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2020 Combined Sewer Overflow Operation Plan (CSOOP) Update

Submitted

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City of Evansville
Combined Sewer Overflow Operational Plan (CSOOP)
2020 Update
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1.0 Introduction

This CSO Operation Plan (CSOOP) documents the on-going implementation of the Nine Minimum Technology Controls (NMCs) by the City of Evansville Water and Sewer Utility ("EWSU" or "the Utility") in compliance with Attachment A, Part III of NPDES Permit No. IN0033073 and NPDES Permit No. IN0032956 (referred to as "the Permits"). As required by the Permits, EWSU has updated the 2019 CSOOP Update to reflect changes and current operational practices.

EWSU's CSOOP History

EWSU first submitted a CSO Operational Plan (CSOOP) to the Indiana Department of Environmental Management (IDEM) dated October 1992, which was prepared by SEC Donohue. This plan will be referred to as the 1993 CSOOP. IDEM commented on the CSOOP submission in a May 15, 2000 letter. In response, Environmental Management Corporation (EMC) (the City's Contract Operator at the time) submitted responses in a September 12, 2000 letter to IDEM. IDEM replied granting conditional approval of the CSOOP in an October 4, 2000 letter. Responses to the Conditional Approval letter were submitted on November 3, 2000 by EMC.

A CSO Operational Plan Revision was submitted in February 2006. NPDES Permits issued on September 18, 2006, stated that the CSOOP was approved as of the effective date of the Permits, November 1, 2006. Pursuant to Section III.B of Attachment A of the NPDES Permits, EWSU submitted updates to the approved CSOOP in October 2007, November 2008 and November 2009.

The Utility assumed full and direct control of the management, operation, and maintenance of Evansville's sewer assets in March 2010. Prior to March 2010, the Evansville CSO system was operated under a contract with EMC. On August 12, 2009, the Utility issued a Request for Proposal (RFP) for the management of the contract operations of its sewer collection system, WWTPs, Pretreatment laboratory, CSS, and lift stations. Proposals were due by

October 6, 2009, and were scheduled to be evaluated until December 4, 2009. As a result of this RFP submittal evaluation, the City of Evansville decided to end private management and bring the operational responsibilities back under the direct control of the Utility.

2020 CSOOP Update

This document is EWSU's 2020 update to the CSOOP and includes the specific changes and improvements to the Evansville NMC program.

The City of Evansville Water and Sewer Utility (Utility) entered into a Consent Decree (The Decree) with the United States and State of Indiana in June 2011 on a plan to develop remedial actions related to sewer system overflows, and measures to properly operate and maintain the sewer systems and wastewater treatment plants (WWTPs). The agreement with state and federal regulators required the Utility to develop an Integrated Overflow Control Plan (IOCP), which is an overall capital improvement plan (CIP) that integrates the Utility's combined sewer overflow (CSO) long-term control plan (LTCP) with a Sanitary Sewer Remedial Measures Plan (SSRMP). The SSRMP contains a prioritized set of projects focused on identifying and addressing any recurring capacity-related sewer overflows and system defects and deficiencies that could potentially cause or contribute to overflows, and the LTCP was developed to meet the requirements of the CSO Policy and reduce the frequency and duration of overflows from the combined sewer system. The Utility fully developed the LTCP and SSRMP and submitted to state and federal regulatory agencies a final, approvable IOCP on May 31, 2013. On June 16, 2014, EPA and IDEM disapproved the IOCP. On June 31, 2015, Evansville submitted a revised IOCP that included additional technical information and details in support of Evansville's approach to address CSOs and SSOs. Revised versions of the IOCP were submitted on January 15, 2016, June 30, 2016, and July 6, 2017. The final IOCP was approved by the USEPA and IDEM on August 31, 2017.

Historically, the control of CSOs has proven to be extremely complex. This complexity stems from the site specific, minute to minute management of the combined flow to both maximize flow through the system so as to minimize untreated discharges while at the same time protecting the biological and other critical processes at the POTW. Since the adoption of the Combined Sewer Overflow Control Policy in 1994, combined sewer system operators around the country have advanced CSO control practices to reduce the volume, frequency, and the duration of CSOs. Changes to the CSOOP reflect the Utility's commitment to that goal.

According to EPA's Guidance for Nine Minimum Controls, the NMCs are controls that can reduce CSOs and their effects on receiving water quality, do not require significant engineering studies or major construction, and can be implemented in a relatively short period (e.g., less than approximately two years). Implementation of the NMCs is among the first steps a municipality is expected to take in response to EPA's CSO Control Policy. NMCs are general in nature and each community must utilize best professional judgment in defining the specific actions to be undertaken by them.

In accordance with the requirement in the NPDES Permits, the Utility will review the CSOOP annually to determine if modifications to the CSOOP are necessary.

2.0 Nine Minimum Controls

A combined sewer system (CSS) is designed to overflow, and total elimination of combined sewer overflows (CSOs) is not possible without complete sewer separation. The CSO Policy is clear that the goal of the CSO control program is to reduce the frequency, duration and magnitude (volume) of CSOs and to ensure that when an overflow occurs it is a result of wet weather. Implementation of the NMCs is the first step in achieving that goal and involves both the treatment plants and the collection system, which must be operated in unison to treat as much sewage as possible, thereby reducing CSOs and their effects on receiving water quality.

Operational Objectives in Implementing NMCs

EWSU has adopted prioritized operational objectives for both the treatment plants and collection system to (1) maximize the effectiveness of its implementation of the NMCs, (2) ensure compliance with the Permit requirements and (3) provide clear direction to the Utility operators and staff. The operational objectives in order of priority for the treatment plants and the collection system are shown in **Exhibit 2.1**.

