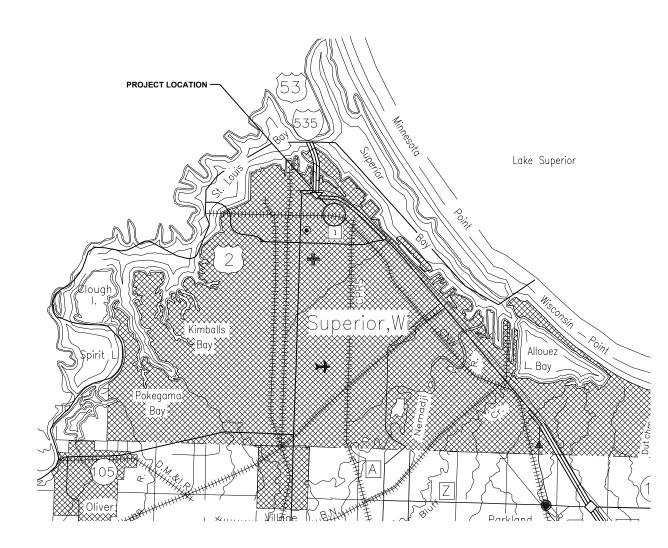
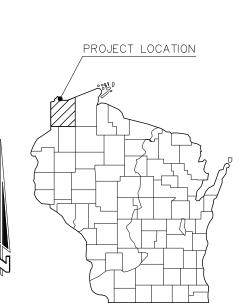
# ROSEWOOD TOWNHOMES SANITARY SEWER RELOCATION

## SUPERIOR, WISCONSIN

### KOA PROJECT NO. 111033





LEGEND

SEWER

SEWER

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ROAD CENTERLINE

SANITARY SEWER

STORM SEWER

SANITARY MANHOLE

STORM MANHOLE

TELEPHONE PEDESTAL

ELECTRICAL PEDESTAL

POWER POLE

GUY WIRE

BOLLARD

PROPOSED SANITARY SEWER

UNDERGROUND TELEPHON

PROPOSED SANITARY MANHOLE

### INDEX

SHEET TITLE TITLE SHEET PROPOSED SITE LAYOUT

CITY OF SUPERIOR MIN. STANDARDS FOR GRAVITY SEWER CONSTRUCTION SHEET NUMBER T1.0 C1.0

C2.0

C2.0

GOVERNING SPECIFICATIONS

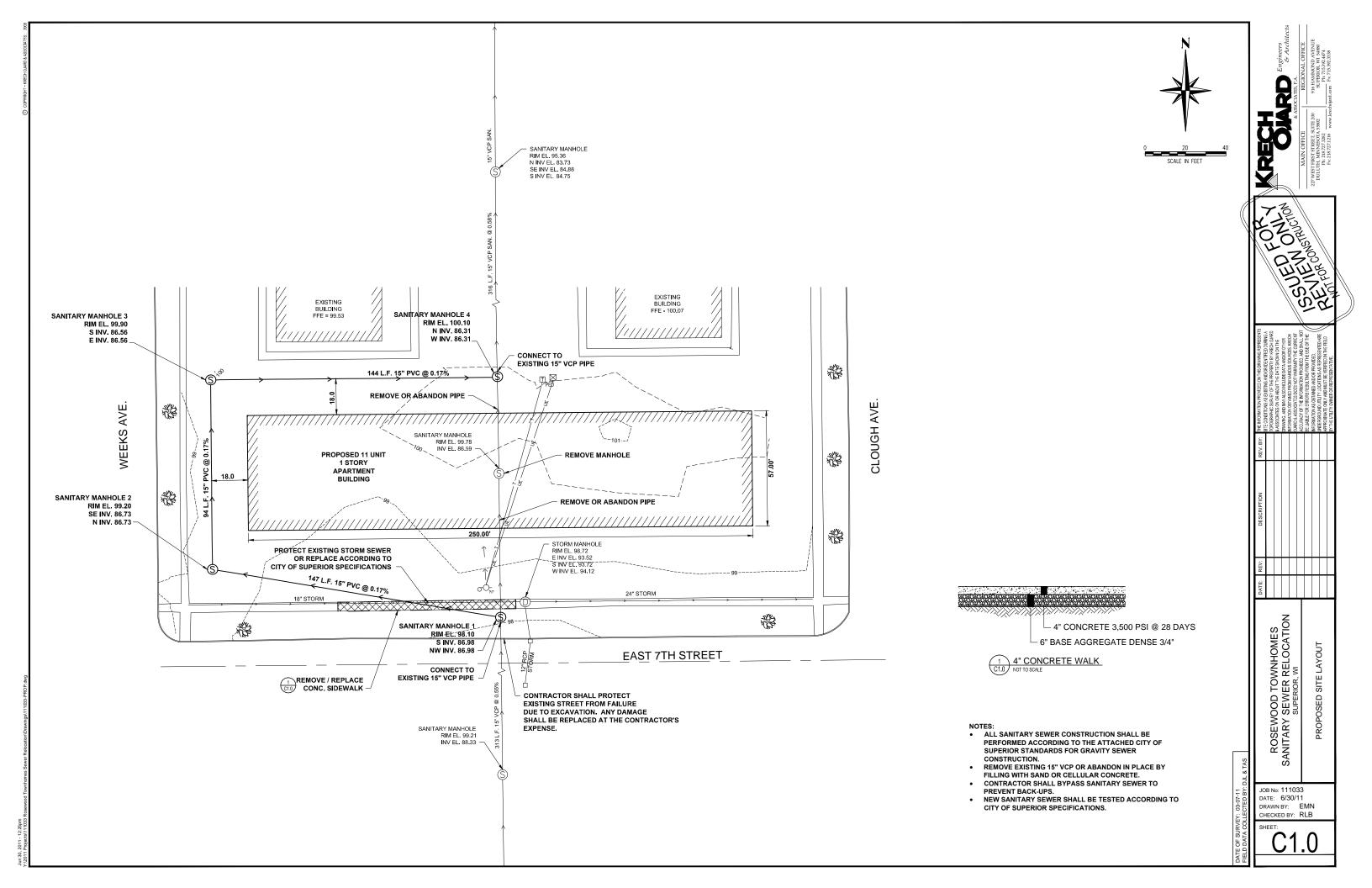
STATE OF WISCONSIN (WISDOT) "STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION" 2010 EDITION, AND CITY OF SUPERIOR MINIMUM STANDARDS FOR GRAVITY SEWER CONSTRUCTION SHALL APPLY.

