

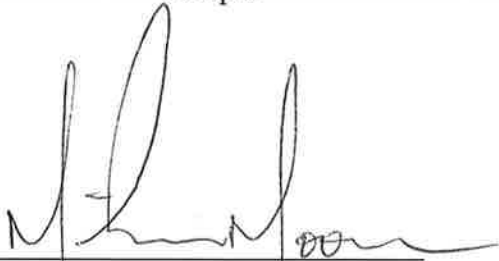


Construction Standards

*Jeffersonville Wastewater
Department
City of Jeffersonville, Indiana*

February 2017

On order to provide consistency in the construction and installation of new sanitary sewer facilities or the repair and/or replacement of sewers facilities, the City of Jeffersonville Sanitary Sewer Board has Reviewed and Adopts these Standards which with go into effect this 16th day of February, 2017.



Mike Moore, Mayor
President of the Sanitary Sewer Board

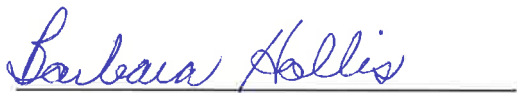


Dale Orem, Board Member



Bill Saegesser, Board Member

ATTEST:



Barbara Hollis
Sanitary Sewer Board Secretary

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SECTION 1. INTRODUCTION

1.1 Forward

- A) The purpose of these standards is intended to provide a uniform standard for all sanitary sewer construction projects located within the jurisdiction of the City of Jeffersonville, Indiana. These specifications are intended to complement the City of Jeffersonville Standard Construction Details. Specifications for all storm sewer construction located within the jurisdiction of the City of Jeffersonville are provided in the City of Jeffersonville Stormwater Technical Standards Manual and the Standard Construction Details, current versions.
- B) At the time of project plan approval, a project is required to comply with the latest revision of standard specifications and details. Developers are encouraged to provide the latest revisions to their contractors before construction. Developer's engineers should not include other specifications and details unless required by the uniqueness of the project.
- C) These specifications and details are expected to be updated as new standards are developed and as errors and discrepancies are discovered. Please forward any comments to the City Engineer for consideration in future updates.

1.2 Contact Information

City Engineer	(812) 285-6476
Wastewater Department Director	(812) 285-6451

1.3 Referenced Documents

City of Jeffersonville Standard Construction Details
City of Jeffersonville Unified Development Ordinance

Indiana Department of Transportation (INDOT) Standard Specifications, Supplemental, and Standard Drawings

Indiana Department of Transportation (INDOT) Design Manual

AASHTO – A Policy on Geometric Design of Highways and Streets (AASHTO Manual or Green Book)

Manual on Uniform Traffic Control Devices (MUTCD) ASTM / AASHTO standard specifications

Recommended Standards for Wastewater Facilities – A report of the Wastewater Committee of the Great Lakes – Upper Mississippi River (Ten States Standards)

Other generally acceptable design standards, policies, and guides

1.4 Definitions

- A) For the purpose of these Construction Standards and Details, the following definitions shall apply:

- 1) **City** – City shall mean the City of Jeffersonville, Indiana, the municipality which has jurisdiction over its corporate limits
- 2) **City Engineer** – The Director of the City of Jeffersonville Engineering Department, acting directly or through the duly authorized representatives.

- 3) **Contractor** – Any individual, partnership, firm, corporation, or combination of same approved by the City of Jeffersonville to construct, install, maintain, repair and remove public or private street, sanitary sewer, or storm sewer facilities within the City of Jeffersonville’s service area. This definition is intended to include all employees, sub-contractors and/or agents acting for or on behalf of the Contractor.
- 4) **Department** – Shall mean the City of Jeffersonville Wastewater Department
- 5) **Design Engineer**– The engineer sealing the construction plans; this definition is intended to include all employees, sub-contractors and/or agents acting for or on behalf of the Design Engineer.
- 6) **Developer**– The person/company financially responsible for construction activity, or an owner of property who sells or leases, or offers lots for sale in a subdivision; this definition is intended to include all employees, sub-contractors and/or agents acting in the interest of the Developer.
- 7) **Director**– Director of the City of Jeffersonville Wastewater Department, acting directly or through the duly authorized representatives.
- 8) **EDU (Equivalent Dwelling Unit)**: Unit used to calculate the capacity fee or 310 gallons per day.
- 9) **Low Pressure System**: A wastewater collection system in which multiple users pump wastewater into a common force main from individual on-site pumping systems.
- 10) **Sidewalk** - The portion of the right-of-way primarily constructed for the use of pedestrians.
- 11) **Specifications and Details** - A general term applied to all directions, provisions, and requirements pertaining to performance of the work.
- 12) **Street** - A general term denoting a public way for purposes of vehicular travel.
- 13) **Subgrade** – The upper portion of a roadbed upon which the pavement structure and shoulders are constructed.

1.5 Permit Applications

Permits for laterals, and sanitary sewer facilities are required to construct, repair, modify, connect, or abandon any lateral or sanitary sewer facility within the City of Jeffersonville.

This does not relieve any person from obtaining any and all applicable approvals and permits from other appropriate regulatory agencies.

The Owner or Developer shall procure at its own expense, all permits and licenses, pay charges and fees, and give all notices necessary and incidental to the due and lawful execution of the work.

Contact the City of Jeffersonville Engineering Department and/or Wastewater Department for all required local permit applications for street, storm, or sanitary sewer construction.

It shall be the responsibility of the Owner whose property is benefited to make all necessary repairs, extensions, relocations, changes, or replacements thereof, and of any accessories thereto for the entire length of lateral, including the portion within public easements and right-of-ways.

These requirements may be altered, modified, or waived, at the discretion of the Department when it is shown compliance is not possible due to extenuating circumstances

1.6 Expiration of Permit

If construction activity has not commenced **within three hundred sixty-five (365) calendar days** from the date of issuance of the Permit, the Permit shall expire and will no longer be of any force or effect. The Director may however, for good cause shown in a written request to the Department, extend the validity of any such Permit for an additional period which is reasonable under the circumstances to allow commencement of the construction activity. In no event shall the extension exceed a period of **sixty (60) calendar days**.

If the construction activity has commenced, but only is partially completed, and thereafter, no visible construction activity occurs on the construction site over a period of **one hundred eighty (180) calendar days** from the time of the last construction activity, the Permit shall expire and no longer be of any force or effect.

1.7 Payment of Fees

Pursuant to 2011-OR-73 the Owner/Developer shall pay the Capacity and Inspection Fees as follows:

A) Capacity Fee

Prior to the issuance of a preliminary plat, final plat or building permit for any new structure or developments, a sewer Capacity Fee of three thousand three hundred dollars (\$3,300.00) per Equivalent Dwelling Unit (EDU) shall be levied against a user connecting to the City's sewage works as follows:

1) Calculation of EDU.

- a) Single Family Residence. A single family residential connection shall equal one (1) EDU.
- b) Non-Residential Users. All other connections shall pay a sewer capacity fee based on the EDUs allocable to the classification of the user connecting to the sewage works. The number of EDUs shall be calculated by the Average Daily Flow (ADF) for the proposed connection as set forth in the most recent version of the Capacity Fee calculations as adopted by the City of Jeffersonville Sanitary Sewer Board as contained in **Appendix A**.

2) Calculation of Sewer Capacity Fee. The sewer capacity fee shall be calculated as follows:

$$\text{Capacity Fee} = \text{Number of EDUs} \times \$3,300 \text{ per EDU.}$$

3) Installment Payments for Proposed Multi-Structures. The Capacity Fee associated with new multi-lot or multi-structure developments within the City of Jeffersonville sewer service area may be paid in installments as follows:

- a) For proposed developments/projects in which the Person wants to reserve capacity for the entire proposed development/project, the Person shall pay one-sixth (1/6th) of the Capacity Fee attributable to the overall project or development at the time of the approval of the preliminary plat or development plan. The Person shall pay another one-sixth of the Capacity Fee upon approval of the final plat or development plan for a total of one-third (1/3rd) of the total Capacity Fee for the EDUs attributable to the final plat or development plan of the property. The City will, upon such payment, certify capacity for those EDUs included in the final plat or development plan. The Person shall pay the remaining two-thirds of the Capacity Fee at the time the building permit is applied for and issued for each lot or property contained in the final plat or development plan.
- b) For proposed developments/projects in which the Person does not want to reserve capacity, the Person shall pay one-third (1/3rd) of the total Capacity Fee for the EDUs attributable to the final

plat or development plan of the property. The City will not certify capacity for any EDUs not included in the final plat but included in the preliminary plat. The Builder shall pay the remaining two-thirds of the Capacity Fee at the time the building permit is applied for and issued for the property contained in the final plat.

- B) Change of Use. Any building in which the use of that building is changed where the expected flow will increase as a result of the use change will be subject to a Capacity Fee. The new Capacity Fee will be assessed as follows: The new Capacity Fee will be based on the type of facility as identified in Appendix A. A credit will be given for the Capacity Fee for the existing building.

Example:

If a single family residence is converted to a 2,500 square foot office then the Capacity Fee will be 2,500 sq.ft. times 0.3 gpd/sq.ft.= 750 gpd – 310 gpd/EDU = 440 gpd. 440 gpd / 310 gpd/EDU = 1.42 EDUs. 1.42 EDUs times \$3,300 = \$4,686. ***The Capacity Fee for the Change of Use is \$4,686.***

- C) Inspection Fee. In addition to the Capacity Fee, a separate sewer tap inspection fee of one hundred dollars (\$100.00) shall be levied against a user connecting to the City's sewage works. The Sewer Tap Inspection Fee shall be paid prior to making the lateral connection to the City of Jeffersonville sanitary sewer facilities.

SECTION 2. SANITARY SEWERS

2.1 General

This section includes specifications for gravity sanitary sewer collection systems, and building laterals.

A) Details

All construction details shall be as shown on “City of Jeffersonville Standard Construction Details,” latest revision. The City Engineer and the Wastewater Department must approve any other alternative method, discrepancy, omission, or duplication of specification standards.

B) Construction Plans

- 1) The plans for the installation of a sanitary sewer system shall be provided by the Applicant and approved by the City Engineer and Wastewater Department. Upon the completion and one week prior to acceptance and unless otherwise approved, the Contractor must submit record drawings certified by a registered Indiana Professional Engineer or Land Surveyor for the installed sanitary sewer system to the Wastewater Department.

C) Standards

- 1) Design, construction, and testing must comply with ASTM and IDEM standards.

D) Responsibilities

- 1) The Owner and/or the Developer shall be responsible for all approvals, permits, and easements.

E) Submittals prior to construction

- 1) The following submittals shall be given to the City’s representative prior to construction:
 - a) Shop drawings for all sanitary sewer materials, including pipe, manholes, pipe couplings, wyes/tees, shall be submitted to the City Engineer/Department at the Pre-Construction Meeting. Shop drawings shall be signed and sealed for compliance to specifications by the Contractor, and, reviewed and stamped by the Project Engineer with comments to the Contractor requiring compliance with Project Plans and Specifications.
 - b) Proposed detailed construction sequence including schedule for bypass pumping and connection to existing sanitary sewer system.
 - c) Permit for excavation within the Right-of-Way, if applicable.
 - d) Copies of Construction Permit and all correspondence concerning deficient plans or approval of plans.

F) Revocation of Permit

- 1) The Wastewater Department may revoke a Permit when:
 - a) The application, plans, or supporting documents contain a false statement or misrepresentation as to a material fact; or
 - b) The application, plans or supporting documents reflect a lack of compliance with the requirements of this Manual; or

- c) Additional information becomes available that would necessitate the revocation of the Permit (Permit issued in error).

G) Stop-Work Order

The Director has the authority to direct the issuance of an order requiring the suspension of the pertinent construction activity ("Stop-Work Order") whenever it is determined that construction activity:

1. Is proceeding in an unsafe manner;
2. Is proceeding in violation of a requirement of this Manual;
3. Is proceeding in a manner which is materially different from the application, plans, or supporting documents; or
4. For which a permit is required is proceeding without such a permit being in force. In such an instance, the stop-work order shall indicate the effect of the order terminates when the required permit is issued.

The Stop-Work Order shall be in writing by the Department and shall state to what construction it is applicable and the reason for its issuance. One (1) copy of the Stop-Work Order shall be conspicuously posted on the property, and one (1) copy shall be delivered via certified mail to the owner of the property or their agent. The Stop-Work Order shall state the conditions under which construction may be resumed.

If a Stop-Work Order is issued, the contractor shall restore the site to a safe condition prior to stopping the work pursuant to the Order.

The sanctions provided in this Section shall in no way limit the imposition of penalties provided elsewhere in this Manual.