Exhibit 2.1
Operational Objectives

OBJECTIVE	TREATMENT PLANTS	COLLECTION SYSTEM
1.	Protect and maintain the biological system and other equipment so as to ensure meeting effluent limits.	Capture and convey all dry weather flow (NMC #1 and #5)
2	Treat as much combined sewage as possible through the secondary treatment processes (NMC #4)	Prevent combined sewer system releases to streets or basements (NMC #1, #2, #4, #5)
3		Capture and convey the maximum amount of wet weather flow (NMCs #2, #4)

Treatment Plants

Whether a wastewater utility has a combined system or not, protecting and maintaining the biological system is paramount to the ability to properly treat sewage to comply with effluent limits and protect water quality. The Utility operators must pay special attention during rain events, to ensure that the biological system is not overwhelmed, thereby compromising the ability to adequately treat flow and meet effluent limits. Maximizing the amount of combined sewage processed through the biological secondary process provides a higher level of pollutant removal. However, this operational objective is subject to the operational objective of protecting and maintaining the biological process.

Collection System

Dry weather overflows are prohibited by the CSO Policy and the Permits; consequently, this is the first priority objective for the operators of the collection system, including lift stations. In dry or wet weather, the objective is to keep sewage (combined or otherwise) in the pipes and to convey as much as possible to the treatment plant.

Finally, as the CSO Policy states, all control activities, including the NMCs, are intended to reduce the frequency, volume and duration of CSOs, so capturing and conveying as much combined sewage to the POTW as possible is the next level operational priority for the collection system.

These operational objectives and priorities are reflected throughout the following documentation of the Utility's implementation of the NMCs.

2.1 NMC 1: Proper operation and regular maintenance programs for the sewer system and CSOs.

Proper operation and regular maintenance of the sewer system (sometimes referred to as "O&M") is necessary to minimize the frequency, duration and magnitude of CSOs and to maximize the amount of combined sewage that receives treatment. Providing a proper operation and a regular maintenance program is an ongoing process that requires planning, organization and commitment. Periodic review, evaluation and revision of the O&M program, if warranted, also are necessary.

O&M is very broad in scope because it involves the entire sewer system and includes a wide range of tasks. Several key components are necessary to assure a proper O&M program, including an appropriate organizational structure, adequate resources and funding; adequate facilities and equipment, established routine procedures and schedules, a training program, periodic inspections and established emergency procedures.

The following provides background information about Evansville's sewer system and describes various aspects of EWSU's organization and operation that relate to the Utility's O&M Program.

Background

Evansville is located in southwestern Indiana in Vanderburgh County and borders the Ohio River. The City of Evansville was estimated to have a 2019 population of 117,979 (Stats Indiana), while Vanderburgh County's 2019 population was estimated at approximately 181,451 (Stats Indiana).

The City is served by two Wastewater Treatment Plants (WWTPs); the Eastside and Westside WWTPs. An estimated 4,072,637 linear feet of sanitary and combined sewers are owned and operated by Evansville Water and Sewer Utility (EWSU). Based on the information gathered

to date as a result of the GIS conversion process, 35%, or 1,420,813 linear feet, of the sewers are combined.

The sanitary and combined sewer systems are divided into 30 separate sub-basins served by one main interceptor sewer or main lift station. The sub-basins are numbered with either an "E" or "W" identifier, or the Town of Darmstadt, signifying whether the flow is a tributary to either the East or West WWTPs.

Storm water is collected in the combined sewer service area by catch basins and inlets and is then directed to storm sewers or the combined sewer system. Some storm sewers exist within the combined sewer area primarily along major highways and direct water to either a surface water drainage way or a portion of the combined sewer system located near the collection point. In the separate sewer areas, catch basins and inlets direct water to storm sewers which then discharge to surface water drainage ways.

Utility Organization

The Utility's applicable Organizational Charts are included in **Appendix A**.

EWSU has 104 staff dedicated to the wastewater function of the Utility. This includes O&M crews for each treatment plant, for the collection system and for the lift stations. For the collection system, the maintenance crew inspects and cleans the sewers and the construction crew repairs and replaces sewers. In addition, the Regulatory Compliance Department has staff dedicated to pretreatment, FOG, CSO, and Green Infrastructure operations and the Engineering Department has staff dedicated to Capital Planning, Utility Project Development, and Engineering Support and Services.

Mapping

Maps included in this 2020 CSOOP Update contain locations and information regarding the sewer sizes, combined sewer areas, subsystems, locations of CSO outfalls, receiving waters, diversion structures, lift stations, WWTPs, trunk sewers, and combined sewer system limits. **Figure 1** is a Collection System Map containing the locations of the CSO outfalls, force mains, trunk sewers lift stations, WWTP locations and **Figure 2** depicts the East and West WWTP service areas for both the Combined Sewer System (CSS) and Sanitary Sewer System (SSS).

Early Action Projects

The Utility has completed or initiated many large capital projects and significant activities in recent years. These projects and activities include:

- Several Southeast Side sewer separation and neighborhood flooding abatement projects, which were identified as being the highest priority projects in the Stormwater Master Plan. A total of $65M has been invested to reduce decades of chronic, problematic surface flooding and decrease CSO discharge volume through these projects. These projects include:
  - Lorraine Park Underground Detention Basin and Stormwater Pump Station (completed in 2007 at a cost of $3M)
  - Raccoon Ditch Improvements (completed in 2007 at a cost of $1.8M)
  - Vann Avenue Trunk Sewer (completed in 2008 at a cost of $6M)
  - Dexter Villa/Southeast Alvord Sewer Separation (completed in 2010 at a cost of $10M)
  - Southeast Brookside and Covert Avenue Outfall (completed in 2012 at a cost of $23.8M)
  - Phases 1 and 2 of the Cass Avenue Stormwater Improvements (completed in 2012 at a cost of $4.6M)

- Phases 3 through 5 of the Cass Avenue Stormwater Improvements (Phase 3 completed in 2012, Phases 4 and 5 completed in 2016 - engineer's estimate for all three phases is $10M)
- The Eastview Terrace Sewer Separation Project (completed in 2012 at a cost of $5.0M)
- Jeanette / Cass Sewer Separation Project (completed in 2012 at a cost of $2.4 M)