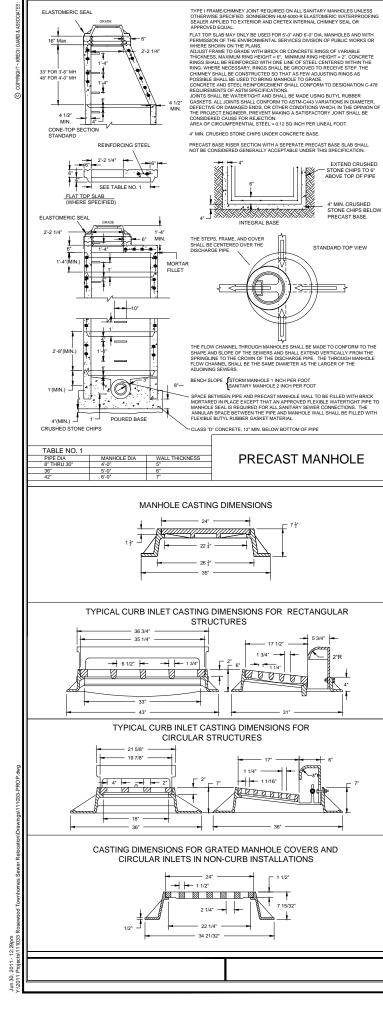


Toll Free (800) 242-8511 Milwaukee Area (414) 259-1181 Hearing Impaired TDD (800) 542-2289 www.DiggersHotline.com

CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND
ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC
FEATURES PRIOR TO THE START OF CONSTRUCTION. THE
CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF
ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.

			Envineers	& Architects		REGIONAL OFFICE		916 HAMMOND AVENUE SUPERIOR, WI 54880	Ph: 715.392.4474	om Fx: 715.392.3338		
					& ASSOCIATES, P.A	MAIN OFFICE		227 WEST FIKST STREET, SULTE 200 DULUTH, MINNESOTA 55802	Ph: 218.727.3282	Fx: 218.727.1216 www.krechojard.com Fx: 715.392.3338		
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	DATE: REV:											
	ROSEWOOD TOWNHOMES SANITARY SEWER RELOCATION SUPERIOR, WI						TITLE SHEET					
	JOB No: 111033 DATE: 6/30/11 DRAWN BY: EMN CHECKED BY: RLB SHEET: T1.0											





### GENERAL The Contractor shall comply with the following. In case of conflict, the first listed standard shall take precedence. 1. Comply with all applicable Sections of Wisconsin Administrative Code.

- Comply with all applicable Sections of City of Superior Administrative Code. Comply with all applicable Sections of "Standard Specifications for Sewer & Water Construction in Wisconsin, Fifth Edition with Addendum No.1 and No.2". Requess Requests
- for copies of the "Standard Specifications" should be forwarded to: Public Works Industry Improvement Program, 2835 North Mayfair Road, Milwaukee, Wisconsin 53222 or requested by telephone at (414) 778-1050.
- Comply with all applicable Sections of "State Of Wisconsin Department Of Transportation Standard Specifications for Highway and Structure Construction
- DIAMETER

- Sewers shall be sized sufficient for future extension in accordance with City of Superior

- Sewer Service Area Planning and shall not be less than 8 inches in dian

SLOPE

LINE AND GRADE

pproval of the ESD.