H) Submittals prior to City Acceptance

- 1) The following submittals shall be given to and the Wastewater Department prior to City Acceptance:
 - a) Air, mandrel, and vacuum tests.
 - b) CCTV Inspection results on a CD, DVD, or Flash Drive
 - c) One set of record drawings showing information including, but not limited to, the following: building lateral locations, pipe slopes, invert elevations, top of casting elevations, horizontal locations, and other utility information encountered during construction. Upon completion of all improvements and installations accepted by the City, Digital Plan information and Record Drawings certified by a registered Indiana Professional Engineer or Land Surveyor, unless other submittal requirements are approved by the Department or City Engineer, shall be submitted to the City in Digital CAD format (DWG) that is projected into **NAD 1983 State Plane Indiana East FIPS 1301 (US Feet)** coordinate system.

I) Final Acceptance

After all of the documents have been submitted to the Department, an acceptance Letter will be sent to the Owner/Developer formally accepting the sewer as part of the City of Jeffersonville's sewer system

J) Sewer connections

- 1) No sewer connections can be made on any City sewer unless the Property Owners or Developers have the following in their possession:
 - a) Final Acceptance Letter

- b) A valid Building Permit (if applicable)
- c) A Sewer Lateral Connection Permit. All lateral permits issued must have the appropriate street address and/or lot number, as well as the Contractor's name. If the Contractor has not yet been determined, then the Property Owner's name must appear on the permit.

It is the responsibility of the permittee to notify the Department, in the manner described on the Lateral Permit that the lateral is available for inspection.

The Department will conduct inspections on lateral connections from 7:30 A.M. to 3:00 P.M. local time, Monday through Friday, except for observed City holidays.

- d) A Street-Cut Permit (if applicable)
- 2) ***Roof drains, footing drains, sump pumps, and/or surface water drains shall not be connected to the sanitary sewer system, including temporary connections during construction.***

2.2 Design

A) Benchmarks

- 1) Permanent and temporary elevation benchmarks shall be referenced on the plans.

B) All Plans must include the Sewer Service Area

- C) 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 Department.

If the right-of-way is not of sufficient width to avoid the granular backfill requirements 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 fifteen (15) feet wide exclusive sanitary sewer easement dedicated to the City of Jeffersonville and recorded with the County Recorder.

Utilities may encroach into the exclusive sanitary easement, but only for perpendicular crossings (between 45° and 90°). Parallel encroachments (less than 45°) are prohibited without written permission from the Department.

- 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 and in such a location to provide adequate access for ease of maintenance and/or repair. The Department will determine if access is adequate. The exclusive easement must be dedicated to the City of Jeffersonville and recorded with the County Recorder.
- c) Sanitary Sewers **shall not be** located in rear yards or other inaccessible areas.

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 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 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 Department.
- 3) 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.

D) Pipe Size and Slope

- 1) All sanitary sewer facilities shall be sized to accommodate anticipated flows from upstream service areas. The Property Owner shall contact the Department to determine applicability.
- 2) Gravity sewers shall be sized to maintain a minimum velocity of 2 feet per second.

Gravity sewers shall be a minimum of 8 inches in diameter. Service laterals for residential buildings shall be a minimum of 4 inches in diameter from the building to the property line or Right-of-Way (R/W) and 6 inches in diameter from the property line or R/W to the sewer main.

Non-residential buildings shall be a minimum of 6 inches in diameter and will be approved on a case-by-case basis.

- 3) Slopes
 - a) For gravity sewers, the slopes shall be calculated from center of manhole to center of manhole (not end of pipes). Design slopes above the minimum required slopes are encouraged; however, the gravity sewer pipes shall not be constructed below the following minimum grades:

Size of Sewer	Slope
4-inch (Building Lateral Only)	1.04%
6-inch (lateral from property line to sewer main)	0.61%
8-inch	0.40 %
10-inch	0.28 %
12-inch	0.22 %
15-inch	0.15 %
18-inch	0.12%
21-inch	0.10 %
24-inch	0.08%

Pipes with slopes greater than 20 percent shall be anchored, in accordance with the most recent version of Ten States Standards.

E) Alignment

- 1) Sanitary sewer facilities and water mains shall be laid with at least a 10-foot horizontal separation distance, measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, deviation may be allowed on a case-by-case basis.
- 2) There must be a minimum 18 inches vertical separation between the two pipes for crossings of water mains and sanitary sewer facilities, measured from the outside of the sanitary sewer facility to the outside of the water main. The crossing shall be arranged so that the sanitary sewer facility joints will be equidistant and as far as possible from the water main joints.
- 3) All sanitary sewer facilities shall have a minimum separation from drinking water wells in accordance with the most recent version of Ten States Standards.
- 4) For separations, horizontal or vertical, that are impossible to obtain, both the water main and sanitary sewer facility shall be constructed of ductile iron pipe with mechanical joints complying with public water supply design standards and be pressure tested to 150 pounds per square inch to assure water tightness before backfilling.
- 5) All sanitary sewer facilities shall be a minimum of 10-feet horizontally from top bank of all ditches, creeks, and ponds.
- 6) Castings shall be located so that drainage flows away from the casting.
- 7) From the lowest incoming pipe invert to the outlet pipe invert, there shall be a minimum 0.1 feet in elevation drop. There shall be a maximum 2.0 feet between the highest incoming pipe invert and the outlet pipe invert. Any drops in excess of 2 feet shall require an outside drop manhole structure.

F) Minimum Cover

- 1) Gravity Sewers
 - a) Minimum depth of cover for mainline sewers shall be 36 inches. If the minimum depth cannot be obtained, the mainline gravity sewer shall be Ductile Iron Pipe, class 50, and have a minimum cover depth of 30 inches.

G) Building Lateral Cleanouts

- 1) Sewer main cleanouts are not acceptable for permanent end of runs but are acceptable as temporary for locations between sections of subdivisions.
- 2) A minimum 4-inch diameter for residential and a minimum 6-inch diameter for commercial cleanout shall be located every 100' of lateral length or at any change in direction (at any 45° or 22 ½° elbow)

H) Elevations

- 1) Finish floor elevations, proposed or existing, for all lots shall be clearly stated. Where the sanitary drainage system of a building can discharge into the sewer by gravity flow, the lowest floor elevation where a plumbing fixture or floor drain is installed must be a minimum of one foot above the top of the crown of the sewer main. Where part of the drainages system cannot be discharged to the

sewer by gravity flow, this part of the system shall be discharged to a tightly covered and vented sump from which the contents shall be lifted (pumped) and discharged into the building gravity drainage system a minimum of one (1) foot above the top of the crown of the sewer main.

- 2) Top of castings of all manhole structures shall be at least one foot above the 100-year flood elevation. In areas where this requirement is not met, lock down castings shall be specified.
- 3) The lowest elevation to receive gravity sanitary service must be one (1) foot above the top of manhole casting elevation of either the first upstream or downstream manhole on the public sewer to which connection is to be made. Those portions of the building not meeting the stated gravity sanitary service requirement shall be provided with a grinder pump system or City approved equal discharging to the gravity building connection outside of the public right-of-way.

I) Manholes

- 1) Maximum distance between manholes shall be as follows:

Sewer Size, inches	Distance Between Manholes, feet
Less than 15	400
15 to 30	500
Greater than 30	600

- 2) Manholes shall be placed where pipe alignment, slope, materials, and/or size changes.
- 3) The angle, between any inlet pipe and the outlet pipe, must be equal to or greater than 90°.
- 4) Minimum manhole diameters shall be as follows as contained in **Table 1**:

TABLE 1	
Pipe Size, inches	Minimum Manhole Diameter, inches
	Pipe Entering / Pipe Exiting at Deflection Angle 90° and greater
8 – 12	48
24	48
27 – 30	60

- 5) Outside drop manholes shall be provided in cases where the invert of any incoming sanitary sewer enters the manhole at elevations greater than twenty-four (24) inches. Inside drop manholes are not permitted.

J) Easements

- 1) Should it be necessary to install gravity sewers outside of public right-of-way, the Owner/Developer will be responsible for providing permanent easements, to be dedicated to the City of Jeffersonville Wastewater Department.
- 2) The minimum required width of the permanent easements for gravity sanitary sewers shall be as follows:
 - a) For sewers with depth of up to 15 feet from finished grade, minimum easement width shall be 15 feet.
 - b) For sewers with depth greater than 15 feet to 25 feet from finished grade, minimum easement width shall be 20 feet.

- c) For sewers with depth, greater than 25 feet from finished grade, minimum easement width shall be 30 feet.
- 3) All sanitary sewers shall be centered in the easement.

2.3 Materials

A) Gravity Sewers

- 1) PVC pipe diameters of 8 inches through 15 inches shall meet or exceed all the requirements of ASTM D 3034 and shall have a minimum cell classification of 12454 C. Reference should be made to ASTM D 1784 for a summarization of cell class properties. PVC pipe diameters greater than 15 inches shall meet or exceed all requirements of ASTM F 679 and shall have a minimum cell classification of 12454 C.
- 2) The minimum wall thickness of PVC pipe 8 inches through 15 inches in diameter shall conform to SDR 35, type PSM, as specified in ASTM D 3034. The minimum wall thickness for PVC pipe greater than 15 inches shall conform to T 1 as specified in ASTM F 679. PVC pipe shall have a minimum pipe stiffness of 46 pounds per square inch for each diameter when measured at 5 percent deflection and tested in accordance with ASTM D 2412.
- 3) PVC sewer pipe shall meet or exceed all requirements of ASTM F 794 or ASTM F 949 and shall have a minimum cell classification of 12454 C and a minimum uniform pipe stiffness of 50 pounds per square inch for each diameter when measured at 5 percent deflection and tested in accordance with ASTM D 2412.
- 4) Pipe joints shall have a bell wall, gasket groove and spigot which are integral with the pipe. The assembly of joints shall be in accordance with pipe manufacturers' recommendations and ASTM D 3212. Solvent cement joints shall not be allowed.
- 5) Pipe fittings shall be SDR 26 manufactured fittings made of PVC plastic having a cell classification of 12454 B or 12454 C as defined in ASTM D 1784. Saddle connections shall not be allowed for new construction. Lateral connections shall occur at SDR 26 Wyes.
- 6) Each pipe section shall be marked with the name of manufacturer, trademark or trade name, nominal pipe size, production/extrusion code, material and cell classification, and ASTM number.
- 7) Installation shall be in accordance with ASTM recommended practice D 2321.

B) Building Laterals

- 1) Pipe for residential building laterals shall be a minimum 4-inch PVC from the house to the property line and 6-inch PVC from the property line to the sewer main meeting the requirements of ASTM D3034, SDR35.
- 2) Commercial lateral connections shall be 6-inch PVC meeting the requirements of ASTM D3034, SDR35 .
- 3) Pipe shall have a flexible gasket push-on compression type joint. SDR 35 Glue joint pipe may be used on a case-by-case basis.
- 4) Pipe must be laid with the male end of the pipe connecting to the female end in the direction of the flow.

- 5) For residential applications a 4-inch cleanout shall be located 3-foot from the building and 6-inch Backflow Valve, Clean Check, Inc. or equal, shall be provided at the property line. For commercial applications the 6-inch Backflow Valve, Clean Check, Inc. or equal shall be installed at a location outside the building to provide for easy access

C) Manholes

- 1) Precast concrete manholes shall conform to ASTM C 478 with rubber type gaskets equal to ASTM C 443 and a minimum inside diameter of 48 inches. Monolithic cast-in-place or 'doghouse-type' manholes shall only be used with the prior written approval by the Department. The base and first riser section of the precast concrete manhole shall be integrally cast as one unit. Precast concrete cones shall be of the eccentric cone type. No "see through" lift holes shall be allowed on precast concrete manholes 48 inches in diameter. In addition to the rubber type gaskets, all joints shall receive a 1/2 inch diameter non-asphaltic mastic (Kent-Seal or as approved by the City), conforming to ASHTO M198 and federal specifications SS-S-210A. Sewer connection to manhole shall be Kor-N-Seal, A-Lok, Dura-Seal or as approved by the City.
- 2) Where one solid riser or barrel section cannot be used, final adjustment in elevation of the frame and cover shall be accomplished by the use of a 4-inch minimum thickness adjusting ring to a maximum combined thickness of 12 inches. Brick or block shall not be used in the construction of a manhole or to adjust the elevation of the frame and cover. The risers shall be LadTech HDPE Recycled Plastic or Cretex Pro-Ring Manhole Grade adjustment systems meeting AASHTO HS-25 load requirements. For situations that require a riser thickness of less than four (4) inches will be approved on a case-by-case basis. Non-hardening butyl rubber sealant shall be installed between cone, riser rings, and casting. Sealant shall meet or exceed ASTM 0990-94.
- 3) Manhole steps shall conform to ASTM C478. Manholes shall be furnished with steps placed a maximum 16 inches apart with the first step placed no greater than 2 feet below the top of the frame. Steps shall be in line and located over the bench of the manhole not over the sewer line.
- 4) A 6-inch minimum width of butyl rubber coating on the exterior of the manhole shall be applied at each joint to prevent leakage.
- 5) Precast flow channel through manholes shall be U-shaped at a minimum width and depth equal to the diameter of the pipe extending between the pipe inverts. The bench walls must extend up from the flow channel to an elevation that creates a one-inch per foot minimum slope with the inner wall of the manhole section and shall have a slick finish.
- 6) Manhole covers shall be Type "A" cast iron ring and cover and must conform to ASTM A 48. All sanitary manholes that lay along a stream, swale, or open storm channel shall have locking or bolt down lids with an inside seal between the lid and casting. Sanitary manholes are not permitted to be located in a stream, or in the flowline of a swale, or open storm channel. Manhole lids shall be stamped "CITY OF JEFFERSONVILLE SANITARY SEWER." Casting shall be East Jordan Ironworks 1045 casting and 1022 lid, Neenah R1642, or equivalent with a self-sealing machined lid.

