City of East Dubuque, Illinois

Storm Sewer System Requirements

WORKING ON TOMORROW.

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STORM SEWER SYSTEM REQUIREMENTS

FOR

CITY OF EAST DUBUQUE, ILLINOIS

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I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Illinois.

For Origin Design Co.
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My license renewal date is November 30, 2023
Pages or sheets covered by this seal: Entire Document

CITY OF EAST DUBUQUE, ILLINOIS
STORM SEWER SYSTEM REQUIREMENTS

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STORM SEWER SYSTEM REQUIREMENTS

PART I
STORM SEWER DESIGN PROVISIONS

1. GENERAL

A. Reference to materials or systems herein by name, make, or catalog number is intended to establish a standard of quality, and not to limit competition; the words "or approved equal" are implied following each brand name.

B. Storm sewers shall be located within street right-of-way whenever possible. If a sewer is located on private property, it shall be within a 20 foot wide permanent storm sewer easement or wider as required for sewers deeper than 10 feet.

C. Storm sewer design shall be in accordance with these provisions and specifications, the requirements of the Illinois Environmental Protection Agency (IEPA), and the City of East Dubuque Storm Water Design Standards.

D. The person(s) or entity proposing the installation of storm sewers shall be responsible for obtaining the required construction permits from city, state, or federal agencies and paying all costs associated with obtaining permits and/or approvals.

E. Design Engineer shall submit storm sewer calculations, drawings and specifications for City review and approval.

2. SCOPE

A. These provisions are intended to govern the design of storm sewers for installation within the City of East Dubuque, Illinois, and shall set forth the minimum requirements.

3. DEFINITIONS

A. City – The City of East Dubuque, Illinois.

B. Engineer or City Engineer – The designated Engineer for the City or the authorized representative of the Engineer.

C. Design Engineer – The Engineer or Engineering Firm responsible for the design of the sewer project.

D. Inspector – A representative of the City or its Engineer, at the site of the work.

E. Sewers – The definitions for and classifications of sewers shall be as indicated Illinois Administrative Coad Title 35.

4. BASIS OF DESIGN

A. Storm sewers shall be designed in accordance with City of East Dubuque Storm Water Design Standards.

5. DETAILS OF DESIGN

A. Minimum Velocity and Grades - The minimum velocity in a storm sewer systems shall be 3 ft/sec. A flatter slope sufficient to maintain a velocity of 2 ft/sec will be permitted only in special cases. All velocities shall be based on the pipe flowing full. Minimum slopes required for a velocity of 3 feet per second can be computed using the Manning's formula.

B. Diameter - The minimum size for all mainline storm sewers shall be 15 inches. The minimum desirable size for lateral storm sewers is 12 inches, however, under special conditions such as clearance problems, 10 inches and 8 inches will be permitted. Contents of a larger pipe should not discharge into a smaller one as it leads to blocking, except when using detention in the system.

C. Cover - Both minimum and maximum cover limits must be considered in the design of storm sewer systems. Minimum cover limits are established to ensure structural stability of conduit under live and impact loads. With increasing fill heights, dead load becomes the controlling factor. For highway applications, a minimum cover depth of 3.0 ft should be maintained where possible. In cases where this criterion cannot be met, the storm sewers should be evaluated to determine if they are structurally capable of supporting imposed loads. For all cases, the minimum cover depth from the top of the pipe to top of the subgrade is 12 inches. As indicated above, maximum cover limits are controlled by fill and other dead loads.

D. Buoyancy - Where high ground water conditions are anticipated, buoyancy of sewers shall be considered and, if necessary, adequate provisions should be made for protection.

E. Location - Storm sewers are normally located a short distance behind the curb or in the roadway near the curb. It is preferable to locate storm drains on public property. On occasion, it may be necessary to locate storm sewers on private property in easements. The acquisition of required easements can be costly, and should be avoided wherever possible.

When possible, the main storm sewer line shall be located outside the roadway pavement with the inner edge of the trench at least 2 feet from the edges of the proposed pavement, stabilized shoulder, curb, or sidewalk. Where storm sewers are located outside the right-of-way, a permanent easement must be provided for the construction and maintenance of the storm sewer and its appurtenances. The location of the storm sewer should be based on consideration of all pertinent factors, including comparative costs and availability and accessibility of right-of-way. The Designer should obtain and show on the plans all existing underground utility data which will affect the storm sewer design and every effort should be made to eliminate interference. When a storm sewer or lateral is located under the pavement, the top of the sewer pipe should be at least 12 inches below the bottom of the top of the subgrade. At other locations, when pipe gradients and ground elevations permit, the minimum cover over a storm sewer should not be less than 3 ft and below the freeze line.

F. Run Length - The length of individual storm sewer runs is dictated by storm drainage system configuration constraints and structure locations. Storm drainage system constraints include inlet locations, manhole and junction locations, etc. Where straight runs are possible, maximum run length is generally dictated by maintenance requirements. The maximum suggested run lengths for various pipe sizes is shown in Section I.2.

G. Uniform Slope – Sewers shall be laid with uniform slope between manholes.

H. Steep Slope Protection - Sewers on 20 percent slope or greater shall be anchored securely with concrete anchors or equal, spaced as follows:

1) Not over 36 feet center to center on grades 20 percent and up to 35 percent.

2) Not over 24 feet center to center on grades 35 percent and up to 50 percent.

3) Not over 16 feet center to center on grades 50 percent and over.

I. Alignment – Gravity sewers 24 inches or less in diameter shall be laid with straight alignment between manholes. For gravity sewers larger than 24 inches the radii of the curve of the alignment that the storm pipe in installed shall not exceed the manufacturer's recommendations.

J. Manholes

1) Location – Manholes are utilized to provide access to continuous underground storm sewers for the purpose of inspection and clean-out, and to permit change in direction, grade and/or size of sewer. Typical locations where manholes should be specified are:

a) Where two or more storm sewers converge
b) At intermediate points along tangent sections
c) Where pipe size changes
d) Where an abrupt change in alignment occurs
e) Where an abrupt change of the grade occurs

Manholes should not be located in traffic lanes. However, when it is impossible to avoid locating a manhole in a traffic lane, care should be taken to ensure it is not in the normal vehicle tire path.

2) Maximum Spacing – The maximum spacing of manholes should be in accordance with the following:

Sizes of Pipe (inches)	Maximum Distance (feet)
10-24	300
27-36	400
42-54	500
60-up	1000

3) Types - A Manhole Type "A" (IDOT) with appropriate frame and lid should be provided when the depth exceeds 4 ft. A cast-in-place junction chamber should be utilized when the general guidelines below cannot be accommodated with a 9 foot diameter manhole, the largest highway standard.

a) A minimum of one foot shall be maintained between adjacent pipe holes.
b) A minimum of one foot shall be maintained between the top of a pipe hole and the top edge of the manhole.
c) No more than 50% of the circumference of the manhole may be removed to accommodate intersecting pipes.

4) Pipe Connections – Pipe tee and wye connections are not permitted for connecting lateral lines from pavement inlets to main storm sewer lines. All connections shall be constructed using manholes.

5) Junction Chambers - The junction of small sewers is made in manholes. On occasion, junction chambers of special design are required to join two or more converging large size storm sewers. In design, a smooth transition is essential to prevent turbulent flow, which would cause eddies and deposition of solids. Normally, junction chambers should not be utilized when standard manholes or catch basins are suitable.

K. Catch Basins

1) Catch basins are designed to collect surface water. Catch basins should be provided with appropriate frames and grates as provided in the attached details.

2) Catch basins shall be designed in conformance with Illinois Drainage Manual and City Storm Water Design Standards.

L. Inlets

1) Inlets are drainage structures utilized to collect surface water through grate or curb openings and convey it to storm sewers or direct outlet to culverts and ditches. Inlets should be provided with appropriate frames and grates as proved in the attached details.

2) Spacing - Inlet spacing should be designed in conformance with Illinois Drainage Manual Chapter 8 - Storm Sewers.

3) Frame and Grate - Frame and grates for storm inlets shall be combination inlets consisting of both a curb opening and a grate inlet acting as a unit.

M. Protection of Water Supplies

1) Cross Connections – There shall be no physical connection between a public or private potable water supply system and a sewer, or appurtenance thereto, which would permit the passage of any wastewater or polluted water into the potable water supply. No water pipe shall pass through or come into contact with any part of a sewer manhole.

2) Wells and Below Ground Storage Facilities– Gravity sewers constructed of standard sewer materials shall not be laid within 75 feet of a public well or 50 feet of a private well or below ground level finished storage facility. Gravity sewers constructed of water main materials shall not be laid within 25 feet of a well or below ground level water storage facility.

3) Horizontal Separation of Gravity Sewers from Water Mains:

   a) Water mains shall be located at least 10 feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection.
   b) Water mains may be located closer than 10 feet to a sewer line when:
      i. Local conditions prevent a lateral separation of 10 feet; and
      ii. The water main invert is at least 18 inches above the crown of the sewer; and
      iii. The water main is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.
   c) When it is impossible to meet 3)a or 3)b above, both the water main and sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, PVC pipe, or HDPE pipe equivalent to water main standards of construction. The sewer shall be pressure tested to the maximum expected surcharge head before backfilling.

4) Vertical Separation Water Mains and Sewers:

   a) A water main shall be separated from a sewer so that its invert is a minimum of 18 inches above the crown of the sewer whenever water mains cross sanitary sewers or sewer service connections. The vertical separation shall be maintained for that portion of the water main located within ten feet horizontally of any sewer or drain crossed. A length of water main pipe shall be centered over the sewer to be crossed with joints equidistant from the sewer or drain.

b) Both the water main and sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, prestressed concrete pipe, PVC pipe, or HDPE pipe equivalent to water main standards of construction when:
   i. It is impossible to obtain the proper vertical separation as described in 4).a above; or
   ii. The water main passes under a sewer drain.

c) Vertical separation of 18 inches between the invert of the sewer and the crown of the water main shall be maintained where a water main crosses under a sewer. Support the sewer to prevent settling and breaking the water main, as shown on the Plans or as approved by the Engineer.

d) Construction of water main quality pipe shall extend on each side of the crossing until the perpendicular distance from the water main to the sewer is at least 10 feet.

CITY OF EAST DUBUQUE, ILLINOIS
STORM SEWER SYSTEM REQUIREMENTS

PART II
CONSTRUCTION SPECIFICATIONS FOR
SITE PREPARATION, EXCAVATION AND BACKFILL

1. GENERAL

A. The project site shall be kept free from ponding water due to construction operations at all times during the progress of the work. The contractor shall make arrangements for disposal of all water and wastewater received at the site from temporary connections or stoppages.

B. The contractor shall strip topsoil and separately store them to provide topsoil replacement. All obstructions such as culvert pipe, signs, shrubbery, and fences shall be removed and stored for replacement upon completion of construction. The contractor shall provide temporary fencing if necessary to control livestock or to prevent accidents until permanent fencing is restored.

C. Site preparation, excavation, and backfill for storm sewer construction shall be in accordance with these specifications and with the requirements of Illinois Environmental Protection Agency (IEPA).

2. SCOPE

A. Provide the labor, material, facilities, and administration as required to complete all work covered by this section.

3. EXISTING UTILITIES AND CONDITIONS

A. Location – The contractor shall be fully responsible for liaison with owners of existing facilities encountered during the construction of storm sewer improvements and extensions. The contractor shall obtain and/or verify the location of all utilities.

B. Protection – All existing utilities shall be protected by the contractor during the progress of the work. Such protection shall allow the utilities to remain in continuous operation. Any utility damaged by the contractor during the course of the work shall be repaired at the contractor's expense.

C. Streets – The contractor shall conduct the work in a manner which will cause a minimum interruption to traffic. The contractor shall conform to requirements of the current Manual on Uniform Traffic Control Devices and IDOT Standard Details indicating that a street is closed or full use is restricted and place necessary control and detour signs for the proper maintenance of traffic. Prior to the closing of any street the contractor shall notify city officials, police, fire department, sheriff, and schools. If county roads will be affected, the contractor shall comply with county construction permit requirements.

4. LINE AND SLOPE

A. Laser – Gravity storm sewer shall be installed utilizing an in-pipe laser to maintain alignment and slope.

B. Line and Slope Stakes – The Design Engineer shall place alignment and slope control stakes for the construction of storm sewers. The contractor shall be responsible for continuously checking the alignment and slope of the laser beam and the pipe. The contractor shall be responsible for protecting the original line and grade control stakes set by the Design Engineer.

