

DOWNERS GROVE SANITARY DISTRICT DESIGN MANUAL

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DOWNERS GROVE SANITARY DISTRICT DESIGN MANUAL

1. *INTRODUCTION*

1.1 Purpose of Design Manual

This manual is written as a guide to be used in the design of sanitary sewers to be constructed within the Downers Grove Sanitary District (District). It defines the policies of the District and describes the procedures for design. The intent of this manual is to establish uniform policies and procedures for the design of various sanitary sewer facilities; however, it is recognized that the design criteria can be set forth only for a portion of the design problems. A manual such as this can not enumerate the acceptable and proper course of action for every situation that may arise. For matters not covered herein, and special situations which may arise, sound engineering judgement must be applied.

1.2 Scope of Design Manual

This manual provides a digest of accumulated wastewater design experience and basic engineering principles for application to present day sanitary sewer system design problems. Acceptable procedures are outlined and engineering formulas, tables, charts, graphs, and techniques are included as a guide to the successful performance of the various tasks necessary to complete the location, design and preparation of construction plans.

1.3 Structure of Design Manual

This manual is composed of many sections relating to the various steps of design, including the drafting standards and required contents of a set of sanitary sewer plans in Section 2, and details of sanitary sewer design, criteria, and easement and utility requirements in Section 3.

1.4 Updating of Design Manual

The District welcomes constructive criticism on the contents and style of this manual and users are encouraged to make suggestions for revisions and improvements. A comment form is provided in the back of this manual for the user's convenience.

1.5 Field Survey

1.51 General

It would be beneficial to the engineer if the survey party chief would familiarize himself with the other sections of the Design Manual prior to the start of fieldwork. This would enable him to obtain the necessary field information which may impact the sanitary sewer design.

1.52 Conduct

The members of the survey party are normally the first representatives of a firm or organization to come in contact with the property owners or residents along the route of a proposed improvement. It is imperative, therefore, that the survey party conduct themselves properly, both on the project and in the surrounding community. The work should be explained to the property owners and the public, insofar as necessary, but the survey party should carefully refrain from outlining any plans or policies which might be misconstrued. The party must be courteous at all times when talking with the public, and the party members should maintain a record of the names of owners or residents with whom they converse. During these conversations, inquiries should be made concerning the location of survey corners or monuments located on the owner's property. Additionally, efforts should be made at this time to obtain all necessary information regarding existing sanitary facilities, particularly with regard to basement facilities of existing buildings to be served by the proposed sanitary sewer. The Sanitary Sewer Information Sheet (*fig. 4*) may be used in this regard.

1.53 Plats

A plat of survey and topographic survey of the property to be served shall be submitted to the District. Plats of subdivision, plats of easements and plats of annexation shall also be submitted, if applicable.

1.6 Definition of Terms

The definition of terms used in this Manual shall be the same as used in the District Ordinance Regulating the Use of Sanitary Sewers.

2. PLANS

2.1 General

All plans for sanitary sewers shall bear a suitable title showing the name of the project. They shall show the scale in feet, a graphical scale, the north point, date and the name of the engineer with his certificate number and imprint of his registration seal. A space should be provided for signature and/or approval stamp of the District.

Plans shall be clear and legible. They shall be drawn to a scale which will permit all necessary information to be plainly shown. The size of the plans shall be 24" x 36" unless specifically approved by the District. Locations and logs of test borings, when made, shall be shown on the plans. Blueprints shall not be submitted.

Detailed plans shall consist of: plan views, elevations, sections and supplementary views which, together with the specifications and general layouts, provide the working information for the contract and construction of the works. They shall also include: dimensions and relative elevations of structures, locations and size of piping, water levels and ground elevation.

2.2 Plans of Sanitary Sewers

2.21 General Plan

A comprehensive plan of existing and proposed sewers shall be submitted for projects involving new sanitary sewer systems and modifications or additions to existing systems. This plan shall show the following:

2.211 Location Map

Showing major streets and a section corner in relation to the project.

2.212 Geographical Features

a. Topography and Elevations

Existing or proposed streets and all streams or water surfaces shall be clearly shown. Contour lines at intervals not more than 2 feet should be included.

b. Streams

The direction of flow in all streams and high and low water elevations in all water surfaces at sewer outlets and overflows shall be shown.

c. Boundaries

The boundary lines of the District and the area to be sewerred shall be shown.

2.213 Sewers

The plan shall show the location, size, and direction of flow of all existing and proposed sanitary and storm sewers and water mains. All manholes must be shown and numbered.

2.22 Detailed Plans

Detailed plans shall be submitted. Profiles should have a horizontal scale of not more than 50' to the inch and a vertical scale of not more than 5' to the inch. Plan views should be drawn to a

corresponding horizontal scale and preferably be shown on the same sheet. Plans and profiles shall show:

- a. Location of streets and sewers, including adjacent lots;
- b. Line of ground surface; size, material and type of pipe; length between manholes; invert and surface elevation at each manhole; and the grade of sewer between each two adjacent manholes (all manholes shall be numbered on the plan and profile);

Where there is any question of the public sanitary sewer being sufficiently deep to serve any adjacent parcels, the elevation of the adjacent parcels shall be plotted on the profile of the sewer. The engineer shall state that all public sanitary sewers are sufficiently deep to serve adjacent parcels except where otherwise noted on the plans;

- c. Locations of all special features such as casing pipes, special crossings, undercut, etc.;
- d. All known existing structures and utilities, both above and below ground, which might interfere with the proposed construction, particularly water mains, gas mains, sanitary sewers, storm drains, and telephone and power conduits;
- e. Special detailed drawings, made to a scale to clearly show the nature of design, shall be furnished to show the following particulars.

All stream crossings and sewer outlets, with elevations of the stream bed and of normal and extreme high and low water levels; details of all special sewer joints and cross sections; and details of all sewer appurtenances such as manholes, sewer bedding and backfill, building sanitary service risers, and conduit crossings.

2.3 Specifications

Complete technical specifications for the construction of sewers, and all other appurtenances, shall accompany the plans.

The specifications accompanying construction drawings shall include, but not be limited to, all construction information not shown on the drawings which is necessary to inform the contractor in detail of design requirements for the quality of materials, workmanship and fabrication of the project. It shall also include the complete standards for all piping, and jointing of pipe; construction materials; special materials, such as stone, sand, gravel; miscellaneous appurtenances; instructions for testing materials and equipment as necessary to meet design standards; and performance test for the completed works and component units.

It is suggested that these performance tests be conducted at design load conditions wherever practical.

The specifications shall include a requirement that the Contractor attend a pre-construction meeting with the District.

2.4 Revisions to Approved Plans

Any deviation from approved plans or specifications affecting capacity, flow, operation of units, or point of discharge shall be approved in writing by the District before such changes are made.

Plans or specifications so revised should, therefore, be submitted well in advance of any construction work which will be affected by changes to permit sufficient time for review and approval.

2.5 As-Built Plans

"As-Built" plans clearly showing such alterations shall be submitted to the District at the completion of the work.

The following information is required on "As-Built" plans:

- a. Actual length of public sanitary sewer constructed, pipe size and material;
- b. Location of wyes or tees, as measured from the nearest downstream manhole;
- c. Actual length of building sanitary service stubs constructed, pipe size and material, depth at end of stub, and location of end of stub relative to a property corner;
- d. Actual elevation of the rim and invert of pipes entering all manholes;
- e. Location and description of all repairs to public sanitary sewers and building sanitary service stubs;
- f. Location of undercut, sheeting, auger, casing pipe or other unusual construction methods;
- g. At locations where the storm sewer or water main crosses the public sanitary sewer or building sanitary service stub, give the location, depth, pipe size and material of the storm sewer and water main and the method of backfill between the sanitary sewer and the storm sewer or water main;
- h. Location of underground utilities encountered while constructing public sanitary sewers and building sanitary services.

2.6 Operation During Construction

Specifications shall contain a program for keeping existing sanitary sewers in operation during the construction of sewer additions.

