CHAPTER 200

DESIGN

SECTION 201
Lateral Design

201.01 Introduction	This Section provides design requirements specific to laterals. For design requirements specific to gravity sanitary sewers refer to Section 202. For design requirements specific to manholes refer to Section 203. For design requirements specific to lift stations and low pressure sewer systems refer to Chapter 500.
201.02 General	The design criteria for laterals shall conform to the latest edition of the 675 IAC 16 - Indiana Plumbing Code (IPC) and to these Standards, whichever is more restrictive.
201.03 Prohibited Connections	Except as provided in an Industrial Pretreatment Permit issued by the Department, no person shall connect a lateral to a sanitary or combined sewer when the lateral has any of the following sources of clear water: 1. Foundation/footing drains; 2. Sump pumps with or without foundation drains connected; 3. Roof drains; 4. Heat pump discharge; 5. Cooling water; or 6. Any other sources of clear water, such as, but not limited to, yard and/or driveway drains.
201.04 Maximum Number of Building Connections	Common laterals are prohibited. No more than one (1) building will be permitted to connect to a lateral. Common laterals for one (1) building with multiple residential units are also prohibited, except for the following: 1. Apartment buildings. 2. Condominiums where different floors have different owners. The intent is to have individually owned residential units served by individual laterals. Industrial facilities will be evaluated on a case-by-case basis.
201.05 Point of Connection	Laterals shall connect to sanitary or combined sewers at manufactured mainline fittings or terminal manholes. Saddle connections are only allowed if a manufactured fitting does not exist and shall be installed per Section 402.05. Saddle connections to Vitrified Clay Pipe (VCP) sewers are not allowed. See Section 402.05 for installation requirements for connections to VCP without manufactured fittings. Lateral connections to existing sewers eighteen (18) inches and larger will be reviewed on a case-by-case basis. A separate sewer may be required to be extended from an existing manhole. No more than three (3) connections to a terminal manhole will be allowed. See Section 403.08 for installation requirements on connections to manholes.

201.06
Size, Depth, and Slope of Lateral

The minimum size, depth and slope of laterals shall be as follows:

1. Pipe size

   The minimum pipe size shall be as follows:

   a. Within the right-of-way or easement - six (6) inches.

   b. Outside the right-of-way or easement - four (4) inches.

2. Pipe Depth

   The minimum depth from the finished grade to the crown of all laterals shall be as follows:

   a. Within the right-of-way or easement - four (4) feet.

   b. Outside the right-of-way or easement - three (3) feet.

3. Pipe Slope

   The minimum slope shall be 1.04% (1/8” per foot).

   For laterals eight (8) inches and larger, the slope may only be reduced if justified by the design flow.

201.07
Location, Length, and Spacing of Lateral

The location, maximum length, and spacing of laterals shall be as follows:

1. Location

   The location of the lateral shall be as follows:

   a. All properties shall be served from the street or alley side of the property.

   b. Where possible, laterals shall not cross abutting properties if the existing gravity sewer can be extended to serve the property.

      If crossing an abutting property is unavoidable, laterals shall not cross more than one (1) property. A dedicated easement on the abutting property shall be recorded.

   c. Properties to the rear may not be crossed.

   d. Laterals shall be located a minimum of five (5) feet from the side property lines.

2. Length

   The maximum lengths for laterals are as follows:

   a. On-site length – No maximum length. Cleanouts shall be provided per Section 201.08.

   b. Offsite Length – One hundred (100) feet.

      The off-site length includes the total distance within both the abutting property (if crossed) and the right-of-way.

3. Spacing between adjacent laterals

   The minimum horizontal distances between adjacent laterals and their connections are as follows:

a. Laterals on the same side of the street/sewer – ten (10) feet.

   Common trenches for more than one lateral are not allowed, unless the minimum horizontal spacing between laterals can be maintained.

b. Laterals on opposite sides of the street/sewer – four (4) feet.

201.08 Cleanouts

Cleanouts shall be installed on all laterals as follows:

1. Location

   Laterals shall have a wye cleanout located between eighteen (18) and sixty (60) inches from the building's exterior. The cleanout shall be extended to grade.