- Designed and constructed the $24M biological aerated filter (BAF) at the West Wastewater Treatment Plant (WWTP) to increase peak wet-weather treatment capacity to a total of 40 million gallons per day (mgd). This project was completed in late 2009 and has provided the ability to increase wet-weather treatment at the West WWTP.
- Eliminated the constructed SSO at Broadway and Johnson at a cost of $7.5M. This was the largest and most problematic SSO location in the Evansville system.
- Procured 14 area-velocity flow monitors in April 2010 and deployed them throughout the sanitary sewer system (SSS) to record flow data for further analysis and input to the CSS hydraulic models.
- Leased 13 area-velocity flow monitors in April 2010 and deployed them throughout the CSS to measure in-system flows for update and validation of the CSS hydraulic models.
- Leased and collected data from 19 rain gauges as part of the 2010 flow monitoring effort (purchased 3 of the 19 for future use).
- Purchased 16 area-velocity flow monitors in January 2011 and deployed them throughout sewer system in a second phase of flow monitoring. Collected data from a total of 25 rain gauges as part of the Phase 2 flow monitoring.
- Initiated real time monitoring along Pigeon Creek Interceptor to understand system response during different wet weather conditions and to determine how to maximize conveyance through the Pigeon Creek Interceptor by using existing infrastructure while reducing CSOs.

- Three of the Phase 2 flow monitors and a total of 12 leased level sensors were placed along Pigeon Creek Interceptor for the real-time flow monitoring of the Pigeon Creek Interceptor.
- Installed overflow alarms at all lift stations.
- Implemented real time monitoring of CSOs. Real time data is transmitted through the canopy system so that it is accessible by field staff. Cellular units have been installed at locations were telemetry is restricted.
- A fourth influent pump and second bar screen were installed at the East WWTP and were operational in February 2012.
- The West WWTP Baffle installation project was completed April 18, 2011 and the secondary clarifiers were placed back into service April 19, 2011.
- Preformed Sanitaire fine air diffuser cleaning for the secondary aeration system at the East and West WWTPs.
- Developed and implemented a green infrastructure participation program to encourage the implementation of green infrastructure concepts in redevelopment projects; funded at $5M for 2014-2015 and an additional $7M for 2016-2017.
- Designed and initiated construction of the relief sewer from the Adams (CSO 004) to Cass (CSO 002) at a cost of $13.8M in 2016. The Utility Achieved Full Operation of the Bee Slough Drainage pipeline portion of the project on December 20, 2017.
- Designed and constructed inflow and infiltration improvements in the North Park sewer basin (completed in 2016 at a cost of $2.6M).
- Initiated the design of inflow and infiltration improvements Phase II in the North Park sewer basin at a cost of $230,000 in 2017.
- Developed documents and completed the cleaning of the Pigeon Creek Interceptor at a cost of $1.8M.
- Initiated Advanced Facility Planning of the Bee Slough projects at a cost of $2.4M. The second phase of the AFP for Bee Slough was contracted at an additional $1.75M in 2016.

- Eliminated CSO 009 and CSO 123 per Consent Decree Appendix G (October 2016).
- Designed and initiated construction for the expansion of the West wastewater treatment plant at a cost of $949,000 in 2017, amended to $5.6M later that year. The amended scope and fee also covered the design of the Howell Park Equalization Basin immediately upstream of the West WWTP. The Equalization basin is under construction.
- Designed and initiated construction of the East WWTP Effluent Pump Station at a cost of $2.5M in 2017, amended to $3.8M later that year. CSO 103 was eliminated in conjunction with the project (August 2019).
- Designed and initiated construction for the expansion of the East wastewater treatment plant at a cost of $4.6M in 2017.
- Achieved Full Operation for the Akin Park partial sewer separation project (November 2019)

Geographic Information System (GIS)

The Utility re-aligned the GIS editing process with the Evansville / Vanderburgh County Computer Services GIS Department in November 2010. This was done to refine the editing and maintenance of GIS databases and to help complete a back log of edits, capture field notes and hand drawn images from the quarter section maps. The Utility maintains the GIS database housing the sewer facilities.

The Utility's GIS includes current information on the CSS (sewer sizes, composition, manholes, elevations, etc.), and will be used to integrate new information as it is obtained. The GIS and IT Strategic Plan include the following completed action items:

- Standardized on a common I/O Platform for SCADA and Real-Time monitoring and control
- Implemented an electronic document management system
- Increased automation at filter plant and WWTPs

- Eliminated multiple mapping platforms and implemented a centralized GIS
- Implemented a utility-owned maintenance and asset management system

The Motorola Canopy system is a 900 MHz wireless system. The canopy system's current capabilities include: CSO outfall monitoring and in-system flow monitoring. This canopy interacts with the secured East Side Data Center and the City of Evansville Networks. An integral part of the GIS is the ability to conduct highly enhanced CSO public notification and remote monitoring. In addition, the GIS could be used to conduct upstream (sub-basin layer development) and downstream (SIU database) sewer tracing to determine the cause or effects of spills or discharges.

Management layers are also an integral facet of the GIS including a sub-basin based cleaning and inspection layer, and inlet cleaning layer. These will both enhance schedules but also the record keeping which documents that these activities have been completed. The system will also be used as a tool for the Utility to pinpoint areas that should be targeted for more intensive maintenance, and/or televising activities, and related investigative evaluation.

The benefits include:

- Improved response times to collection system problems
- Real time public notification of overflow or releases throughout the collection system
- Real-time updating of sewer maps
- Tracking repairs and work orders
- More effective customer complaint follow up
- Tracing spills or other problems
- Improved management of SIUs
- Tracking source controls (street sweeping, catch basin cleaning)
- Tracking and prioritizing sewer maintenance
- Identifying potential system capacity problems

System Composition

The Utility continues to compile and continuously update the information regarding the sewer GIS layer. As the Utility's maintenance and cleaning programs progress the conditions of the system will be continually incorporated into the GIS.

