

**CITY OF CRYSTAL LAKE WATER MAIN CHLORINATION SPECIFICATIONS**

- DISINFECTION OF WATER MAINS SHALL BE DONE IN ACCORDANCE WITH THE STATE OF ILLINOIS STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION, CURRENT EDITION.
- THE CITY ENGINEERING DIVISION AND WATER DIVISION SHALL BE NOTIFIED 48 HOURS IN ADVANCE FOR SCHEDULING OF ANY TESTING, CHLORINATING, FLUSHING, OR SAMPLING.
- ONLY CITY WATER DIVISION PERSONNEL MAY OPERATE WATER VALVES ON LIVE MAINS.
- A WATER VALVE JUMPER IS REQUIRED TO MAINTAIN PRESSURE ON THE CHLORINATED LINES DURING THE SAMPLING PROCEDURE FOR PROPER INSTALLATION AND REQUIREMENTS SEE THE STANDARD WATER VALVE JUMPER DETAIL.
- WATER MAINS SHALL BE FLUSHED WITH A MINIMUM VELOCITY OF 2.5 FPS.
- THE INITIAL CHLORINE CONCENTRATION SHALL BE 50 mg/L WITH A MINIMUM 24 HOUR RESIDUAL OF 25 mg/L.
- THE METHOD OF CHLORINE APPLICATION SHALL BE APPROVED BY THE CITY:
  - LIQUID CHLORINE WITH CHLORINATING DEVICE WITH BACKFLOW PREVENTER.
  - CHLORINE BEARING COMPOUNDS IN WATER.
  - TABLET DISINFECTION.
- ALL NEW VALVES AND HYDRANTS SHALL BE OPERATED WHILE LINE IS BEING CHLORINATED.
- THE CITY ENGINEERING DIVISION SHALL DETERMINE LOCATION AND QUANTITY OF CORPORATION STOPS FOR FLUSHING AND CHLORINATING.
- THE FINAL FLUSHING RESIDUAL IN THE NEW CHLORINATED LINES SHALL BE BETWEEN 0.2 AND 2.0 mg/L.
- ALL WATER SAMPLES SHALL BE COLLECTED ON TWO (2) CONSECUTIVE DAYS AND PASS BACTERIOLOGICAL TEST RESULTS. IN THE EVENT THAT THE FIRST SET OF SAMPLES TAKEN TWO (2) CONSECUTIVE DAYS APART FAIL TO PASS, ANOTHER SET OF SAMPLES MAY BE TAKEN TWO (2) DAYS APART (PER STATE SPECS). IF THE SECOND SET FAILS TO PASS TESTING, THEN THE PROCEDURE MUST BE REPEATED WITH THE MAIN BEING RECHLORINATED, REFRESHED, AND RESAMPLED.
- STATE CERTIFIED LAB MUST BE USED FOR SAMPLES.

CHLORINE REQUIREMENTS TO PRODUCE 50 mg/L CONCENTRATION IN 100 FEET OF PIPE-BY DIAMETER

PIPE SIZE IN INCHES	100% CHLORINE, LB.	1% CHLORINE SOLUTION, GALS.
4	0.027	0.33
6	0.061	0.73
8	0.105	1.30
10	0.170	2.04
12	0.240	2.88

NUMBER OF 5-GRAIN HYPOCHLORITE TABLETS REQUIRED FOR A DOSAGE OF 50mg/L PER LENGTH OF PIPE SECTION

PIPE SIZE IN INCHES	LENGTH OF PIPE SECTION IN FEET			
	UP TO 15	16	20	40
2	1	1	1	1
4	1	1	2	2
6	2	2	3	4
8	2	3	5	6
10	3	5	7	9
12	5	8	10	14