2. Spacing

   Cleanouts shall be spaced a maximum of every one hundred (100) feet.

3. Size

   Cleanouts shall match the size of the lateral pipe up to a maximum of eight (8) inches.

4. Type

   Cleanout covers shall be a threaded-type, water tight, and capped at all times. Covers within the paved areas shall be metallic and able to withstand traffic loads.

Cleanouts installed under concrete or asphalt paving shall be made accessible by yard boxes or extended flush with the paving.

Manholes may not be used in lieu of cleanouts unless the facility has been issued an Industrial Pretreatment Permit by the Department.

201.09 Minimum Elevation for Gravity Connection

To reduce the occurrence of sewer backups, the lowest floor elevation with gravity service shall be a minimum of one (1) foot above either the first upstream or first downstream manhole casting elevation. See Figure 200.01.

If this condition cannot be met due to the natural topography of the area, then either an alternate manhole will be evaluated or the connection to the sewer must be made using a sewage ejector pump system.

201.10 Connections Utilizing an Existing Lateral

When an existing or abandoned lateral is intended to be reused, the Owner and Contractor are responsible for verifying the lateral does not have any defects by means of a CCTV inspection. The record of the inspection shall be maintained by the Owner and Contractor for one (1) year from the date of the inspection.

Upon request, the results of the CCTV Inspection shall be submitted to the Division and/or the Department for review.

If the Division or Department determines the existing lateral has deficiencies, the Owner will be required to either replace the existing lateral per requirements of this Manual, or rehabilitate the lateral per Department direction. Rehabilitation requirements will be determined on a case-by-case basis.

201.11 Laterals Crossing Drainage Ways	Laterals shall be separated from existing or proposed waterbodies as required by Section 202.07.5. Lateral's crossing proposed or existing lakes, ponds, and/or retention or detention areas (either wet or dry) are prohibited.
201.12 Future Connections	Laterals installed for future connections shall be terminated at the right-of-way or easement and sealed with a manufactured cap/stopper made specifically for the purpose of sealing/capping the end of the sanitary sewer to ensure 100% water tightness. A tracer wire shall be installed per Section 401.07 terminating at a one-half (½) inch metal locator rod at the end of the plugged line to within three (3) feet of the finished grade.

SECTION 202
Gravity Sanitary Sewer Design

202.01 Introduction

This Section provides design requirements specific to gravity sanitary sewers.

For design requirements specific to laterals refer to Section 201.

For design requirements specific to manholes refer to Section 203.

For design requirements specific to lift stations and low pressure sewer systems refer to Chapter 500.

202.02 General

Gravity sanitary sewers shall be extended to proposed developments per the Sanitary Sewer Masterplan. The Department will consider alternate routes for the gravity sanitary sewer extension if the proposed route identified in the Masterplan is impractical, not possible, or a more desirable route is available. The Department maintains and periodically updates the Sanitary Sewer Masterplan.

202.03 Sanitary Sewer Service Area Study

The Applicant shall prepare a Service Area Study for all proposed sanitary sewer facilities. The intent is to maximize the service area to the greatest extent practical. The Division or Department will determine if the projected service area has been maximized. The Service Area Study shall include, at a minimum, the following:

1. Service Area Map

   The map shall include, at a minimum, the following information:

   a. Project boundaries;

   b. Projected service area boundaries including the following:

      i. All on-site areas;
      ii. Undeveloped off-site areas excluding floodways and existing waterbodies;
      iii. Developed unsewered off-site areas, such as areas currently served by septic systems; and
      iv. Other areas as deemed appropriate by the Division or Department.

      The Engineer and Applicant shall not assume the boundaries of the projected service area to be only those areas that can be serviced by gravity sewer extensions. Other areas within the service area may need to be served by a lift station.

   c. Elevation contour lines;

   d. Existing sanitary sewer facilities with invert and top of casting elevations. As-built information may be used;

   e. All relevant topographic information; and

   f. Any other information deemed necessary.

   All relevant information on the Service Area Map shall be clearly labeled and easy to read.

   The Service Area Map shall be included in the Plans.