D) Bedding and Backfill

- 1) Contractor shall comply with Bedding and Backfill requirements as required by the City of Jeffersonville Construction Standard Details Sheets.

2.4 Execution

A) Pre-Construction Conference

- 1) Before the start of any construction on the project site, a conference must be scheduled and completed with the City Engineer and the Wastewater Department.

B) Permits

The Contractor or Property Owner must obtain sewer permits at one time. The sewer permit must be obtained before connection can be made.

C) Utility Locations

- 1) The Contractor is responsible for determining the location of existing utilities 48 hours prior to any construction or excavating per Indiana 811 requirements.
- 2) A tracer wire must be installed on all lateral connections with the wire exposed/connected to the cleanout.

D) Benchmarks

- 1) Benchmarks shall be referenced to the North American Vertical Datum of 1988 (NAVD 88) and be related to existing monuments that have been published by MGD, USC&GS, USGS, or IDNR, Division of Water.
- 2) Benchmarks shall have at least one benchmark per site or more if appropriate, using monuments that are of good construction (i.e. pin in concrete, railroad spike or nail in utility pole, or chiseled mark on a stable concrete structure).

E) Building Laterals

- 1) Tight fitting, PVC caps shall be installed on the end of each lateral stub. Also, a metallic marker must be placed at the end of each lateral for future locating.
- 2) Lateral connections to the mainline sewer must be wye connections; no saddle connections will be allowed.
- 3) InsertaTEE™ or InsertaWYE™ may be used on a case-by-case basis as approved by the Wastewater Department
- 4) A 12-gauge stranded wire shall be installed (taped) on the top of the pipe along the entire length of the lateral from the sewer to the 4-in cleanout located near the building. All wire-to-wire connections will be joined using a DBR Direct Burial Splice Kit as manufactured by 3M Electrical Products Division or a Department approved equal
- 5) No lateral shall directly discharge to a manhole unless approved by the City Engineer and the Wastewater Department.
- 6) **Sewer laterals, under no condition shall be backfilled until the Wastewater Department's representative has inspected and approved all work.**
- 7) Turns made in lateral alignment shall be accomplished by utilizing 22° and/or 45° elbow fittings with a cleanout located at each elbow. **The utilization of 90° elbow fittings is not permitted.**

F) Manholes

- 1) Manholes shall be placed on a minimum 12 inches of No. 8 crushed stone that has been mechanically compacted. Where unstable or poor soil conditions exist, the contractor/owner shall have a geotechnical engineer provide recommendations on how to stabilize the unsuitable soil. The remainder of the manhole shall be backfilled using No.53 or No.8 stone. Stone shall be placed in 6-inch lifts and mechanically compacted to 95 percent maximum dry density as determined by ASTM D 698.
- 2) Joint seal system (Kent-Seal or as approved by City) shall be installed using the Manufacturers written instructions. The top of the manhole casting and cone section shall be joint-sealed with inspection prior to backfilling.
- 3) Connections to all manholes, new or existing, shall be core drilled and booted. These taps shall be cored into the manhole between the spring line of the sewer or no more than 24 inches above the flow line. Manhole connections shall not protrude past the interior of the wall of the manhole. All pipe connections to the manhole shall not be grouted to verify watertight installation.
- 4) Drop manholes shall be either precast or cast-in-place exterior drop manholes.
- 5) All sanitary manholes shall be vacuum tested with castings per ASTM C 1244 following full installation.

G) Drainage

- 1) **Roof drains, footing drains, sump pumps, and/or surface water drains shall not be connected to the sanitary sewer system, including temporary connections during construction.**

H) Backfill

- 1) Bedding and backfill dimensions shall have a minimum trench width as designated on the standard construction details.
- 2) Fill placed under any street or sidewalk shall be compacted to 95 percent maximum density as determined by ASTM D 1557.

I) Safety and Spills

- 1) CONTRACTORS ARE SOLELY RESPONSIBLE FOR ALL SEWAGE SPILLS to occur as a result of their work. The Contractor must have an action plan to anticipate problems connecting to existing sewers and pumping sewage around a work site.
- 2) CONTRACTORS ARE RESPONSIBLE FOR SAFETY AT THE JOB SITE. They shall make provisions for a safe working environment for their own crews, as well as City personnel and inspectors. The project site shall be in compliance with all OSHA safety regulations, including but not limited to construction trench safety and confined safety entry regulations.
- 3) Should unknown active utilities be damaged during excavation work, work must be stopped immediately. Do not proceed with work until decision has been reached regarding repair, removal, or relocation of utilities. The Contractor must give notice to the appropriate utility.

J) Testing

- 1) Leakage Testing

- a) The City shall be given 24 hour written notice of the required leakage testing procedure to be performed by the contractor. Contractor shall utilize a liquid-filled gauge for pressure measurements in test. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4 PSIG plus the groundwater head divided by 2.31 (maximum test pressure is 9 PSIG).
- b) At a stable internal air pressure within 0.5 PSIG of the initial internal air pressure, timing shall commence with a stopwatch or similar device of 99.8 percent accuracy. Timing shall end when the internal air pressure drops 1 PSIG below the stable internal air pressure.
- c) The line shall be accepted if the time shown in **Tables 2, 3, and 4** for the designated pipe size and length elapses before the air pressure drops 1 PSIG below the stable internal air pressure at which time the test can be discontinued for the accepted line.
- d) These tests shall be observed and certified by a representative of the City on the in **Appendix B**.
- e) In areas where groundwater is known to exist, the Contractor and Engineer shall determine the extent of groundwater over the invert of the pipe and apply additional pressure to the test pressure as follows. In no case should the starting test pressure exceed 9.0 psig.

TABLE 2	
Extent of groundwater over invert of pipe	Pounds of pressure to be added to test pressure
1 feet	0.5
2 feet	0.8
3 feet	1.3
4 feet	1.7
5 feet	2.1
6 feet	2.6
8 feet	3.4
10 feet	4.3
12 feet	5.2

TABLE 3	
If the pressure does not fall below 2.5 psi from 3.5 psi in the following situations, the pipe will be accepted. The length of pipe shall be any length between manholes.	
Size (inches)	Time allowed for pressure to drop from 3.5 to 2.5 psi
6	3 minutes
8	4 minutes
10	5 minutes
12	5-1/2 minutes
15	7-1/2 minutes
18	8-1/2 minutes
21	10 minutes

24	11-1/2 minutes
27	13 minutes
30	14-1/2 minutes
33	15-1/2 minutes
36	17 minutes

TABLE 4	
If the pipe does not meet the above test, the time shall be computed by the following expression: $t = k / c$	
where t =	time in seconds for air pressure inside of pipe to decrease from 3.5 to 2.5 psi
k =	$0.011 \times d^2 \times L$
c =	$0.0003883 \times d \times L$ (if c is 1, or less, use value of 1 for c)
d =	inside pipe diameter of pipe under test (inches)
L =	length of pipe under test (feet)

2) Mandrel Testing and Televising

- a) A 5 percent "GO-NO-GO" Mandrel Deflection Test shall be performed on all gravity sanitary sewer pipes.
- b) These pipes shall be mandrelled with a rigid device sized to pass 5 percent or less deflection (or deformation) of the base inside diameter of the pipe. The mandrel test shall be conducted no earlier than 30 days after reaching final trench backfill grade, provided that in the opinion of the Department or City Engineer sufficient water densification or rainfall has occurred to thoroughly settle the soil throughout the entire trench depth. If densification, in the opinion of the Department or City Engineer, has not been achieved within the 30 day time frame, the mandrel size shall be increased to measure a deflection limit of 3 percent.
- c) The mandrel (GO-NO-GO) device shall be cylindrical in shape and constructed with 9 or 10 evenly spaced arms or prongs. Mandrels with fewer arms shall not be allowed due to being insufficiently accurate. The mandrel diameter dimension "D" shall be equal to the inside diameter of the sanitary sewer. Allowances for pipe wall thickness tolerances or ovality (from heat, shipping, poor production, etc.) shall not be deducted from the "D" dimension, but shall be counted as part of the 5 percent or lesser deflection allowance. Each pipe material/type required to be Mandrel tested shall be tested with a mandrel approved by the pipe manufacturer and meeting the requirements of this Section. The "D" mandrel dimension shall carry a tolerance of +/-0.01 inches.
- d) The mandrel shall be pulled in a manner acceptable to the Department through all sewer lines and any section or sewer not passing the mandrel shall be uncovered, replaced or repaired to the Department's satisfaction and retested.
- e) The contact length (L) shall be measured between points of contact on the mandrel arm. The length shall not be less than as shown on **Table 5** below:

TABLE 5			
9 Arm Mandrel Deflection D DIMENSIONS FOR ASTM 3034 - SDR 35 Sewer Pipe			
Nominal Diameter (inches)	Length (inches)	3% Deflection (in)	5% Deflection(in)
8	8	7.71	7.56
10	10	9.63	9.45
12	10	11.46	11.26
15	12	14.03	13.78
10 Arm Mandrel Deflection D DIMENSIONS FOR ASTM D3034 - SDR 35 Sewer Pipe			
Nominal Diameter (inches)	Length (inches)	3% Deflection (inches)	5% Deflection (inches)
8	8	7.71	7.58
10	10	9.65	9.48
12	10	11.48	11.29
15	12	14.06	13.82

- f) Contractor shall provide proving rings to check the mandrel. Drawings of mandrels with complete dimensions shall be furnished by the Contractor to the City upon request for each diameter and specification of pipe.
- g) Testing Form: Contractor must submit the results of the mandrel test on the form in **Appendix C** with the following information:
- Project Name
 - Contractor
 - Date of Test
 - Manhole ID numbers
 - Diameter of Sewer (Inches)
 - Type of Mandrel (9-arm, 10-arm)
 - Proving Ring Check (serial number of proving ring)
 - Pass/ Fail
 - Testing Operator's Signature
 - Wastewater Department's Representative's Signature

3) Manhole Testing

- a) All manholes must be vacuum tested after installation, repair or modification.
- b) The City may require additional vacuum tests if the manhole casting is not bolted to the structure prior to the test.
- c) Manhole boots must be secured to prevent movement while the vacuum is drawn.
- d) Installation and operation of vacuum equipment and indicating devices must be in accordance with manufacturer's recommendations and performance specifications that have been provided by the manufacturer and accepted by the Wastewater Department.

- e) All manholes shall be negative air pressure (vacuum) testing methods in accordance with ASTM C1244-93. These tests shall be performed by the Contractor and observed and confirmed by a representative of the Department.
- f) Stub outs, manhole boots and pipe plugs must be secured to prevent movement while the vacuum is drawn.
- g) Installation and operation of vacuum equipment and indicating devices must be in accordance with manufacturer's recommendations and performance specifications that have been provided by the manufacturer and acceptable to the City.
- h) Procedures: With the vacuum tester set in place:
 - i.) Inflate the compression band to 40 psi to affect a seal between the vacuum base and the structure.
 - ii.) Connect the vacuum pump to the outlet port with the valve open.
 - iii.) Draw a vacuum 10" of Hg. and close the valve.
- i) Acceptance standards for leakage will be established from the elapsed time for a negative pressure change from ten (10) inches to nine (9) inches of mercury. The maximum allowable leakage rate for a four-foot diameter manhole must be in accordance with **Table 6** below:

TABLE 6			
Manhole Depth	Minimum Elapsed time for a Pressure Change of 1 Inch HG		
	<i>Four (4) foot Manhole</i>	<i>Five (5) foot Manhole</i>	<i>Six (6) foot Manhole</i>
10 feet or less	60 seconds	75 seconds	90 seconds
>10 feet <15 feet	75 seconds	90 seconds	105 seconds
>15 feet <25 feet	90 seconds	105 seconds	120 seconds

For all manholes deeper than 25 feet, the City Engineer will determine the applicable minimum elapsed time.