C. Obstruction to Alignment and Slope - Whenever obstructions are encountered during the progress of the work and interfere to such an extent that an alteration in the plans is required, the Design Engineer shall have the authority to change the plans and order a deviation from the alignment and slope or arrange for the removal, relocation, or reconstruction of the obstructions with the approval of the Engineer and the City.

5. EXCAVATION

A. General – The ground shall be excavated by the open trench method to the depth required except where boring is required or desired. Excavated material suitable for use as backfill material shall be piled in an orderly manner at a sufficient distance back from the edge of the trench to avoid rollback, slides or cave-ins.

B. Width of Trench – The width of the trench shall be sufficient to allow the pipe to be installed and joined and to allow the embedment material to be placed and properly compacted. At least 6 inches of clear space is required on each side of the pipe to permit compaction of embedment material.

The width of the trench at ground surface shall not exceed that required to be consistent with safety requirements. A trench box is recommended for use for safety and to minimize the trench width.

C. Extent of Open Trench – Trench excavation shall not precede completed gravity sewer pipe installation by more than 200 feet.

D. Trench Bottom – Rock, boulders and large stones shall be removed from the trench to provide a clearance of at least 6 inches below and around all parts of the pipe and pipe appurtenances. The space between the outside of the pipe and the bottom and sides of the excavation shall be filled with compacted embedment materials.

E. Embedment – All embedment material for sewer pipe including bedding, haunching, and initial backfill to 12 inches above the top of the pipe, shall be compacted to 95% of maximum standard Proctor density.

F. Over-Excavation – Should the excavation continue beyond or below the alignment or elevations required, all such excavated space shall be backfilled with compacted embedment material.

G. Excavation in Poor Soil – If the trench bottom is found to be unstable or to be composed of material which includes ashes, cinders, refuse, vegetable or other organic matter or large pieces or fragments of inorganic material or any material that in the judgment of the Engineer should be removed, such unsuitable material shall be excavated and removed to the width and depth approved by the Engineer. The area from which the unsuitable material was removed shall be filled with compacted foundation stone approved by the Engineer.

H. Rock Excavation – Rock excavation shall consist of the excavation from the trench of boulders or concrete pieces 1/2 cu yd in volume or greater and all rock in ledges, bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal.

Boulders and pieces of concrete or masonry shall not be classified as rock unless larger than 1/2 cubic yard.

Rock shall be removed from the trench to provide the required 6 inch minimum clearance between any portion of the pipe or appurtenance and the rock. The resulting space shall be backfilled with compacted select granular material approved by the Engineer. The surface of the rock excavation shall be free from projecting points, ribs, crevices or undrained pockets. The method of rock removal shall be the option of the Contractor. However, excessive blasting or overshooting will not be permitted. The contractor shall comply with all applicable local, state, and federal safety codes and requirements. The contractor shall be responsible for securing all permits required by law for blasting operations and any additional hazard insurance required. All rock excavation operations shall precede laying of the pipe by at least 100 feet. No blasting shall be undertaken by the contractor until the contractor has notified the Engineer and City.

6. BORING

A. Bored Sections – Steel casing pipe less than 36 inch in diameter shall be bored. Proper alignment and slope shall be maintained at all times. Excavation shall not precede the boring operation by a distance more than is necessary. When a casing pipe is used, the carrier pipe shall be AWWA C900/905 DR18 PVC pipe supported on stainless steel casing spacers, installed per manufacturer's recommendations. The ends of the casing pipe shall be sealed with end seals or a double wrap of woven geotextile secured to the casing and carrier with insulated copper wire or stainless steel bands.

7. SHEETING, SHORING AND BRACING

A. General – Sheeting, shoring, a trench box, or bracing shall be provided as required by governing federal or state laws and regulations, and as may be necessary to protect life, property, or the work. Trench wall stabilization shall remain in place until backfilling of the trench progresses to the point at which no damage or accident will result from its movement or removal. Trench sheeting shall be left in place below the top of the pipe. The use of a trench box is preferred to sheeting.

8. DEWATERING

A. General – Trenches and excavations shall be kept free from water which, in the opinion of the Engineer, would in any way impair the quality of the work being performed. Methods and materials shall be provided for handling such water encountered during the progress of the work. The method of disposal of such water shall be subject to comply with state environmental regulations. In no case shall a sanitary sewer be used for the disposal of such water, unless approved by the City.

9. BACKFILL

A. General – The trench shall not be backfilled until the pipe elevations, gradient, alignment, and joints have been checked by the contractor. The pipe bedding, haunching, and initial backfill to 12 inches above the top of the pipe shall be as required to provide pipe support and load carrying capacity. The space between the utility pipe and the bottom and the sides of the trench shall be backfilled with required and approved materials. All materials shall be thoroughly compacted by hand for the full width of the trench to a depth of 12 inches above the top of the pipe. The backfill material shall contain no rocks or boulders and shall be free from cinders, ashes, roots, refuse, or organic material.

Consistent with pipe protection requirements, the remainder of the backfilling operation shall proceed by mechanical means in layers not to exceed 12 inches (loose). This backfill material shall contain no rock or stones greater than 3 inches in their greatest dimension for a distance of 2 feet above the top of the pipe. No rock or rock excavation debris shall be placed within the upper 12 inches of the trench. Rock or rock excavation debris may be used in the remainder of the trench provided that it is separated and arranged so that no interference with proper backfill and no excessive settlement will result. Trench excavation backfill material shall be compacted to 88% of maximum standard Proctor density.

All backfill material shall be carefully placed in the trench to avoid movement or damage to the sewer pipe. The contractor shall be fully responsible for any backfill settlement which occurs. Jetting and flooding of backfill materials shall not be used.

C. Select Backfill – Select granular backfill shall be placed and compacted to 95% standard Proctor density at plus or minus 2% of optimum moisture in those locations designated on the plans, and where the utility is constructed under or within 5 feet of pavement, sidewalk, driveways, and other utilities and structures. The select granular backfill material shall conform to Part III – 3.F.3.a. of these specifications.

The select granular backfill must have approval of the Engineer prior to its use. At the time of use, select granular backfill material shall be free from frozen lumps, and foreign materials that may become mixed with it during handling.

10. TREE REMOVAL

A. General – Approval of the City shall be obtained prior to removing any trees. The contractor shall be responsible for removal and disposal of such approved trees from the work area and grubbing and removal of stumps and roots.

11. PAVEMENT REMOVAL

A. General – Pavement shall be removed to a minimum of 1 foot from the edge of the trench. Absolutely no under-cutting of pavement will be permitted. The pavement removal shall be conducted along straight lines approximately parallel to the centerline of the trench.

B. Concrete Pavement and Drives – Concrete pavement and drives shall be removed to the adjacent existing joint or the concrete shall be sawed to a depth of at least 6 inches.

C. Asphalt Pavement – Asphalt pavement shall be removed by full depth sawing with neat square edges.

D. Sidewalk – Sidewalk shall be removed to the nearest joint beyond the minimum distance of one foot from the edge of the trench.

E. Other Surfaces – Other types of surfaces may be removed by the machine used for excavating the trench.

F. Disposal – The contractor shall be responsible for disposal of removed pavement and surplus excavated material.

12. PAVEMENT REPLACEMENT

A. General – No permanent pavement may be restored unless the condition of the backfill will properly support the pavement without settlement. Approval to replace pavement will not relieve the contractor of responsibility for settlement.

B. Replacement – The contractor shall restore/replace all pavement, sidewalks, curbing, and gutters (as well as other site features) removed or disturbed as a part of the work, to a condition equal to that before the work began (or better), unless approved otherwise in writing by the Engineer.

C. Standards – If specifications for pavement restoration and/or replacement are not set forth by the City, the materials and installation shall conform to current edition of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, unless otherwise approved by the Engineer.

13. ACCESS DURING CONSTRUCTION

A. General – A suitable means of access to property which abuts easements, streets, and roads involved in the construction of the project shall be maintained. Suitable access shall mean a roadway of sufficient width, free from ruts, potholes, and mudholes, and capable of carrying a passenger car without damage to the car. All adjoining property owners shall be notified by the contractor at least 24 hours in advance of a street closure. Whenever access must be denied due to construction operations, a suitable access shall be provided within 24 hours after that portion of the construction responsible for the access denial is completed. Whenever construction is halted due to inclement weather, weekends, holidays, or any other reason, a suitable access shall be provided for all adjoining property owners.

14. DISPOSAL OF DEBRIS AND REFUSE

A. General - All surplus excavated material shall be disposed by the contractor. Such excess excavated material may be hauled to a site provided by the contractor. All rubbish, debris, and refuse shall be disposed at a proper disposal site.

15. SAFETY

A. Neither the City nor the Engineer nor any of their employees will be responsible for the contractor’s compliance with safety and health requirements and regulations.

CITY OF EAST DUBUQUE, ILLINOIS
STORM SEWER SYSTEM REQUIREMENTS

PART III
CONSTRUCTION SPECIFICATIONS
FOR STORM SEWER PIPE

1. GENERAL

A. Reference to materials or systems herein by name, make, or catalog number is intended to establish a standard of quality, and not to limit competition; the words "or approved equal" are implied following each brand name.

B. Storm sewer shall be constructed in accordance with these specifications which are to establish minimum requirements and with the requirements of Illinois Environmental Protection Agency (IEPA).

2. SCOPE

A. Provide labor, material, facilities, and administration necessary to complete all work covered by these specifications in accordance with the best installation and construction techniques.

3. MATERIALS

A. Storm Sewer Pipe

1) Reinforced Concrete Pipe (RCP) – Reinforced concrete pipe shall conform to ASTM Designation C76, Classes I, II, III, IV or V.

2) Ductile Iron Pipe (DIP) – Ductile iron pipe shall conform to ANSI A21.51 (AWWA C151), class thickness designed per ANSI A21.50 (AWWA 150), cement lined with bituminous coating per ANSI A21.4 (AWWA C104), with mechanical or rubber ring push on joints per ANSI A21.11 (AWWA C111 and C600). Gray or ductile iron fittings, cement lined with bituminous coating per ANSI A21.4 (AWWA C104), shall conform to ANSI A21.11 (AWWA C111 and C600) for mechanical or rubber ring push-on joints or ANSI A21.10 or A21.53 (AWWA C110 or C153) for flanged joints. All DIP and ductile iron fittings shall be polyethylene encased per AWWA C105. The polyethylene shall be linear low density with a clear or green color. DIP shall be minimum class 350 in 4 inch to 12 inch and minimum class 250 in 14 inch to 24 inch. All DIP shall be USA made.

3) Corrugated Metal Pipe (CMP) – Corrugated metal pipe shall conform to the material and fabrication requirements of AASHTO M36, M245 or M196. Design and minimum gage determination will be in accordance with AASHTO Section 12 and noted on the plans. Corrugated metal pipe material and coatings will conform to the requirements of AASHTO M128, M274, M246 or M197. Material type will be noted on the Plans.

4) Polyvinyl Chloride (PVC) Pipe To 30 Feet Deep – For sewers up to 30 feet deep (to flow line), all polyvinyl chloride plastic sewer pipe shall conform to the requirements of ASTM D3034 (6 inch to 15 inch) or ASTM F679 (18 inch and larger). The PVC sewer pipe shall have SDR 35 for depths to 20 feet and SDR 26 for depths to 30 feet. Pipe stiffness when measured at 5% deflection in accordance with ASTM D2412 shall be 46 psi for SDR 35 and 115 psi for SDR 26.

5) Polyvinyl Chloride (PVC) Pipe 30 to 40 Feet Deep – For sewers 30 to 40 feet deep (to flow line), influent pipes at pumping stations, inside casing for drainageway/stream crossings, and where required or desired, the polyvinyl chloride plastic sewer pipe shall conform to the requirements of AWWA C900 (8" through 12") or C905 (14" and larger). The C900/905 PVC shall be DR 18 with a stiffness of 364 psi. All PVC pipe shall be USA made.

6) High Density Polyethylene (HDPE) Pipe – HDPE pipe shall conform to the requirements of AASHTO M252 for pipe three (3) inches to ten (10) inches in diameter and AASHTO M294 for pipe twelve (12) inches to sixty (60) inches in diameter.

B. Rigid Pipe

1) Reinforced Concrete Pipe, Ductile Iron Pipe shall be classified and installed as Rigid Pipes. Refer to Standard Details for Rigid Pipe Installation Detail.

C. Flexible Pipe

1) Corrugated Metal Pipe, Polyvinyl Chloride Pipe, and High Density Polyethylene Pipe shall be classified and installed as flexible pipe. Refer to Standard Details for Flexible Pipe Installation Detail.

D. Storm Sewer Pipe Joints

1) Joint Lubricant – Sufficient joint lubricant shall be supplied by the pipe manufacturer and used in accordance with manufacturer's recommendations.