2. Design Flow Projections

   Design flow projections shall be determined for the entire service area per Section 202.04.

202.04
Design Flow

All sanitary sewer facilities shall be designed to carry the projected design flow from the projected Sanitary Sewer Service Area, as defined in Section 202.03, contributing to each respective reach of the sanitary sewer facility.

The Design Flow shall be calculated as follows:

Design Flow = Average Daily Flow X Peaking Factor

where:

Design Flow = Flow used to design a sanitary sewer facility, gpd.

Average Daily Flow = Estimated average daily flow, gpd.

Peaking Factor = Ratio of peak hourly flow to average daily flow.

The above variables shall be calculated as follows:

1. Average Daily Flow (ADF)

   The ADF shall be the total ADF from the entire Service Area. Each area shall be calculated as follows:

   a. Proposed Developments

      The ADF for proposed residential developments shall be determined using the following flow rates multiplied by the number of units:

Unit Type	Flow, gpd
Single Family Home	310
One Bedroom Apartment/Condominium	200
Two Bedroom Apartment/Condominium	300
Three Bedroom Apartment/Condominium	350

      For additional Residential-type, Commercial, Industrial, and all other land uses refer to Appendix B for the ADF.

      If a land use being proposed is not included in either Appendix B or 327 IAC Article 3, engineering judgment may be used to estimate the flow. The Division or Department reserves the right to determine the appropriateness or applicability of the estimated flow.

   b. Developed Unsewered Off-site Areas

      The ADF for developed unsewered off-site areas may be determined using the same flow rates listed in 202.04.1.a. multiplied by the actual number of unsewered units. The Division or Department will determine if an alternate method may be used.

   c. Undeveloped Off-site Areas

      The ADF for undeveloped off-site areas shall be determined by using the greater of the following:

      i. Proposed land use as shown in the most recent version of the Department of Metropolitan Development Comprehensive Plan, or

      ii. Five (5) Single Family Residential Units/Acre (1,550 gpd/Acre).

2. Peaking Factor

A peaking factor of four (4) shall be used for all calculations unless directed otherwise by the Department.

Alternate methods to determine the peaking factor such as ”Recommended Standards for Wastewater Facilities” latest edition (also known as ‘Ten States Standards’) may be approved on a case-by-case basis.

202.05 Pipe Size, Slope, and Depth

The minimum pipe size, slope, and depth shall be as follows:

1. Pipe Size

The required diameter of gravity sewers shall be determined by using the Design Flow as calculated in Section 202.04 and Manning’s formula using a roughness coefficient, “n”, of 0.013 or the pipe manufacturer’s recommendation, whichever is greater, and the following:

a. Minimum pipe diameter - eight (8) inches.

b. Maximum depth of flow - two-thirds (2/3) full.

2. Pipe Slope

The minimum and maximum slope shall be as follows:

a. Minimum Slope

All sanitary sewers shall be designed and constructed to provide a minimum velocity of 2.0 ft/sec when flowing full.

The minimum acceptable slopes for the design and construction of sanitary sewers are as follows:

Pipe Size, inches	Minimum Slope (feet per 100 feet, %)
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12
21	0.10
24	0.08
27	0.067
30	0.058
36	0.046
42	0.037
48	0.030
54 and larger	0.026

b. Maximum Slope

Sewers shall not be designed with a slope greater than 20% or a maximum velocity greater than 10.0 ft/sec.

3. Depth

To protect the sanitary sewers from potential damage caused by utilities, the minimum depth to the crown of all gravity sanitary sewers and forcemains shall be as follows:

a. Gravity Sewers – 6.5 feet

b. Force mains – 4.5 feet

When the pipe depth is greater than twenty-five (25) feet, the engineer shall verify the pipe material selected is acceptable for the application. Upon request, the Engineer shall submit all calculations verifying the pipe selected is acceptable.

202.06 Extensions for Off-site Unsewered and/or Undeveloped Areas

To accommodate future users within the Sanitary Sewer Service Area, sanitary sewers within the proposed development shall be extended to the property boundaries at the same hydraulic capacity and grade line as the sewers immediately downstream. A reduction of size or slope may be allowed if the off-site design flow projection justifies a reduction.