Based on the information confirmed to date, approximately 35%, or 1,420,813 linear feet, of the sewers in Evansville are combined sewers. Sewer sizes range between 2 inch and 120 inches in diameter and various arch and box shapes are included in the system. The majority of the sewers are composed of vitrified clay pipe, reinforced concrete pipe or brick. The Utility continues to gather information on the sewers of unknown materials.

Exhibit 2.2 shows the current estimate of materials used in the sewer system.

Exhibit 2.2:
CSS Sewer Materials

Material	% of Total
Vitrified Clay	68
Reinforced Concrete	18
Brick	8
Unknown	2
Other	4

The combined sewer system is primarily located in the southern portion of Evansville, generally bordered by the Ohio River on the south, Pigeon Creek on the north, Carpenter Creek on the west, and Vann Avenue on the east.

Thirty subsystems compose the sewer systems. Subsystems W-17, W-16, W-15, W-14, W-13, W-12, W-11, W-10, W-9, W-8, E-12, E-11, E-10, E-9, E-6, and Darmstadt, are either comprised entirely of separate sanitary and storm sewers or have a small percentage of combined sewer areas. The fourteen remaining subsystems are comprised almost entirely of combined sewers. Since the 1993 CSOOP, inspections occur a minimum of five times a week

at all CSO Outfalls **(Exhibit 2.3)**, and flap gates have been installed on nineteen (19) CSO outfalls. An outfall in area W-4 was eliminated and flows rerouted to Outfall 024.

CSO Structures

The Utility currently has 19 CSO outfalls which are listed with their coordinates, receiving water, and corresponding WWTP, in **Exhibit 2.3**. Three CSOs discharge to Bee Sough, which ultimately discharges to the Ohio River, seven CSOs discharge directly to the Ohio River, nine discharge to Pigeon Creek, which is a tributary of the Ohio River.

CSO Outfalls 005 and 026 were removed when the NPDES permits were renewed, since these CSO discharges do not discharge from these points, but are routed to the Kentucky and Baker Street CSO Outfalls, respectively. Additionally, the decree required the Utility to physically eliminate CSO 009 and CSO 123 since they are no longer utilized. The existing controls and equipment for CSO 009 and CSO 123 were removed in October 2016 to render these CSOs inoperable. The utility eliminated CSO 103 in August 2019 in conjunction with the East WWTP Effluent Pumping Station Project. **Exhibit 2.3** has been modified to reflect the CSO eliminations.

Exhibit 2.3: CSO Outfalls

CSO	Name	Receiving Water	Coordinates	
001	Kentucky Avenue	Bee Slough	37 56 54.42 N	87 33 30.10 W
002	Cass Avenue	Bee Slough	37 57 13.88 N	87 33 51.13 W
004	Adams	Bee Slough	37 57 38.84 N	87 34 14.18 W
006	Fulton Avenue Pumping Station	Ohio River	37 58 25.01 N	87 34 54.66 W
008	Chestnut Street	Ohio River	37 57 58.58 N	87 34 28.15 W
010	Dress Plaza	Ohio River	37 58 11.61 N	87 34 36.23 W
011	Oakhill \ Weinbach	Pigeon Creek	37 59 42.38 N	87 31 37.48 W
012	Maryland Street-West Bank	Pigeon Creek	37 59 08.41 N	87 35 27.45 W
013	Delaware Street	Pigeon Creek	37 58 58.57 N	87 35 14.20 W
014	Dresden Street	Pigeon Creek	37 59 37.70 N	87 35 20.77 W
015	7th Avenue East	Ohio River	37 58 31.12 N	87 35 07.66 W
016	Franklin Street	Pigeon Creek	37 58 48.61 N	87 35 15.16 W
017	6th Avenue	Pigeon Creek	38 00 07.28 N	87 34 58.78 W
018	Oakley Street	Pigeon Creek	37 59 43.31 N	87 34 29.71 W
020	9th Avenue	Ohio River	37 58 33.29 N	87 35 32.11 W
022	St. Joseph Avenue	Ohio River	37 58 23.19 N	87 36 01.72 W
024	Baker Street	Pigeon Creek	37 59 41.22 N	87 34 04.10 W
025	Diamond Avenue	Pigeon Creek	37 59 56.85 N	87 33 57.49 W
038	Oak/Riverside	Ohio River	37 57 51.72 N	87 34 25.55 W

* Only when the river is high and flood control lift stations are opened.

	East Plant
	West Plant

Since March 2010, the established protocol for inspecting the CSO overflow structure has been to have a responsible visual inspection of all the structures five times a week. In addition, the CSO Compliance Manager also performs a visual inspection of all structures after a high river event or if there is an alarm. Bar screens are inspected during CSO inspections to determine if cleaning is necessary. Detailed CSO inspection and testing occurs annually, which include examination of the condition of the diversion structure, outfall, signage, security, access/steps, flow monitoring equipment, probes and weir. If these weekly or annual inspections indicate that there is a concern about the operations of the structure; a work order is prepared and corrective action is taken.

The GE MDS orbit radio real time flow monitoring system also provides specific information by outfall when a CSO occurs, including:

- Day of the Month
- Time discharge began
- Duration in hours
- Event discharge by MG

The reports prepared with this information are included in the monthly MROs and include whether the overflow volume was measured or estimated.

Diversion Structures

Diversion structures are located upstream of CSO outfalls. They are situated near the terminal end of a relatively large combined trunk sewer that has collected flow from smaller tributary sewers. During dry weather, low flow travels through the trunk sewer, enters the diversion structure, and is directed into a throttle pipe. The throttle pipe flows toward an intercepting sewer that will convey the flow to one of the wastewater treatment plants.