Should it become necessary to take sanitary sewers out of operation, a shutdown schedule, which will minimize disruptions to users on the sanitary sewer, shall be reviewed and approved in advance by the District and shall be adhered to during construction.

2.7 Easements

Whenever a sanitary sewer easement is required, it may be provided either by a separate easement grant (*Figure 3*), in which case a plat of easement must also be provided, or by incorporation into a plat of subdivision (*Figure 2*). In either case, the proposed easement should be submitted for District review prior to execution by the appropriate parties.

3. DESIGN OF SANITARY SEWERS

3.1 Approval of Sanitary Sewers

The District will approve plans for new sanitary sewer system extensions to areas or replacement sanitary sewers only when designed to exclude the entry of inflow or infiltration from rainwater or groundwater.

3.11 Gravity Public Sewer Systems

All public sanitary sewers to be owned, operated or maintained by the District shall flow by gravity. No pump stations or force mains will be accepted.

3.12 Force Main Building Sanitary Services

In the event a gravity public sanitary sewer is or can be made available to a parcel but the topography of the parcel and the depth of the public sanitary sewer does not allow the installation of a gravity building sanitary service, a force main building sanitary service and pump will be permitted. Such a system must be reviewed and approved by the District. In addition, the parcel owner must agree to the recording against the title to the property of a notice to future owners that

the property is served by a force main building sanitary service and pump, and the operation, maintenance, and replacement of the system is the responsibility of the property owner.

3.2 Design Capacity

In general, sanitary sewer capacity should be designed for the estimated ultimate tributary population. Similarly, consideration should be given to the maximum anticipated capacity of institutions, industrial parks, etc.

In determining the required capacities of sanitary sewers the following factors should be considered:

- a. Maximum hourly domestic sewage flow;
- b. Additional maximum sewage or waste flow from industrial plants;
- c. Inflow and ground water infiltration;
- d. Topography of area;
- e. Location of Wastewater Treatment Plant;
- f. Depth of excavation;
- g. Pumping requirements.

The basis of design for all sanitary sewer projects shall accompany the plan documents. More detailed computations may be required by the District or Illinois Environmental Protection Agency for critical projects.

3.3 Design Flow

3.31 Per Capita Flow

New sanitary sewer systems shall be designed on the basis of an average daily per capita flow of sewage of not less than 100 gallons per day. This figure is assumed to cover normal infiltration and is equal to one population equivalent (1 P.E.).

The following design criteria should be used in estimating the population equivalent of a residential building:

Efficiency or Studio Apartment	=	1	Person
1 Bedroom Apartment or Condominium	=	1.5	Persons
2 & 3 Bedroom Apartments or Condo's	=	3	Persons
Private Home	=	3.5	Persons
Mobile Home	=	2.25	Persons

Design criteria approved by the District shall be used to estimate the population equivalent of a non-residential building. Maximum permitted design for an 8-inch sanitary sewer is 1,125 P.E., 2,796 P.E. for 10-inch sanitary sewer and 4,284 P.E. for 12-inch sanitary sewer. These figures may be revised from time to time in accordance with revisions to the Illinois Environmental Protection Agency regulations.

3.32 Peak Design Flow

Sanitary sewers shall be designed on a peak design flow basis using the ratio of peak to average daily flow as determined from *Figure 1*.

3.4 Details of Design and Construction

3.41 Minimum Size

No gravity public sanitary sewer shall be less than 8 inches in diameter.

3.42 Depth

In general, sanitary sewers should be sufficiently deep to prevent freezing. Minimum depth of cover allowed from the top of the pipe to finished grade is 5' for public sanitary sewers and 4' for building sanitary services. The construction of a berm to achieve the minimum depth of cover for public sanitary sewers must be specifically approved by the District, in the District's sole discretion, and will only be approved in those limited situations where the proposed berm does not negatively impact safety, drainage or accessibility of the public sanitary sewer for maintenance and does not result in a significant variation from the surrounding topography. If the sanitary sewer is constructed of ductile iron pipe and an acceptable method of insulating the pipe is provided, the minimum depth of cover for building sanitary services shall be 3'. Building sanitary service risers are required where the public sanitary sewer is greater than 12' deep, to the top of the pipe and must extend to within 12' of the ground surface. Overhead building sanitary services are required for all buildings in accordance with District ordinances. All rough grading on the site must be completed before any sanitary sewer construction is started. Any fill material located beneath a proposed public sanitary sewer or building sanitary services must be compacted to provide adequate support for the sanitary sewer(s), as verified in writing by an independent testing laboratory approved by the District, following appropriate field sampling and analysis.

3.43 Slope

- a. All sanitary sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Kutter's formula using an "N" value of 0.013. The following are minimum slopes which should be provided; however, slopes greater than these are desirable:

<u>Sanitary Sewer Size</u>	<u>Minimum Slope in Feet per 100 ft.</u>
8"	0.40
10"	0.28
12"	0.22

- b. Where velocities greater than 15 feet per second are attained, special provisions shall be made to protect against displacement by erosion and shock.
- c. Sanitary sewers shall be laid with uniform slope between manholes.

3.44 Location

3.441 General

No storm sewer detention area may be located over any sanitary sewer, existing or proposed. No public sanitary sewer may be located under a roadway except to cross. All public sanitary sewers, smaller than 12", located outside the right of way must be centered in a 20' permanent sanitary sewer easement. All public sanitary sewers, 12" and larger, located outside the right of way must be offset 10' within a 30' permanent sanitary sewer easement. All public sanitary sewers located inside the right of way but less than 10' from the lot line must have a 10' easement along the lot line. All public sanitary sewers located outside the right of way in an easement between lots, or where access would be difficult, must be constructed of ductile iron pipe or PVC pipe. To allow District vehicles to reach public sanitary sewers in these locations, a 10' wide access route capable of supporting up to 5 tons of vehicle weight must be provided. The District may prohibit building sanitary service connections to existing or proposed public sanitary sewers (12" and larger) where the integrity of the public sanitary sewer would be diminished by the construction of a building sanitary service connection. No curvilinear sewers are allowed. The public

sanitary sewer must extend at least half way across any lot to be served. All building sanitary service stubs must be extended to the lot line.

3.442 Protection of Water Supplies (refer also to "Recommended Standards for Water Works")

3.4421 Water Supply Connections

There shall be no physical connections between a public or private potable water system and a sewer, or appurtenance thereto which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole.

3.4422 Relation to Water Works Structures

Any sanitary sewer within a 50' radius of a well must be constructed of water main quality pipe and joints.

3.4423 Relation to Water Mains

a. Horizontal Separation

Sewers shall be laid at least 10 feet horizontally from any existing or proposed water main. The distance shall be measured edge to edge.

b. Crossings

Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18" between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equal distance and as far as possible from the water main joints. The plans shall include a method of backfilling between the pipes which will provide adequate structural support for the sanitary sewer. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main. Sanitary sewer/water main crossings must comply with requirements of the Illinois EPA, Water Permits Section. Whenever a water main 24" in diameter or greater will cross less than three (3) feet over an existing or proposed sanitary sewer, the water main shall be supported by a special crossing as shown in the District Special Crossing Detail, which shall be included as a part of the construction plan.

c. Special Conditions

When it is impossible to obtain proper horizontal and vertical separations as stipulated above, the sewer shall be designed and constructed equal to the water pipe, and shall be pressure tested to assure water tightness.

3.443 Sanitary Sewers in Relation to Storm Sewers and Streams

3.4431 Location of Sanitary Sewers in Relation to Storm Sewers

Minimum vertical separation shall be 18" and minimum horizontal separation shall be 10 feet between sanitary sewers and storm sewers. The plans shall include a method of backfilling between the pipes, which will provide adequate structural support for the sanitary sewer. If less, then the sanitary sewer shall be constructed of ductile iron pipe or PVC pipe. Whenever a storm sewer 24" in

diameter or greater will cross less than three (3) feet over a sanitary sewer, whether existing or proposed, the storm sewer shall be supported in accordance with the District Special Crossing detail which shall be included as a part of the construction plans.