STORM PIPE AND JOINT MATERIALS

CULVERT PIPE AND JOINT MATERIALS

ceptance by the ESD, except in relay work.

vise enerified

e following are minimum standards for nonpressure pipe:

PIPE & FITTING MATERIALS

the approval of the ESD.

REJECTION OF PIPE MATERIALS

DEPTH

Sewers shall be laid with uniform slope between manholes. All sewers shall be designed

were statut be had with uniform slope between manifolds. An severe statut be desp id constructed to give average velocities of not less than 2 feet per second. Minimu isign slope shall be as shown below. Sewers on slopes of 20% or greater shall be proved on a case by case basis by the Environmental Services Division of Public orks (ESD) and shall be anchored securely with concrete anchors.

Line and grade shall be controlled and maintained by use of a laser beam. Grade boards

Materials used in open trench construction of nonpressure sanitary severs shall be restricted to the following: Reinforced Goncrete Pipe (RCP), Ductile from Pipe (D), and Polyvinyl Chindle Pipe (PVC). All material used for sanitary sever construction shall be free from defects that impair service. Each length of pipe and fitting used in a sanitary sever shall be stamped or indelibyl marked with the manufacture's name or mark. The

substitution of any other type of pipe, or monolithic section, may only be used with the

STORM PIPE AND JOINT MATERIALS Materials used in open trench construction of storm sewers shall be restricted to the following: RCP and Polyethylene Pipe with a smooth liner and corrugated exterior (PE). All material used for storm sewer construction shall be free from defects that impair service. Each length of pipe and fitting used in a storm sewer shall be stamped or indelibly marked with the manufacturer's name or mark. The substitution of any other type of pipe, or monolithic section, may only be used with the approval of the ESD.

Coll Very Fire AND Joint MATERNES. Materials used in construction of culverts shall be restricted to the following: RCP, PE, and Corrugated Steel Culvert Pipe (CSCP). The substitution of any other type of pipe may only be used with the approval of the ESD. All material used to culvert construct shall be free from defects that impair service. Each length of pipe and fitting used in a culvert shall be stamped or indefiby marked with the manufacturer's name or mark.

FITTINGS FOR ALL BUILDING SEWER (LATERAL) CONNECTIONS Fittings for all building sewers shall be factory-fabricated wyes, unless otherwise specified on the plans. These fittings shall be placed at an angle of 45 degrees above the building the place of the place place of the place in dispersion to place the place in the place to place the place of the place to pl

izontal unless otherwise specified. On sewers 12 inches or larger in diameter, tees

may be substituted for wyes. The wye or tee shall have a diameter of 6 inches unless

connect any building sewers or drains to new sewers or manholes prior to their

otherwise specified. Fittings on the main sewer for the construction of risers shall be in-line, factory fabricated tees placed with the branch vertical. The Contractor shall not

Polyvinyl Chloride (PVC) bell and spigot sewer pipe shall meet the requirements of ASTM D3034 (1981). PVC shall be type PSM SDR-35 unless otherwise specified.

Joints shall be rubber gasket bell and spigot joints conforming to ASTM C443 (1979

Joints shall be rubber gasket bell and spigot joints unless otherwise specified

Reinforced Concrete Pipe (RCP) bell and spigot sewer pipe shall meet the requirements of C76 (1982). RCP shall be Class III unless otherwise specified

Steel Pipe shall be welded from steel plate or spiral welded from steel coil. The

Steel rpg shall be welced from steel plate of spiral welced from steel coll. In minimum yield strength shall be 36,000 psi. For casing pipe the minimum wall thickness shall be 0.625 inches. The minimum inside diameter of the steel cas shall be not less than 8 inches greater than the maximum outside diameter of carrier pipe. The steel casing pipe shall be epoxy coated on inside and outside

surfaces. <u>Ductile [ron [0]]</u> bell and spigot sewer pipe, fittings, and joints shall meet the requirements of AWWA C100 (1977). <u>Corrugated Polyethylene Pipe (PE)</u> with a smooth liner shall conform to ASTM F894 or AASHTO M294, Type S. PE pipe conforming to ASTM F894 shall be not less than Class 100 (Ring Stiffness Constant = 100) and carrier pipe shall be not less than Class 100. Joints shall be waterlight, bell and spigot type with nubber gaskets conforming to ASTM F477. Soli-tight joints which are not waterlight are not adequate under these specifications. Pipefittings shall conform to ASHTO M294 or ASTM F894. Fittings shall be suitable for specified pipe joints. PE pipe shall conform to ASHTO F894 (c.) Solicitie as manufactured by Chervon Jor ASHTO

no: in rose, runnings snaii oe suitable tor specified pipe joints. PE pipe shall conform to ASINTO M294, rype S (e.g. Hancor Blue Seal as manufactured by Hancor Corporation). Corrugated Steel Culver Pipe (CSCP), shall be industry standard galvanized corrugated steel culver pipe. Corrugations shall be 2.02 inches by 3/-inch. Steel trickness shall be 0.652-inch for 8-inch diameters pipe and 0.664-inch for diameters from 10 to 48 inches. Joints shall be industry standard connecting bands subject to the acrocrute of the ESC.

