize the Chlorine in the sample.

Sampling Procedures

Take care to safeguard the sample bottles and the sample from becoming contaminated before, during, and after the time of collection. Keep the sterile sample bottles closed until ready to take the sample. Do not use a hose to take the sample. The water should be allowed to run to waste for at least 2 to 3 minutes before sampling. The sample shall be collected directly into the sample bottle and taken from a flow of water that will allow filling of the bottle without splashing. Replace the cap immediately after sampling and label the sample with the location, time, and date of sample. Samples should be delivered to the laboratory within 1 Hr of sampling or the water sample should be kept in an iced cooler or refrigerated until delivered. The time between collection and examination should never exceed 30 Hrs.

References

ANSI/AWWA C651-92 AWWA Standard for Disinfecting Water Mains

APHA/AWWA/WPCF Standard Methods for the Examination of Water and Wastewater