3.4432 Location of Sanitary Sewers on Streams

a. Cover Depth

Must meet Illinois Department of Transportation, Department of Water Resources requirements.

b. Horizontal Location

Sanitary sewers located along streams shall be located outside of the stream bed and sufficiently removed from there to provide for future possible stream widening and to prevent pollution by siltation during construction. Sanitary sewers must be a minimum of 10' from the top of the bank of the stream.

c. Structures

The sanitary sewer manholes or other structures shall be located so that they do not interfere with the free discharge of flood flows from the stream.

d. Alignment

Sanitary sewers crossing streams should be designed to cross the stream as nearly perpendicular to the stream flow as possible, and shall be free from change in grade. Sanitary sewer systems shall be designed to minimize the number of stream crossings.

3.4433 Construction

a. Materials

Sanitary sewers crossing streams shall be constructed of ductile iron pipe. Material used to backfill the trench shall be stone, course aggregate, washed gravel, or other materials which do not cause siltation.

b. Siltation and Erosion

Construction methods that will minimize siltation and erosion shall be employed. The design engineer shall include in the project specification the method(s) to be employed in the construction in or near streams to provide adequate control of siltation and erosion. Specifications shall require that clean-up, grading, seeding, and planting or restoration of all work areas shall begin immediately. Exposed areas shall not remain unprotected for more than 7 days.

3.45 Alignment

All public sanitary sewers shall be laid with straight alignment between manholes. The alignment shall be checked by taping in accordance with District construction specifications.

3.46 Changes in Pipe Size

When a smaller sanitary sewer joins a larger one, the invert of the larger sanitary sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sanitary sewers at the same elevation.

3.47 Materials

The only materials allowed for the construction of sanitary sewers in the District are:

Ductile Iron Pipe – AWWA C151, joints AWWA C111;

PVC Pipe – ASTM D2241, 160 psi pressure pipe, SDR 26, push-on bell and spigot type with rubber ring seal gasket ASTM D3139;

Reinforced Concrete Cylinder Pipe – AWWA C300, rubber gasket type joints with steel bell and spigot rings AWWA C300.

All iron pipe and fittings shall be protected from internal and external corrosion by methods approved by the District.

There shall be no change in pipe material between manholes.

Building sanitary services to commercial/industrial lots must have an inspection manhole located approximately 5' from the building. All sanitary sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sanitary sewer shall be made because of the width and depth of the trench. Where necessary to withstand extraordinary superimposed loading, special beddings, concrete cradle or special construction may be used.

3.48 Installation

3.481 Standards

Installation shall be in accordance with District specifications.

3.482 Leakage Tests

Leakage tests shall be performed in accordance with District specifications.

3.483 Inspection

The specification shall include a requirement for inspection of manholes and sanitary sewer lines for water tightness and conformance with District construction standards prior to placing into service.

3.484 Deflection Testing

All new public sanitary sewers constructed with PVC pipe shall be deflection tested in accordance with District specifications.

3.49 Building Sanitary Services

The requirements of this Design Manual shall apply to building sanitary services.

3.491 Outside Cleanouts

An outside cleanout shall be installed on each new building sanitary service at a location approved by the District. The outside cleanout shall be constructed in accordance with the standard outside cleanout detail (Standard Drawing No. 9).

3.492 Building Sanitary Service Testing

All new building sanitary services shall be tested in accordance with District specifications for building sanitary service air testing.

3.493 Building Sanitary Service Televising

All new building sanitary services shall be televised in accordance with District specifications for building sanitary service televising.

3.5 Manholes

3.51 Location

Manholes shall be installed:

- a. at the end of each line;
- b. at all changes in grade, size or alignment;
- c. at all intersections;
- d. at distances not greater than 400 feet.

3.52 Drop Type

A drop pipe shall be provided for a sanitary sewer entering a manhole at an elevation of 24" or more above the manhole invert. Where the difference in elevation between the incoming sanitary sewer and the manhole invert is less than 24", the invert shall be filleted to prevent solids deposition. All manholes shall be constructed with an outside drop connection. Inside drop connections may be permitted under the following conditions: When the manhole is at least 5' in diameter, and when the manhole is of excessive depth. Inside drop connections shall be secured to the interior wall of the manhole and provide access for cleaning. Due to the inequality in earth pressures that would result from the backfilling operation in the vicinity of the manhole, the entire outside drop connection shall be encased in concrete.

In general, building sanitary service connections to manholes are prohibited in the District. The connection of a building sanitary service to a manhole may be permitted under the following conditions:

- a. When the manhole is at the end of the line;
- b. When the manhole is existing and is extremely deep.

When building sanitary service connection to a manhole is permitted, the building sanitary service shall connect to the manhole at the flow line, or in the cases of an extremely deep manhole may be connected with an outside drop pipe discharging at the flow line of the manhole.

3.53 Diameter

The minimum diameter of manholes shall be 48" for pipe sizes up to and including 18 inches and 60" for pipe sizes over 18 inches. A minimum access diameter of 22" shall be provided. The cone section of all sanitary sewer manholes constructed in the District shall be of an eccentric design with the manhole opening over the outlet pipe.

3.54 Steps

Manhole steps shall be installed at 16" spacing over the outlet pipe, starting no more than 32" from the top of the frame. Steps shall be of a design approved by the District.

3.55 Flow Channel

The flow channel through manholes shall be made to conform in shape and slope to that of the sanitary sewer.

3.56 Water Tightness

a. Manhole Construction

Manholes shall be made of precast concrete or poured-in-place concrete. No brick or concrete block manholes shall be permitted within the District. All manholes shall be waterproofed on the exterior surface in a manner approved by the District. All manholes shall be constructed as shown on the drawings and shall comply with the specifications on the standard manhole details (Standard Drawing Nos. 3, 5, and 6).

b. Pipe Connections

Inlet and outlet pipes shall be joined to the manhole with a gasketed flexible watertight connection or another watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place.

c. Frame and Lid

The standard manhole frame and lid required in the District shall be a watertight design, such as the East Jordan Iron Works 1050-2-1. The standard waterproof frame and lid required in the District shall be a locking bar design, such as East Jordan Iron Works 1885. Waterproof manhole covers are to be used whenever the manhole top may be flooded by street runoff or high water or are in isolated easement locations. All manholes, existing and proposed, shall have a top of frame elevation no less than 6" above the overflow high-water elevation of storm water detention ponds for the project.

d. Adjusting Rings

The manhole frame and lid shall be adjusted to final grade by means of precast concrete adjusting rings. The adjusting rings shall have a maximum height of 7 1/2" and a minimum of 2" and shall be sealed with bituminous or plastic mastic to assure water tightness. If existing manholes must be adjusted to meet final grade, there may be no more than 7 1/2" of concrete rings after adjustment. If more adjustment is required, or if the manhole must be lowered and there are no adjusting rings, then the manhole must be reconstructed. Concrete block or brick adjustment is not permitted, and the use of mortar is not permitted for achieving water tightness.

e. Manhole Frame Seal

An internal or external manhole frame seal shall be installed to cover the entire chimney area on all sanitary manholes. The frame seal shall be installed in accordance with the manufacturer's instructions and shall consist of a flexible rubber sleeve, interlocking extensions, and stainless steel expansion bands as manufactured by Cretex Specialty Products or an equal approved by the District.

f. External Manhole Joint Sealer

External manhole joint seals shall be installed at each joint and be protected during backfilling in accordance with the manufacturer's instructions. Approved manufacturers include MacWrap or an equal approved by the District.

3.57 Manhole Testing

Manhole vacuum testing shall be performed in accordance with District specifications for manhole testing (latest revision).