pe shall be subject to rejection for failure to conform to any requirement of the edifications or for any of the following reasons: Fractures or cracks passing through the pipe wall or socket, except that a single crack not exceeding 2 inches in length at either end of the pipe or a single fracture in the socket not exceeding 3 inches in width nor 2 inches in length shall not be considered cause for rejection unless these defects exist in more than 5% of the entire shipment or delivery. Chips or fractures on the interior of the pipe exceeding 2 inches in length, 1 inch in width or a factor provide the source of the pipe exceeding 2 inches in length, 1 inch in width or a factor provide the source based of the pipe exceeding 2 inches in length, 1 inch in width or a factor provide the pipe the source of the pipe exceeding 2 inches in length, 1 inch in width or a factor prove the pipe the pipe exceeding 2 inches in length, 1 inch in width or a factor prove the pipe the p

Defects that indicate imperfect proportioning, mixing, and molding. Variations of more than 1/8 inch per linear foot in alignment of a pipe intended to be

straight. nsecure attachment of spurs. Damaged ends, where such damage would prevent making a satisfactory joint. Cracks, splits, or damage of any kind which may impair the watertight integrity of testin spice.

ALIGNMENT All pipes shall be laid uniformly to line and grade so that the finished sewer will present a uniform bore. Noticeable variations from true alignment and grade will be considered sufficient cause for rejection of the Work.

CITY OF SUPERIOR MINIMUM STANDARDS FOR GRAVITY

SEWER CONSTRUCTION

with, or a depth more than 1/2 the barrel thickness. Cracks sufficient to impair the strength, durability, or serviceability of the pipe. Defects that indicate impediect proportioning, mixing, and malating

Pipe shall be subject to rejection for failure to conform to any requirement of the

Sewer Size Minimum Slope %

0.25

nd banjo strings are not acceptable under this specification ANITARY PIPE AND JOINT MATERIALS

8" 0.45 10" 0.32

Sewers shall be laid at a depth sufficient for future extension in accordance with City of

Superior Sewer Service Area Planning. Sewers shall be laid at a depth to prevent ezing and to provide gravity basement drainage for sanitary w

Lift thickness for bedding materials shall not exceed 12 inches. Bedding shall be compacted by hand, or mechanically compacted by equally careful means, to a minimum of 90% of Standard Proctor Density. Pipe bedding shall be as

JOINT ASSEMBLY OF POLYETHYLENE AND POLYVINYL CHLORIDE

Lubricated spigot end shall be inserted into receiving pipe bell until marked line

Lubricated spigot end shall be inserted into receiving pipe beil until marked into s even with edge of bell. Assembly resulting in over-insertion, rolled gaskets, split bells, failure to pass acceptance testing or damage to previously assembled joints will be considered sufficient cause for rejection of the Work.

COUPLINGS Where pipe couplings are required to join pipes of dissimilar material, they shall be fully stainless steel shielded rubber couplings intended for underground use. Clamps shall be nut-and-boit clamps; worm-drive or T-Boit clamps shall not be generally acceptable under this specification. Couplings shall be Flex-Seal Adjustable Repair Couplings as manufactured by Mission Rubber Company or FSD approved and

RCP

COUPLINGS

Plastic Pipe Plastic pipe, including but not limited to PVC and PE, shall be ding material of Crushed Stone Chips placed below and around the pipe up to the spring line in such a manner as to provide adequate side support and to prevent lateral movement of the pipe. A layer of Crushed Stone Chips shall be spread over the bottom of the trench so that after the pipe has been placed thereon, imbedded to grade, and aligned, there emains a 4 inch minimum depth of Crushed Stone Chips below the pipe barrel and a minimum of 3 inches below the bell for pipe 36 inches in eter or smaller and a minimum of 6 inches below the pipe for diameters 36 inches or larger. If excavation has been carried deeper than 6 inches below the pipe barrel, the excess depth shall be filled with Backfill Concret or Crushed Stone. Care shall be taken to insure that the pipe does not re of Crushed Stone. Care shall be taken to insure that the pipe does not rear directly on the bell but is uniformly supported through its entire length. Wood foot blocks of 2-inch minimum thickness may be used at joints of pipe

Wood foot blocks of 2-inch minimum thickness may be used at joints of pi 36 inches in diameter and larger provided that the bedding material is mechanically compacted under the lower 90 degree quadrant of the pipe. Supporting blocks are not permitted under pipe less than 36 inches in

RCP pipe shall be bedded according to the specifications for plastic

DI sewer pipe shall be bedded according to the specifications for plastic be, except that bedding material may be Crushed Stone Chips or Cover

4. <u>CSCP</u> CSCP shall be bedded according to the specifications for plastic

mechanical compaction of rock, boulders, large cobble stones, or pea gravel of which 85% to 100% of particles have been fractured by crushing operations.