Extensions to all boundaries, including along existing right-of-ways, may be required if multiple contiguous unsewered areas abut the property.

202.07 Location of Sanitary Sewer Facilities

All sanitary sewer facilities, both existing and proposed, shall be located to provide adequate access for maintenance and/or repair, and as follows:

1. New Sanitary Sewers

   a. New sanitary sewers shall be constructed within the public right-of-way unless directed otherwise by the Division or Department.

      If the right-of-way is not of sufficient width to avoid the granular backfill requirements of Section 401.06.2.b.i., and the sewer is fifteen (15) inches or less in diameter, the sewer may be constructed outside, but within five (5) feet of, the right-of-way within a ten (10) feet wide exclusive sanitary sewer easement. The easement shall be per Section 204.02.1.

      Utilities may encroach into the exclusive sanitary easement, but only for perpendicular crossings (between 45^{o} and 90^{o}). Parallel encroachments (less than 45^{o}) are prohibited without written permission from the Department. All provisions relating to utility relocations in exclusive sanitary easements contained within Section 204.02 shall apply.

   b. When construction within, or within five (5) feet of, the right-of-way is not possible (i.e. crossing undeveloped off-site areas, etc.), the sanitary sewer shall be located in an exclusive sanitary sewer easement as required by Section 204.02 and in such a location to provide adequate access for ease of maintenance and/or repair. The Division and/or Department will determine if access is adequate.

   c. Sanitary Sewers shall not be located in rear yards or other inaccessible areas unless directed otherwise by the Division and/or Department.

2. Existing Sanitary Sewers

   a. The proposed development shall be configured in such a manner to provide adequate access to all existing sanitary sewers and manholes for ease of maintenance and/or repair. The Division and/or Department will determine if the site configuration provides adequate access.

Acceptable locations for existing sanitary sewer facilities within proposed developments may be as follows:

i. Within common areas;
ii. Within proposed right-of-ways;
iii. Adjacent proposed right-of-ways provided the existing sanitary sewer is in, and remains in, an exclusive sanitary sewer easement; and/or
iv. Others as deemed acceptable by the Division and/or Department.

b. The proposed subdivision or development shall not be configured in such a manner that would cause existing sanitary sewer facilities to be located in rear yards or other areas determined to be inaccessible by the Division and/or Department.

3. Lift Stations

Existing and Proposed Lift Stations shall be located per Section 502.05.

4. Force Mains

Existing and proposed force mains shall be located per the same requirements as sewers per the above Section 202.07.1 & 2.

5. Adjacent Waterbodies

All sanitary sewer facilities and laterals shall be separated from existing or proposed waterbodies by a minimum twenty (20) feet horizontally as measured from the outside edge of the sanitary sewer facility to the top of bank.

Sanitary sewers, force mains, and laterals crossing existing or proposed lakes, ponds, and/or retention or detention areas (either wet or dry) are prohibited.

202.08 Location and Elevation of Sanitary Sewer Facilities within Special Flood Hazard Areas

The elevation and location of sanitary sewer facilities within Special Flood Hazard Areas shall be as follows:

1. Sanitary Sewers and Force Mains

Sanitary sewers and force mains may be located within Special Flood Hazard Areas, but not within the floodway, unless the location is a perpendicular crossing. Refer to Section 204.06 for design criteria for crossing drainageways.

2. Manholes

Manholes may be located within the Special Flood Hazard Area, but not within the floodway.

The elevation of the top of casting shall be at or above the 25-year flood elevation. The surrounding ground must have a 3:1 slope. If the top of casting elevation is below the 100-year flood elevation, bolt down castings with watertight, non-rocking/self-sealing covers shall be used.

3. Lift Stations

Lift stations may be located within the Special Flood Hazard Area, but not within the floodway.

The elevation of the lift station base slab, all above ground equipment, and access drive shall be a minimum two (2) feet above the 100-year flood elevation.