As flows increase during wet weather, the throttle pipe may reach its peak capacity. This causes surcharging in the upstream diversion structure and interceptor sewer. As the diversion structure fills, further increases in flow submerge the weir wall. When the weir wall becomes submerged, additional flow will be diverted to the overflow structure and into the receiving stream. Diversion structure and CSO outfall drawings are presented in EWSU's *Initial System Characterization Including Separate Sanitary Sewer Hydraulic Model Development* (November 2012).

WWTP Facilities – Eastside

The existing WWTP includes preliminary, primary, and secondary treatment facilities. The Eastside WWTP is located on Waterworks Road near the Ohio River. Treated effluent discharges to the Ohio River. The Eastside WWTP is a conventional activated sludge treatment plant. Influent wastewater flows to the WWTP by gravity via a 54-inch diameter influent sewer. Preliminary mechanical screening, pista grit removal, primary clarification, activated sludge, secondary clarification, and chlorine disinfection/dechlorination are the sequential treatment processes used at the Eastside WWTP. After mechanical screening, the wastewater flows into the Pista grit by gravity. After the Pista grit the wastewater flows by gravity into the influent wet well. The wastewater is then pumped to the primary clarifiers where it then flows by gravity throughout the remaining treatment processes. A site plan for the East WWTP can be found in the Eastside WWTP Wet Weather SOP included electronically on the CD for this CSOOP submittal.

The secondary design capacity of the Eastside WWTP is 18.0 MGD, while the primary treatment capacity is 34.6 MGD. The design capacity of the East WWTP was evaluated in the IOCP Facility Planning and is shown in **Exhibit 2.4**. The WWTPs were designed in 1971 based on the accepted design requirements at the time. The 2012 Facility Plan evaluations were based on current industry standards. The criteria used for sizing the unit processes identified are listed under the Notes segment in **Exhibit 2.4**.

Based on the design criteria listed in **Exhibit 2.4**, the aeration tanks have a design capacity of 18 MGD; using the average primary effluent BOD from the time period from 2004-2006 they have a hydraulic loading capacity of 14.7 MGD. Since assuming operational control of the East WWTP in March 2010, the Utility has sustained treatment capacity to 22.5 mgd due, in part, to changing wet well channel levels, increased head on pumps, and reprogramming the programmable logic controllers (PLCs).

Stress testing was conducted on April 9 – April 20, 2012 to identify the maximum treatable flow rates of the preliminary, primary, secondary and disinfection processes. Testing was conducted using protocols approved by the U.S. Environmental Protection Agency (EPA) and Indiana Department of Environmental Management (IDEM). Full details of the protocols and results of stress testing can be found in the East WWTP Stress Test, CH2M HILL, July 2012. In general, the process units were loaded beyond their design capacity to determine their capacity limits. The duration of all stress tests was 5 hours, which was based on three hydraulic detention times of the secondary clarifiers. When the maximum capacity of the test unit was determined from the stress test, a repeat confirmation stress test at the maximum flow rate was conducted. The maximum capacities determined from stress testing are include in Exhibit 2.4. At the East WWTP, testing indicated that the secondary clarifiers are the limiting process at 28 mgd. It should be noted that stress testing was conducted under controlled, dry-weather conditions and only offers an estimate of capacity in that "snap-shot" of time. Therefore, the results may not represent actual performance during all wet-weather events. It was recommended that stress testing results be confirmed by monitoring the unit processes under wet-weather conditions. Refer to the East WWTP Stress Testing report for details regarding monitored parameters and definitions of failure for each unit process.

Exhibit 2.4 East WWTP Design and Stress Testing Capacities

Unit Process	Type	Quantity	Size	Design Capacity	Stress Test Capacity
Preliminary Treatment:					
Influent Screening	Mechanically Cleaned	2(1)	¼" Continuous Belt	20 MGD each	40 MGD(6)
Influent Pumping	Wet/Dry Well	4	13, 900 gpm	16.5 MGD @ 47.5 TDH (each)	
Grit Removal	Vortex (Pista Grit)	2	18' dia	30 MGD each (2)	45 MGD(6)
Primary Treatment:					
Primary Clarification	Rectangular	7	103'L x 32'W x 8'8"SWD	34.6 MGD(2)	50 MGD
Secondary Treatment: Activated Sludge					
Aeration Tanks	Plug-flow Tanks	3	300'L x 30'W x 15'SWD	3.03 MG(3)	
Blowers	Positive Displacement	4	5,050 cfm ea.	40.6 MGD	
Clarification	Circular, Flat-bottom	3	100' dia., 12' SWD	28.3 MGD	28 MGD(7)
Disinfection:					
Chlorination	Gas Chlorinators	2	2,000 lbs/day	64.8 MGD	32.4 MGD
Dechlorination	Sodium Bisulfate Pumps	2	20.8 gph	173 MGD	
Other:					
Flow Metering	Magmeter	2	16"	25.0 MGD each	
Effluent Pumping	USCoE Pump Station	1		110 MGD	
Sludge Processing:					
Thickening	Gravity Belt	2	2-meter units	60 MGD	
Digestion	Primary	2	75' dia., 23' SWD	N/A(4)	
		1	75' dia., 26' SWD		
	Secondary	1	75' dia., 23' SWD		
Dewatering	Belt Filter Press	4	2-meter units	10.7 MGD(5)	
Storage	Covered Storage Pad	1	100,000 sf	13.3 MGD	

(1) A second, identical 20 MGD screen was installed in 2012, bringing capacity to 40 MGD
(2) @ Peak Hourly Flow
(3) Per NPDES Permit No. IN0033073 and the IDEM 1971
(4) At average flow of 18 MGD, the detention time is 29 days. Sludge is stored for further drying and land filling.
(5) 7-hr shift 5-days per week – maximum is 51 MGD.
(6) Historical Discharge Monitoring Report (DMR) data and WWTP flow data were analyzed to determine the capacity of the bar screen.
(7) During testing, the activated sludge system was in a highly stressed condition with rising septic sludge, clumping, and poor settling with high SVIs.