4. *SUBMISSION FOR REVIEW*

4.1 Required Documents

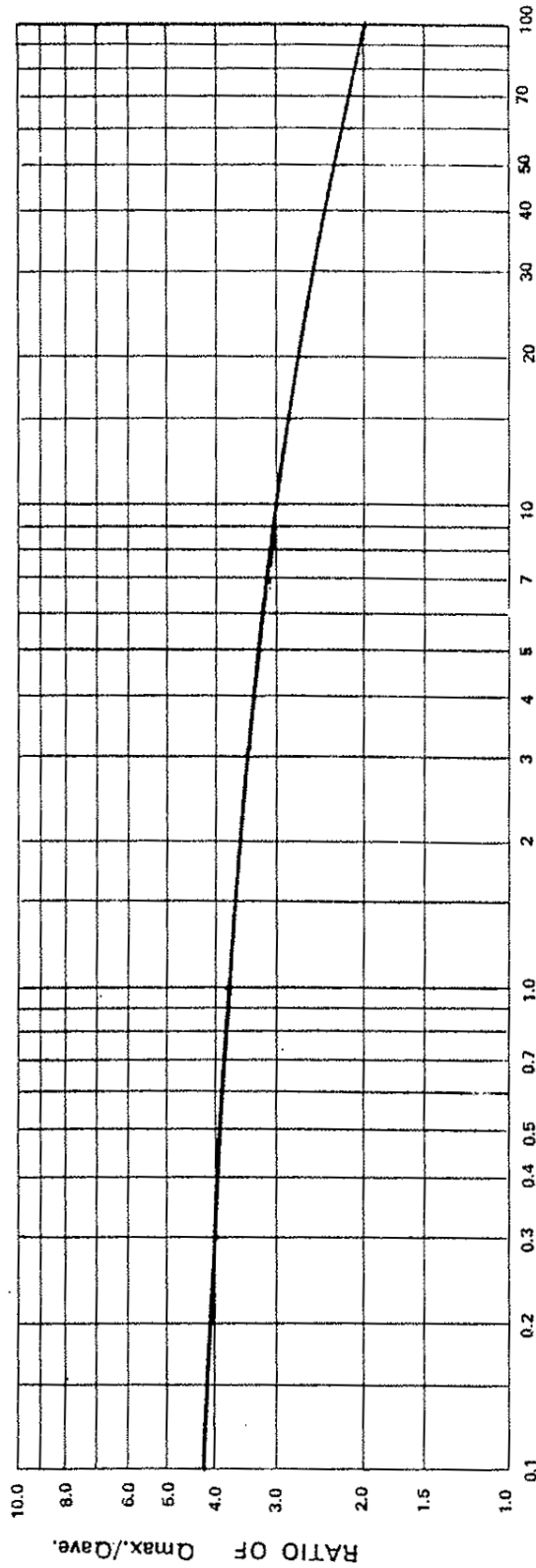
The following documents are required:

- 4 complete sets of plans;
- 4 sets of specifications;
- 3 sets of Illinois Environmental Protection Agency permit applications;
- 2 copies of an Engineer's Estimate of Cost for sanitary sewer construction;
- 2 copies of subdivision plats, easement plats, and annexation plats (if applicable).

If survey and topographical data are not contained in the project plans, 2 copies of each must also be submitted.

DESIGN OF SEWERS

FIGURE 1.
RATIO OF EXTREME FLOW TO DAILY AVERAGE FLOW



POPULATION IN THOUSANDS

Qmax: Maximum Rate of Sewage Flow (Peak Hourly Flow)

Qave: Average Daily Sewage Flow

Source: $Q_{max.}/Q_{ave.} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$ (P = population in thousands)

Fair, G.M. and Geyer, J.C. "Water Supply and Waste-Water Disposal"
1st Ed., John Wiley & Sons, Inc., New York (1954), p. 136

LANGUAGE FOR ACCEPTING SANITARY SEWER SERVICE
EASEMENT GRANTS ON PLAT

The Grantor(s) _____
do(es) hereby give, grant, and convey unto the Downers Grove Sanitary District,
a body politic and corporate in DuPage County, Illinois, its successors and
assigns, an easement right to install, use, operate, maintain, replace and remove
sanitary sewers, including all rights of access thereto in, under, over, upon and
across the following described real estate:

(Legal Description)

This grant of easement is accepted by the Grantee, Downers Grove Sanitary
District, this _____ day of _____, 19____.

DOWNERS GROVE SANITARY DISTRICT,
a body politic and corporate in
DuPage County, Illinois

BY: _____
President

ATTEST:

Clerk

GRANT OF EASEMENT

GRANTOR, _____, an Illinois Corporation,
 pursuant to due authority bestowed upon it by Statute, does hereby give, grant, and
 convey unto the DOWNERS GROVE SANITARY DISTRICT, a body politic and corporate in DuPage
 County, Illinois, its successors and assigns, an exclusive, permanent easement for the
 construction, operation, maintenance, replacement and repair of sanitary sewers over
 and under the following described property, to-wit:

IN WITNESS WHEREOF, the Grantors have caused this Grant of Easement to
 be executed on the _____ day of _____, 1981.

BY: _____
 President

ATTEST: _____
 Secretary

STATE OF ILLINOIS)
) SS
 COUNTY OF DU PAGE)

I, the undersigned, a Notary Public in and for the County and State
 aforesaid, DO HEREBY CERTIFY that _____ personally
 known to me to be the President of _____, and _____,
 personally known to me to be the Secretary _____, personally
 known to me to be the same persons whose names are subscribed to the foregoing instrument,
 and appeared before me this day in person and severally acknowledged that they signed
 and sealed the said instrument and caused the corporate seal of said corporation to
 be affixed thereto pursuant to authority given by the Board of Directors of said
 corporation as its free and voluntary act, for the uses and purposes set forth therein.

GIVEN under my hand and notarial seal this _____ day of _____, 19____

 Notary Public

Accepted by the Grantee, Downers Grove Sanitary District, this _____ day of
 _____, 19____.

DOWNERS GROVE SANITARY DISTRICT
 a body politic and corporate in
 DuPage County, Illinois.

BY: _____
 President

ATTEST: _____
 Clerk

SANITARY SEWER
INFORMATION SHEET

1. Name _____ Street Address _____
Date _____

2. Does your house have a basement? Yes _____ No _____

If No, additional questions are not applicable - Return this form in the enclosed self-addressed stamped envelope.

If Yes, continue -

3. Does your basement contain any of the items listed below?

Comments

Sink	Yes _____	No _____
Shower	Yes _____	No _____
Commode	Yes _____	No _____
Sump Pump	Yes _____	No _____
Washer	Yes _____	No _____

4. If your basement has any of the facilities listed below, does the discharge pipe go through the basement floor slab?

Comments

Sink	Yes _____	No _____
Shower	Yes _____	No _____
Commode	Yes _____	No _____
Sump Pump	Yes _____	No _____
Washer	Yes _____	No _____

5. If your basement has any of the facilities listed below and the discharge pipe goes through the basement wall, approximately how far above the basement floor slab does the pipe exit?

Above Basement
Floor Slab

Sink	_____	Feet
Shower	_____	Feet
Commode	_____	Feet
Sump Pump	_____	Feet
Washer	_____	Feet