2) Reinforced Concrete Pipe – The joints shall be gasketed tongue and groove complying with ASTM C443, unless otherwise City approved.

3) Ductile Iron Joints – Joints for DIP shall be push-on type (pipe) and mechanical joints (fittings) with rubber gaskets in accordance with AWWA Specification C111. Field welding of ductile iron will not be allowed.

4) Corrugated Metal Pipe (CMP) – Pipe joints shall conform to the material and fabrication requirements of AASHTO M36, M245 or M196. Design and minimum gage determination will be in accordance with AASHTO Section 12 and noted on the plans. Corrugated metal pipe material and coatings will conform to the requirements of AASHTO M128, M274, M246 or M197. Material type shall be noted on the Plans.

5) Polyvinyl Chloride Pipe Joints – The joints for ASTM D3034 and F679 PVC pipe shall be elastomeric - gasket bell end in accordance with ASTM D3212. Gasket material shall conform to ASTM F477. Joints for AWWA C900/905 PVC pipe shall comply with ASTM D3139. No solvent cement joints will be allowed. Inches in diameter and AASHTO M 294 for pipe twelve (12) inches to sixty (60) inches in diameter.

E. Concrete

1) General – Concrete for storm sewer construction shall be prepared at a ready mixed concrete plant in accordance with ASTM C94 or IDOT requirements. The concrete shall have a 28 day compressive strength of 4500 psi. Strength determination shall be in accordance with ASTM C39, unless otherwise approved by the Engineer. Concrete aggregate shall conform to ASTM C33 or IDOT requirements. Portland cement shall conform to ASTM C150 Type I or III. Water shall be potable. Concrete shall have a slump of 3 to 5 inches.

F. Storm Sewer Foundation, Bedding, Haunching, Initial Backfill, and Final Backfill

1) General – Storm sewer pipe embedment material shall include foundation, bedding, haunching, initial backfill, and final backfill. Trench cross-section terminology is indicated in the standard details for rigid pipe (RCP and DIP) and flexible pipe (CMP, PVC, and HDPE).

2) Foundation Material – Foundation material, to the width and depths necessary, is required when the trench bottom is unstable. If suitable for conditions encountered, the pipe bedding material may be used for foundation material. Foundation stone shall be IDOT gradation CA2, CA4 or alternate gradation (3 inch maximum) as approved by Engineer.

3) Bedding and Haunching Material – The bedding and haunching stone material for storm sewers shall be either Select Granular Stone or Clean Stone.

a) Select Granular Stone – Storm sewer embedment stone including bedding, haunching, and initial backfill shall be IDOT Stone Gradation CA-6, CA-7, CA-9, CA-10, CA-18 or Engineer approved equivalent.

b) Clean Stone Embedment – Storm sewer embedment stone for use in wet trenches shall be coarse aggregate for Portland cement concrete per IDOT Section 1004.02. A screened but unwashed concrete coarse aggregate would be considered for approval by the City. The use of this clean or relatively clean product will require the installation of ground retarders if the sewer slope exceeds 2% in fine grained soil or in trenches in rock.

c) Groundwater Retarder Sand – The sand for groundwater retarders shall be concrete fine aggregate per IDOT specification section 1003.01 (FA 1 or FA 2) or approved equal

4) Initial Backfill – Initial backfill material shall be suitable material excavated from the trench or select granular material meeting the requirements above for Bedding and Haunching Material.

5) Final Backfill – Final backfill material shall be suitable material excavated from the trench, selected granular material meeting the requirements above for bedding and haunching materials.

6) Bedding, Haunching, Initial Backfill, and Final Backfill in Rock Excavation – In locations where rock is encountered, the rock shall be removed to the required depths indicated in the Plans. Select granular material shall be used to replace foundation, bedding, haunching, initial and final backfill to the extents of where rock excavation occurs.

4. PIPE INSTALLATION GENERAL

A. Laying storm sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared in accordance with Part II of these specifications. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surface.

B. Where pipe material approved for use for water main is used for storm sewer force main, the pipe shall be appropriately identified with metallic tape installed at twelve (12) inches beneath finished grade and centered directly over the force main material.

C. Storm Sewers that are laid in the vicinity pipe lines designated to carry potable water shall meet the separation distances in Part I of these specifications.

D. Dewatering shall be sufficiently accomplished to maintain the water level twelve (12) inches below the surface of the trench bottom or base of the bedding course. Dewatering shall be accomplished prior to pipe laying and jointing, not prior to excavation and placing the bedding, as called for in other sections of the specifications or Special Provisions. The dewatering operation however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation.

E. Bedding: The pipe bedding shall be placed so that the entire length of the pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to graded except when used with concrete encasement.

F. Plugs and Connections: Plugs for pipe branches, stubs or other open ends which are not to be immediately connected shall be made of an approved material and shall be secured in place with a joint comparable to the main line joint. Stoppers may be of an integrally cast breakout design.

G. Pipe Markings: The markings on reinforced concrete pipe indicating the minor axis of the elliptical reinforcement shall be placed in a vertical plane (top or bottom) when the pipe is laid.

H. Pipe Jointing: The type of joint to be used shall conform to the requirements under Section D of this specification.

I. Gasketed Joints:

a. When gaskets are placed on the pipe in the field, the surfaces on which the gasket seats shall be thoroughly cleaned. The gasket shall be installed to the manufacturer's instructions.

b. Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced, cleaned and relubricated if required, before the jointing is attempted.

c. Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned.

d. Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has sufficiently been compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep. The pipe shall be closed with a suitable "night cap" as approved by the Engineer.

e. Pipe required to be laid on curved alignment shall be joined in straight alignment and then be deflected, joint by joint. Special care shall be taken in blocking the pipe just previously laid, by tamped foil or otherwise to resist the misaligning forces generated during compression of the joints being made.

J. Joint Sealer: The elastic and mastic joint sealer shall be used in accordance with recommendations of the manufacturer. After each joint is sealed, it shall be wiped clean on the inside.

K. Joining of Dissimilar Pipes: Suitable adaptation couplings shall be specified in the Special Provisions or project plans for the jointing of dissimilar pipes. Where suitable adaptor couplings are not available for dissimilar pipes, the joining shall be accomplished with a special fabricated coupling or concrete encasement as specified, or as approved by the Engineer.

L. Storm Sewer Line Connections:

1) Storm sewer line connections to existing trunks, mains, laterals or side storm sewers shall be left uncovered until after inspection has been made. The City/Engineer will make such inspection within two working days after notification by the Contractor. After approval of the connection, the trench shall be backfilled as specified in Part II of these specifications, after first covering the bare pipe with select material compacted to a depth of six (6) inches above the top of the pipe.

2) No existing storm sewer shall be connected to a storm or sanitary sewer unless specifically authorized in each instance by the City/Engineer. Storm drains and drain tiles shall not be connected to a sanitary sewer. Storm drains and drain tiles discovered during construction shall be brought to the attention of the City/Engineer.

M. Service Risers:

1) Where the depth of the sewer invert is greater than twelve (12) feet below the surface of the ground, a service riser shall be constructed to an elevation of nine (9) feet below the ground elevation or as shown on the Plans.

2) The service riser shall be constructed with the four (4) inch minimum tee or wye as shown on the Plans placed to receive the four (4) inch minimum riser pipe. The tee or wye shall be bedded as shown on Standard Details or Plans.

3) The riser pipes shall extend to the proper elevation and shall terminate with a manufactured plug.

4) Extreme care shall be taken in backfilling around risers. Where the excavated material is not suitable for this purpose in the opinion of the Engineer, granular material shall be placed around the riser.

N. Testing and Inspection for Acceptance of Storm Sewers:

1) Post construction inspection shall conform to the inspection requirements of AASHTO Section 26 for Corrugated Metal Pipe.

2) Post construction inspection shall conform to the inspection requirements of AASHTO Section 27 for Reinforced Concrete Pipe.

3) Post construction inspection shall conform to the inspection requirements of AASHTO Section 30 for high density polyethylene pipe and polyvinyl chloride pipe.

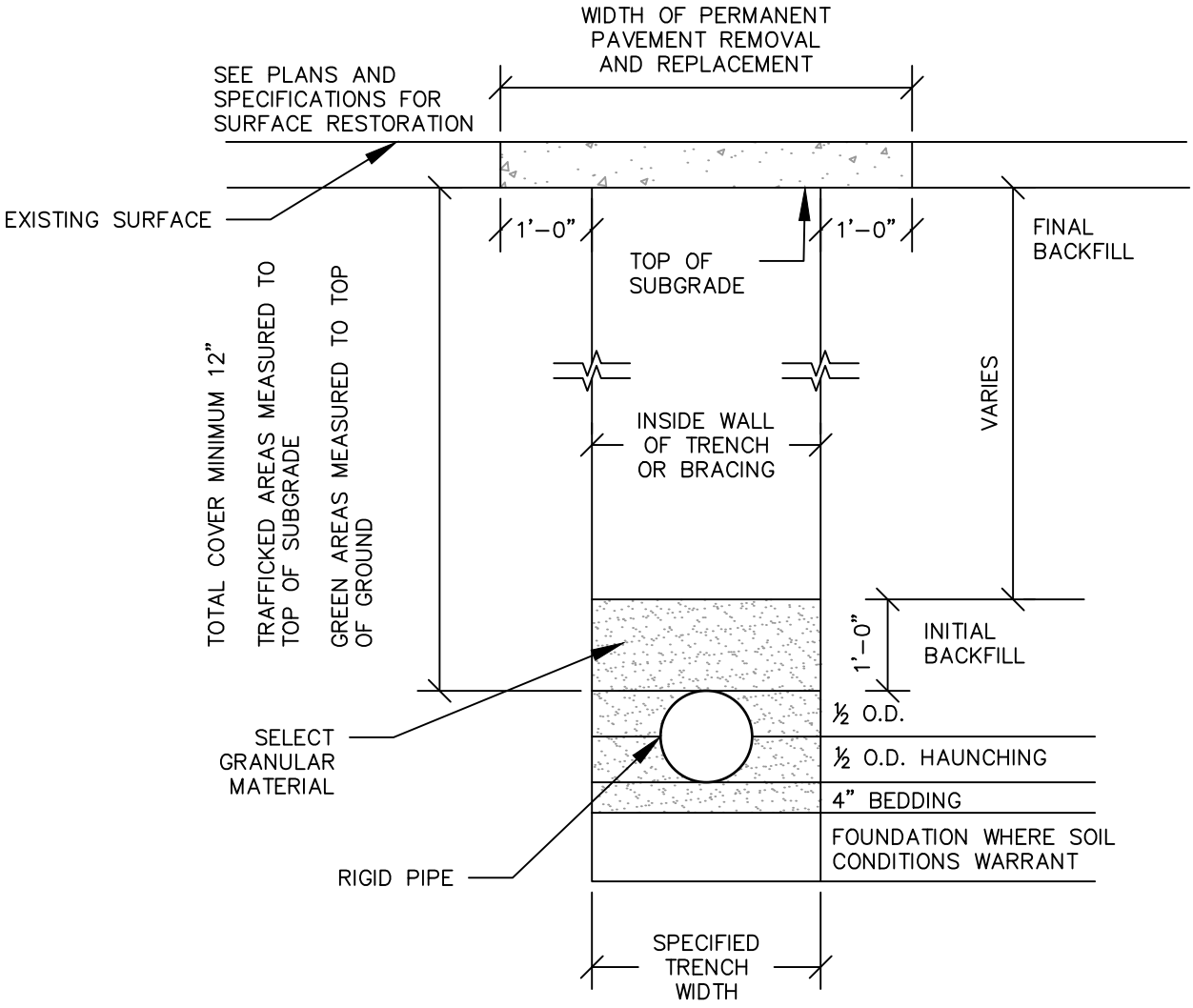
O. Post Construction Cleaning of Storm Sewer:

1) Storm structures and pipe shall be cleaned to the satisfaction of the City/Engineer prior to final inspection.