WWTP Facilities – Westside

The West WWTP includes preliminary, primary, and secondary treatment facilities. The Westside WWTP is located near the Ohio River on the west side of the City on Tekoppel Avenue. Treated effluent discharges to the Ohio River. The Westside WWTP is a conventional activated sludge treatment plant. Influent wastewater flows to the WWTP by gravity via a 66-inch diameter influent sewer. Preliminary mechanical screening, grit removal, primary clarification, aeration, secondary clarification, and chlorine disinfection/dechlorination, are the sequential treatment processes used at the Westside WWTP. After mechanical screening, the wastewater flows into the influent wetwell. It is then pumped to the pista grit system where it then flows by gravity throughout the remaining treatment processes. A site plan for the West WWTP can be found in the 7th Avenue Lift Station and West WWTP Wet Weather SOP electronically included on the CD for this CSOOP submittal.

Exhibit 2.5 includes information contained in the design summary for the West WWTP. The secondary design capacity of the Westside WWTP is 20.6 MGD, while the primary treatment capacity is 39.5 MGD.

The construction of a $24 million Biological Aerated Filter (BAF) was completed at the West WWTP in 2009. New fine and coarse bar screens, new influent and effluent pumps, new influent magnetic flow meter, new grit removal system and new effluent flow meters were installed as part of this project. The project was funded with SRF Loan No. CS182385 01, and the construction project was approved by IDEM in Construction Permit Approval L-0256 issued on June 14, 2007. Construction of the BAF was completed ahead of schedule, and it was put into service in June 2009. The BAF process and capabilities have been tested during a variety of rain events and it has proven capable of reliably treating a peak flow of 14 mgd on a sustained basis. The Decree required that baffles be installed in the secondary clarifiers at the West WWTP by April 30, 2011 to increase flow through the clarifiers. Baffle installation was completed on April 18, 2011, and the secondary clarifiers were placed back into service on April 19, 2011.

Stress testing was conducted on April 9 – April 20, 2012 to identify the maximum treatable flow rates of the preliminary, primary, secondary and disinfection processes. The Biological Aerated Filtration (BAF) process at the West WWTP was not tested. Testing was conducted using protocols approved by the U.S. Environmental Protection Agency (EPA) and Indiana Department of Environmental Management (IDEM). Full details of the protocols and results of stress testing can be found in the West WWTP Stress Test, CH2M HILL, July 2012. In general, the process units were loaded beyond their design capacity to determine their capacity limits. The duration of all stress tests was 5 hours, which was based on three hydraulic detention times of the secondary clarifiers. When the maximum capacity of the test unit was determined from the stress test, a repeat confirmation stress test at the maximum flow rate was conducted. The maximum capacities determined from stress testing are include in Exhibit 2.5. At the West WWTP, testing indicated that the primary clarifiers are the limiting process at 39.6 mgd. It should be noted that stress testing was conducted under controlled, dry-weather conditions and only offers an estimate of capacity in that "snap-shot" of time. Therefore, the results may not represent actual performance during all wet-weather events. It was recommended that stress testing results be confirmed by monitoring the unit processes under wet-weather conditions. Refer to the West WWTP Stress Testing reports for details regarding monitored parameters and definitions of failure for each unit process.

Exhibit 2.5 West WWTP Design and Stress Testing Capacities

Unit Process	Type	Quantity	Size	Design Capacity	Stress Test Capacity
Preliminary Treatment:					
Influent Screening	Mechanically Cleaned	1	40 MGD(1)	40MGD(1)	40 MGD(5)
Influent Pumping	Wet/Dry Well	3		20MGD, each	-
Grit Removal	Vortex unit	1	19'dia	50MGD	50 MGD(5)
Primary Treatment:					
Primary Clarification	Rectangular	7	137'L x 32'W x 8'8"SWD	39.5 MGD	39.6 MGD
Secondary Treatment: Activated Sludge					
Aeration Tanks	Plug-flow Tanks	3	342'L x 30'W x 15'SWD	3.45 MGD, each (2)	-
Blowers	Positive Displacement	4	5,050 cfm ea.	15,150 CFM, firm	-
Clarification	Circular, Flat-bottom	3	105' dia., 12' SWD	31.2 MGD	33 MGD
BAF	Aerated Upflow w/ Polystyrene Beds	1	6- 11.5'D cells w/ bed of 4.5mm polystyrene beads	20 MGD peak hour, 14MGD sustained peak	14 MGD
Disinfection:					
Chlorination	Gas Chlorinators	2	2,000 lbs/day	45.2 MGD	-
	Two-pass Contact Tank	1	471,00000gal	45MGD	43 MGD(6)
Dechlorination	Sodium Bisulfate Pumps	2	20.8 gph	173 MGD	-
Other:					
Flow Metering	Magmeter (Influent)	2	16"	25 MGD each	-
Effluent Pumping	Wet/Dry Well	2	1050 gpm ea.	20 MGD, each	-
Sludge Processing:					
Thickening	Gravity Belt	2	2-meter units	20.2+ MGD(4)	-
Digestion	Primary	2	75' dia., 23' SWD	39.7 MGD	-
		1	75' dia., 26' SWD		
	Secondary	1	75' dia., 23' SWD		-
Sludge Transfer		2	450 gpm ea.	48.4 MGD	-

(1) Screen can handle more flow, but secondary treatment capacity is limited at 40 MGD.
(2) Per NPDES Permit No. IN 0032956 and 1971 IDEM Design Summary.
(3) Per 2004 MRO annual average $CBOD_5$ at 40 lb BOD_5 /d/1000 ft^3.
(4) 7-hr shift 5-days per week – maximum is 96 MGD.
(5) Historical DMR data and WWTP flow data were analyzed to determine the capacity of the bar screen.
(6) Hydraulic modeling indicates that the vertical baffle wall limits capacity of the contact tank to 43 mgd.