6. Return this form in the enclosed, self-addressed stamped envelope.
Thank you.

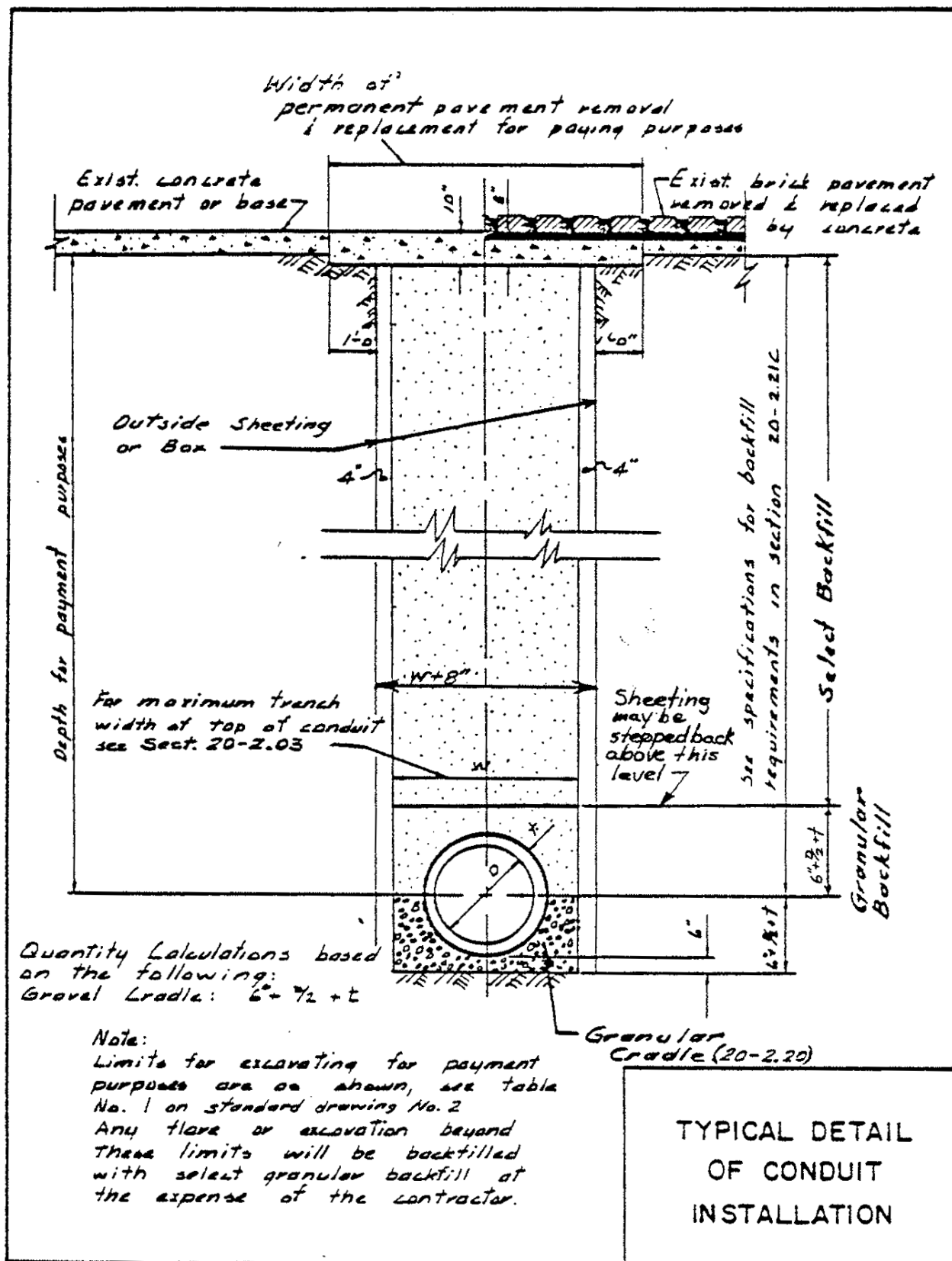


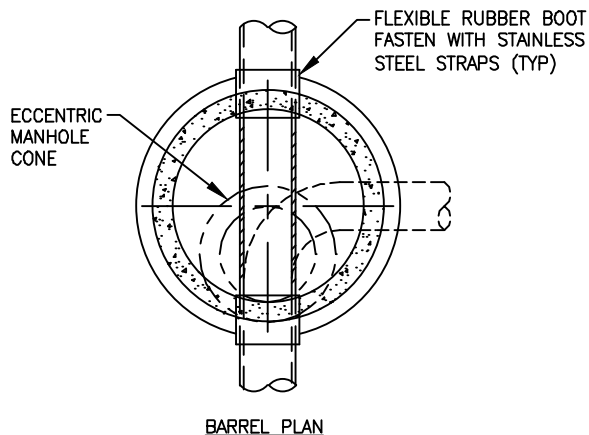
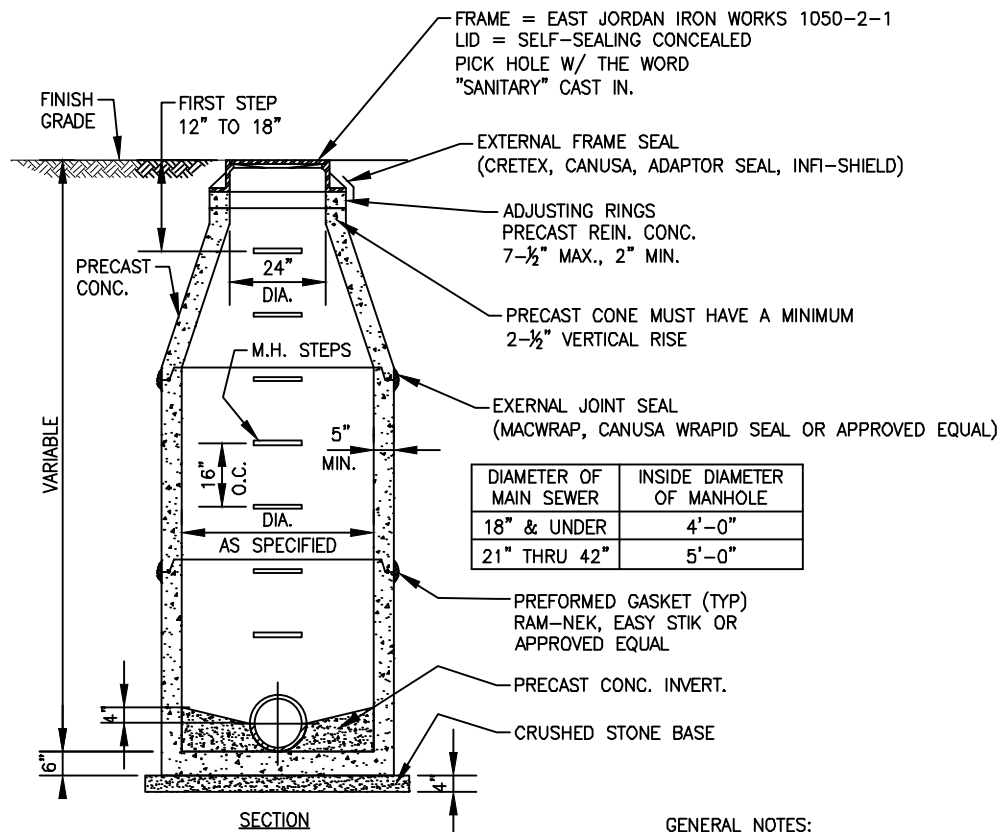
TABLE I

Inside Diameter of Conduit in inches "D"	Sect. 20-2.03 Maximum Trench Width at Top of Conduit W + 8"	PAYMENT QUANTITIES PER FOOT OF CONDUIT						
		Sect. 20-2.21C Select Backfill Cu Yds/ Ft of depth W + 8"	Sect. 20-2.1C Select Backfill Cu Yds/ Ft of depth W	Sect. 20-2.20 Granular Cradle Du Yds/ Ft W + 8"	Sect. 20-2.20 Granular Cradle Cu Yds/ Ft W	Granular Backfill 1 Ft over top of pipe Cu. Yds/Ft W + 8"	Permanent Type Pav't or Drive Removal & Replacement Sq Yds/Ft W + 2'8"	Removal & Replacement: Conc. or Brick Sidewalk (sq. ft/ft) Curb or Curb & Gutter (ft/ft) W + 2'8"
6	2'-8"	0.099	0.074	0.08	0.05	0.13	0.48	4.35
8	3'-2"	0.117	0.093	0.10	0.07	0.16	0.57	5.17
10	3'-2"	0.117	0.093	0.11	0.08	0.17	0.57	5.17
12	3'-4"	0.12	0.093	0.12	0.08	0.18	0.59	5.33
15	3'-6"	0.13	0.105	0.13	0.10	0.20	0.61	5.50
18	3'-10"	0.14	0.117	0.15	0.12	0.22	0.65	5.83
21	4'-4"	0.16	0.136	0.19	0.15	0.27	0.70	6.33
24	4'-8"	0.17	0.148	0.21	0.19	0.30	0.74	6.67
27	4'-11"	0.18	0.157	0.23	0.20	0.32	0.77	6.92
30	5'-3"	0.19	0.170	0.26	0.21	0.36	0.81	7.25
33	6'-0"	0.22	0.198	0.32	0.27	0.43	0.89	8.00
36	6'-4"	0.23	0.210	0.35	0.29	0.47	0.93	8.33
42	6'-11"	0.26	0.231	0.41	0.35	0.54	0.99	8.92