CRUSHED STONE CHIPS Crushed Stone Chips shall mean granular material resulting from the

Crushed Stone Chips shall consist of clean, hard, tough, durable materia

acceptable under this specification

Sieve Size % Passing % Passing

90 -100 20 - 55

0 - 15 0 - 10

Crushed Stone Chips

No. 30

C-33 Size 4

COVER

Crushed Stone

d as cover

COVER MATERIAL

No. 200

equirements under this specification

Sieve Size Percent Passing

PREPARATION OF SUBGRADE

85-100

Sieve Size Percent Passing

90-100

amped to a minimum of 90% of Standard Proctor Densi

20-55

CRUSHED STONE

crushed from bedrock, dolomite, or granite as in the opinion of the ESD are

suitable. 3/4" Crushed Stone Chips corresponds with ASTM C-33 Size 67 or DOT 501.2.5.4.4 Size 1. "Crushed Pea Gravel" or "1 Inch Minus" are generally

90 -100

Crushed Stone shall mean granular material resulting from the mechanica

ompaction of rock, boulders, or large cobble stones, of which substantially all faces

have been fractured by crushing operations. Crushed Stone shall consist of clean, hard, bugh, durable, angular material crushed from bedrock, dolomite, or granite as in the opinion of the ESD are suitable. Crushed Stone corresponds with ASTM

Lift thickness for pipe cover shall not exceed 12 inches. Cover shall be mechanically

Plastic Pipe Plastic pipe, including but not limited to PVC and PE, shall be laid

terial or Crushed Stone Chins placed in not less than

with Cover Material or Crusted Stone Chips placed in not less than two stages, one to the top of the pipe and the other to a level at least 5 inches above the pipe for sizes 35 inches in diameter or smaller and to a level at least 12 inches above the pipe where the pipe is larger than 36 inches in diameter. Material shall be placed by hand or equally cardiul means. In order to provide lateral support for the pipe, each stage of cover shall be compacted by hand or mechanical tamping to a minimum of 90% Standard Proctor Density. If the remaining backfill material contains large rocks or boulders, the second stage of cover shall be increased to a level 12 inches above the pipe. RCP\_RCP hall be covered according to the specifications for plastic pipe, except where pipe 36 inches in diameter or larger is installed, Granular Backfill may be used as cover.

S. <u>DI</u> DI sewer pipe shall be covered according to the specifications for plastic pipe, except that the cover material shall the same material used for bedding material. <u>L CSCP</u> CSCP shall be covered according to the specifications for plastic pipe.

Cover material shall consist of durable particles ranging in size from fine to course in

All undesirable material such as organic soils, etc., which cannot adequately suppor

the manhole shall be removed below the normal manhole bottom and replaced with

Where distance to stable ground is excessive, the ESD reserves the right to order other

types of foundation such as an additional poured base as deemed nec

substantially uniform combination. DOT % Inch Dense Graded Base Course 305.2.2.1 is generally acceptable under this specification. Sand does not meet the gradation

Excess concrete shall not be deposited around the manhole in such a manner that will interfere with possible future connections. The pipe shall be supported on brick or solid concrete blocks for the pouring of the concrete base. The oncrete support for rigid pipe shall end in a vertical plane flush with the face of the pipe bell.

ee chall he as follow

MANHOLE BASES

Separate Concrete Base Slab Separate concrete base slabs shall not generally

crete manhole bases shall be as follows: <u>Precast Manhole With Integral Base</u> The excavation shall be made deep enough so that after the bottom manhole barrel section with the integral base has been placed thereon, set to grade, and plumbed, there remains a minimum depth of bedding material below the bottom of the base equal to the depth of bedding material of the adjacent servers. The annular space between the manhole excavation and the outside manhole wall shall be backfilled with bedding material up to the spring line of the incoming nine.

up to the spring line of the incoming pipe. <u>Field Poured Base For Precast Manhole</u> The Precast Manhole bottom barrel shall be set on concrete brick or solid block so that the bottom of this section is

below the Invert of the outlet sewer. The manhole base shall substantially

below the spring line of the outlet pipe, set for proper location and plumbed. The concrete base of Class D concrete shall have a minimum thickness of 12 inches

conform to the required shape and dimensions; the excavation shall be back formed, if necessary, to achieve this end. If excavation in stable soil has been

carried below the required depth, such excess depth shall be filled with concrete

PIPE TO MANHOLE CONNECTION

FLOW CHANNEL The flow channel through manholes shall be made to conform to the shape of the connecting sewers and shall extend vertically from the springline to the crown of the discharge pipe. A minimum uniform drop of 0.10 feet shall be provided in the flow proven the entering sewer and the discharge sewer. The through mar inel shall be the same diameter as the larger of the adjoining sewers. 