Levee Authority

The Evansville-Vanderburgh Levee Authority operates a total of 18 lift stations located along the Ohio River, Bee Slough, Pigeon Creek, and Carpentier Creek. Ten of these lift stations discharge flows contributed by CSOs. The pumping capacities and the river elevation when the lift stations are prepared to operate, and the actual pump starting elevations are identified in **Exhibit 2.6**.

The function of the levee authority is to provide protection of Evansville and the Vanderburgh County area from flooding by the Ohio River and also to remove storm water which may accumulate on the land side of the levee and be prevented from discharging by gravity into the Ohio River or Pigeon Creek due to high water levels in the receiving stream. Initiation of pumping operations is strictly a function of receiving stream levels since no pumping is required unless the receiving stream is at a high level, as indicated in **Exhibit 2.6.** Preparations for pumping occur when the selected high river stages are reached, and consist mainly of opening access to the lift stations from tributary sewers and closing off gravity discharge points to the receiving stream to prevent water from flooding the land side of the levees. These preparations are manually performed based on the list of procedures developed by the Corps of Engineers. Pumping continues as long as water levels are maintained in the pump station wet wells above the pump stop elevation.

Exhibit 2.6: EVANSVILLE-VANDERBURGH LEVEE AUTHORITY LIFT STATIONS

Pump Station Identification	Location	Sewer System	Pump Size (GPM)	Total Pumping Capacity (GPM)	Pumping Station Prepared for Pumping (Ft./USGS Elev.)	Pump Start/Stop Points (USGS Elev.)
K-4	Sunset Park (701 Veterans Memorial Parkway)	E-1, E-3, E-4	38,000; 38,000	76,000	26/354.70	355.02/353.52
K-5	Chestnut Street (301 Riverside Drive)	E-1	11,000; 35,000; 35,000; 2,800	83,800	29/358.70	356.92/354.42
Sycamore Street	2 Sycamore Street	E-2	62,500; 62,500; 62,500	187,500	34/362.70	361.12/359.02
Ohio Street	411 Fulton Avenue	W-3	23,250; 23,250; 23,250	69,750	34/362.70	362.02/360.02
H-4	Howell Street	W-2	42,300; 28,200; 14,100; 14,100; 1,200	99,900	34/362.70	351.92/350.12
Delaware Street	1601 W. Iowa St	W-3	113,400; 113,400; 113,400; 13,450; 13,450	367,100	36/364.70	346.52/339.52
Dresden Street	1725 Dresden St	W-4	31,400; 31,400; 31,400	94,200	37/365.70	370.02/369.02
6th Avenue	2412 Sixth Ave	W-4	26,200; 26,200	52,400	39/367.70	367.52/358.02
First Avenue	801 Uhlhorn	W-4	30,833; 30,833; 30,833	92,499	40/368.70	368.52/366.52
Diamond Avenue	15 W. Richardt	W-6	143,600; 143,600; 143,600	430,800	35/366.70	364.52/355.52

Land Use

According to US Bureau of Economic Analysis – Stats Indiana, the majority of those employed are in:

- Other Private (20.9%),
- Health Care/Social Service (12%)
- Manufacturing (13.8%)
- Retail Trade (11.9%) sectors.

Land use based on land cover in the study area is presented in **Exhibit 2.7 and Exhibit 2.8**. The Ohio River – Evansville watershed land cover is divided in the following manner:

- Open Water (1.85%)
- Low Intensity Residential (36.22%)
- High Intensity Residential (31.69%)
- Commercial/Industrial/Transportation (20.87%)
- Deciduous Forest (0.33%)
- Evergreen Forest (0.01%)
- Pasture/Hay (2.73%)
- Row Crops (3.19%
- Urban/Recreational Grasses (2.40%)
- Woody Wetlands (0.13%)
- Emergent Herbaceous Wetlands (0.58%)

(Indiana Water Quality Atlas)

Only 0.3% of the population is employed in the farming industry. The 2012 US Census of Agriculture (issued May 2014) lists Vanderburgh County as having 275 farms, with an average size of 278 acres. The agricultural land use is split approximately 92% cropland and 8% other uses. The primary land use (48.2%) overall is commercial and industrial.

Exhibit 2.7: Land Use Distribution (Ohio River)

Assessed Property Class (Source: Stats Indiana/State Board Tax Commissioners)	**Percent Distribution in Region**
Commercial & Industrial	48.2%
Residential	40%
Agricultural	6.7%
Utilities	5.1%

Exhibit 2.8: Land Use Distribution (Pigeon Creek)

LAND USE IN THE PIGEON CREEK WATERSHED (Source: Indiana Gap Project)		
Land Use	**Area (ac)**	**Percentage**
Urban	10,847	4%
Agriculture Row Crop	113,055	48%
Agriculture Pasture/Grassland	46,728	20%
Upland Forest and Woodlands	38,114	16%
Wetland Forest and Woodlands	11,237	5%
Other Wetlands and Water	6,326	3%
Other Non-vegetated	8,920	4%
Total	235,226	100%

Exhibit 2.9 includes information for the lift stations serving the combined sewer system including the name of the lift station, sewer subsystem, number of pumps, and lift station capacity. These lift stations serve only combined sewer within the combined sewer area. There are other lift stations in the combined sewer area but they only serve sanitary sewers.

Exhibit 2.9 : COMBINED SEWER SYSTEM LIFT STATION SUMMARY

Number	Name	Sewer Subsystem	Pump Capacity (GPM)	Number of Pumps	Rated Capacity (GPM)
1	Seventh Avenue	W-2	11,400	2	22,800
10	Weinbach Avenue	E-11	6700	3	15,000
94	Ohio Street	W-3	300	1	300

Sewer System Inspections / Maintenance

CSO visual inspections are conducted a minimum of five times per week, and inspections are also conducted in the case of a rain event or alarm. The Utility's SCADA telemetry monitoring system indicates the occurrence of an overflow and allows real-time public notification when CSO overflows are occurring through a link on the City of Evansville website (http://cso.ewsu.com). This web site was made available to the public in March 2011 and revised in 2020. In addition, an e-mail notification link is provided to interested parties that want to receive CSO notifications. All CSS lift stations included in **Exhibit 2.9** are monitored via telemetry. Bar screens are inspected during CSO inspections, to determine if cleaning is necessary.