NOTES:

REVISIONS:

PAYMENT QUANTITIES PER
FOOT OF CONDUIT



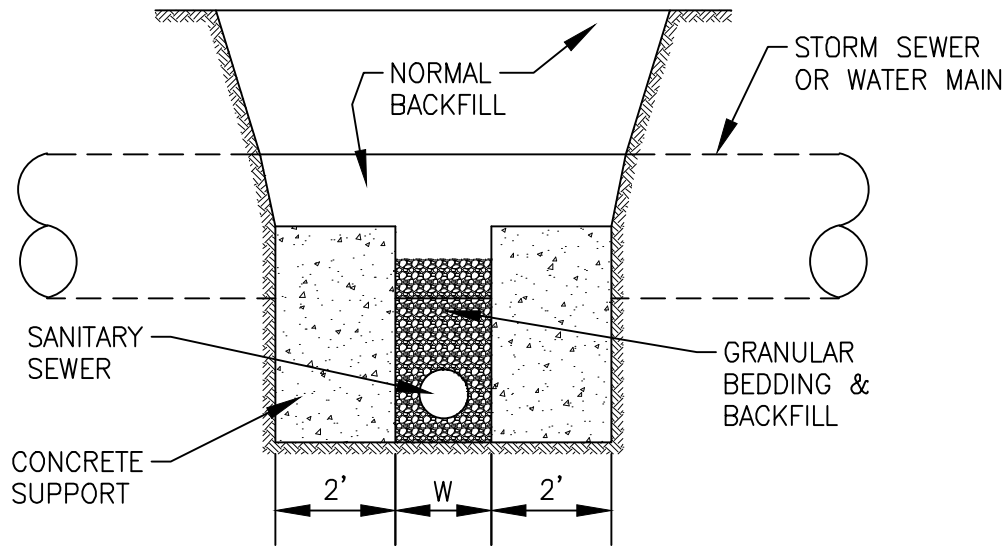
GENERAL NOTES:

1. PRECAST REINFORCED CONCRETE RISERS, TOP, BOTTOM & INVERT SHALL CONFORM TO ASTM C-478.
2. MANHOLE STEPS SHALL BE POLYPROPYLENE COATED STEEL BAR, M.A. INDUSTRIES PS1-PF, AMERICAN STEP COMPANY ML-10, LANE P-10938, OR APPROVED EQUAL.
3. WHERE REQUIRED, WATERPROOF FRAMES SHALL BE EAST JORDAN IRON WORKS 1885 W/ LID, WITH EXTERNAL FRAME SEAL, CRETEX OR APPROVED EQUAL.
4. THE SPACE BETWEEN THE CONE, ADJUSTING RINGS AND FRAME SHALL BE COMPLETELY SEALED WITH PREFORMED BITUMINOUS MASTIC GASKET.

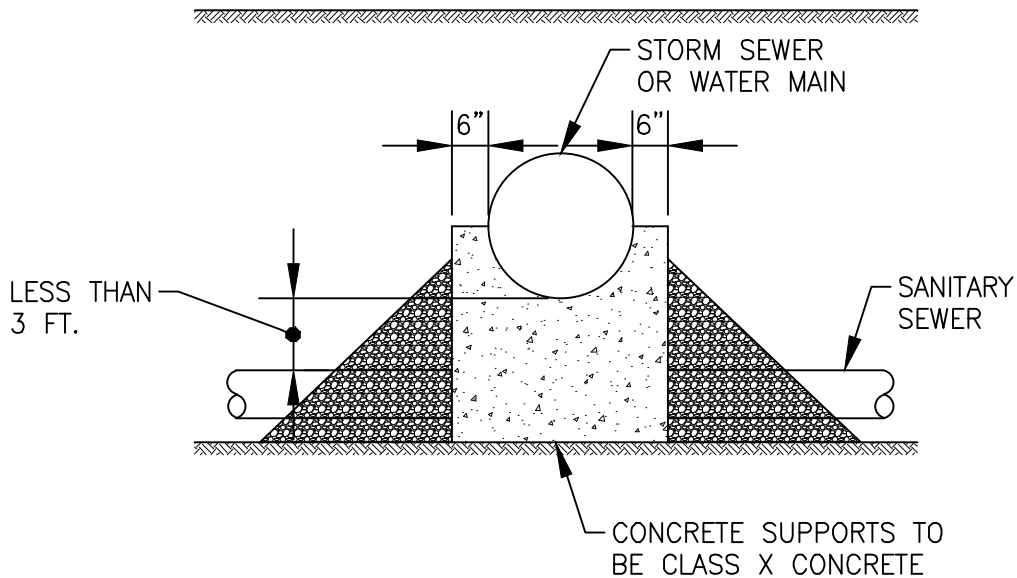
STANDARD MANHOLE DETAIL (OVER 5 FEET)

DOWNERS GROVE SANITARY DISTRICT

REV. 10-20-84
REV. 8-12-97
REV. 4-23-98
REV. 7-14-98
REV. 2-1-15
REV. 9-14-15



* FULL PIPE LENGTH CENTERED IN SUPPORT

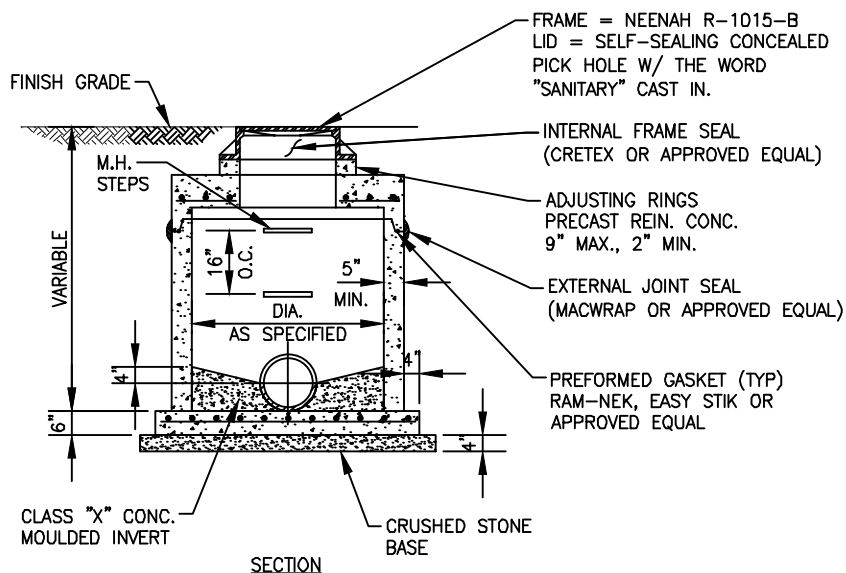


NOTE:

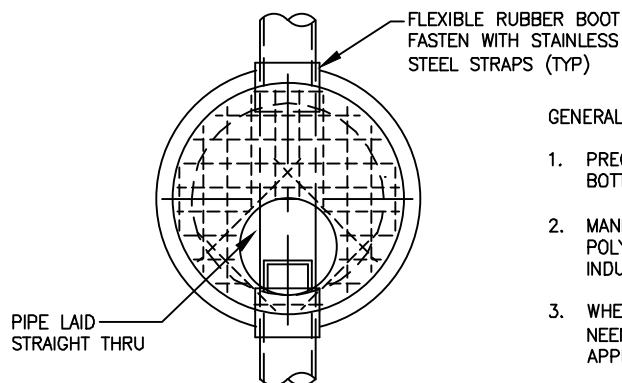
BACKFILL MATERIAL AS REQUIRED BY PLANS OR SPECIFICATIONS.