DROP HIPE An outside drop pipe shall be provided for a sewer entering a manhole where the invert elevation of the entering sewer is 2 feet or more above the springline of the outgoing sewer. The entire drop pipe connection shall be encased in concrete. Th drop pipe shall be the same diameter as the incoming sewer unless otherwise specified. An inside drop pipe shall not be used without the approval of the ESD.

NTERNAL CHIMNEY SEAL Connection shall be water tight in all manholes. Penetrations in manholes shall be cored or preformed.

The manhole connection of pipe sewers shall be accomplished by one of the

llowing: Nonflexible Connections of Rigid Pipe When rigid pipe is connected to a concrete brick, block, or present manhoe within the manhole base, it shall be supported on brick or solid concrete clocks for the pouring of the concrete base. The concrete of the base shall be extended under the pipe and end in a vertical plane flush with the face of the pipe bell. Where pipe enters the manhole above the manhole base, it shall be supported from the wall of the manhole to the face of the first pipe joint bell with a wall of backfill concrete, brick, or solid concrete block columns. Connections shall be as follows:

ELASTOMERIC SEALER MORTAR

performed under the obs

specification

HIMNEY

wells, and cold shuts.

ck columns. Connections shall be as follows: a. <u>Sanitar</u>, When connecting rigid pipe to a precast manhole the connection shall be by means of an approved flexible waterlight pipe to manhole seal for pipe diameters up to 24 thches in 48-inch manholes. This seal shall meet the physical requirements of ASTM C923. Larger diameter pipe connections shall be as shown on the Contract Drawings. Connections of rigid pipe to brick or block manholes shall be by means of

Connections of rigid pipe to brick or block manholes shall be by means of brick and mortar. A minimum of water shall be added to the mortar to produce a lumpy texture. Mortar shall be packed in and troweled dft. b. <u>Storm</u> When connecting rigid pipe to storm manholes, the connection shall be by means of brick and mortar. <u>Texbible Connection of Pipe</u>. All plastic pipe shall be connected to Precast Manholes by means of an approved flexible wateringht pipe to manhole seal. This seal shall meet the physical requirements of ASTM C-443 and the performance requirements of ASTM C-425 and C-433. Pipe entering a manhole through this seal shall not be rigidly supported as required for nonResible connections. To maintain the seal flexibility that portion of the annular space between the pipe and the manhole wall shall be plugged with buyl rubber gasket material prior to the placing of concrete in the manhole. material prior to the placing of concrete in the manhole

BULKHEAD Unless otherwise specified, bulkheads shall be constructed to form a watertight 8-inch

thick wall of mortar and of either clay brick or concrete brick MANHOLE MATERIALS

does not exceed the depth of the joint. Defects that indicate imperfect proportioning, mixing, and molding. Surface defects indicating honeycombed or open texture. Defective or damaged ends, where such defect or damage would prevent making

Defective or damaged ends, where such defect or damage would prevent making a satisfactory joint. Manhole steps out of line or not properly spaced. Defects allowing infiltration. The internal diameter of the manhole section shall not vary more than one percent from the nominal diameter. Any variation in diameter which would prevent making a satisfactory joint shall be considered cause for rejection. Any continuous crack having surface width of 0.01-inch or more and extending for a length of 12 inches or more regardless of position in the section wall.

MANHOLE DIAMETER The minimum diameter of manholes shall be 48 inches. Larger diameter manholes shall be used as indicated on the plan and profile drawings.

equally spaced vertically in the completed manhole at a design distance of 16 inches on center and shall be centered over the discharge pipe. The steps shall project a minimum clear distance of 4 inches from the wall of the riser

Steps shall be Steel Reinforced Plastic Manhole Steps or Grav Cast Iron Manhole

 Steel Reinforced Plastic Manhole Steps\_shall be made with an approved plastic

 such as copolymer polypropylene reinforced with a ½-inch diameter deformed

Gray Cast Iron Manhole Steps shall be made of gray cast iron and shall have minimum cross sectional dimension (diameter) of 1 inch in any direction.

The manhole frame shall be set at the elevation given on the plan or, when no such elevation is given, they shall be set as follows: 1. <u>Within A Traveled Roadway</u>. Within a traveled roadway or in the shoulders of a highway, the top of the manhole frame shall be set %-inch below the shoulder or

pavement surface. In Other Locations. In other locations, the top of the frame shall be set at the proposed or established grade, whichever is higher.