Approved: City Engineer

*Victor C. Ramirez, P.E.*  
Director of Engineering and Building

Drawing Name

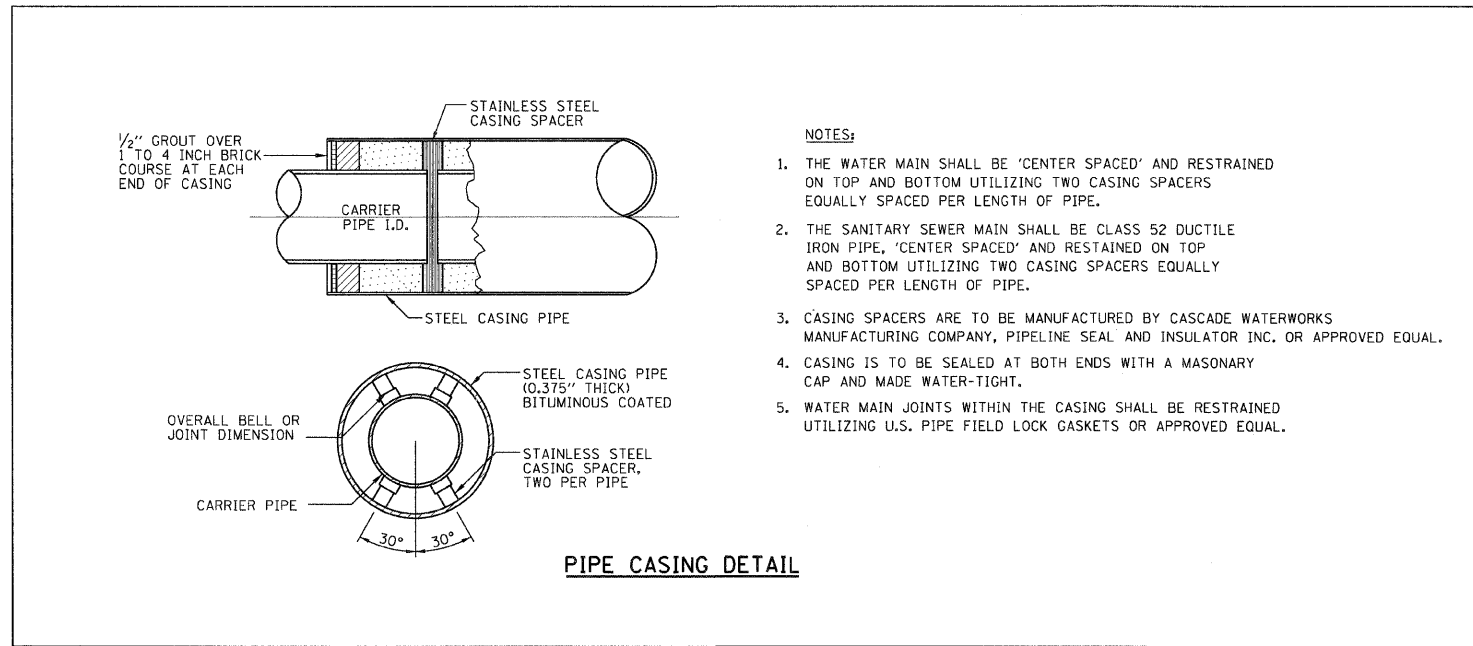
**CHLORINATION SPECIFICATIONS**

Drawing Number

UW-08

Date: 4/18/2007

Drawn: EM  
Checked: LZ



**NOTES:**

- THE WATER MAIN SHALL BE 'CENTER SPACED' AND RESTRAINED ON TOP AND BOTTOM UTILIZING TWO CASING SPACERS EQUALLY SPACED PER LENGTH OF PIPE.
- THE SANITARY SEWER MAIN SHALL BE CLASS 52 DUCTILE IRON PIPE, 'CENTER SPACED' AND RESTRAINED ON TOP AND BOTTOM UTILIZING TWO CASING SPACERS EQUALLY SPACED PER LENGTH OF PIPE.
- CASING SPACERS ARE TO BE MANUFACTURED BY CASCADE WATERWORKS MANUFACTURING COMPANY, PIPELINE SEAL AND INSULATOR INC. OR APPROVED EQUAL.
- CASING IS TO BE SEALED AT BOTH ENDS WITH A MASONRY CAP AND MADE WATER-TIGHT.
- WATER MAIN JOINTS WITHIN THE CASING SHALL BE RESTRAINED UTILIZING U.S. PIPE FIELD LOCK GASKETS OR APPROVED EQUAL.