- j) Retest:
 - i.) If the manhole fails the test, necessary repairs must be made and the vacuum test and repairs must be repeated until the manhole passes the test.
 - ii.) If manhole joint seals are pulled out during the vacuum test, the manhole must be disassembled and the joints replaced.
- k) Visual:
 - i) Manholes will be subject to visual inspection with all visual leaks being repaired.
- l) Testing Form:
 - i) Contractor must submit the results of the vacuum test on the form in **Appendix D** with the following information:

- Date of Test
- Project Name and Contractor
- Manhole ID number, Diameter, and Depth
- Test Duration (Seconds) and Pressure Drop (Inches of Mercury)
- Pass/ Fail
- Testing Operator's Signature
- Engineer's Representative Signature

4) Closed Circuit Television (CCTV) Inspection

- a) All sections of the new sewer will be inspected by closed circuit television. All television inspections must be performed in a manner acceptable to the Wastewater Department.
- b) The Contractor must furnish all equipment, a qualified television technician, a trained supervisor and sufficient personnel to perform all the work required in the inspection operation.
- c) The Contractor must furnish spare cameras and related equipment to prevent delays due to equipment breakdowns. Cameras must be equipped with remote-control focusing devices, remote-control devices to adjust the light intensity and enough cable must be furnished to inspect one thousand (1,000) lineal feet of sewer in a continuous operation. The camera must be small enough to pass through a six (6) inch opening.
- d) The Contractor must clean the sewer at the discretion of the Wastewater Department., when required, one section at a time After the sewer is cleaned, the television camera must be attached to the end of a cable so that it can be pulled through the pipe. The camera must trail a line of steel cable which will be attached to a winch of sufficient size to be able to pull back or retrieve the camera whenever necessary.
- e) The camera must transmit a continuous color image to the color television monitor. This image must be clear and sharp enough to enable those viewing the monitor to be able to easily see the interior condition of the pipe being inspected. A continuous distance log, zeroed at the starting manhole, must be displayed on the monitor at all times.
- f) The Contractor must furnish all equipment required for making a continuous Digital copy of the view which appears on the monitor.
- g) The Wastewater Department's representative must be present at all times during television inspection of the sewers and will indicate to the Contractor whatever data is required to be logged and prepared for record purposes. The Contractor must prepare and furnish to City of Jeffersonville Wastewater Department and the Developer not less than two (2) copies of the final record, CD and report of all inspection work done.
- h) Final Inspection

Prior to conveyance, the City of Jeffersonville Wastewater Department will conduct an inspection ("Final Inspection") which will consist of a walk-through of the completed project.

- i) After the Final Inspection has been performed, the City of Jeffersonville Wastewater Department will provide a written summary, or punch list, of items which require corrective action. Developer must complete all punch list items within forty-five (45) days from the date of issuance of the punch list.
- j) Developer must rectify all defects identified during the Final Inspection in a manner acceptable to The City of Jeffersonville prior to Sanitary Sewer Facilities being conveyed to Jeffersonville.

SECTION 3. SANITARY SEWER LIFT STATION/FORCE MAIN

3.1 General

This section includes specifications for sanitary sewer pump station/ force main systems.

A) Details

- 1) All construction details shall be as shown on “City of Jeffersonville Standard Construction Details,” latest revision. The Department must approve any other alternative method, discrepancy, omission, or duplication of specification standards.

B) Construction Plans

- 1) The plans for the installation of a sanitary sewer system shall be provided by the Developer and approved by the Department. Upon the completion and one week prior to acceptance, the Contractor must submit record drawings certified by a registered Indiana Professional Engineer or Land Surveyor for the installed sanitary sewer system to the City.

C) Standards

- 1) Design, construction, and testing must comply with ASTM and IDEM standards.

D) Responsibilities

- 1) The Property Owner/Developer shall be responsible for all approvals, permits, and easements.

E) Submittals prior to construction

- 1) These submittals shall be given to a City representative prior to construction:
 - a) Shop drawings for all sanitary sewer materials, including pipe, pipe couplings, wyes/tees, pump station structures and equipment, air release valve cleanout structures/equipment shall be submitted to the Department. Shop drawings shall be signed and sealed for compliance to specifications by the Contractor, and, reviewed and stamped by the Project Engineer with comments to the Contractor requiring compliance with Project Plans and Specifications.
 - b) Proposed detailed construction sequence including schedule for bypass pumping and connection to existing sanitary sewer system.
 - c) Permit for excavation within the Right-of-Way, if applicable.
 - d) Copies of the Construction Permit and all correspondence concerning deficient plans or approval of plans.

F) Submittals prior to City Acceptance

- 1) These submittals shall be given to a Department’s representative prior to City Acceptance:
 - a) Hydrostatic, vacuum, and pump-down tests. The pump-down test must be performed by a representative of the pump supplier or the pump manufacturer.
 - b) One set of record drawings showing information including, but not limited to, the following: building lateral locations, invert elevations, top of casting elevations, horizontal locations, and other utility information encountered during construction. Upon completion of all improvements

and installations accepted by the Department, Digital Plan information and Record Drawings certified by a registered Indiana Professional Engineer or Land Surveyor unless other submittal requirements are approved by the Department or City Engineer, shall be submitted to the City in Digital CAD format (DWG) that is projected into **NAD 1983 State Plane Indiana East FIPS 1301 (US Feet)** coordinate system.

G) Operation and Maintenance Manuals

- 1) Two (2) operation and maintenance manuals shall be submitted to the City of Jeffersonville
- 2) Manuals shall include, at a minimum:
 - Operation instructions
 - Maintenance instructions
 - Recommended spare parts list
 - Lubrication schedules
 - Structural diagrams
 - As-built wiring diagrams
 - Bill of materials

H) Pump warranty, provided by the pump manufacturer, shall be submitted to the City of Jeffersonville Wastewater Department for review and approval. The pump warranty shall warrant the units being supplied to the Owner against defects in workmanship and materials for a period of five (5) years under normal use, operation and service. The warranty shall be in printed form and apply to all similar units.

3.2 Design

A) Benchmarks

- 1) Permanent and temporary elevation benchmarks shall be referenced on the plans.

B) Location

Lift station locations will be evaluated by the Department on a case-by-case basis.

C) Force Main Size

- 1) Force mains shall be sized to maintain a minimum cleansing velocity of 2 feet per second.
- 2) Velocities in force mains greater than eight (8) ft/s are not acceptable.
- 3) Force mains shall be a minimum of 4 inches in diameter unless approved by the Department.

Minimum acceptable force main diameter, for use with grinder pumps, shall be two (2) inches.

- 4) "Common force main systems" will not be permitted. "Low pressure force main systems" will be reviewed by the City/Department on a case-by-case basis.
- 5) Force mains shall be designed to resist hydraulic forces and prevent water hammers.

D) Alignment

- 1) Sanitary sewer facilities and water mains shall be laid with at least a 10-foot horizontal separation distance, measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, deviation may be allowed on a case-by-case basis.
- 2) There must be a minimum 18 inches vertical separation between the two pipes for crossings of water mains and sanitary sewer facilities, measured from the outside of the sanitary sewer facility to the outside of the water main. The crossing shall be arranged so that the sanitary sewer facility joints will be equidistant and as far as possible from the water main joints.
- 3) All sanitary sewer facilities shall have a minimum separation from drinking water wells in accordance with the Ten States Standards, current version.
- 4) All sanitary sewer facilities shall be a minimum of 10-feet horizontally from top bank of all ditches, creeks, and ponds.
- 5) Castings shall be located so that drainage flows away from the casting.

E) Minimum Cover

- 1) A minimum depth of cover for force mains shall be 36 inches.

F) Elevations

- 1) Force main high points: Air/vacuum relief valves shall be e A.R.I. Model D-025, or equal located at all high points along the force main. Additional valve placement may be required as directed by the Department.
- 2) Force main low points: Clean out valves shall be located at all low points along the force main. Additional valve placement may be required as directed by the City Engineer and/or the Wastewater Department.

G) Lift Station Structures and Equipment

- 1) Sanitary sewer lift stations will be permitted only upon the submittal of an economic analysis to the City Engineer, proving to the satisfaction of the City Engineer and the Wastewater Department that the pump station exhibits a lower 50-year life cycle cost than that of a gravity sewer or if a gravity sewer cannot be constructed due to geographical limitations.
- 2) Design Engineer shall obtain approval on pump station /force main design prior to construction. Design Engineer shall submit the following documentation to the Jeffersonville City Engineer for review and approval:
 - a) Project plans and specifications
 - b) Force main head calculations.
 - c) Plots of pump curve and system curve, provided in feet of total dynamic head (TDH) versus gallons per minute of flow, with complete force main head calculations supporting curves.
 - d) Wet well detention/float setting calculations.
 - e) Buoyancy calculations for all pump station structures. Minimum safety factor of 2.0 shall be utilized.

- 3) All wet wells shall be designed for ultimate peak flow in accordance with flows required by Jeffersonville City Engineer.
- 4) High water alarm shall be six inches below flow line of the lowest incoming pipe.

H) Easements

- 1) The developer will be responsible for providing a permanent easement for the placement of the pump station, to be dedicated to the City of Jeffersonville. The dimensions and boundaries of the easement shall be approved by the Jeffersonville City Engineer and the Wastewater Department.
- 2) Should it be necessary to install force mains outside of public right-of-way, the developer will be responsible for providing permanent easements, to be dedicated to the City of Jeffersonville Wastewater Department.
- 3) The permanent easements for force mains shall have a minimum width of 15 feet.
- 4) All force mains shall be centered in the easement.

3.3 Materials – Submersible Lift Station Structures and Equipment

A) General Requirements

- 1) Furnish all labor, equipment and material to construct a submersible pumping station consisting of pumps, motors, wet well, separate valve vault, separate meter pit, valves, piping, hatches, guide rails, pump removal components, control center, mercury float switches, remote monitor package, interconnecting electrical wiring, incoming power supply, one-inch frost free yard hydrant and all other features regularly and normally required as a part of a complete and functional facility. All work to be in accordance with site requirements, details in the plans, these specifications and the manufactures recommendations.
 - 2) All of the mechanical and electrical equipment shall be an integral package supplied by the pump manufacturer with local representation so as to provide undivided responsibility. The package shall be equal in construction and performance to KSB, Myers or Flygt (Xylem) equipment and other specific requirements set forth herein and in the approved plans.
 - 3) All non-metallic force mains (PVC, HDPE) shall have a 12 gauge shielded copper tracing wire placed directly above the pipe. The wire must be accessible at valve vaults and manholes.
 - 4) Any exceptions to this specification or associated approved plans shall be submitted in writing and clearly stated. The exceptions must be approved by the Project Engineer and the City of Jeffersonville prior to proceeding with work.
 - 5) All components of the pump station that are exposed to weather shall be constructed of material that is resistant to corrosion and will not surface protection throughout the expected life of the pump station. In general, these materials are stainless steel, aluminum, fiberglass reinforced polyester (FRP) and ultraviolet stabilized PVC.
- B) Operating Conditions of pump station shall be determined by the Project Engineer and approved by the City of Jeffersonville.

C) Pumping Equipment:

- 1) Pumps shall be of the submersible type, explosion-proof for handling raw unscreened sewage. Pump volute, motor and seal housing are to be high quality gray cast iron. Impeller shall be either cast iron or cast bronze of a non-clog design capable of handling minimum 3-3/4" sphere solids, fibrous material, heavy sludge and other matter found in normal sewage applications. Impeller shall have pump out vanes on the back shroud of the impeller to keep pumped material away from the seal area and increase operating life. Impeller shall be either slip fit or taper fit with key to securely lock the impeller to the driving shaft. The pump volute shall be fit with a replaceable bronze wear ring to minimize wear on the impeller and help achieve longer balanced operating life. All fasteners shall be of stainless steel. The City of Jeffersonville provides an option, upon request by the City Engineer and/or Department, for the project pump specifications to provide "cutter" or "chopper" type pumps, based on the quantity of fibrous materials in the raw wastewater accepted by the proposed pump station.
- 2) All mating surfaces where water tight sealing is required shall be machined and fitted with nitrile rubber O-rings. Sealing shall be accomplished when metal-to-metal contact is made, resulting in controlled compression of the rubber O-rings without requirement of a specific torque limit.
- 3) The pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall consist of one (1) stationary seat and one (1) rotating ring held in place by its own spring. The lower seal shall be removable without disassembling the seal chamber. The upper seal between the motor and the seal chamber shall be of the same design with its own separate spring system. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Seal shall be fitted on a 303 stainless steel shaft sleeve. Shaft seals with conventional double seal utilizing a single spring between the two seals and requiring a pressure differential to offset external pressure shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to pressures equivalent to two hundred (200) feet. No seal damage shall result from operating the pump unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication. The seal chamber shall also be equipped with a seal failure sensor probe which will sense water intrusion through the lower seal. This sensor is to be connected to an alarm in the control panel to indicate lower seal failure.
- 4) The stator winding, rotor and bearings are to be mounted in a sealed submersible type housing. Insulation utilized in the stator windings shall be class F with maximum temperature capability of 155 degrees Centigrade. Motor housing shall be filled with a high-dielectric oil to give superior heat transfer and allow the bearings to run in a clean, well lubricated environment; or the housing shall be air filled with grease lubricated bearings. The pump and motor are to be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped. The pump should not require cooling water jackets. Stators shall be securely held in place with a removable end ring and threaded fasteners so that it may be easily removed in the field without use of heat or a press.