MANHOLE STEP ALIGNMENT, SPACING, AND PROJECTION Manhole Steps shall be installed in all manholes and structures in excess of 4 feet deep, and be aligned so as to form a continuous ladder with the Manhole Steps

r cone section measured from the point of embedmen

GRADES FOR SETTING MANHOLE FRAMES

MANHOLE STEPS

einforcing bar

Sanitary manholes shall be precast concrete. Risers and tops shall conform to ASTM C-478.

REJECTION MANHOLE RISERS AND TOPS Precast manhole risers and tops shall be subject to rejection for failure to conform to any of the specification requirements. In addition, individual sections of manhole ers and tops may be rejected because of any of the following reasons Fracture or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

immer 2: dimension particular and a maximum height of 16 inches, constructed of precast concrete adjusting rings all be built on top of the corbet section or flat slab up to the elevation at which the frame is set. The chimney shall be constructed that as few adjusting rings are possible shall be used to bring the manhole to grade.

AUUS ING KINGS Concrete adjusting rings shall substantially conform to the diameter dimensions of the respective manhole corbel and shall have height of 2 to 5 inches. Concrete adjusting rings shall be reinforced with No. 2 reinforcing rod centered within the ring. Cracks, exposed bar, or other damage or defect; shall be considered cause for rejection of adjusting rings. The Contractor shall wire brush and wipe clean adjusting rings to remove surface contaminants prior to placement and shall moisten the adjusting rings to receive

All manhole and inlet castings shall conform to the requirements of ASTM A-48, Class No. 30-B and shall be free from cracks, holes,

Jans, and color situits. <u>Standard Manhole Castings</u> Castings shall be Neenah R-1670, East Jordan Ironworks 112021 or ESD approved equal. Standard manhole castings where frames with grated manhole covers are required, castings shall be Neenah R-2500 or ESD approved equal. Covers shall be "Self Sealing", "T-Seal" or "Gasket Sealed" covers with "SANITARY" or "STORM" labels as

Bolt Down Manhole Castings Bolt down castings shall be Neenah R-1916-D or ESD approved equal, and shall be secured to the manhole wall with one-inch diameter anchor bolts as directed by the ESD. Covers shall be "Self Sealing", "T-Seal" or "Gasket Sealed" covers with "SANITARY" or "STORM" labels as applicable.

Curb Inlet Castings - Circular Typical curb inlet castings for circular structures shall be Neenah R-3235 Type C, ESD approved equal. or ESD approved alternate. Curb Inlet Castings - Rectangular, Typical curb inlet castings for rectangular structures shall be Neenah R3290, East Jordan Ironworks 7030, ESD approved equal, or ESD approved alternate.

FRAME / CHIMNEY JOINTS

shall be constructed with flexible watertight frame/ chimney joints. All frame / chimney joints for sanitary sewe manhole chinneys shall be constructed with flexible watertight frame / chinney joints. All frame / chinney joints for sanitary sew holes shall be Type I Chinney Joints. All frame / chinney joints for storm sever manholes shall be Type III Chinney Joints. Type I Chinney Joint. Type I Chinney Joint shall be a Type III Chinney Joint and an internal chinney seal. Chinney seals or ESD approved equal. Type II Chinney Joint. Type II Chinney Joint shall be a mortar joint. The mottar Frame / Chinney joint and typical joints between concrete adjusting rings shall be 1 inch in thickness and the full width of the adjusting ring. The interior shall be back-plastered with 0.25 inches of mortar or other approved sealant. An Elastomeric Waterproof Seal shall be applied to the contraine of the othermore.

INTERVIGE CHIMMET SEAL Chimney Seals shall be manufactured seals installed on new or existing sanitary manholes. The flexible portion of the seal shall be natural or synthetic rubber conforming to applicable requirements of ASTM C-923. All metal parts shall be Type 304 stainless steel. The seal shall prevent leakage of water into the manhole at the area of the joint between the manhole frame, chimney, and corbel continuously throughout a 20-year design life. The seal shall remain flexible while allowing repeated vertical movements of the frame of up to two inches occurring at rates not less than 0.10 inches per minute.

### ELASTOMERIC WATERPROOFING SEAL

ELAS JOMERIC WAI ENVROUPING SEAL All masony work shall be cured a minimum of 24 hours prior to applying an elastomeric waterproofing seal. All surfaces shall be cleaned and primed in accordance with the manufacturer's recommendation. Elastomeric Waterproofing Sealer shall be applied so that it forms a continuous membrane, 100-mill thick, extending from a point 4 inches below the chinney to a point 2 inches above the frame flange. The ESD reserves the right to require bond breaker (duct tape) be placed completely around the mahole nce and centered over the mortar joint between the frame and chimney or cone. Adjacent backfill shall not be placed within 24 hours of applying the seale

Elastomeric Waterproofing Sealer shall be a single component moisture curing polyurethane applied to form a continuous membrane. The sealer shall be Sonneborn HLM 5000-R, Temproof 60, Duramen V500, Thiodeck CF, Sikaflex 1A, or ESD approved equal.