5. CONSTRUCTION DETAILS

A. Construction details are part of these standard specifications. The details include:

- Rigid Pipe Installation Detail
- Flexible Pipe Installation Detail



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Project Description

RIGID PIPE
CITY OF EAST DUBUQUE, ILLINOIS

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Drawing Issue Information

Drawing No:	E1
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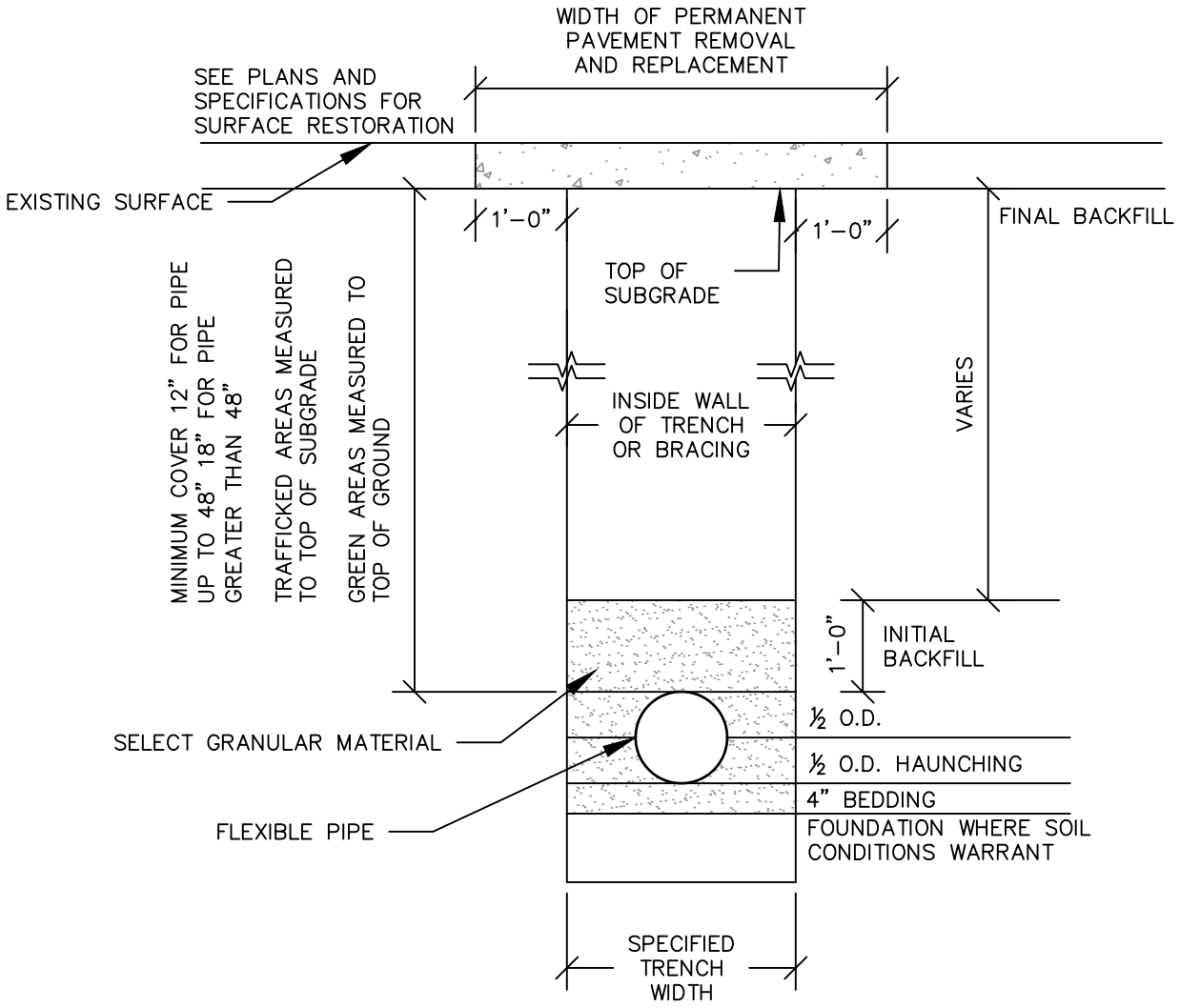
Date:	6-28-23
Drawn By:	AMH
Project No:	22175



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Project Description

FLEXIBLE PIPE
CITY OF EAST DUBUQUE, ILLINOIS

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Drawing Issue Information

Drawing No:	E2
Sheet:	2 of 11
Date:	6-28-23
Drawn By:	AMH
Project No:	22175

CITY OF EAST DUBUQUE, ILLINOIS
STORM SEWER SYSTEM REQUIREMENTS

PART IV
CONSTRUCTION SPECIFICATIONS
FOR MANHOLES, CATCH BASINS, AND INLETS FOR STORM SEWER

1. GENERAL

A. Manholes, catch basins, and inlets shall be constructed of precast reinforced concrete units, or cast-in-place concrete. The work shall consist of furnishing & placing or constructing the manholes, catch basins and inlets together with the necessary frames, grates, and lids.

B. Reference to materials or systems herein by name, make, or catalog number is intended to establish a standard of quality, and not to limit competition; the words "or approved equal" are implied following each brand name.

C. Storm sewer shall be constructed in accordance with these specifications which are to establish minimum requirements and with the requirements of Illinois Environmental Protection Agency (IEPA).

2. SCOPE

A. Provide labor, material, facilities, and administration necessary to complete all work covered by these specifications in accordance with the best installation and construction techniques.

3. MATERIALS

A. Cast-in-place concrete manholes and structures

1) Cast-in-place concrete manholes and structures shall conform to detailed shop drawings submitted to the Engineer prior to the beginning of work and shall conform to the dimensional requirements specified.

2) Concrete shall consist of Portland cement, mineral aggregates, additive mixtures, and water.

3) Cement shall conform to the requirements of ASTM C150.

4) Wire fabric reinforcement shall consist of wire conforming to ASTM A1064.

5) Aggregates shall conform to ASTM C33, except that the requirements for gradation shall not apply to precast items.

6) The aggregates shall be sized and graded, proportioned, and thoroughly mixed with cement and water to produce a homogeneous concrete mixture.

7) Cast-in-place manhole components shall be moist-cured for a period not less than seven (7) days except that when high-early-strength cement is used, the curing shall be not less than three (3) days. Pigmented membrane curing compound, or other approved method may be applied in lieu of moist curing.

8) All concrete placed under these specifications shall have a minimum compressive strength of 4500 psi at 28 days. Strength determination shall be in accordance with ASTM C39, unless otherwise approved by the Engineer.

B. Bases

1) Unless otherwise specified, cast in place bases shall be at least eight (8) inches in thickness and shall extend at least eight (8) inches radially outside of the outside dimension of the manhole, catch basin or inlet section.

C. Mortar For Jointing

1) Mortar for jointing reinforced concrete structures shall be one (1) part Portland cement to two (2) parts plaster sand, mixed with the least amount of clean water necessary to provide a workable mortar.

D. Precast Manholes, Catch Basins and Inlets

1) Precast manholes and structures shall conform with ASTM C478 and the design dimensions shown on the Plans. Minimum concrete compressive strength shall be 4500 psi. Precast components shall be substantially free from fractures, large or deep cracks and surface roughness conforming to the quality criteria established in ASTM C478.

2) Joints between precast sections shall be designed for rubber gaskets, butyl rope, or other equivalent bituminous material or as shown on the plans.

3) Precast structures shall be constructed with a precast base section or a cast-in-place structure as shown on the Plans.

4) A precast base section shall be carefully placed on the prepared bedding to be fully and uniformly supported in true alignment and making sure that all entering pipes can be inserted on proper grade.

5) All lift holes shall be either filled with a precast concrete plug sealed and covered with mastic or thoroughly wetted, fill with mortar, smoothed and pointed both inside and out.

6) All joints between precast elements in storm sewer manholes shall have an internal or external sealing band or mastic joint sealer.

7) The first precast section shall be placed on the base structure before the base has taken initial set, and shall be carefully adjusted to true grade and alignment with all inlet pipes properly installed to form an integral unit; or the section shall be mortared into a suitable groove provided in the top of the base. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes.

8) Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the ladder runs. The completed structure shall be rigid and true to dimensions.

E. Preformed Flexible Gaskets, and Mastic Joint Sealer

1) Joints between precast sections shall be designed for preformed flexible gaskets, rubber gaskets, butyl rope or other equivalent bituminous material as shown on the plans. Preformed flexible gaskets to used for sealing structure sections shall conform to the

requirements of AASHTO M 198 or ASTM C990. Rubber Gaskets to be used for sealing structure sections shall conform to the requirements of AASHTO M 315 or ASTM C443. Mastic joint sealer used for sealing structure sections shall conform to the requirements of IDOT "Standard Specifications for Road and Bridge Construction," Article 1055.01.

F. External Sealing Bands

1) External joint wrap systems, when required, shall conform to the requirements of ASTM C877.

G. Steps

1) Manhole steps, when required, shall be furnished and installed as shown on the Plans, and shall be grey cast iron ASTM A48 or polypropylene coated steel reinforcing rods with land and pullout ratings meeting OSHA Standards.

H. Cast Iron Frames and Covers

1) Casting shall conform to the requirements of gray iron castings as specified in ASTM A48 or ductile iron castings as specified in ASTM A536.

2) Castings placed on concrete or masonry surface shall be set in full bituminous mastic beds, full bed of mortar or approved rubber gasket seals. Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary.

i. Street at Grade: Where work is in paved streets or areas which have been brought to grade, not more than two (2) adjusting rings for a total height of eight (8) inches shall be provided between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to street grade.

ii. Street or Alleys with No Established Grade: Where works in in paved streets or other areas which have not been brought to grade, not more than two (2) adjusting rings for a total height of not less than four (4) inches or more than sixteen (16) inches shall be provided between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to street grade. The top of the manhole casting shall be flush with the street surface unless otherwise directed by the Engineer.

iii. Manholes not within Street or Alley Areas: Where work is in cultivated areas, as shown on the Plans, the top of the casting, unless otherwise directed by the Engineer, shall be twenty-four (24) inches above the established ground surface. Unless otherwise directed, in non-cultivated areas, the top of the manhole casting shall be at grade of existing surface using not more than two (2) adjusting rings for a total height of eight (8) inches.

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I. Adjusting Rings

1) Concrete adjusting rings shall have a minimum thickness of two (2) inches.

2) High density polyethylene (HDPE) adjustment rings shall conform to the requirements of Article 1043.02 of the IDOT "Standard Specifications for Road and Bridge Construction".

3) Recycled rubber adjusting rings shall conform to the requirements of Article 1043.03 of IDOT "Standard Specifications for Road and Bridge Construction".

4) Expanded polypropylene shall conform to the requirements of ASTM D3575 and have a traffic rating compliant with AASHTO M306 HS-25.

J. Pipe Connections

1) Pipe or tile placed in the masonry for the inlet or outlet connections shall extend through the wall and beyond the outside surface of the wall a sufficient distance to allow for connections, and the masonry shall be carefully constructed around them to prevent leakage along the outer surfaces. The openings through which pipes enter the structure shall have flexible watertight connections conforming with ASTM C923.

K. Channels

1) Channels shall be made to conform accurately to the sewer grade and shall be brought together smoothy with well-rounded junctions, satisfactory to the Engineer, and in conformance with details shown on the Plans.

L. Drop Manhole Connections

1) Drop manhole connections, wherever shown on the Plans, shall conform in all respects to details shown on the Standard Details or Plans.