202.09 Capacity Certification

For existing and proposed sanitary sewer facilities, the City of Indianapolis is required to submit Certifications in accordance with 327 IAC 3-6-4 to the Indiana Department of Environmental Management. The required Certifications are limited to additional flow generated as a result of the construction, installation, or modification of sanitary sewers.

When determining if the Certification can be submitted to IDEM, the following factors will be considered when reviewing new sewer connection applications:

1. Capacity of receiving sewer during wet and dry weather, including contractual obligations to reserve future capacity for another party.

2. Compelling public need for the project, such as economic development or conversion of areas currently serviced by septic systems, such as the City's STEP program.

3. Mitigating or offsetting capital, operations, or maintenance projects designed to improve sewer capacity.

A downstream capacity evaluation may be required for the City to submit the necessary Certification. Refer to Section 202.10 for guidelines for the downstream evaluation.

The Department and/or Division will document the basis for its decision for issuing or denying a Capacity Certification.

202.10 Downstream Evaluation

To evaluate the downstream capacity of a receiving sanitary sewer facility, the Division or Department will rely on the following:

1. Available Data/Information

   Available data/information may include the following:

   a. Existing flow monitoring data;
   b. Sanitary sewer studies;
   c. Maintenance records;
   d. Complaint records;
   e. Past and/or proposed Capital Improvement Projects; and/or
   f. Any other information deemed relevant by the Division and/or Department.

2. Additional Data/Information

   If adequate data/information is not available, the applicant may be required to conduct, at no cost to the City, all the necessary tasks to assure the Division and Department makes an informed decision on the adequacy of the downstream sanitary sewer facilities. Such tasks may include the following:

   a. Temporary Flow Monitoring

      The requirements for temporary flow monitoring will be determined on a case-by-case basis by the Department at the time of application. General guidelines include the following:

      i. Number of Monitors – The complexity of the downstream system will determine the number of temporary monitors required. The maximum number shall not exceed five (5).

ii. Monitoring Duration – The monitoring duration shall be a minimum of sixty (60) days or until one and one-half (1½) inches of rainfall in a 24-hour period is recorded, whichever is the greater period of time.

iii. Monitoring Period – If possible, part of the monitoring period shall be done during the months of March, April, May, and June. However, if monitoring cannot be done during those months, the Department will consider an alternate time period.

Monitoring shall not be done during the month of January.

iv. Temporary Rain Gages – Temporary rain gages shall be installed at or near the temporary flow monitoring site(s) during the flow monitoring period unless the monitors are located within one-half (1/2) mile of an operating City rain gage. An alternate rainfall measuring method may be approved by the Department on a case-by-case basis.

v. Flow Monitoring Data and Format – At a minimum, the following shall be included:

(1) Depth / Velocity Hydrographs;
(2) Flow Hydrographs;
(3) Scatterplots / Scattergraphs; and
(4) Any other data deemed necessary

vi. Other requirements as deemed necessary.

b. Hydraulic Modeling

The Department may require the extension of the City's existing sanitary sewer collection system model to the point of connection of the proposed development. If a Model extension is necessary, the SWMM Model shall be used. To assure consistency, the Model shall be coordinated with the consultant currently being used by the City.

c. Lift Station System Evaluation

The Department may require an evaluation of one or more lift station systems. The evaluation may include the following systems:

i. Hydraulic;
ii. Electrical;
iii. Mechanical;
iv. Instrumentation & Control; and
v. Others as deemed necessary.

d. Other evaluations as deemed necessary.

202.11 Inadequate Downstream Capacity

If the Department determines downstream capacity is not available for the proposed flow from the development, the Applicant has the following options:

1. Make additional capacity available in the downstream system by:

a. Increasing the capacity in the system, and/or

b. Removing a sufficient volume of Infiltration/Inflow.

2. Connecting to an alternate point within the sanitary or combined sewer system. A downstream analysis of the alternate system may be required.

202.12 Connections to Existing Sanitary Sewers

Sanitary sewers and force mains shall only be connected to the existing sewer system at manholes and shall be per Section 403.08. For lateral connections refer to Section 201.05.

Blind tee connections to existing sewers are prohibited.