**SANITARY SEWER:**

- Non-shear stainless steel couplings shall be used when connecting sewer pipes of dissimilar materials and pipes with no hub joints. When connecting to an existing sanitary sewer by means other than an existing wye or manhole, contractor shall use a Shower-Tap and hub-wye or hub-toe saddle.
- Unless an alternate method is approved, water stop gaskets shall be provided at all sanitary sewer manhole connections. Type and manufacturer to be approved by the City.
- PVC plastic sewer pipe and fittings of sizes 4-inch through 16-inch shall conform to the latest revised specification requirements of ASTM D2284 for type PSM polyvinyl chloride (PVC) sewer pipe and fittings of minimum wall thickness SDR 25.
- Joints shall be either the solvent weld type conforming to the latest revised specification requirements of ASTM D2284 and ASTM D2855, or elastomeric gasket type conforming to the latest revised specification requirements of ASTM D1999 and ASTM D3212.
- A thicker welded pipe such as SDR 29 may be specified by the engineer depending on design and/or field conditions.
- PVC plastic sewer pipe and fittings of sizes 16-inch through 36-inch shall conform to the latest revised specification requirements of ASTM F179 or polyvinyl chloride (PVC) large diameter ribbed gravity sewer pipe and fittings, with integral ball gasketed joints and elastomeric gaskets to form a watertight seal conforming to the latest revised specification requirements of ASTM F477 or ASTM D3212.
- Pipe and fittings shall be the products of one approved manufacturer only, and there shall not be any mixing of pipe and fittings of different manufacturers.
- The handling and installation of pipe, assembly or joints, and manhole connections shall be in accordance with the manufacturer's recommendations.
- Gasket type waterstop collars consist of a neoprene collar and a stainless steel band or other approved manhole waterstop shall be installed wherever the pipe passes through the manhole walls to provide a watertight joint to prohibit infiltration into the sewer system.
- PVC pipe shall be installed in accordance with the latest revised specification requirements of ASTM D2221 using either compacted class 1 or class 2 granular embankment materials for bedding, haunching and initial backfill of 12 inches over the top of pipe to provide the necessary support for the pipe so that the maximum deflection does not exceed five percent (5%) of the pipe's original internal diameter.

- The Contractor shall provide the necessary tools and equipment and perform the work necessary to test the deflection in the initial 1,200 feet of installed sewer and not less than ten percent (10%) of the remainder of the sewer project at random locations selected by the engineer no sooner than 30 days after backfilling has been completed. In the event that deflection exceeds the maximum limit of five percent (5%), the Contractor shall test all other new flexible pipe for deflection. Deflection shall be tested by use of either a mandrel or rigid ball having a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe, and the test shall be performed without using mechanical pulling devices. Whenever the deflection limitation is exceeded, the contractor shall unroll the pipe, carefully replace compacted embankment and backfill material, and retest for deflection.
- The Contractor shall subject all sanitary sewers, including service lines, to an air test. Allowable infiltration shall not exceed 100 gallons per inch diameter of pipe per mile per day. Following testing, coat for televising, and testing shall be the responsibility of the Contractor.
- Cast Iron Soil Pipe: service weight cast iron soil pipe and fittings conforming to C.I.S.P. Specification HS-67 with compression type rubber gasket joints conforming to ASTM specification C364, or other suitable materials approved by the City Engineer.