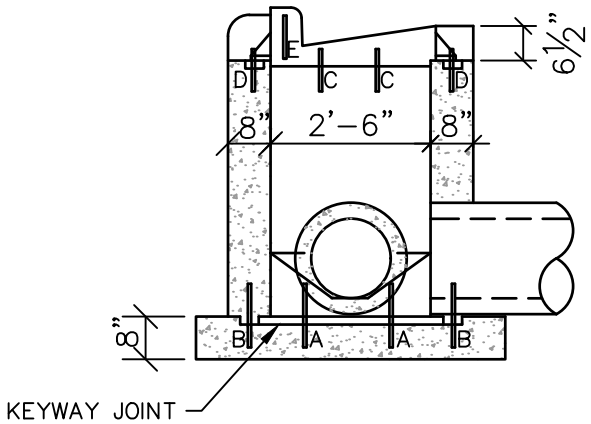
M. Cleaning

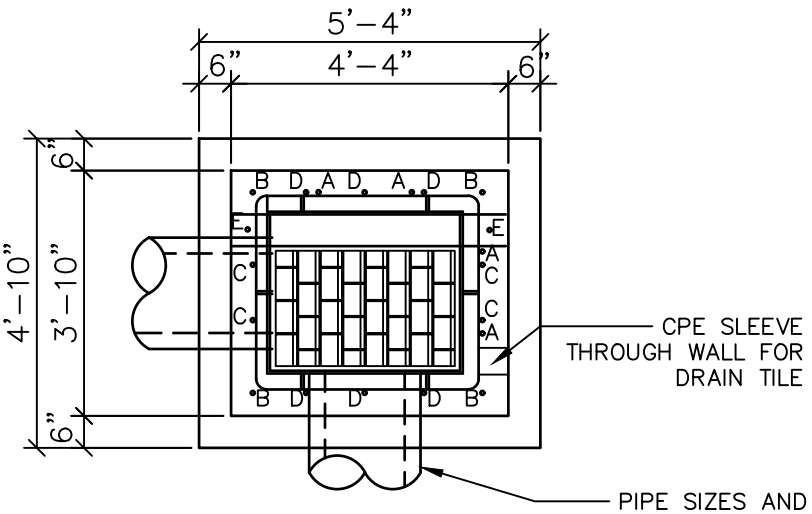
1) All newly constructed structures shall be cleaned of any accumulation silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

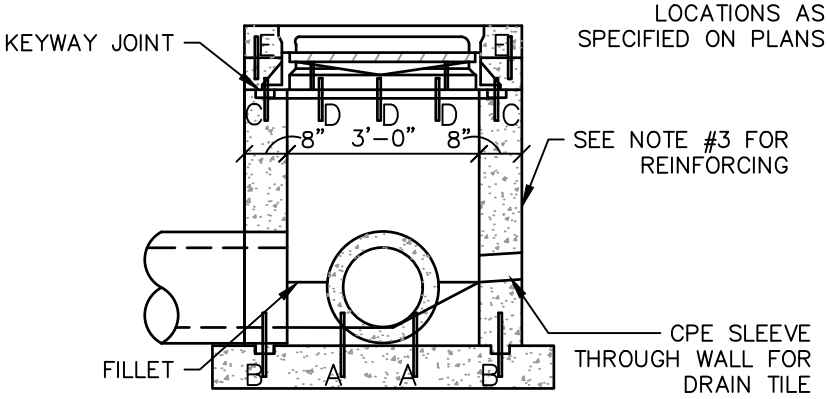
4. CONSTRUCTION DETAILS

A. Construction details are part of these standard specifications. The details include:

- Single Inlet
- Double Inlet
- Catch Basin
- Single Inlet Special
- Double Inlet Special
- Inside Drop Manhole
- Outside Drop Manhole







NOTES:
1. GRATE, FRAME & CURB BOX – NEENAH R–3246AL OR EQUAL.
2. BACKFILL AROUND CATCH BASIN TO BOTTOM OF PAVEMENT WITH POROUS BACKFILL (GRADATION CA 7, CA 8, CA 11, CA 15, AND CA 16)
3. CATCH BASINS DEEPER THAN 6'–0" SHALL INCLUDE #4 BARS @ 12" ON CENTER E.W. IN BASE AND SIDEWALLS.

REINFORCING SCHEDULE			
MARK	DIAMETER	LENGTH	SPACING
A	1/2"	1'–0"	17 1/2"
B	1/2"	1'–0"	38"
C	5/8"	8 1/2"	10"
D	5/8"	8 1/2"	11"
E	5/8"	8"	

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Project Description

SINGLE INLET
CITY OF EAST DUBUQUE, ILLINOIS

Drawing Issue Information

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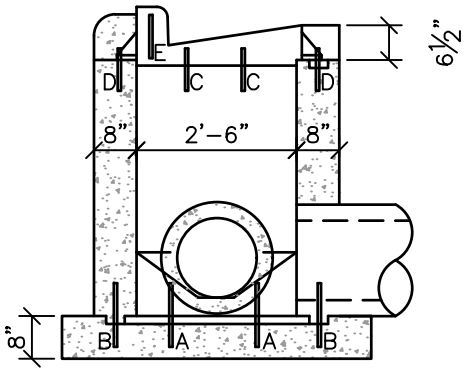
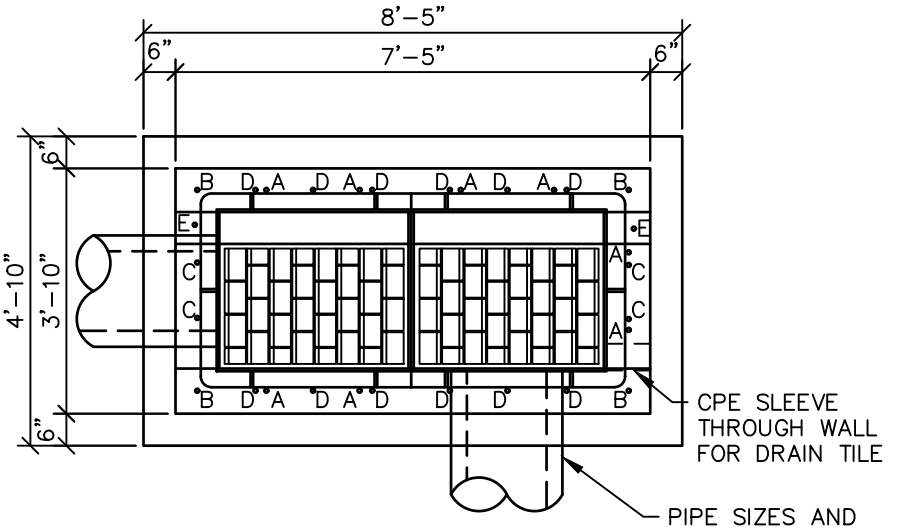
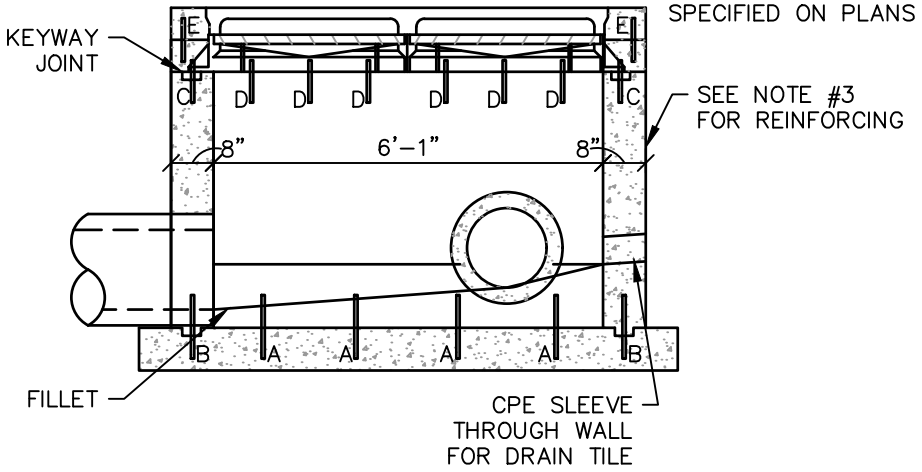
Project No: 22175





NOTES:
1. GRATE & CURB BOX – NEENAH R–3246AL OR EQUAL. FRAMES USED IN THIS CATCH BASIN REQUIRE FLANGES TO BE REMOVED WHERE THEY BUTT TOGETHER.
2. BACKFILL AROUND CATCH BASIN TO BOTTOM OF PAVEMENT WITH POROUS BACKFILL (GRADATION CA 7, CA 8, CA 11, CA 15, AND CA 16)
3. CATCH BASINS DEEPER THAN 6'–0" SHALL INCLUDE #4 BARS @ 12" ON CENTER E.W. IN BASE AND SIDEWALLS.

REINFORCING SCHEDULE			
MARK	DIAMETER	LENGTH	SPACING
A	1/2"	1'–0"	17 1/2"
B	1/2"	1'–0"	38"
C	5/8"	8 1/2"	10"
D	5/8"	8"	11"
E	5/8"	8"	



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Project Description

DOUBLE INLET
CITY OF EAST DUBUQUE, ILLINOIS

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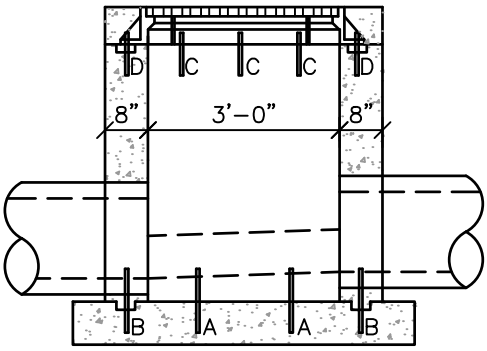
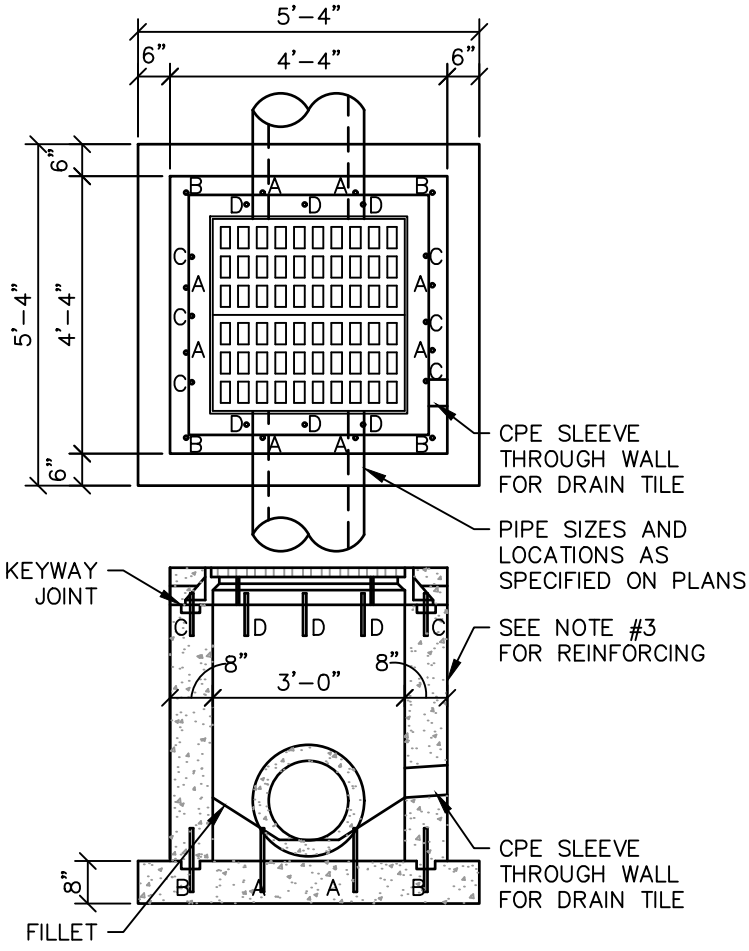
Project No: 22175



NOTES:
1. GRATE, FRAME & CURB BOX – NEENAH R-1878-A10G OR EQUAL.
2. BACKFILL AROUND CATCH BASIN TO BOTTOM OF PAVEMENT WITH POROUS BACKFILL (GRADATION CA 7, CA 8, CA 11, CA 15, AND CA 16)
3. CATCH BASINS DEEPER THAN 6'-0" SHALL INCLUDE #4 BARS @ 12" ON CENTER E.W. IN BASE AND SIDEWALLS.