If an existing manhole is not available, as determined by the Division or Department, a new manhole shall be installed as shown in Figure 300.06 and installed per Section 403.

Connections to existing manholes will be evaluated on a case-by-case basis. Rehabilitation may be required and will be at the discretion of the Division or Department. Rehabilitation methods will be determined on a case-by-case basis.

For brick or block manholes, at a minimum, a structural liner approved by the Department shall be installed prior to the connection of the new sanitary sewer. Brick or block manholes may need to be replaced in lieu of a structural liner.

No more than four (4) connections to existing manholes, three (3) incoming and one (1) outgoing, will be allowed.

202.13 Connections in the Combined Sewer Area

The construction of new combined sewers is prohibited.

The Department maintains and periodically updates a map of both the combined and sanitary sewer areas within the City.

When constructing sanitary sewer facilities within the combined sewer area, the City will address each application on a case-by-case basis using the following guidelines:

1. Connections to Combined Sewers

   All new or proposed sanitary and storm sewers shall be separated prior to connecting to the combined system. Each system shall be connected individually to the combined sewer if a separate storm sewer is not available. The connections shall be per Section 202.12.

2. Sewer Separation

   To remove stormwater from the combined sewer system, the Division or Department may require an off-site extension of the proposed storm sewer if an alternate stormwater discharge location is available.

   The following factors shall be considered by the Division when evaluating the separate storm sewer requirement:

   a. Capacity in receiving sewers to accept stormwater flow, and planned capital improvement projects identified within the City's CSO Long Term Control Plan (LTCP), or other plans;

   b. Impacts on Water Quality;

   c. Feasibility of separation, including costs to treat, construct, and manage the sewer system as a separate or combined system; and

   d. Other appropriate factors deemed relevant by the Division and/or Department.

3. Stormwater release rates to the combined sewer system.

   The stormwater release rates to any combined sewer shall, at a minimum, comply with all requirements set forth in the latest version of the City of Indianapolis Stormwater Design Manual.

The Division and/or Department may further restrict the stormwater release rates, if justified.

The Division and/or Department will document the basis for its decision for requiring, or not requiring, sewer separation in the project area.

SECTION 203
Sewer Structures - Manholes

203.01 Introduction

This Section provides design requirements specific to manholes.

For design requirements specific to laterals refer to Section 201.

For design requirements specific to gravity sewers refer to Section 202.

For design requirements specific to lift stations and low pressure sewer systems refer to Chapter 500.

203.02 Location

Manholes shall be installed in the following locations:

1. At the end of each sewer segment;
2. At all changes in sewer slope, size, or alignment;

   At changes in sewer alignment and/or sizes, the energy gradient elevation shall not increase by:

   a. Matching the crown elevations when changes in pipe sizes are necessary.

   b. Providing an elevation difference between incoming and outgoing pipe inverts as follows:

      i. For sewer angles between zero (0^o) degrees (straight through) to and including ninety (90^o) degrees – 0.1 feet minimum;
      ii. Over ninety (90^o) degrees – Not allowed.

3. At all sewer segment intersections.
4. In areas that will minimize the potential for I/I entering the sewer system.

   To minimize the potential for I/I, manholes shall NOT be designed or installed in any drainage path such as, but not limited to, the following locations:

   a. Swales or ditches.

   b. Roadside gutters.

   c. Inverted crowns of streets.

   d. Low points of paved or unpaved areas.

   e. Adjacent stormwater inlets.

   f. Other areas the Division or Department deems necessary.

Cleanouts shall not be used in lieu of manholes.

203.03 Protection against Ponding

To provide protection against ponding, manholes shall be designed and constructed to provide positive drainage away from the top of casting as follows:

1. Paved areas – Top of casting flush with finished grade.
2. Unpaved areas – Top of casting a minimum of three (3) inches above finished grade.

203.04
Maximum Manhole Spacing

The maximum distances between manholes shall be based on the sewer size and as follows:

Sewer Size, inches	Max. Spacing, feet
12 or less	400
15 – 27	500
30 and larger	600

203.05
Manhole Dimensions

The following Table contains the minimum manhole diameters for sanitary sewer pipes entering or exiting a sanitary sewer manhole at the given range of angles.