Approved: City Engineer

*Victor C. Ramirez, P.E.*  
Director of Engineering and Building

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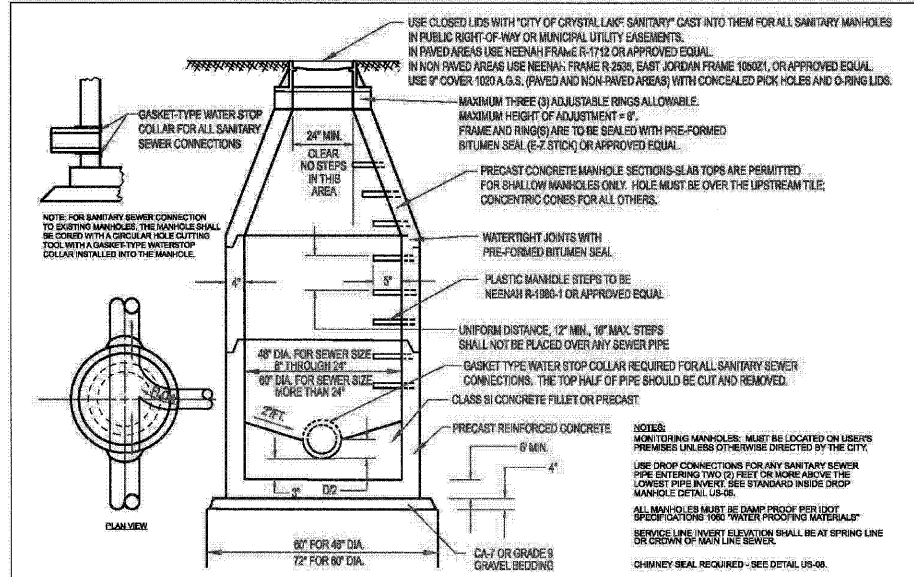
**STANDARD NOTES AND SPECIFICATIONS**

Drawing Number

GE-02c

Date: 6/1/2007

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Approved: City Engineer

*Victor C. Ramirez, P.E.*  
Director of Engineering and Building

Drawing Name

**STANDARD SANITARY AND MONITORING MANHOLE**

Drawing Number

US-04

Date: 11/2/2007

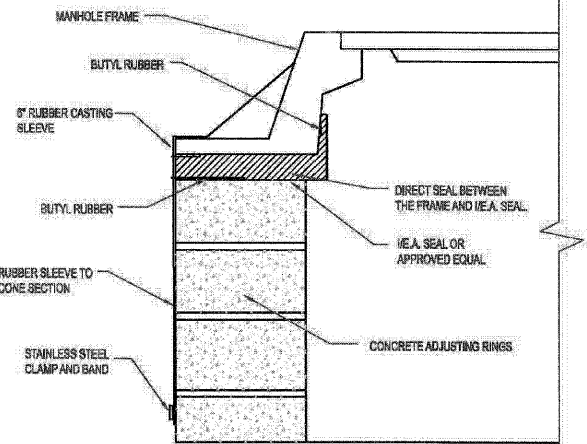
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**INTERNAL / EXTERNAL CHIMNEY SEAL**

ALL SANITARY MANHOLES SHALL BE INSTALLED WITH AN INTERNAL / EXTERNAL CHIMNEY SEAL WITH A RUBBER SLEEVE TO SEAL THE OUTSIDE OF THE CHIMNEY FROM THE TOP OF THE CORBEL TO THE MANHOLE FRAME. THE SEAL SHALL BE INSTALLED PER THE INSTALLATION INSTRUCTIONS AND AS DIRECTED BY THE ENGINEER.

CHIMNEY SEAL TO BE ADAPTER INC. BRAND OR APPROVED EQUAL. THEY SHALL BE INSTALLED DURING CONSTRUCTION AND SET TO FINAL GRADE. ANY STRUCTURE THAT IS IN THE ROADWAY MUST BE RAMPED UNTIL FINAL SURFACE IS PLACED.



Approved: City Engineer

*Victor C. Ramirez, P.E.*  
Director of Engineering and Building

Drawing Name

**INTERNAL / EXTERNAL CHIMNEY SEAL**

Drawing Number

US-08

Date: 4/18/2007

Drawn: EM  
Checked: TH



REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
F.A.P. ROUTE 336  
IL RTE 31 AND IL RTE 176

**WATER MAIN & SANITARY SEWER DETAILS**

SCALE: NTS  
DATE: 02/10/2012

DRAWN BY: BCD  
CHECKED BY: BOH