REINFORCING SCHEDULE			
MARK	DIAMETER	LENGTH	SPACING
A	1/2"	1'-0"	17 1/2"
B	1/2"	1'-0"	44"
C	5/8"	9"	13"
D	5/8"	9"	13"



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Project Description

CATCH BASIN
CITY OF EAST DUBUQUE, ILLINOIS

Drawing Issue Information

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Sheet: 11 of 11
Date: 6-28-23
Drawn By: AMH
Project No: 22175

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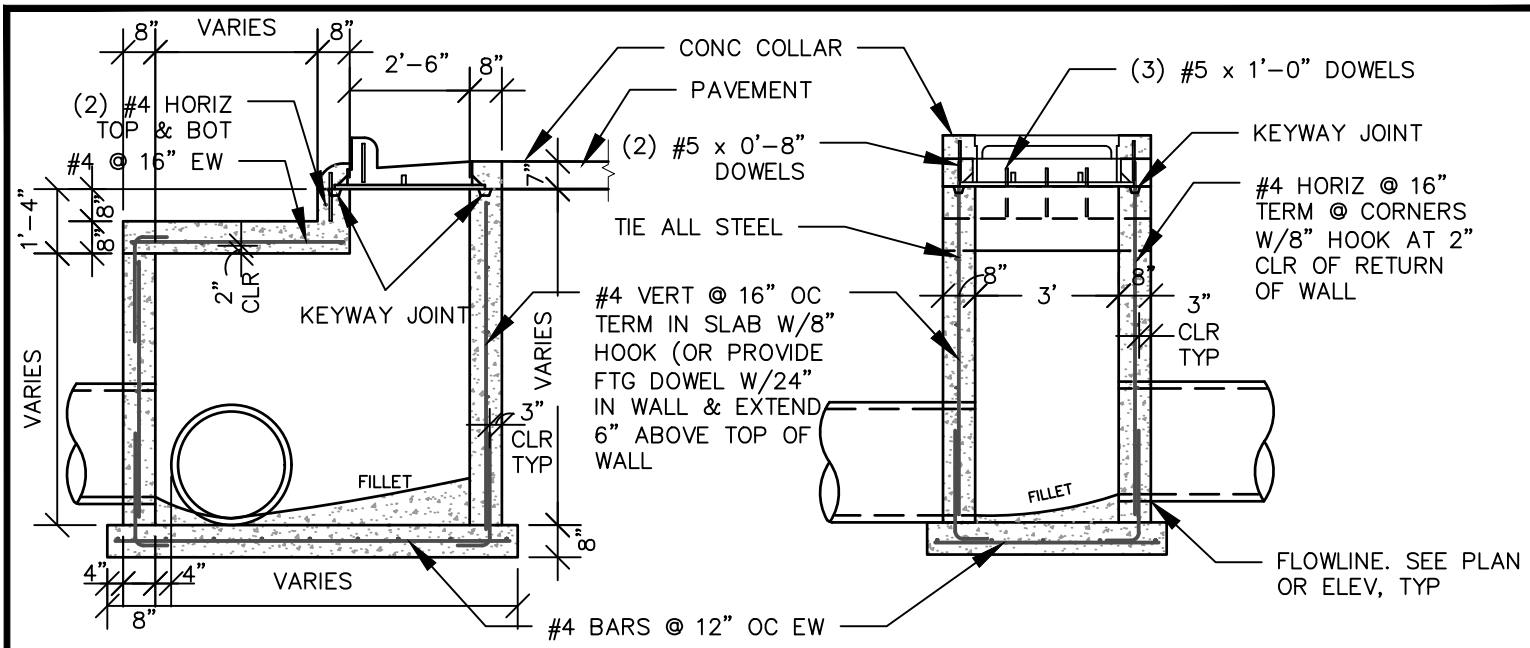

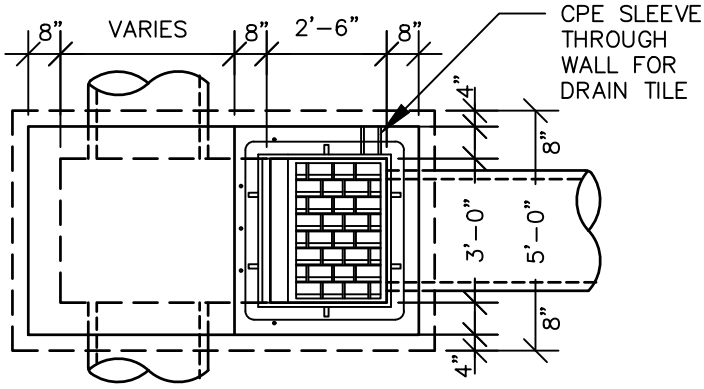

MODIFICATIONS TO THIS DETAIL INCLUDING MODIFYING THE ORIENTATION AND MODIFYING DIMENSIONS SHOWN IN THE DETAIL OTHER THAN THOSE IDENTIFIED AS VARIES WILL REQUIRE CUSTOM DESIGN/MODIFICATION BY THE ENGINEER MAKING USE OF THESE DETAILS.

NOTES:

1. BACKFILL AROUND CATCH BASIN TO BOTTOM OF PAVEMENT WITH POROUS BACKFILL (GRADATION CA 7, CA 8, CA 11, CA 15, AND CA 16).

2. CONSTRUCTION OF INTAKES SHALL INCLUDE THE COST OF FURNISHING AND PLACING THE CPE SLEEVE THROUGH THE WALL OF THE INTAKE STRUCTURE, THE PERFORATED SUBDRAIN, FITTINGS AND THE COST TO CONNECT THE ROADWAY SUBDRAIN TO THE INTAKE SUBDRAIN AND ALL TOOLS AND LABOR NECESSARY TO CONSTRUCT THE SUBDRAIN AND CONNECTIONS.

3. ROADWAY SUBDRAIN SHALL CONNECT TO THE INTAKE SUBDRAIN AT THE LOCATIONS SHOWN ON THE ROADWAY STORM SEWER SHEETS.

4. ALL LOCATIONS ALONG THE INTAKE SUBDRAIN MUST DRAIN TOWARDS THE FABRICATED TEE FITTING.

5. PLACE GRATE TOWARD DIRECTION OF FLOW ACCORDING TO MANUFACTURE'S INSTRUCTION.

6. THE CAST IRON GRATE SHOWN IN THE CONTRACT DOCUMENTS SHALL BE INCLUDED IN THE COST OF THE INTAKE.

7. CAST IRON GRATE AND FRAME SHALL BE NEENAH R-3246 AL, OR APPROVED EQUAL. FRAMES USED IN THIS CATCH BASIN REQUIRE FLANGES TO BE REMOVED WHERE THEY BUTT TOGETHER. FRAMES SHALL BE FASTENED TOGETHER USING STAINLESS STEEL BOLTS, 5/8"øx1 1/2" LENGTH, IN TWO LOCATIONS ALONG THE BUTTED EDGE.

8. DIMENSIONS SHOWN ARE FOR THE CONSTRUCTION OF A 6 INCH STANDARD CURB AS A PART OF THE PAVEMENT.

9. ALL BARS SHALL BE ASTM A 615, GRADE 60.

10. PRECAST CONCRETE UNITS WITH THESE DIMENSIONS MAY BE UTILIZED. PIPE CONNECTIONS TO PRECAST UNITS SHALL BE GROUTED.

11. WHEN INTAKE IS CONSTRUCTED OVER EXISTING PIPE, THE PIPE SHALL BE CUT TO PROPER LENGTH. THE COST OF CUTTING THE PIPE IS INCIDENTAL TO THE COST OF CONSTRUCTING THE INTAKE.

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Project Description

SINGLE INLET SPECIAL
CITY OF EAST DUBUQUE, ILLINOIS

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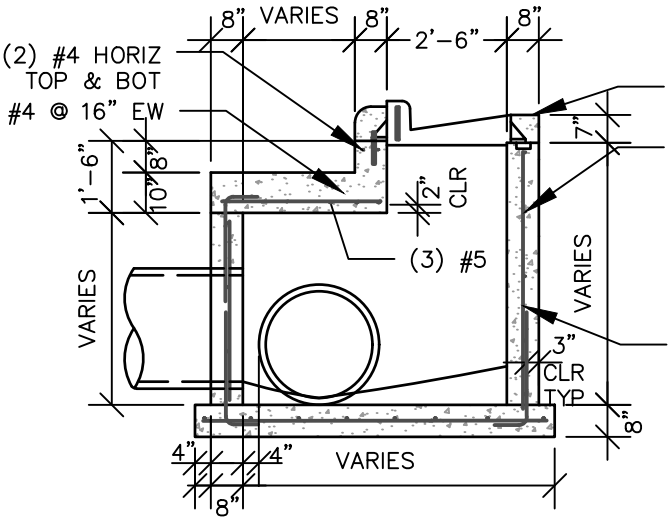
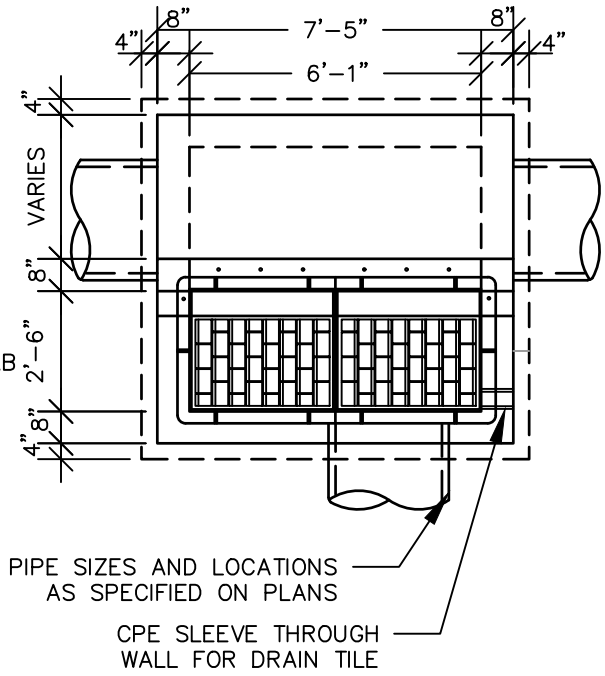
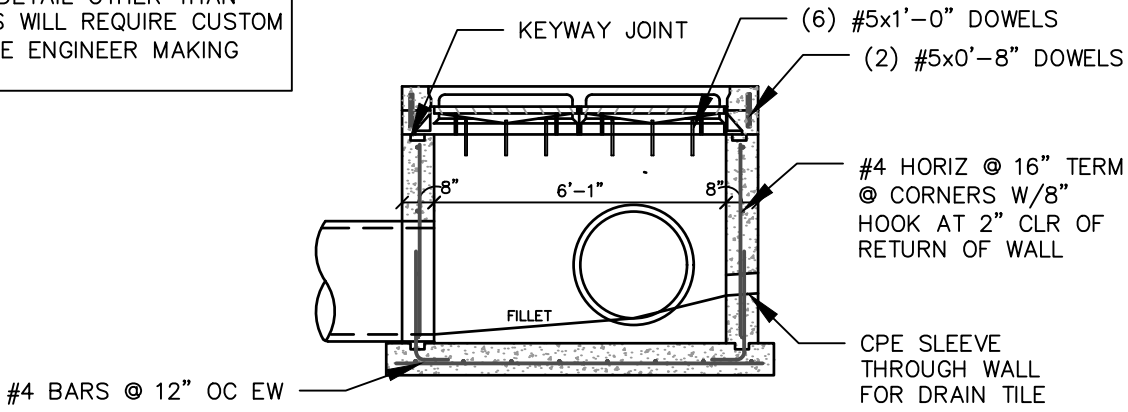




MODIFICATIONS TO THIS DETAIL INCLUDING MODIFYING THE ORIENTATION AND MODIFYING DIMENSIONS SHOWN IN THE DETAIL OTHER THAN THOSE IDENTIFIED AS VARIES WILL REQUIRE CUSTOM DESIGN/MODIFICATION BY THE ENGINEER MAKING USE OF THESE DETAILS.



NOTES:

1. BACKFILL AROUND CATCH BASIN TO BOTTOM OF PAVEMENT WITH POROUS BACKFILL (GRADATION CA 7, CA 8, CA 11, CA 15, AND CA 16)

2. CONSTRUCTION OF INTAKES SHALL INCLUDE THE COST OF FURNISHING AND PLACING THE CPE SLEEVE THROUGH THE WALL OF THE INTAKE STRUCTURE, THE PERFORATED SUBDRAIN, FITTINGS AND THE COST TO CONNECT THE ROADWAY SUBDRAIN TO THE INTAKE SUBDRAIN AND ALL TOOLS AND LABOR NECESSARY TO CONSTRUCT THE SUBDRAIN AND CONNECTIONS.

3. ROADWAY SUBDRAIN SHALL CONNECT TO THE INTAKE SUBDRAIN AT THE LOCATIONS SHOWN ON THE ROADWAY STORM SEWER SHEETS.

4. ALL LOCATIONS ALONG THE INTAKE SUBDRAIN MUST DRAIN TOWARDS THE FABRICATED TEE FITTING.

5. PLACE GRATE TOWARD DIRECTION OF FLOW ACCORDING TO MANUFACTURE'S INSTRUCTION.

6. THE CAST IRON GRATE SHOWN IN THE CONTRACT DOCUMENTS SHALL BE INCLUDED IN THE COST OF THE INTAKE.

7. CAST IRON GRATE AND FRAME SHALL BE NEENAH R-3246 AL, OR APPROVED EQUAL. FRAMES USED IN THIS CATCH BASIN REQUIRE FLANGES TO BE REMOVED WHERE THEY BUTT TOGETHER. FRAMES SHALL BE FASTENED TOGETHER USING STAINLESS STEEL BOLTS, 5/8"ø x 1 1/2" LENGTH, IN TWO LOCATIONS ALONG THE BUTTED EDGE.

8. DIMENSIONS SHOWN ARE FOR THE CONSTRUCTION OF A 6 INCH STANDARD CURB AS A PART OF THE PAVEMENT.

9. ALL BARS SHALL BE ASTM A 615, GRADE 60.

10. PRECAST CONCRETE UNITS WITH THESE DIMENSIONS MAY BE UTILIZED. PIPE CONNECTIONS TO PRECAST UNITS SHALL BE GROUTED.

11. WHEN INTAKE IS CONSTRUCTED OVER EXISTING PIPE, THE PIPE SHALL BE CUT TO PROPER LENGTH. THE COST OF CUTTING THE PIPE IS INCIDENTAL TO THE COST OF CONSTRUCTING THE INTAKE.