MURT/IAR Motar used in connection of rigid pipe to manholes not in active service, for construction of chimney joints, and for backplastering shall be 2 1/4 to 3 parts sand and one part of either a mixture of 50 percent Portland Cement/ 50 percent masonry cement or a mixture of 75 percent Portland Cement/ 25 percent hydrated lime and shall be carefully proportioned by volume. Prepackaged completely blended mortar meeting ASTM C-270 property Type M may be substituted for site mixed component mortar. Mortar shall be machine mixed for 3 to 5 minutes, except that manufacturers mixing instructions shall supercede this specification. Speed Crete Blue Line, or approved equal cement material intended for underwater use, shall be used for non-flexible connection of rigid pipe to manholes in service. All mortar shall be smooth trowel finished.

OVCRETE Overland Cerement Concrete shall be composed of a mixture of Portland Cerement, fine and course aggregates, and water. The air ontent shall be between 4% and 7%. Aggregate gradations shall meet ASTM C-33 Size 67 or Size 467. <u>Class A Concrete</u> Class A Concrete shall contain a minimum of 7.0 bags of coremet per cubic yard. Maximum allowable slump shall be 3". A minimum of 3 cylinders shall be made by the Contractor in accordance with ASTM C-31 for each pour. Not less than 2 cylinders shall be tested for 28-day compressive strength of 4.000 PSI. Class A Concrete shall have a minimum 28-day compressive strength of 4.000 PSI. 
 Class C Concrete
 Class A Concrete shall be substituted for Class C Concrete.

 Class D Concrete
 Class A Concrete shall be substituted for Class D Concrete.

PHASING & CONSTRUCTION SCHEDULE

A Phasing & Construction Schedule shall be submitted to the ESD upon request. The Phasing & Construction Schedule shall indicate the Contractor's plan for progression of the Work.

### CONSTRUCTION QUALITY TESTING

oject acceptance shall not occur until all of the Construction Quality Testing reports have been delivered and approved by the ESD oject acceptance shall not occur until all of the Construction Quality I esting reports have been delivered and approved by the ESI resonnel certified for the applicable class of testing shall perform construction quality testing. All construction quality testing must the reformed under the observation of the ESD (this requirement does not apply to materials testing such as graduation testing, concret impressive strength testing, and other laboratory testing) and written notice must be provided to the ESD 3 business days prior to sting. All construction quality testing reports shall include testing methods and results of the testing. The reports shall clearly dicate any deficiencies observed.

Deflection Testing Deflection tests shall be performed for flexible pipe installations. The deflection test shall be performed using a rigid ball or a mandrel and shall be performed without mechanical pulling devices. If deflection testing occurs within 30 days of placement of the final backfill, deflection may not exceed 5%. Maximum deflection may not exceed 7.5% when testing occurs more than 30 days after placement of the final backfill. <u>Televising</u> Televising inspection shall be performed for all sever installations. Digital video and a televising report shall be submitted for each inspection. Analog video is generally not acceptable under this specification. The video shall be produced such that the display indicates the date of televising, line number, direction of travel, and relative position (footage cound) of the camera for the duration of televising. The video shall be produced with a "crawler" or "tractor" type camera, or other device approved by the ESD, so that the camera retains a generally vertical alignment. The device shall main the camera near the center of the pipe being inspected. The resolution, lighting, and contrast shalls be adequate to capture details with the pipe. The use of "pan and tilt" is required for all inspections. Black and white video does not meet the requirements of this specification.

Leakage Testing Groundwater infiltration into gravity sewer systems shall be minimized. All sanitary sewers, except relays with active connected building sewers, shall be leakage tested in accordance with Chapter 3.7.0 of the most current edition of Standard Specifications for Sewer & Water Construction in Wisconsin.

COVER MATERIAL, 6 INCHES ABOVE PIPE FOR SIZES 36 INCHES IN DIAMETER OR SMALLER. MINIMUM 12 INCHES ABOVE PIPE FOR DIAMETERS 36 INCHES OR LARGER. FOR RCP OVER 36 INCHES, GRANULAR BACKFILL MATERIAL MAY BE USED.	CRUSHED STONE CHIPS MAY BE USED AS COVER MATERIAL	
SEWER PIPE BEDDING OF CRUSHED STONE CHIPS BELOW PIPE AND UP TO SPRING LINE. BEDDING THICKNESS 4 INCH MINIMUM FOR 38 INCHES IN DIAMETER OR SMALLER. MINIMUM 6 INCHES BELOW THE PIPE FOR DIAMETERS 36 INCHES OR LARGER.	3 INCH CRUSHED COARSE STONE FOR WET OR UNSTABLE TRENCH BOTTOM	
SUPERIOR W	DRAWN CURRENT AS OF:	