Shaft shall be of stainless steel and supported by ball bearings. Motor shall be provided with heat sensing units attached to the motor windings, which shall be connected to the control panel to shut down the pump if overheating occurs.

- 5) Pump motor cable and heat sensor /seal failure sensor cable shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size to allow motor voltage conversion without replacing the cable. Cable of the proper length shall be provided to eliminate the need for splices or junction boxes between pump and 'Control Center'. The cable shall enter the motor through a cord cap assembly which is double-sealed allowing

disassembly and disconnect of the wires at the motor and still not damage the sealed characteristics of the motor housing.

- 6) The pump mounting base shall include adjustable guide rail supports and a discharge connection with a one hundred twenty-five (125) pound standard flange. The base and the discharge piping shall be permanently mounted in place. The base plates shall be anchored in place utilizing epoxy type anchors with stainless steel studs and nuts as manufactured by HILTI Fasteners, Inc.
- 7) All piping inside pump station wet well, valve vault and meter pit structures shall be ductile iron pipe, and extended ten feet outside of each structure, in accordance with the ductile iron force main pipe section of these Standards.
- 8) A rail system shall be provided for easy removal of the pump and motor assembly for inspection and service. The system shall not require a man to enter the wet well to remove the pump and motor assembly. Two (2) rails of two (2) inch stainless steel pipe or one (1) rail of fiberglass reinforced plastic (FRP) I-Beam shall be provided for each pump. The guide rails shall be positioned and supported by the pump mounting base. The guide rails shall be aligned vertically and supported at the top by an attachment to the access hatch frame. One (1) intermediate guide rail support is required for each fifteen (15) feet of guide rail length for stainless steel pipe and one for each nine (9) feet of guide rail length for FRP I-Beam rail.
- 9) The pumps shall be equipped with sliding brackets or rail guides. To insure easy removal of the pumps, the rail guides attached to each pump shall not encircle the rails. A stainless steel lifting chain of adequate length for the wet well depth shall be provided for each pump.
- 10) The rails and rail guides shall function to allow the complete weight of the pumping unit to be lifted on dead center without binding and stressing the pump housing. The rail system shall function to automatically align the pumping unit to the discharge connection by a simple downward movement of the pump. No twisting or angle approach will be considered acceptable. The actual sealing of the discharge interface will be a metal face such as Myers, KSB or Flygt.

D) Wet Well, Valve Vault, Meter Pit and Accessories:

- 1) The wet well, valve vault, and meter pit are to be constructed of precast concrete. The actual arrangement of the structures is to be as shown in the approved plans. The wet well top shall be provided with a four (4) inch PVC vent having a downward pointing inlet and screen over the inlet opening. The City of Jeffersonville provides an option, upon request by the Department, for the project specifications to require a carbon filter on the vent based on the need for odor control.
- 2) The wet well, valve vault, meter pit, flat tops and base slabs are to be constructed of precast reinforced concrete manhole sections conforming to ASTM C-478. All joints between precast sections shall be made with an approved rubber O-ring in accordance with ASTM C-443. In addition, the outside wall below grade is to be coated with bituminous waterproofing material. The top and bottom of the chambers shall be precast or may be poured in place concrete if approved by the Project Engineer and the Department. An OSHA compliant aluminum ladder with Bilco Ladder-Up steps shall be provided in the valve vault and meter pit only.
- 3) The pump supplier shall to provide an aluminum two (2)-door (for duplex pump station), or, three (3)-door (for triplex pump station) access hatch frame and door assembly to be installed in the concrete wet well top. This door assembly shall provide access for removal of the pumps and shall support the guide rails. The doors shall be provided with lifting handle, safety latch to hold door in the open position and a hasp suitable for a padlock. The doors shall have a non-skid finish. The hatch shall be Bilco or equal with Fall Protection as part of the unit.

- 4) An aluminum single door access hatch frame and door assembly, similar to the one described above, shall be provided for use as entry to the valve vault and the meter pit. Minimum opening for the valve box entry shall be thirty-six (36) inches by thirty-six (36) inches. The valve vault door shall be offset over the ladder provided in the valve vault and meter pit.
- 5) A check valve (APCO Valve Series 6000 weighted check or City-approved equal) and an eccentric plug valve (Clow Corporation Valve Division, or City- approved equal) shall be installed in the valve vault in each pump's discharge piping. All piping from pump base elbows, through the valve vault and exiting the valve vault shall be ductile iron. All elbows, tees and cross piece fittings shall be ductile iron. A PVC drain pipe and check valve shall be installed to drain the valve vault back to the wet well.
- 6) An additional eccentric plug valve (Clow, or City- approved equal) shall be provided in the valve vault to allow access to the force main for bypass pumping. The bypass valve shall have an upward directed elbow and a 4", 6" or 8" (to match the size of the force main) female aluminum Cam Lock fitting to allow attachment of City owned bypass pumping equipment. The wet well shall be provided with a suction pipe matching the size of the force main for use in bypass pumping. The pipe shall be protruded through the wet well top and be provided with an elbow and 6" male aluminum Cam Lock fitting with cap.
- 7) Plug valves to be positioned so that they may be turned from grade level with a T-handle wrench

E) Emergency Pump Connection Manhole

- 1) An emergency pump auxiliary connection and manhole shall be provided at all Lift Stations. The structure shall be a precast manhole (5' minimum diameter) with a 8" thick precast concrete lid (ASTM C478 LR) with an East Jordan Iron Works hinged lid, Ergo XL Access Assembly poured in precast lid.
- 2) This connection shall allow bypass pumping of the wet well during emergency conditions. The pipe shall extend a minimum of one (1) foot above the lid, turned
- 3) 90° to the hose connection. The emergency connection Quick Disconnect fitting shall be the same size as the force main female Cam-Lok fitting.

There shall be a plug valve installed on the pipe to allow bypassing when necessary, a two (2) inch pipe with valve from the piping to the wet well for pipe drainage and a 2" PVC pit drain from this structure to the valve vault.

F) Disconnect Switch:

- 1) A single main fusible or breaker disconnect switch of adequate size to provide power for the 'Control Center' and its related components shall be provided by the Contractor.
- 2) The disconnect switch shall be housed in a NEMA 4X stainless steel enclosure with an external operation handle capable of being locked in the ON position.

G) Control Center:

- 1) The control center shall be built in a NEMA 4X stainless steel enclosure and shall be suitable for the specified horsepower and voltage for the pumping equipment. The outer door of the panel shall be hinged dead front with provisions for locking with a padlock. Inside shall be a separate hinged panel to protect all electrical components. H-O-A switches, run lights, circuit breakers, etc. shall be

mounted such that only the faces protrude through the inside swing panel and no wiring is connected to the back side of the inside swing panel.

- 2) A circuit breaker and NEMA rated starter with three (3) leg overload protection and manual reset shall be provided for each pump. Starters shall have auxiliary contacts, on three phase applications, to operate both pumps on over-ride condition. A separate circuit breaker shall be supplied for power to the control circuit. The control center shall include an extra circuit breaker of adequate size to provide 115 volt, single (1) phase power for remote monitor panel. The control center shall include a voltage transformer to reduce supply voltage such as 115 volt, single (1) phase and 12 volt transformers for pump controller voltage. Included in the panel shall be an Allen Bradley PLC and shall be SCADA ready. A green light and H-O-A switch shall be provided for each pump. A terminal strip shall be provided to make field connections of pump power leads, float switches, seal sensor leads, and remote monitor panel interconnections.
- 3) A time delay relay shall be provided to delay start of second pump should power outage occur.
- 4) The control center shall incorporate connections for heat sensors which are installed in the pumps. The connection shall disconnect the starter upon high temperature signal, and will automatically reconnect when condition has been corrected.
- 5) The control center shall incorporate connections for seal failure sensors which are installed in the pumps. The panel will have a seal failure alarm light for each pump. This alarm indicates failure of the lower mechanical seal in the pump. This will be an alarm light and will shut down the pump.
- 6) The control center shall include an hour meter for each pump to register the elapsed operating time of each pump.
- 7) The control center shall have a high water alarm built-in the main enclosure. The high water alarm shall consist of a flashing alarm light with red Lexan plastic cover or red glass globe with metal guard mounted on top of the enclosure such that it is visible from all directions. An alarm horn shall be mounted on the side of the enclosure. A push to test horn and light button as well as a push to silence horn button shall be provided and mounted on the side of the enclosure.
- 8) The control center shall include a condensate heater to protect against condensation inside the enclosure. The heater shall be placed so as not to damage any other component or wiring in the control center.
- 9) The control center shall include lightning protection and a phase monitor relay to shut down the control circuit and protect the equipment due to loss of phase or phase reversal. The three phase sequence voltage relay shall be of the eight pin connector type.
- 10) The control center shall incorporate an alternator selector switch to allow selection of automatic alternation or manual selection of the lead pump.
- 11) The control center shall include a GFI convenience outlet with a 20 AMP breaker and suitable transformer or power supply to provide 110 single (1) phase power to the convenience outlet.
- 12) The control center shall be suitable for connection to a remote monitor package. The main control must include the following interconnection capability:
 - Circuit breaker to power remote monitor panel as described above.
 - Relay contact to signal high water alarm.
 - Relay contact to signal tripping of the overload of each of the pumps.
 - Relay contact to transmit signal of seal failure trip of each of the pumps.
 - Relay for power failure
 - Relay for low level

- Float – Back-up floats active.
- 13) A minimum four (4) inch PVC schedule 40 wall conduit shall be provided from the wet well to the control center which will allow the pump power cables, and sensor cables A separate conduit for transducers and floats float switch cables to be pulled through without difficulty and allow the use of one (1) piece cables from the pumps and float switches to the control center. The conduit shall be sealed at the control center to avoid entrance of sewer gases into the control panel.
 - 14) The control center and associated components shall be mounted on a panel stand constructed of aluminum.
 - 15) All components of the control center shall be American made and available from local sources. In particular, items such as circuit breakers, overload protection, relays, etc. shall be available and in stock by local sources.
 - 16) In order to maintain unit responsibility and warranty on the pumping equipment and control center, the control center must be accepted in writing by the pump manufacturer, as suitable for operation with the pumping equipment.

H) Level Control:

- 1) Primary level control and alarm signal shall be a submersible pressure transducer with a 4-20mA output signal for the pump controller. In addition, there shall be both high and low level floats. The City of Jeffersonville provides an option, upon request by the Department, for the pump station specifications to provide ultrasonic level sensors, in lieu of pressure transducers.
- 2) Back-up level control shall be sealed float type “low mercury” or “no mercury” switches control sump level and alarm signal. The tube switches shall be sealed in a solid polyurethane float for corrosion and shock resistance. The support wire shall have a heavy Neoprene jacket and a weight shall be attached to the cord above the float to hold the float in place in the sump. The floats shall also be capable of supporting themselves from stainless steel hanger. Each float shall have is own hook
- 3) Manual Transfer Switch – The contractor shall supply and install a three way switch lockable in all positions for the City’s emergency generator. A fusible disconnect switch between the transfer switch and the generator plug shall be located in a NEMA X box. The Design Engineer shall coordinate with the Jeffersonville City Engineer to provide compatibility of switch and cable with the City’s generator. The City Engineer and/or Department will have the option to specify on-site emergency generator set for the project pump station.

3.4 Materials – Force Main

A) Force Main

- 1) PVC Pipe
 - a) PVC pipe must meet ANSI/AWWA C900 for 4-inch pipe or ASTM D 2241. The design and manufacture of pipe must meet minimum requirements of a working pressure of 150 pounds per square inch plus 100 pounds per square inch surge and a safety factor of 2 at the depth of cover indicated on the plans. Wall thickness of pipe and integral bell must have a minimum dimension ratio of 21 (SDR or DR).
 - b) PVC compounds shall equal or exceed ASTM D 1784 class 12454-B.