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Project Description

DOUBLE INLET SPECIAL
CITY OF EAST DUBUQUE, ILLINOIS

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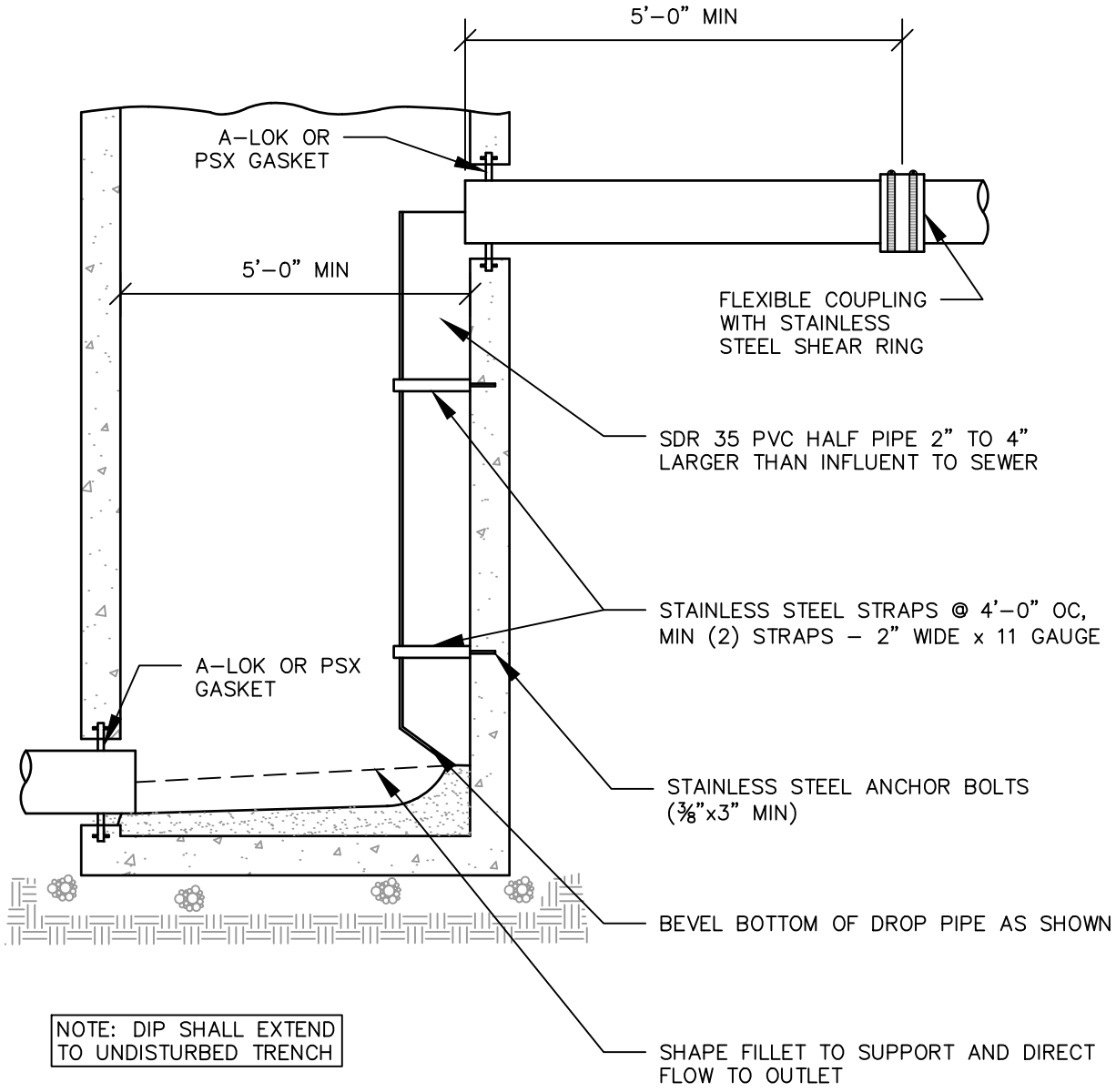
Drawing Issue Information

Drawing No:	E9
Sheet:	8 of 11
Date:	6-28-23
Drawn By:	AMH
Project No:	22175

AVERAGE GRADE	MINIMUM DROP THROUGH MANHOLE
0.00 – 2.5%	0.10'
2.51 – 5.0%	0.20'
5.01 – 7.5%	0.30'
7.51 – 10.0%	0.40'
10.01 – 12.5%	0.50'
12.51 – 15.0%	0.60'
15.01 – 17.5%	0.70'
17.51 – 20.0%	0.80'



NOTE: DIP SHALL EXTEND TO UNDISTURBED TRENCH

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Project Description

INSIDE DROP MANHOLE
CITY OF EAST DUBUQUE, ILLINOIS

Drawing Issue Information

Drawing No: E10
Sheet: 6 of 11
Date: 6-28-23
Drawn By: AMH
Project No: 22175

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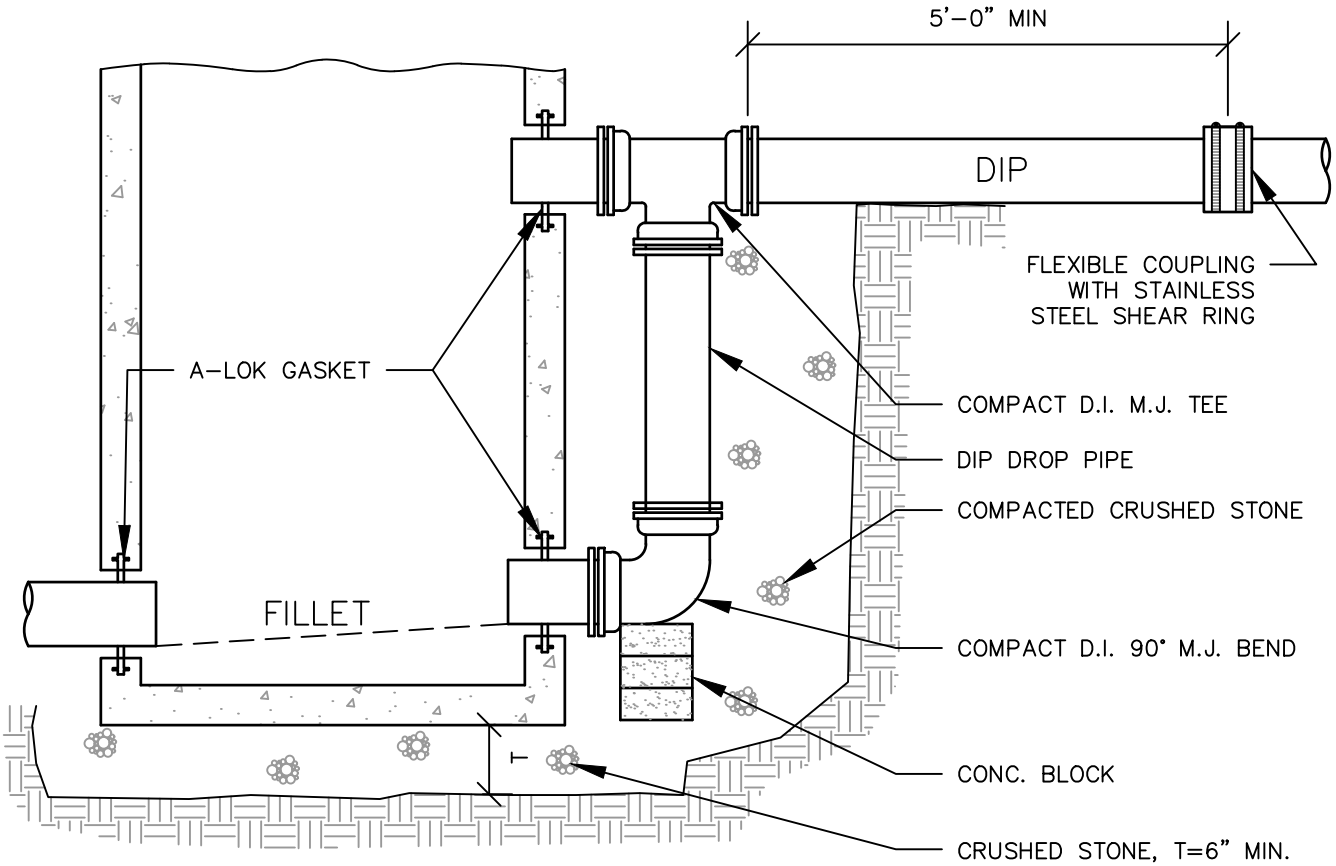
AVERAGE GRADE	MINIMUM DROP THROUGH MANHOLE
0.00 – 2.5%	0.10'
2.51 – 5.0%	0.20'
5.01 – 7.5%	0.30'
7.51 – 10.0%	0.40'
10.01 – 12.5%	0.50'
12.51 – 15.0%	0.60'
15.01 – 17.5%	0.70'
17.51 – 20.0%	0.80'



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Project Description

OUTSIDE DROP MANHOLE
CITY OF EAST DUBUQUE, ILLINOIS

Drawing Issue Information

Drawing No: E11
Sheet: 7 of 11
Date: 6-28-23
Drawn By: AMH
Project No: 22175

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CITY OF EAST DUBUQUE, ILLINOIS
STORM SEWER SYSTEM REQUIREMENTS

PART V
CONSTRUCTION SPECIFICATIONS
FOR STORM SERVICE SEWERS

1. GENERAL

A. Reference to materials or systems herein by name, make, or catalog number is intended to establish a standard of quality, and not to limit competition; the words "or approved equal" are implied following each brand name.

B. Storm sewer shall be constructed in accordance with these specifications which are to establish minimum requirements and with the requirements of Illinois Environmental Protection Agency (IEPA).

C. Storm service connections shall conform to all applicable ordinances or regulations unless otherwise stated on the Plans.

2. SCOPE

A. Provide labor, material, facilities, and administration necessary to complete all work covered by these specifications in accordance with the best installation and construction techniques.

3. MATERIALS

A. Pipe and Fittings

1) Approved pipe and fitting materials shall consist of any material listed in Part III of these specifications. Unless otherwise specified, storm service sewers and fittings shall be six (6) inches in diameter.

B. Joints

1) Approved jointing materials shall conform to those defined in Part III of these specifications.

C. Storm Sewer Foundation, Bedding, Haunching, Initial Backfill, and Final Backfill

1) Excavation and backfill shall conform with Part II of these specifications.

D. Fittings

1) All fittings shall be factory-produced and shall be designed for installation on the pipe to be used. Fittings shall be of the same quality and material as the pipe used.

2) The maximum deflection permissible at any one (1) fitting shall not exceed 45 degrees (1/8 bend). The maximum deflection of any combination of two adjacent fittings shall not exceed 45 degrees (1/8 bend) unless straight pipe of not less than 2-1/2 feet in length be installed between such adjacent fittings, or unless one of such fittings be a wye branch with a cleanout provided on the straight leg. Service sewers shall be connected to the tee, wye, or riser proved in the public sewer where such is available, utilizing approved fittings or adapters. Where no

tee, wye or riser is provided available, connection shall be made by machine-made tap and suitable saddle, or other methods as approved by the Engineer.

E. Cleanouts

1) Cleanouts shall be provided at locations and in accordance with details shown on the Plans.

F. Inspection

1) Storm service sewers shall be inspected and tested in accordance with special provisions.

4. PIPE INSTALLATION GENERAL

A. Laying storm sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared in accordance with Part II of these specifications. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surface.

B. Where pipe material approved for use for water main is used for storm sewer service, the pipe shall be appropriately identified with metallic tape installed at twelve (12) inches beneath finished grade and centered directly over the force main material.

C. Storm sewer services that are laid in the vicinity pipe lines designated to carry potable water shall meet the conditions required in Part I of these specifications.

D. Dewatering shall be sufficiently accomplished to maintain the water level twelve (12) inches below the surface of the trench bottom or base of the bedding course. Dewatering shall be accomplished prior to pipe laying and jointing, in not prior to excavation and placing the bedding, as called for in other sections of the specifications or Special Provisions. The dewatering operation however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation.

E. Bedding: The pipe bedding shall be placed so that the entire length of the pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade except when used with concrete encasement.

F. Plugs and Connections: Plugs for pipe branches, stubs or other open ends which are not to be immediately connected shall be made of an approved material and shall be secured in place with a joint comparable to the main line joint. Stoppers may be of an integrally cast breakout design.