SPECIAL CONDUIT CROSSING DETAIL (FOR STORM SEWER OR WATER MAIN 24-INCH OR LARGER)

DOWNERS GROVE SANITARY DISTRICT



DIAMETER OF MAIN SEWER	INSIDE DIAMETER OF MANHOLE	TOP REINFORCEMENT	BOTTOM REINFORCEMENT
18" & UNDER	4'-0"	#5 BARS @ 6"O.C.	#5 BARS @ 6"O.C.
21" THRU 42"	5'-0"	#6 BARS @ 6"O.C.	#6 BARS @ 6"O.C.



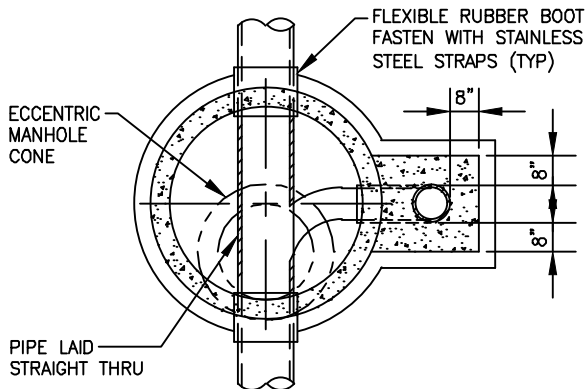
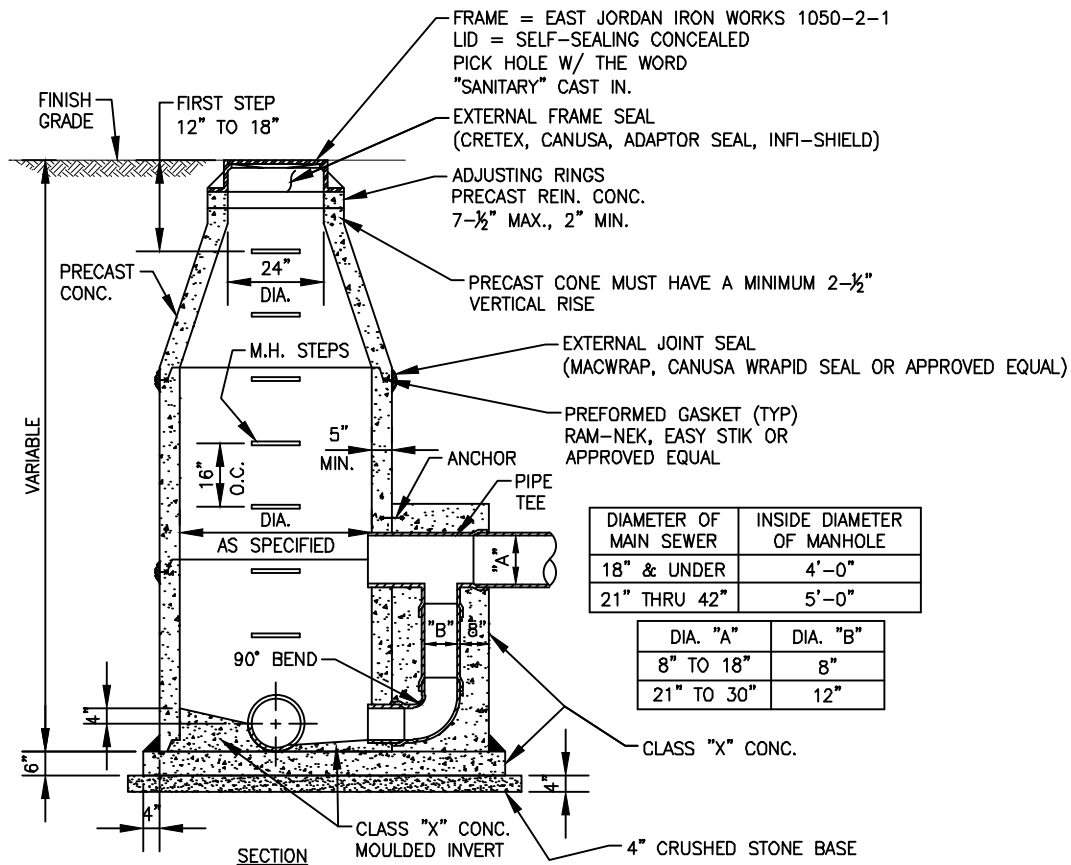
GENERAL NOTES:

1. PRECASE REINFORCED CONCRETE RISERS, TOP & BOTTOM SHALL CONFORM TO ASTM C-478.
2. MANHOLE STEPS SHALL BE NEENAH R-1981-1 W/ POLYPROPYLENE COATING SIMILAR TO M.A. INDUSTRY PS-1-PF OR APPROVED EQUAL.
3. WHERE REQUIRED, WATERPROOF FRAMES SHALL BE NEENAH R-1755 W/ LID AS ABOVER OR APPROVED EQUAL.
4. THE SPACE BETWEEN THE TOP, ADJUSTING RINGS AND FRAME SHALL BE COMPLETELY SEALED WITH PREFORMED BITUMINOUS MASTIC GASKET.
5. CUT OUT TOP PORTION OF PIPE AFTER POURING CONCRETE BENCH.

MANHOLE DETAIL (SHALLOW DEPTH)