- c) Push-on joints with bell integrally cast into pipe shall be provided. The joint must comply with ASTM D 3139 and the physical requirements of Uni-Bell PVC Pipe Association' UNI-B-1 "Recommended Specifications for Thermoplastic Pipe Joints, Pressure and Non-Pressure Applications."
 - d) Elastomeric gaskets, as provided in ASTM F 477 shall be used. Gaskets must meet all applicable requirements of ANSI A-21.11.
 - e) PVC fittings for pipe smaller than 4 inches must be fabricated in such a manner as will provide strength and water tightness at least equal to the class and material of the adjacent main line pipe to which they are joined. Pipe 4 inches and larger must utilize ductile iron fittings.
- 2) HDPE Pipe
- a) Materials used for the manufacture of HDPE pipe and fittings must be extra high molecular weight, high density HDPE 3408 polyethylene resin. The pipe must be extruded from virgin resin meeting the specifications of ASTM D 3350 with a minimum cell classification of HDPE 345434C. Fittings must be manufactured from the same resin type and cell classification as the pipe itself.
 - b) The pipe and fittings must contain no recycled compound except that generated in the manufacturer's own plant from resin of the same raw material.
 - c) The material must be listed by PPI ("Plastics Pipe Institute", a division of the Society of the Plastics Industry) in its pipe grade registry technical report (TR).
 - d) A 73° Fahrenheit hydrostatic design basis of 1,600 pounds per square inch and a 140° Fahrenheit hydrostatic design basis of 800 pounds per square inch. e) The manufacturer must conform to ISO 9001.
 - e) Pipe supplied must have a nominal iron pipe size outside diameter.
 - f) Pipe and fittings having a diameter of 3 inches and larger must be made to the dimensions and tolerances specified in ASTM F 714 with a cell class of PE 345434C. Pipe and fittings with diameters less than 3 inches must be made to the dimensions and tolerances set forth in ASTM D 3035 with a cell class of PE 3408.
 - g) Fittings must be manufactured in accordance with ASTM D 3261. Fittings must be manufactured by injection molding, a combination of extrusion and machining, or fabricated from PE pipe conforming to this specification.
 - h) Fittings must be fully pressure rated and provide a working pressure equal to that of the adjacent pipe with an included 2-to-1 safety factor.
 - i) The pipe and fittings must be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.
 - j) The pipe and fittings for horizontal directional drilling must be a minimum DR of 9. Pipe and fittings used in open cut installations must be a minimum of DR 11. l)
 - k) Joints
 - i) The butt fusion process should be used to join sections of HDPE pipe into continuous lengths above ground at the job site. The joining method must be by the heat fusion method and must be performed in strict accordance with the pipe manufacturer's

recommendations. The heat fusion equipment used in the joining procedures must be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements, alignment and interracial fusion pressure.

- ii) Properly executed electrofusion fittings may be used.

Socket fusion, extrusion welding, hot gas welding or threading and gluing of HDPE pipe will not be accepted.

- iii) Mechanical joint adapters are required to mechanically connect HDPE pipe to main line valves 3 inches or larger. Two-inch valves and smaller must be connected by compression fittings.
- iv) Refer to the manufacturer's recommendations for proper installation procedures.
- v) Fused segments of pipe must be handled so as to avoid damage to the pipe.
- vi) Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

3) Ductile Iron (DI) Pipe

- a) Ductile iron pipe must meet ASTM A746 or ANSI/AWWA C151/A21.51 with exterior asphaltic coating (for buried service) and interior special asphaltic lining (for buried and exposed service) conforming to all appropriate requirements for seal coat described in ANSI/AWWA C104/A21.4. Thickness design of DI pipe must be in accordance with ANSI/AWWA C150/A21.50.
- b) Provide thickness class as indicated on Construction Plans, or, as a minimum:
 - i.) Four (4) inch diameter – Class 51, minimum.
 - ii.) Six (6) to twenty (20) inch diameter – Class 50 minimum
- c) All DI pipe, fittings and restrained joints must be wrapped with a minimum of eight (8) mil polyethylene conforming to ANSI/AWWA C105/A21.5 prior to being backfilled. Polyethylene adhesive tape is required for closure of all open edges against pipe or fitting.
- d) All exposed DI pipe, including pipe with pump station/force main manholes, must be painted with three (3) coats of Tnemec Company, Inc. two (2) part epoxy paint Hi- Build Epoxoilne Series 66 (66-INO1) as supplied by JD Petro o Franklin, IN .
 - i.) All surfaces must be cleaned as directed by paint manufacturer and Engineer but at a minimum the exposed wet well piping must receive SSPC. The Society for Protective Coatings (“SSPC”) SSPC-SP5/NACE 1 white metal blast cleaning and valve vault piping must receive SSPC-SP3 power tool cleaning.
 - ii.) Thinning of factory mixed paint will not be permitted.
- e) Joints on DI pipe must be the integral bell type push-on joint meeting ANSI/AWWA C111/A21.11 mechanical joint (“MJ”) meeting ANSI/AWWA C111/A21.15 or flanged joint meeting ANSI/AWWA C110/A21.10, C153/A21.53 or C115/A21.15. Buried accessories for mechanical and flanged joints must be alloy steel “I” head bolts (for MJ) or heavy hex head/hex head bolts (for flanged) and heavy hex nuts of coarse thread series class 2A external and class

2B internal per ASME/ANSI B1.1. Accessories for flanged joints in exposed services must be stainless steel meeting the thread requirements of coarse thread series class 2B.

- f) Provide flange joints for all exposed piping.
- g) Provide mechanical sleeve type coupling where specified or indicated.
- h) Provide anchored couplings where indicated or where restraint is required to withstand specified operating or hydrostatic test pressure.

B) Air Release and Cleanout Manholes and Equipment

- 1) Precast concrete manholes shall conform to ASTM C 478 with rubber type gaskets equal to ASTM C 443 and a minimum inside diameter of 48 inches. Monolithic cast-in-place manholes shall only be used with the prior written approval of the City. The base and first riser section of the precast concrete manhole shall be integrally cast as one unit. Precast concrete cones shall be of the eccentric cone type. No "see through" lift holes shall be allowed on precast concrete manholes 48 inches in diameter or less. In addition to the rubber type gaskets, all joints shall receive a 1/2 inch diameter non-asphaltic mastic (Kent-Seal or as approved by the City), conforming to ASHTO M198 and federal specifications SS-S-210A. Sewer connection to manhole shall be Kor-N-Seal, A-Lok, Dura-Seal or as approved by the City.
- 2) Where one solid riser or barrel section cannot be used, final adjustment in elevation of the frame and cover shall be accomplished by the use of a 4-inch minimum thickness adjusting ring to a maximum combined thickness of 12 inches. Brick or block shall not be used in the construction of a manhole or to adjust the elevation of the frame and cover. Non-hardening butyl rubber sealant shall be installed between cone, riser rings, and casting. Sealant shall meet or exceed ASTM 0990-94.
- 3) Manhole steps shall conform to ASTM C 478. Manholes shall be furnished with steps placed a maximum 16 inches apart with the first step placed no greater than 2 feet below the top of the frame.
- 4) Joint seal system for the setting of a manhole casting shall be Infi-Shield Uniband or equivalent. The manufactured joint seal shall be made of a high quality EPDM rubber with a minimum thickness of 60 millimeters that meets or exceeds ASTM C 923. The joint shall have 2-inch wide mastic strips on the top and bottom of the roll. The mastic shall be non-hardening butyl rubber sealant that meets or exceeds ASTM 0990-94. The seal shall be designed to prevent leakage of water into the manhole.
- 5) Manhole covers shall be Type "A" cast iron ring and cover and must conform to ASTM A48. All sanitary manholes that lay in or along a stream, swale, or open storm channel shall have locking or bolt down lids with an inside seal between the lid and casting. Manhole lids shall be stamped "CITY OF JEFFERSONVILLE SANITARY SEWER." Casting shall be East Jordan Ironworks 1045 casting and 1022 lid, Neenah R1642, or equivalent.
- 6) Minimum manhole diameter shall be 48-inches, for force main systems with force main sizes 4-inch diameter to 24-inch diameter.
- 7) All piping inside force main air release and cleanout structures shall be ductile iron pipe and extended ten feet outside of each structure, in accordance with the ductile iron pipe section of these specifications.
- 8) Air/vacuum release valves shall be A.R.I. Model D-025, or equal.

C) Bedding and Backfill

- 1) Contractor shall comply with Bedding and Backfill requirements as required by the City of Jeffersonville Construction Standard Details Sheets.

3.5 Execution

A) Pre-Construction Conference

- 1) Before the start of any construction on the project site, a conference must be scheduled and completed with the Department and the Department's Inspector.

B) Permits

- 1) The Contractor or Property Owner must obtain sewer permits at one time. The sewer permit must be obtained before connection can be made.

C) Utility Location

- 1) The Contractor is responsible for determining the location of existing utilities 24 hours prior to any construction or excavating.
- 2) Two-inch wide sewer detection tape shall be laid 12 inches above top of pipe including mainline and laterals prior to sewer backfilling.

D) Submersible Pump Station

- 1) The pump station shall be provided with an access drive to the nearest public right-of- way.
- 2) Access drive shall include paved area around the pump station adequate for utility trucks to turn around, remove pumps and service equipment.
- 3) The control panels and generator receptacle must be located within ten (10) feet of the pump station drive so that a portable generator can be readily connected to the generator receptacle.
- 4) The wet well, valve vault, and meter pit shall be enclosed at grade level with a reinforced concrete pad, rectangular in shape and extending a minimum of 1'-0" from the chambers' outside dimensions.
- 5) "Live" yard hydrant shall be installed inside fence area (if possible) and close to fence, to provide water service for pump station maintenance purposes, per City of Jeffersonville Standard Details. Contractor shall coordinate with the appropriate water company and obtain applicable local and state water permits before installing such facilities. Contractor shall provide backflow preventer, installation, testing, flushing, and disinfection of water main and hydrant system, in accordance with Water Company requirements.

E) Air Release and Cleanout Structures and Equipment

- 1) Force Main Air Release and Cleanout Structures shall be placed on a minimum 6 inches of No.8 crushed stone that has been mechanically compacted. Where unstable or poor soil conditions exist, additional No. 2 crushed stone or Class B concrete shall be placed to form a stable base. The remainder of the manhole shall be backfilled using No. 53 or No.8 stone. Stone shall be placed in 6-inch lifts and mechanically compacted to 95 percent maximum dry density as determined by ASTM D 698.

- 2) Joint seal system (Kent-Seal or as approved by the City) shall be installed using the Manufacturers written instructions. The top of the manhole casting and cone section shall be joint-sealed with inspection prior to backfilling.
 - 3) Connections to all manholes, new or existing, shall be core drilled and booted. These taps shall be cored into the manhole between the spring line of the sewer or no more than 24 inches above the flow line. Manhole connections shall not protrude past the interior of the wall of the manhole.
 - 4) All sanitary manholes shall be vacuum tested with castings per ASTM C 1244 93 following full installation. All sanitary manhole sections shall be vacuum tested in the shop prior to shipment.
- F) Backfill
- 1) Bedding and backfill dimensions shall have a minimum trench width as designated on the standard construction details.
- G) Safety and Spills
- 1) CONTRACTORS ARE SOLELY RESPONSIBLE FOR ALL SEWAGE SPILLS that occur as a result of their work. The Contractor must have an action plan to anticipate problems connecting to existing sewers and pumping sewage around a work site.
 - 2) CONTRACTORS ARE RESPONSIBLE FOR SAFETY AT THE JOB SITE. They shall make provisions for a safe working environment for their own crews, as well as City personnel and inspectors. The project site shall be in compliance with all OSHA safety regulations, including but not limited to construction trench safety and confined safety entry regulations.
 - 3) Should unknown active utilities be damaged during excavation work, work must be stopped immediately. Do not proceed with work until decision has been reached regarding repair, removal, or relocation of utilities. The Contractor must give notice to the appropriate utility.
- H) Testing
- 1) General Testing Requirements
 - a) All testing must be conducted at the Contractor's expense in the presence of the City.
 - b) Notification must be provided at least five (5) days prior to any testing.
 - c) All testing (except manhole vacuum testing) must be conducted after the final backfill has been in place and is undisturbed for at least thirty (30) days and after all other utilities have been installed. All concrete thrust blocks must have been in place for a period of at least ten (10) days prior to testing.
 - d) At the Department's discretion, testing may be delayed or additional testing may be required, based upon weather conditions (inadequate precipitation to allow for adequate settlement, etc.) Also, testing may be delayed or additional testing may be required due to the installation of site improvements (including but not limited to fencing, signage, landscaping, site lighting and other sub surface improvements).
 - e) If the Owner requires sanitary sewer service prior to final testing, a preliminary test may be performed, however, the Owner must provide, in writing, a guarantee that all cleaning and testing will be performed per the construction plans and the Department's then current standards, specifications and details.

2) Force Main Testing

- a) Hydrostatic pressure tests must be performed on all force mains.
- b) The hydrostatic pressure test must conform to ANSI/AWWA C600 and C605 procedures except as modified by these specifications.
- c) Conduct test at pressure of at least 100 pounds per square inch or 1.5 times the operating pressure, whichever is greater.
- d) Maintain pressure for a minimum of 2 consecutive hours.
- e) Test pressure must not vary by more than 5 +/- pounds per square inch.
- f) During filling of the pipe and before the application of the specified test pressure, all air must be expelled from the force main by means of the air/vacuum release valves and, if necessary by additional taps at points of highest elevation. After the test is finished, the taps must be tightly plugged, unless otherwise specified.
- g) Limit fill rate of force main to available venting capacity. Fill rate must be regulated to limit velocity in force main when flowing full to not more than 1 foot per second.
- h) Test separately in segments between isolation valves, between an isolation valve and a test plug, or between test plugs.
- i) Contractor shall furnish and install test plugs, including all anchors, braces and other temporary or permanent devices to withstand hydrostatic pressure on plugs.
- j) Contractor is responsible for any damages caused by failure of the sanitary sewer facilities during testing of the project.
- k) Contractor shall refit and replace all pipes not meeting the leakage or pressure requirements.
- l) Contractor shall repair all visible leaks regardless of the amount of leakage.
- m) Contractor shall repeat hydrostatic pressure test as necessary:
 - After location of leaks and repair or replacements of defective joints, pipe or fittings.
 - Until satisfactory test results are obtained.
 - Open all air/vacuum release valves and verify proper operation.
- n) The system will not be considered complete until all leaks have been repaired and all tests have been passed to the satisfaction of the Wastewater Department.