G. Pipe Markings: The markings on reinforced concrete pipe indicating the minor axis of the elliptical reinforcement shall be placed in a vertical plane (top or bottom) when the pipe is laid.

H. Pipe Jointing: The type of joint to be used shall conform to the requirements of under Section 3.B of this specification.

I. Gasketed Joints:

1) When gaskets are placed on the pipe in the field, the surfaces on which the gasket seats shall be thoroughly cleaned. The gasket shall be installed to the manufacturer’s instructions.

2) Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced, cleaned and relubricated if required, before the jointing is attempted.

3) Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned.

4) Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint as specified in Part III of these specifications shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has sufficiently been compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep. The pipe shall be closed with a suitable "night cap" as approved by the Engineer.

5) Pipe required to be laid on curved alignment shall be joined in straight alignment and then be deflected, joint by joint. Special care shall be taken in blocking the pipe just previously laid, by tamped foil or otherwise to resist the misaligning forces generated during compression of the joints being made.

J. Joint Sealer: The elastic and mastic joint sealer shall be used in accordance with recommendations of the manufacturer. After each joint is sealed, it shall be wiped clean on the inside.

K. Jointing of Dissimilar Pipes: Suitable adaptation couplings shall be specified in the Special Provisions for the jointing of dissimilar pipes. Where suitable adaptor couplings are not available for dissimilar pipes, the jointing shall be accomplished with a special fabricated coupling or concrete encasement as specified, or as approved by the Engineer.

L. Storm Sewer Line Connections:

1) Storm sewer line connections to existing trunks, mains, laterals or side storm sewers shall be left uncovered until after inspection has been made. The City/Engineer will make such inspection within two working days after notification by the Contractor. After approval of the connection, the trench shall be backfilled as specified in Part II of these specifications, after first covering the bare pipe with select material compacted to a depth of six (6) inches above the top of the pipe.

2) No existing storm sewer shall be connected to a storm or sanitary sewer unless specifically authorized in each instance by the City/Engineer. Storm drains and drain tiles shall not be connected to a sanitary sewer. Storm drains and drain tiles discovered during construction shall be brought to the attention of the Engineer.

M. Service Risers:

1) Where the depth of the sewer invert is greater than twelve (12) feet below the surface of the ground, a service riser shall be constructed to an elevation of nine (9) feet below the ground elevation or as shown on the Plans.

2) The service riser shall be constructed with the four (4) inch minimum tee or wye as shown on the Plans placed to receive the four (4) inch minimum riser pipe. The tee or wye shall be bedded as shown on Standard Details or Plans.

3) The riser pipes shall extend to the proper elevation and shall terminate with a manufactured plug.

4) Extreme care shall be taken in backfilling around risers. Where the excavated material is not suitable for this purpose in the opinion of the Engineer, granular material shall be placed around the riser.

N. Testing and Inspection for Acceptance of Storm Sewers:

1) Post construction inspection shall conform to the inspection requirements of AASHTO Section 26 for Corrugated Metal Pipe.

2) Post construction inspection shall conform to the inspection requirements of AASHTO Section 27 for Reinforced Concrete Pipe.

3) Post construction inspection shall conform to the inspection requirements of AASHTO Section 30 for high density polyethylene pipe and polyvinyl chloride pipe.

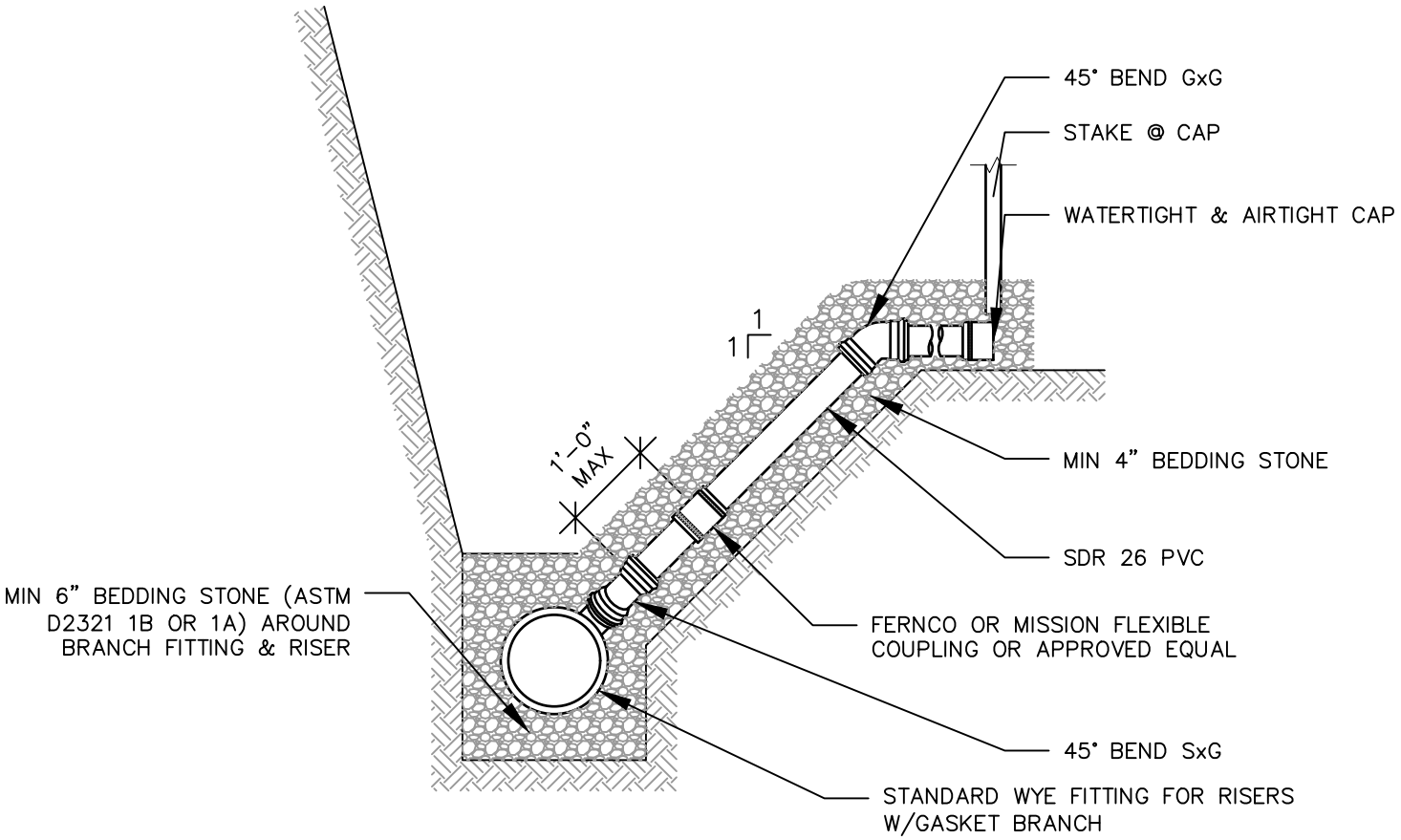
O. Post Construction Cleaning of Storm Sewer:

1) Storm structures and pipe shall be cleaned to the satisfaction of the Engineer prior to final inspection.

5. CONSTRUCTION DETAILS

A. Construction details are part of these standard specifications. The details include:

- Typical Riser For Storm Service Lateral Without Trench Box
- Typical Riser For Storm Service Lateral With Trench Box



NOTES:

BRACE OR BLOCK CAP TO WITHSTAND AIR TEST.

RISERS TO BE CONSTRUCTED WHERE SEWER DEPTH EXCEEDS 12' OR AS REQUIRED.

SXG IS SPIGOT BY GASKET
GXG IS GASKET BY GASKET

CONSULT ENGINEER FOR DIP RISER

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Project Description

SERVICE DETAIL
WITHOUT TRENCH BOX
CITY OF EAST DUBUQUE, ILLINOIS

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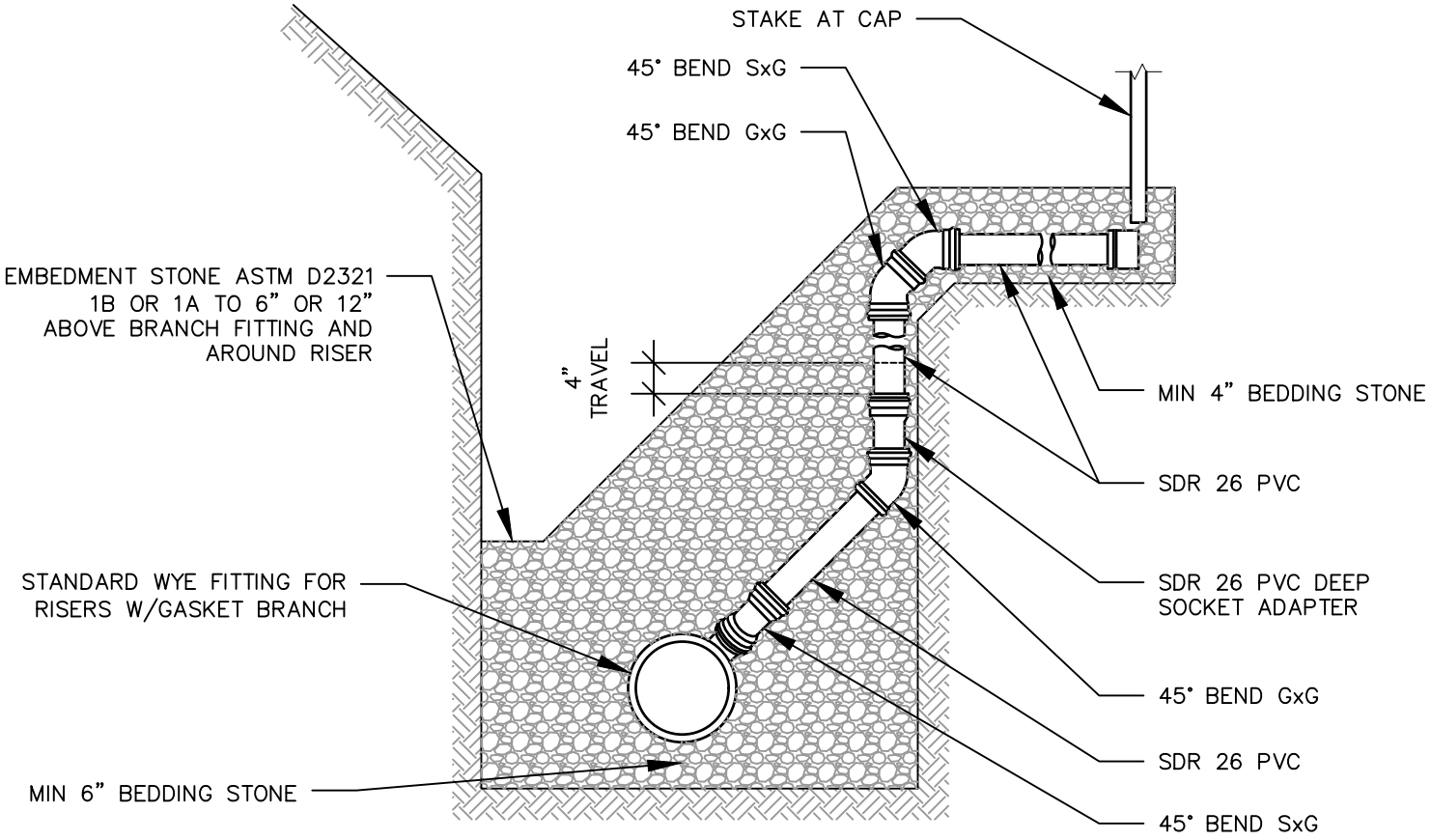
Drawing Issue Information

Drawing No:	E3
Sheet:	3 of 11
Date:	6-28-23
Drawn By:	AMH
Project No:	22175



NOTES:

INSTALL VERTICAL SECTION AGAINST UNDISTURBED SOIL.

ENCASE RISER PIPE IN FITTINGS IN CRUSHED STONE

RISERS TO BE CONSTRUCTED WHERE SEWER DEPTH EXCEEDS 12' OR AS REQUIRED

SXG IS SPIGOT BY GASKET
GXG IS GASKET BY GASKET

BRACE OR BLOCK CAP TO WITHSTAND AIR TEST

CONSULT ENGINEER FOR DIP RISER

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Project Description

SERVICE DETAIL
WITH TRENCH BOX
CITY OF EAST DUBUQUE, ILLINOIS

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Drawing Issue Information

Drawing No:	E4
Sheet:	4 of 11
Date:	6-28-23
Drawn By:	AMH
Project No:	22175