Pipe Size, inches	**Minimum Manhole Diameters, inches**		Reference Figure
	Pipes Entering or Leaving at a 45° Angle	Pipes Entering or Leaving at a 46° - 90° Angle	
18 or less	48	48	300.01
21-24	48	60	300.02
27	60	72	300.02
30 to 36	60	84	300.02
42	72	96	300.02
48	84	Special Design	300.02*
54 or larger	N/A	N/A	300.03

*Only for straight through pipes otherwise use Figure 300.03

The number and entrance angle of pipe connections, with consideration given to outside pipe diameter(s), shall be limited to those guidelines established in the previous Table to ensure the structural integrity of the manhole. If at any time the structural integrity of the manhole cannot be maintained, a cast-in-place structure will be required.

203.06
Drop Connections

Drop pipe connections shall be provided for all sanitary sewers or laterals entering a manhole at an elevation twenty-four (24) inches or greater above the invert of the manhole.

Inside or outside drop connections may be used and are shown in Figures 300.04 and 300.05. However, the Division or Department may require either an inside or outside drop connection, if conditions necessitate. The size of the drop pipe shall be the same size as the incoming sewer.

The Division or Department may require an increase in the slope of one or more upstream sewer segments or the lateral to eliminate the need for a drop manhole.

When inside drop connections are installed, the minimum inside diameter of the manhole shall be as follows:

Total Number of Drop Lines	Pipe Size, inches	Inside Manhole Diameter, inches
1	8 to 12	60
2 or 3	8 to 12	72

No more than three (3) inside drop connections are allowed in one manhole.

Sewers larger than twelve (12) inches proposing drop connections will be evaluated on a case-by-case basis.

204.01 Drafting Standards

All plans for sanitary sewer facilities shall be prepared in compliance with the latest edition of the *City of Indianapolis Department of Public Works Drafting Standards.*

204.02 Easements

When easements are required, they shall be exclusive Sanitary Sewer Easements and shall be dedicated and recorded solely for the benefit of the Department.

Exclusive sanitary sewer easements shall not overlap other easements.

Easement boundaries shall be shown on the plans, specifications, and plats as "Sanitary Sewer Easement" in lieu of "Utility Easement." Common utility easements are prohibited for sanitary sewer facilities.

The minimum permanent easement widths to be dedicated to the Department are as follows:

1. For sanitary sewers less than twenty-four (24) inches in diameter:

Depth of Sewer	Minimum Width, feet
Up to and including 10 feet	20
Greater than 10 feet to and including 20 feet	30
Greater than 20 feet	40

All sanitary sewers shall be centered in the easement. For those sanitary sewers constructed in the public right-of-way, the easement shall extend the distance outside the right-of-way necessary to provide the required easement width.

If the sewer is located outside, but within five (5) feet of the right-of-way per Section 202.07.1.a. and is fifteen (15) inches or less in diameter, the exclusive easement is only required to be ten (10) feet wide. The remainder of the required easement width may be shown as a DU&SE. For sewers greater than fifteen (15) inches in diameter, the exclusive easement width shall be as shown in the above table.

2. For sanitary sewers twenty-four (24) inches and larger

   The easement width will be determined on a case-by-case basis, but shall not be less than a minimum of fifty (50) feet in width.

3. Lift Stations

   The easements for lift stations may, at the discretion of the Department, be modified on a case-by-case basis, if justified. At a minimum, the easement requirements for lift stations are as follows:

   a. From the base slab – twenty (20) feet in all directions;

   b. From the access drive – ten (10) feet in all directions.

   The lift station easement shall not overlap any other easement.

Except for perpendicular crossings as described in Section 202.07.1.a, utility companies are not allowed to use the sewer easements for the installation of their utility lines without the expressed written permission of the Department. If permission is granted, utilities shall agree to relocate or support their respective facilities, at no expense to the City, if the City requires access to maintain or repair the sanitary sewer facility.