3) Manhole Testing

- a) All air/vacuum release, clean-out and flow monitoring/metering manholes must be vacuum tested after installation, repair or modification.
- b) Installation and operation of vacuum equipment and indicating devices must be in accordance with manufacturer's recommendations and performance specifications that have been provided by the manufacturer and accepted by the City.

- c) All manholes shall be negative air pressure (vacuum) testing methods in accordance with ASTM C1244-93. These tests shall be performed by the Contractor and observed and confirmed by a representative of the Department.
- d) Stub outs, manhole boots and pipe plugs must be secured to prevent movement while the vacuum is drawn.
- e) Procedures: With the vacuum tester set in place:
 - i.) Inflate the compression band to 40 psi to affect a seal between the vacuum base and the structure.
 - ii.) Connect the vacuum pump to the outlet port with the valve open.
 - iii.) Draw a vacuum 10" of Hg. and close the valve.
- f) Acceptance standards for leakage will be established from the elapsed time for a negative pressure change from ten (10) inches to nine (9) inches of mercury. The maximum allowable leakage rate for a four-foot diameter manhole must be in accordance with Table 7 below:

TABLE 7			
Manhole Depth	Minimum Elapsed time for a Pressure Change of 1 Inch HG		
	Four (4) foot manhole	Five (5) foot Manhole	Six (6) foot Manhole
10 feet or less	60 seconds	75 seconds	90 seconds
>10 feet <15 feet	75 seconds	90 seconds	105 Seconds
>15 feet <25 feet	90 seconds	105 seconds	120 seconds

For all manholes deeper than 25 feet, the Department will determine the applicable minimum elapsed time.

- g) Retest:
 - i.) If the manhole fails the test, necessary repairs must be made and the vacuum test and repairs must be repeated until the manhole passes the test.
 - ii.) If manhole joint seals are pulled out during the vacuum test, the manhole must be disassembled and the joints replaced.
- h) Visual:
 - i.) Manholes will be subject to visual inspection with all visual leaks being repaired.
- i) Testing Form:
 - i.) Contractor must submit the results of the vacuum test with the following information:
 - Project Name
 - Contractor
 - Date of Test
 - Manhole ID number
 - Manhole Diameter

- Manhole Depth
- Test Duration (Seconds)
- Pressure Drop (Inches of Mercury)
- Pass/ Fail
- Testing Operator's Signature
- Engineer's Representative Signature

4) Pump Testing

- a) In order for the pump station/force main project to be approved and accepted by the City of Jeffersonville, upon completion of the project, the Developer shall be responsible for scheduling a pump station start-up test and inspection meeting with the Department, or other Department representatives, in attendance, along with Contractor, Design Engineer, and Pump Manufacturer's representative.
- b) The Developer shall be responsible for assuring that the pump station is running property and in accordance with the project design. During the start-up test and inspection meeting, the following tests shall be run:
 - i.) The pump manufacturer's representative shall run a pump down test on all pumps and control panels and record the following test data (but not limited to the following test data), for submittal to the Jeffersonville City Engineer, for approval.
 - (a) Conduct pump down test on all pumps, to check that pumps are operating at the designed pump conditions [flow (gpm) at total dynamic head (TDH)]
 - (b) Check pressure gauge readings and hour meter readings during pump down test.
 - (c) Check breaker switches.
 - (d) Check hand-off-automatic switches
 - (e) Check amperage
 - (f) Check automatic operation on all pumps and check float- and pressure transducer/level sensor-sequencing with pumps.
 - (g) Check seal failure/heat sensor
 - (h) Check all control components, alarm lights, horn activation
 - (i) Check float settings and recheck float elevation
 - ii.) The valve supplier and the flow meter supplier shall run applicable tests on all valves/flow meter and record the following test data (but not limited to the following test data). Submittal to the Department for approval.
 - (a) Check if packing leaks
 - (b) Check valve opening and closing and flapper operating properly
 - (c) Check flow meter readings up against the pump down test results.
 - iii.) The Department's SCADA system designer shall run tests on the SCADA system and record the test data, for submittal to the Wastewater Department for approval.

4.0 Fats, Oil & Grease (FOG) Requirements

Introduction

Fats, oils, and greases (FOG) are a significant concern for the City of Jeffersonville collection system and the wastewater treatment plant. When not disposed of properly, FOG components congeal and accumulate along the walls of sanitary sewers. This constricts the pipes, impedes the flow of wastewater, and raises the potential for blockage. Grease also affects the proper operation of pump stations, leading to sewage accumulation in wet wells. Either of these situations can eventually result in a sanitary sewer overflow in which wastewater is discharged from a manhole, or wastewater enters homes and businesses. This is both an environmental issue and a public health concern, in which sewage can contaminate the ground, local bodies of water, and any property which the wastewater comes into contact. These overflows are strictly prohibited by the State and Federal regulations.

The financial consequences related to excessive FOG is potentially two-fold. Maintenance crews of the Department devote considerable time to cleaning sewerage components, and treatment processes may be hindered at the City of Jeffersonville's wastewater treatment plant.

FOG discharges relate directly to the preparation, cooking, and disposal of food items. These can originate from commercial, institutional, and industrial facilities. However, it is restaurants and related commercial food service users that are the most significant source of FOG due to the amount of oil and grease used in cooking, and with other food preparation.

The purpose of this standard is to set forth requirements for non-residential users of the City's sanitary/combined sewer system to capture and dispose of FOG, enabling the City to comply with all applicable federal and state laws, and to prohibit the discharge of any wastewater containing more than 100 part per million of FOG.

To reduce the operational and maintenance costs of the City by limiting the introduction of FOG in the sewer system, to reduce the impact of the City's wastewater treatment plant operations by limiting the amount of FOG delivered by the City's sewer system and to protect the general public health and prevent environmental disturbances by eliminating or reducing sanitary sewer overflows due to grease accumulations.

Applicability of this Provision

The provisions of this standard are applicable to all commercial users as well as all other businesses or dischargers whose discharges contain fats, oil and or greases in concentrations above one hundred milligrams per liter (100 mg/l), including all commercial food users, institutions with food service, and industries with food service that discharge to the City's wastewater collection system.

4.1 General Requirements

Discharges of wastewater containing more than 100 parts per million of FOG, measured as Hexane Extractable Material (HEM), are prohibited.

All commercial food service users, and institutions or industries with food service, shall install, operate, and maintain at their expense a grease control device.

The maintenance costs related to excessive grease in the City's sewer system, and traceable to the food service operations of a facility, shall be the responsibility of the user.

The maintenance costs of sewer overflow that is related to excessive grease in the City's sewer system, and traceable to the food service operations of a facility, shall be the responsibility of the facility causing the problem.

Any fines imposed upon the City by the State of Indiana or the United States of America in regard to a sewer overflow which is related to excessive grease in the City's sewer system, and traceable to the food service operations of a facility, shall be the responsibility of the user.

New Sewer System Users

All new commercial food service users, and institutions or industries with food service, shall be required to install the appropriate grease control device, approved by the Department, prior to initiating operations. Following a review of preliminary construction plans, the Department shall notify the owner in writing of the specific grease control device for installation. In general this will be a grease interceptor for all sizable restaurants, and for hospitals, schools, motels, and industries.

The Department strongly recommends that each new building, located in a commercial complex generally referred to as a strip mall, provide a stub-out for a separate waste line for possible future grease interceptor installation. This shall apply to all buildings in the complex not initially planned as restaurants. The designer of such new structures shall consider suitable physical space and sewer gradient on the property that will be conducive for the installation of a grease interceptor(s).

Existing User; New User in Existing Building

All existing commercial food service users, and institutions or industries with food service, shall have grease control devices that meet the same general requirements for installation and design for new users. This shall also pertain to a new user that begins operations in an existing building, and an existing user that expands its food service operations.

Any commercial food service user, or institution or industry with food service, whose grease handling facilities or methods are determined by the Department to be inadequate to prevent excessive FOG from entering the City's sewer system, shall be notified of the deficiencies, the required improvements, and a compliance deadline. Required improvements may include modifications of the maintenance schedule, the installation of a larger, or additional, grease trap, or the installation of a grease interceptor. The user may be required to provide a schedule of corrective action to meet full compliance.

A facility without a grease control device shall be allowed a compliance deadline not to exceed two (2) months for the installation of a grease trap, or not to exceed six (6) months for the installation of a grease interceptor, following written notification from the Department. If a facility, which is required to install a grease interceptor, does not have an existing grease trap, than the latter shall be installed within two (2) months of notification by the Department, unless the grease interceptor is installed within that time period.

The Utility Director or his/her designee may decide certain instances that the installation of a grease interceptor on an existing facility property is physically impossible due to space limitations, is not possible due to inadequate slope for proper gravity flow, or for other reasons. The facility manager shall be responsible for an aggressive kitchen Best Management Practices program to produce wastewater that meets the FOG requirements.

Grandfathering of Existing Users

Existing facilities in which a grease trap or interceptor has been installed prior to the effective date of these Standards shall be allowed to continue the operation of the existing unit only if the device meets the FOG discharge limits.

An existing user which operates a grease trap may be required to add a sample valve to the discharge line from the device and prior to a union with any sewer line in the building. This requirement shall typically be limited to facilities in which there is a history of poor grease trap maintenance.

An existing user which expands its food service operations may be required to install a larger grease trap, an additional grease traps, or a grease interceptor to replace, or operate in conjunction with, an existing grease trap.

4.2 Design, Sizing and Installation Requirements

All grease traps and interceptors shall be designed, sized and installed according to the standards of the Uniform Plumbing code, and the Department's *Sanitary Sewer Standards* and be of a type, capacity, and location approved by the Utility Director or his/her designee.

Various formulas exist to calculate the proper size of a grease interceptor. The Department shall not require the use of any one formula, but rather sound engineering judgment in this instance. The Utility Director or his/her designee shall make all final decisions on the requirement for a specific grease control device, its design, and its size.

General Specifications

1. Grease Traps

- a. A grease trap shall be constructed of corrosion-resistant metal or plastic;
- b. be accessible for cleaning, maintenance, and inspection; contain properly installed and functioning baffles necessary to achieve the appropriate retention time to allow for proper separation of FOG and solids from the remaining water; handle the flow from no more than three (3) kitchen sinks, and shall be located inside the facility as close to the sink(s) as possible;
- c. never receive wastewater from sanitary sewer; not receive discharge that exceeds 120 degrees Fahrenheit;
- d. not receive discharge from a dishwasher or food grinding unit;
- e. be installed with an approved flow control or restricting device to restrict the flow to the rated capacity of the trap, and for cleaning purposes; and
- f. be installed with a sample valve on the discharge line from the device and prior to the union with any sewer line in the building.

2. Grease Interceptors

- a. A grease interceptor shall be constructed of precast concrete with a minimum compressive strength of 3,000 psi;
- b. be sized from a minimum of 1,000 gallons to a maximum of 3,000 gallons;
- c. contain multiple chambers and properly positioned tee piping to achieve a thirty (30) minute retention time before wastewater is discharged to the City's sewer system;
- d. be installed on the facility, with access for inspection, cleaning, pumping, and maintenance;
- e. not be installed in areas subject to heavy traffic, where possible,
- f. shall be accessible for all inspections at all times, having no permanent or temporary structure or container placed directly over the unit; have a minimum 24" diameter manhole, extended to finish grade, over each chamber, interior baffle wall, and sanitary tee;
- g. Have solid manhole covers that are traffic rated and that prevent infiltration of storm water or other surface water. Any gaskets shall be positioned beneath the cover; be designed with a minimum 8" diameter sample box or sample tee at the outlet; receive the discharge from all facility drains and fixtures through which grease may be released including all sinks, floor drains, food grinding units, and dishwashers;
- h. never receive wastewater from sanitary sewer lines; be installed at a minimum distance of ten (10), and a maximum distance of fifty (50) feet from dishwashers and sinks to allow for optimal cooling of the wastewater; not receive discharge that exceeds 120 degrees Fahrenheit;
- i. include properly sized solids interceptor, and have its volume increased by 25 %, when receiving discharge from a food grinding unit; and
- j. be installed with an approved flow control or restricting device to stop the flow for cleaning purposes.