DOWNERS GROVE SANITARY DISTRICT

REV. 10-20-84
REV. 8-12-97
REV. 11-21-00
REV. 2-1-15



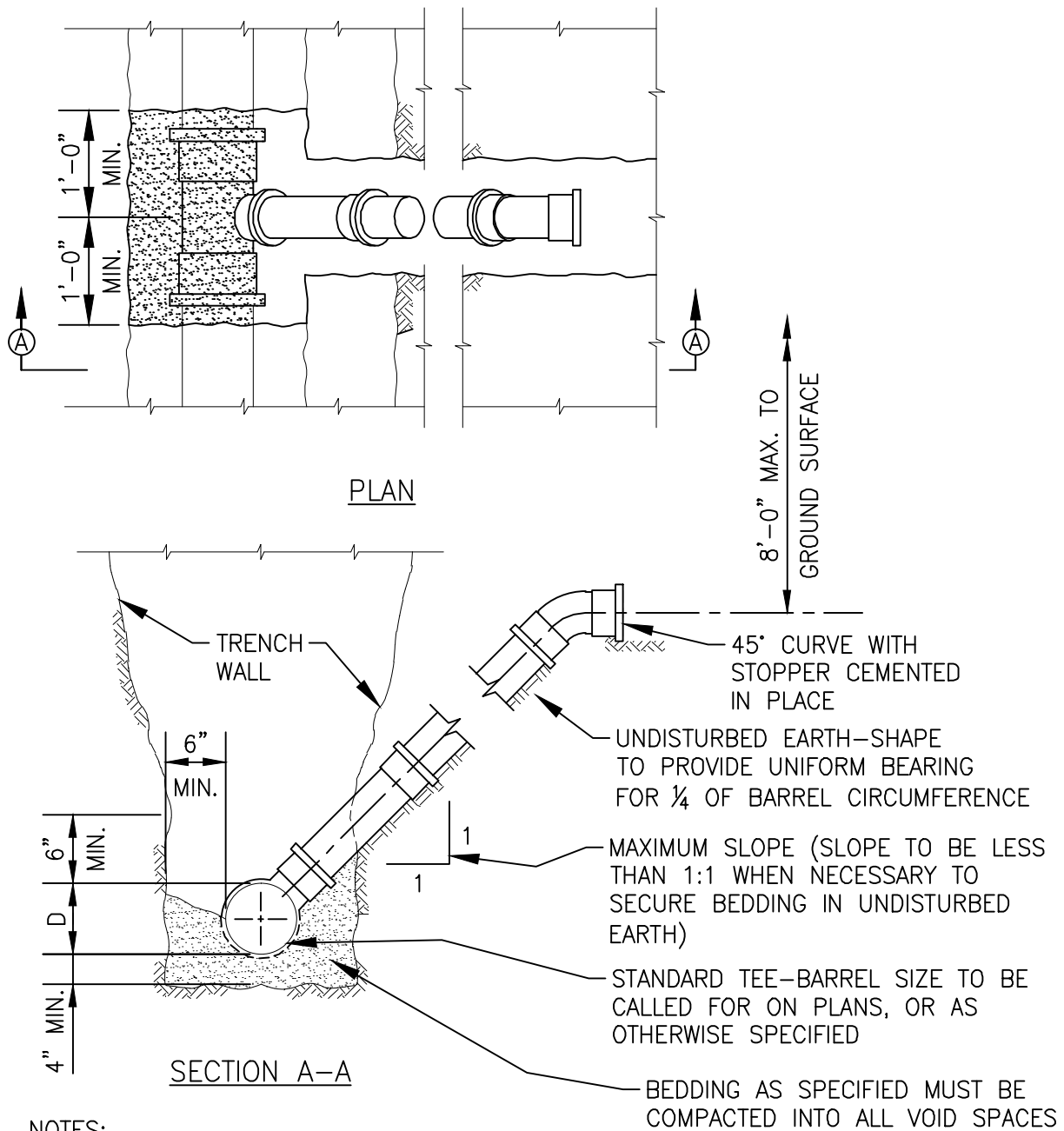
BARREL PLAN

DROP MANHOLE DETAIL DOWNERS GROVE SANITARY DISTRICT

GENERAL NOTES:

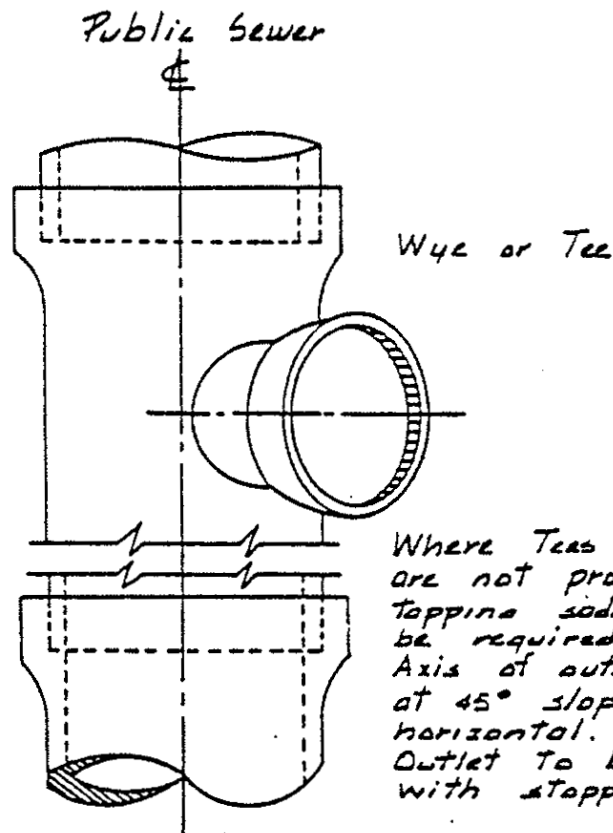
1. PRECAST REINFORCED CONCRETE RISERS, TOP & BOTTOM SHALL CONFORM TO ASTM C-478.
2. MANHOLE STEPS SHALL BE POLYPROPYLENE COATED STEEL BAR, M.A. INDUSTRIES PS1-PF, AMERICAN STEP COMPANY ML-10, LANE P-10938, OR APPROVED EQUAL.
3. WHERE REQUIRED, WATERPROOF FRAMES SHALL BE EAST JORDAN IRON WORKS 1885 W/ LID, WITH EXTERNAL FRAME SEAL, CRETEX OR APPROVED EQUAL.
4. THE SPACE BETWEEN THE CONE, ADJUSTING RINGS AND FRAME SHALL BE COMPLETELY SEALED WITH PREFORMED BITUMINOUS MASTIC GASKET.

REV. 10-20-84
 REV. 8-12-97
 REV. 4-23-98
 REV. 11-21-00
 REV. 2-1-15
 REV. 9-14-15



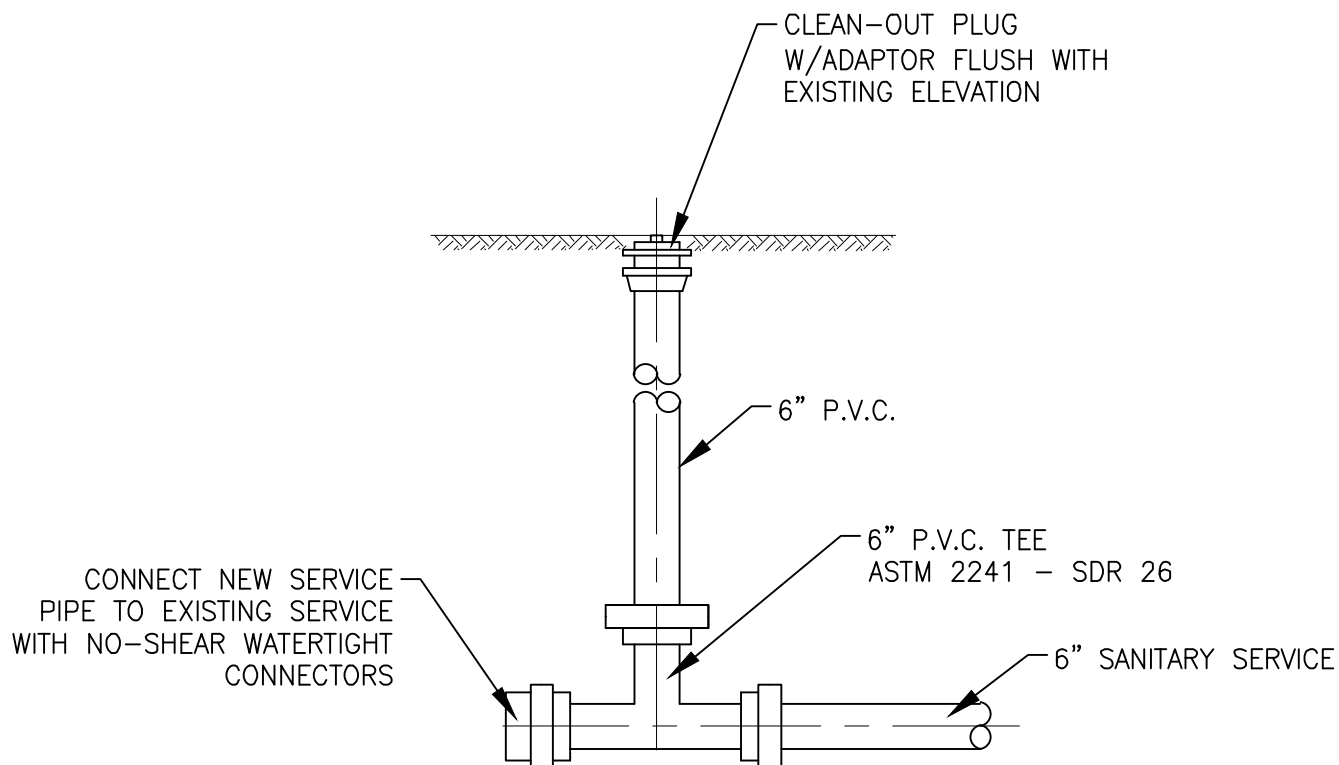
SERVICE LATERAL RISER DETAIL

DOWNERS GROVE SANITARY DISTRICT



PLAN
OF SEWER
AT HOUSE INLET

TYPICAL
HOUSE INLET



STANDARD OUTSIDE CLEANOUT DETAIL

NO SCALE

DOWNERS GROVE SANITARY DISTRICT
STANDARD DETAIL NO. 9

REV. 2-1-15