All site development and plan/profile sheets shall clearly identify the sanitary sewer easement and the location of all existing and proposed utilities. The plan/profile sheets shall also show the location and elevation of existing and proposed utilities, on both plan and profile sections, proposed to cross the sanitary sewer easement.

204.03 Protection of Water Supplies

To protect public and private drinking water supplies, the IDEM, ISDH, and MCH&HC have established minimum clear distances between sanitary sewer facilities and drinking water supplies. Applicant is responsible for complying with all applicable regulations. Where discrepancies are found between the requirements set forth herein and any other requirements by agencies having jurisdiction relating to water supplies, the more restrictive requirement shall be followed.

The clear distances shall be as measured from the outside edge of the sanitary sewer facility (sewer, force main, manhole, or lift station) to the outside edge of the water supply (water main or well screen).

The minimum separation distances between sanitary sewer facilities and water supplies shall be as follows:

1. Water Mains

   The minimum separation distance between the following sanitary sewer facilities and existing or proposed water mains shall be as follows:

   a. Sanitary Sewers / Force Mains

      The minimum horizontal and vertical separation distances shall be as follows:

      i. Horizontal Separation – Ten (10) feet

      ii. Vertical Separation – Eighteen (18) inches

         The vertical separation shall only be applicable when sanitary sewers and water mains cross. When crossing, the sewer and watermain shall cross at a minimum angle of forty-five (45) degrees as measured from the centerlines of the pipes and maintain the minimum vertical separation a minimum distance of ten (10) feet on either side of the sanitary sewer. The joints of the sanitary sewer shall be equidistant and as far as possible from the water main joints.

      Separation distances less than the above will be considered and may be allowed if all the following conditions are met:

      - The pipe material is pressure rated PVC, DIP, or PCCP force main material per Section 304.
      - The sanitary sewer and water main are not in contact.
      - The sanitary sewer joints are compression type and placed equidistant from the water main.
      - The sanitary sewer and water main are laid on separate trench shelves.

b. Manholes – Eight (8) feet

c. Lift Stations – Ten (10) feet

2. Public Water System Drinking Water Wells

The minimum separation distance between the following sanitary sewer facilities and public water system drinking water wells shall be as follows:

a. Sanitary Sewers – Two hundred (200) feet

Sanitary sewers may be located within two hundred (200) feet, but under no circumstances less than fifty (50) feet, from a public water system drinking water well if pressure rated PVC, DIP, or PCCP force main material per Section 304 is used.

b. Manholes – Two hundred (200) feet

c. Lift Stations – Two hundred (200) feet

3. Private Water Supply Wells

The minimum separation distance between the following sanitary sewer facilities and private water supply wells shall be as follows:

a. Sanitary Sewers – Fifty (50) feet

Sanitary sewers may be located within fifty (50) feet, but under no circumstances less than ten (10) feet, from a private water supply well if pressure rated PVC, DIP, or PCCP force main material per Section 304 is used.

b. Manholes – Fifty (50) feet

c. Lift Stations – Fifty (50) feet

204.04 Existing Utility Structures and Facilities	Based on the best available information and field surveying, all existing overhead and underground utility lines and existing sewers shall be shown on the plans.
204.05 Utility Coordination	It is the responsibility of the Owner or their authorized representative to coordinate with and get approvals from the various utilities, including other Departments of the City for all proposed Work. Further, it is the responsibility of the Owner to get authorization to encroach upon any other utility easement(s) and secure such recorded encroachment as a requirement for dedication of the sanitary sewer facility.
204.06 Sanitary Sewers Crossing Drainage Ways	When crossing streams or rivers, sanitary sewers shall be constructed with DIP or PVC SDR 21, with mechanical joints rated to two hundred (200) psi and backfilled with stone, gravel, or coarse aggregate with a minimum cover depth as follows: 1. Under a Paved Channel – Below the pavement; 2. When located in rock - Twelve (12) inches; or 3. All other areas - Thirty-six (36) inches. The Division and/or Department may require cover depths greater than those specified above, if justified.

204.07 Aerial Crossings and Siphons	If possible, siphons and aerial crossings shall be avoided. If not possible, the requirements shall be determined on a case-by-case basis and will be at the sole discretion of the Department.