4.3 General Maintenance

1. Proper maintenance of grease traps and interceptors is crucial to establish optimal efficiency of the devices. They shall be cleaned as often as necessary to ensure that:
 - a. Floating material and sediment do not accumulate to impair the operation of the device.
 - b. The discharge of the FOG to the City's sewer system meets the stated limitations.
 - c. No visible grease is observed in the discharge.
 2. Upon request, the Department shall provide information that describes proper cleaning and maintenance of the devices. However, due to the varying designs and sizes, the user shall follow specific manufacturer guidelines for cleaning and maintenance, at a minimum, in all instances.
1. General guidelines for cleaning and maintenance include:
 - a. Grease traps and interceptors shall be kept free at all times of such solid materials as gravel, sand, bones, shells, cigarettes, utensils, towels and rags that will reduce the effective volume of the device and increase the frequency of cleaning.
 - b. The total depth of the surface FOG, combined with the settled solids, should not exceed approximately 25 % of the total depth of the liquid/solid column.
 - c. Based upon the above, a grease trap will typically require cleaning every 1-4 weeks, a grease interceptor will generally require cleaning every 2-4 months. However, the actual loading on a device will determine the specific cleaning schedule.

Kitchen Best Management Practices: The application of kitchen Best Management Practices (BMPs) serves as a critical initial step in reducing the amount of oil and grease that enters a facility's grease control device, and therefore in prolonging the periods between cleaning and maintenance. All facilities with food service operations shall establish kitchen BMPs, and provide continuous training and monitoring of employees.

Waste Grease Disposal

All facilities are encouraged to use designated buckets for the disposal of waste grease removed from grease traps during cleaning. Such material shall not be combined with cooking oil that is to be recycled. Buckets should have a well-sealing lid and shall be disposed at a disposal site permitted to receive such waste.

Grease Interceptor Cleaning and Maintenance

Specific Requirements for the servicing of grease interceptors shall be include the following:

1. Cleaning and related maintenance shall be performed at least every four (4) months, unless written permission for a schedule of less frequent service has been obtained by the City.
2. Cleaning and maintenance shall include the evacuation of all contents of the interceptor, including floating materials, wastewater, and settled solids.
3. All waste removed from an interceptor shall be disposed at a disposal site permitted to receive such wastes.
4. Clean water shall be returned to the interceptor following evacuation and cleaning.
5. Other than the clean water immediately returned to the interceptor to complete maintenance, none of the waste material removed from an interceptor shall be discharged to the City's sewer system.

Prohibitions

The following practices and devices are prohibited

1. Any modification of a grease interceptor, such as alteration or removal of flow constricting device, that causes flow to rise above the design capacity of the unit or reduce the retention time.
2. Interceptor cleaning that involves only skimming the surface layer, partial cleaning, or use any method that does not remove the entire contents of the vessel.

3. The introduction of such agents as concentrated detergents, other surfactants, emulsifiers, degreasers, solvents, or any other type of product that will liquefy grease wastes.
4. The addition of any chemical enzyme product unless written permission has been granted by the City.
5. The addition of bacteria unless written permission has been granted by the City.
6. The use of automatic, or mechanically operated, grease removal systems, unless written permission has been granted by the City.

Recordkeeping

Facilities with a grease control device shall maintain records of all cleaning and maintenance of the device. These records shall include, at a minimum:

1. The date and time of service.
2. The name and signature of user representative who performed or witnessed the service (if applicable).
3. The contract company that performed the service (if applicable).
4. The name and signature of the contract company employee (if applicable).
5. The gallons of waste removed.
6. A copy of the service record or manifest from the contract company (if applicable).

All facilities shall keep records of their waste grease disposal or recycling, including the number and size of containers, the dates on which they were disposed of or recycled, and the name and contact information of the disposal or recycling service location.

Records shall be placed in a logbook, folder, or binder, shall be maintained for at least three (3) years, and shall be immediately made available to the Department on demand during an inspection, or at intervals specified.

Right of Entry and Inspections

Authorized representatives of the City shall have the right to enter the premises of any facility operating a grease control device to determine whether the user is in compliance with all requirements of this standard. Entry shall be during normal business hours and for the purpose of inspection and evaluation of the facility's grease control program. If entry is refused, the Department shall have recourse to the remedies provided by law for entry.

Inspection may involve any or all of the following items:

1. the integrity of the grease control device,
2. the amount of grease present in the device,
3. wastewater appearance and clarity,
4. cleaning and maintenance records,
5. waste grease disposal and recycling storage and records,
6. all food processing areas and fixtures, and,
7. sampling of discharge water from device.

It shall be the responsibility of the user to keep its grease control device accessible at all times. The Department shall have the option of requesting that a grease trap be opened by a representative of the user.

The result of the inspection shall be made available to the user's representative verbally. A written report shall be mailed within ten (10) days of the inspection if the facility is found to be out of compliance with any of the requirements outlined in these standards, and shall include the necessary corrective action and a timetable for accomplishing such improvements.

4.4 Sampling & Testing

Sampling and Testing

The Department may collect and analyze annual samples for laboratory testing to determine if a user is in compliance with this standard. The expense of any additional sample collection, shipment, and analyses shall be borne by the user.

Frequency of Sampling

Sampling shall be at least annually from any facility maintaining a grease trap/interceptor. The laboratory analysis shall consist of FOG, BOD and suspended solids testing. Additional sample collection and testing shall be done at the discretion of the Department, and relate to a history of the user's discharge, or to existing conditions.

Sampling Methods and Cost

Sampling shall involve grab samples which are collected, stored transported, and analyzed in accordance with the procedures specified in 40 CFR Part 136. All annual testing required by the Department shall be conducted by the Department's wastewater laboratory at the Department's expense. Any additional sampling and testing required by the Department to demonstrate compliance for facilities that have experienced noncomplying discharges, shall be conducted by a private commercial laboratory which is in good standing with the Indiana Department of Environmental Management and shall be at the user's expense.

Sample Collection

Sample collection from a grease interceptor shall be from the sample box at the outlet of the device, if present, or from the nearest manhole. Sample collection from a grease trap shall be from the sample valve at the outlet of the device, if present, or from the nearest manhole.

Analysis Reports

A copy of the analysis report of any laboratory testing on samples collected from a facility by anyone other than the Department shall be provided to the Department. The Department shall mail a copy to the user within ten (10) business days of receipt by the Department. The report shall include, at a minimum, an explanatory cover letter, the chain of custody form, the laboratory at which testing took place, the results of the testing, the test methods used, and the dates of analyses.



WASTEWATER DEPARTMENT CAPACITY FEES

Residential

Homes (single family)

Capacity Fee: \$3,300*

* *Please contact the Wastewater Department Office at 812-285-6451 fees for new projects not on the following list or for industrial dischargers.*

ADOPTED: SEPTEMBER 4, 2014

Commercial, Non-industrial Capacity Fees

The following information is for reference only. Actual calculations for commercial sewer tap construction permits will be determined after a footprint detailing the usage of the commercial space is provided to the Wastewater Department Office located at 423 Lewman Way at River Ridge.

The charge for non-residential, non-industrial connections shall be computed by establishing the total gallonage flow rate per day for the connection by dividing the total by 310 G.P.D and multiplying the quotient by the amount of the residential sewer connection. Gpd/sf shall mean gallons per day per square foot as noted below.

<i>TYPE OF FACILITY</i>	<i>FLOW</i>
Airports	
• Per employee	20 gpd
Institutions-Nursing Homes, Hospitals, etc. (per bed)	200 gpd
Schools (without gym and showers) per student	15 gpd
Schools (with gym and shower) per student	25 gpd
Camps	
• Per Toilet	400 gpd
• Showers	300 gpd
• Washing Facilities	5 gpd
Mobile Home Parks (per space)	200 gpd
Motels and Hotels (per room)	100 gpd
Restaurants, Cafeterias, etc. (per square foot)	0.35 gpd
Bars, Cocktail Lounges	0.35 gpd
Manufacturing	
0 - 4,999 square feet	0.20 gpd/sf
Add to Base 5,000 square feet	
• 5,000 - 24,999 square feet	0.50 gpd/sf
• 25,000 - 99,999 square feet	0.015 gpd/sf
• 100,000 - 499,999 square feet	0.0125 gpd/sf
• 500,000 - 999,999 square feet	0.0100 gpd/sf
Doctor's Office	
• Doctors/Nurses	75 gpd
• Support Staff	20 gpd

Warehousing	
0 - 4,999 square feet	0.100 gpd/sf
Add to Base 5,000 square feet	
• 5,000 - 9,999 square feet	0.050 gpd/sf
• 10,000-24,999 square feet	0.015 gpd/sf
• 25,000-99,999 square feet	0.0125 gpd/sf
• 100,000 -499,999 square feet	0.010 gpd/sf
• 500,000 – 999,999 square feet	0.0005 gpd/sf
Offices	
0 - 4,999 square feet	0.30 gpd/sf
Add to Base 5,000 square feet	
• 5,000 – 9,999 square feet	0.25 gpd/sf
• 10,000 and over	0.20 gpd/sf
Banks and Financial Institutions	0.30 gpd/sf
Theaters, Drive-ins (per parking ramp)	7 gpd
Theaters, indoor (per seat)	4 gpd
Service Stations (without car wash)	0.25 gpd/sf
Service Station (with car wash)	
(all improvements except washing bay) .25 GSFPD plus	650 gpd/bay
Service Stations, Garages, Mechanics, Repair Establishments	0.25 gpd/sf
Duplexes, Condos, Townhouses and Apartments with washer hookups	
• 1 bedroom	200 gpd
• 2 bedroom	260 gpd
• 3 bedroom	310 gpd
Duplexes, Condos, Townhouses and Apartments without washer hookups	
• 1 bedroom	120 gpd
• 2 bedroom	150 gpd
• 3 bedroom	300 gpd
Churches (with kitchen) (per sanctuary seat or equivalency in case of benches)	5 gpd
Laundry (per washing machine)	110 gpd
Grocery Stores with grinder facilities	0.35 gpd/sf
Grocery Stores	0.20 gpd/sf
Retail Establishments	0.20 gpd/sf
Kennels and Vet Clinics	
• Cages per cage	5 gpd
• Inside runs per run	10 gpd
• Outside runs per run	20 gpd
• Surgery plus per room	50 gpd
• Staff	
• Doctor	75 gpd
• Staff	20 gpd
Picnic Areas or Parks	
• per toilet	400 gpd
• showers	300 gpd
• washing facilities	5 gpd
Club Houses, Community Houses, etc.	0.35 gpd/sf
Not-for-profit, subject to attorney's opinion	0.20 gpd/sf
Health clubs, and beauty and barber shops, etc.	0.30 gpd/sf
Self-service car wash	650 gpd/bay
Day care center	0.25 gpd/sf
Dental Offices	
• Chair(s)	200 gpd
• Employees	75 gpd



Mandrel Test Report

Date of Test: _____

Weather: _____

Project/Subdivision Name:	Contractor:
Testing Conducted by: <i>(Company Name & Signature)</i>	Department Inspector: <i>(Name & Signature)</i>

Testing procedure shall be as specified in City of Jeffersonville Construction Standards (latest revision)

Structure (SanNode) No.	Pipe Material	Pipe Diameter (inches)	Sewer Length, (feet)	Date Sewer Line Backfilled	Type of Mandrel (9-arm or 10-arm)	Pass (P) or Fail (F)	Remarks

Proving Ring Check (Serial Number of Proving Ring: _____)

Comments: _____



Sewer Manhole Test Report

Date: _____

Sheet: 1 of 2

Project/Subdivision Name:	Contractor:
Testing Conducted by: <i>(Company Name & Signature)</i>	Department Inspector: <i>(Name & Signature)</i>

Testing procedure shall be as specified in ASTM C 1244 (latest revision) – Standard Test Method For Concrete Sewer Manholes by Negative Air Pressure (Vacuum) Test, further as modified by the allowable vacuum loss shall not exceed 1" Hg (mercury) within the minimum times as contained in the following Table.

Manhole Depth (ft)	Manhole Diameter		
	48-in	60-in	72-in
<i>Minimum Test Time, seconds</i>			
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

Manhole			Time			Vacuum,(Inch Hg)			Pass/ Fail
No.	Diameter, in	Depth, ft	Time Req'd	Start	End	Start	End	Loss	

POLICY AND REQUIREMENTS FOR DIRECTIONAL DRILLING (BORING) BY CONTRACTORS AROUND EXISTING SEWERS AND FORCE MAINS

The following are the requirements for Directional Drilling by companies installing pipes or cables for the installation of new facilities within the City of Jeffersonville sewer service area.

1. If a new Utility line will be crossing the City of Jeffersonville’s gravity sewers or force main by directional drilling (boring), the company boring must verify the location of the sewer line by potholing (vacuum excavating) prior to the installation of the utility line. The pothole must expose the gravity sewer or force main’s depth. If no sewer line is exposed, the pothole shall be a minimum of (2) feet below the desired depth of the proposed utility line. The gravity lines are within (6) feet either side of the marked location and (10) feet either side for force mains.
2. The location of the proposed boring shall be marked consistent with the Indiana 811 requirements. It is also recommended that prior to boring, the utility company obtain a sewer map from the GIS Administrator in the Wastewater Department for the approximate location of the gravity sewer or force mains.