The Utility implemented two types of lift station inspections, one was a Consent Decree requirement that all lift stations be inspected per Ten State Standards by November 30, 2012. Inspection of the sanitary lift stations in the sewer system assessed the adequacy of the lift stations compliance with Chapter 40, "Wastewater Pumping Stations" of the most recent edition of "Recommended Standards for Wastewater Facilities" by the Great-Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards). The inspections are now 100% complete.

Inspections were performed in October and December 2011, and June 2012. Details of the 2011 inspections are provided in the pump station inspection report included with the Utility's February 29, 2012 CMOM 2.1 submittal. Details of the 2012 inspections are provided in the pump station inspection report included with the Utility's November 30, 2012 CMOM 3.0 submittal.

In addition to Ten State Standards inspections, the Utility performs routine inspections for all 90 sanitary lift stations weekly and maintenance is performed as required. Lift Station locations are listed in **Figure 1**.

Sewer / Catch Basin Cleaning

The Utility implemented a Small Diameter Cleaning and Inspection (C&I) Program to comply with the Decree, which required the Utility to develop provisions for cleaning and inspecting sewer pipes. The Utility's Small Diameter C&I Program includes:

- Conducting routine, proactive cleaning and inspection of all 8-inch through 15-inch gravity sewers
- Conducting manhole inspections during C&I activities to identify obvious structural defects and prioritizing repair of any major structural defects found

The Utility has developed its proactive C&I and manhole inspection program to meet the performance requirements outlined in the Decree. The initial C&I cycle was to be completed by November 1, 2017, with 70 percent of 8- through 15-inch pipes being cleaned and inspected by November 1, 2015. However, Evansville requested a modification to the decree to extend the completion date for the initial C & I cycle to January 31, 2018. The Consent Decree also requires the Utility to develop a follow-up C&I program conducted on 10-year cycles after the initial cycle is completed. A minimum of 75 miles of pipeline will be cleaned and inspected annually throughout the entire program.

For this 2020 CSOOP Update, the Utility has cleaned over 14% of 8"- 15" diameter pipes. Cleaning statistics for these segments were reported in Semi-Annual Reports 2019-2 and 200-1, covering the July 1, 2019 through June 30, 2020 reporting periods.

Catch basins are brick or precast structures that collect debris 1-2 feet below the invert connecting the pipe to the manhole to prevent the debris from being transported to the sewer system. Inlets contain elbows that allow debris to be transported to the sewer system. The Utility responds to reactive inlet/catch basin work orders. In addition, the Evansville Street Maintenance Department and the Vanderburgh County Highway Department continue to clean catch basins located within the street right-of-way, however, they do not track any data regarding this work.

Overflow Structure Cleaning

CSO overflow weirs are inspected five (5) days a week for evidence of dry weather overflows, debris and anything out of the ordinary. If excessive debris is encountered, the overflow weir is cleaned. Detailed CSO inspections occur annually. Annual CSO inspections have occurred that include examination of the condition of the diversion structure, outfall, signage, security, access/steps, flow monitoring equipment, probes, and weir. Documentation of daily CSO inspections are maintained to ensure all components are operational. The annual inspections for 2020 were performed in October 2020.

Excessive Loading Areas

A two-person Vactor Truck crew is assigned to sewers that require more frequent cleaning, such as areas are in the vicinity of restaurants and trees in which grease build-up and root intrusion is more likely to occur.

Inspecting Sewers

The Utility initiated a trunk line condition assessment in late February 2011. As part of this effort, some pipe segments were inspected using QuickView at the time the manhole inspections were completed. The Utility also initiated condition assessment work for 8" to 15" diameter sewer segments in June 2011, with CCTV work completed at select locations following analysis of the manhole and pipe inspection data.

The Engineering Department's Instrumentation and Electronic Technicians focus on proactive investigation of the system. To assist with compliance of Consent Decree cleaning and inspection requirements, the Utility acquired two new CCTV trucks and two Sewer Line Rapid Assessment Tools (SL-RAT) for acoustic pipe inspection.

CCTV inspections of over 481,000 linear feet of 8"to 15" diameter pipe was reported in Semi-Annual Reports 2019-2 and 2020-1 covering the July 1, 2013 through June 30, 2020.

Inspection and Maintenance Schedules

Inspection and maintenance activities are logged into the computerized work-order maintenance database Cityworks. This system integrates work activities of the EWSU and includes maintenance and inspection of existing facilities and allows for data management and record keeping. Listed below in **Exhibit 2.10** is the current inspection/maintenance schedule for the City.

Exhibit 2.10: MAINTENANCE/INSPECTION SCHEDULES

Tasks	Locations/Conditions	Frequency
Street Sweeping	Schedule A	3 times/week
	Schedule B	Monthly
	Schedule C	Semi-Annually
Diversion Structure Inspections	All	1 times/week
Flap Gate Inspections	Automated Structures	5 times/week [2]
CSO Outfalls	Normal Conditions	5 times/week * [2]
	High Water Conditions	Following High River Conditions
CSS Lift Stations	All	1 time/week
Catch Basins and Inlets	All	1 time/3 years
Sewer Inspection and Cleaning	All	75 miles per year (8"-15" sewer segments)
Industrial Source Controls	All	Annually

* At a minimum – in addition, CSOs are checked when rainfall is occurring or is likely to occur.
. [2] Where accessible and not underwater at normal river pool

The Utility continues its rehabilitation of sewers and manholes. For the 2020 CSOOP update, there have been 2622 manhole inspections completed. The list and locations of manholes and the dates of inspection are provided in Semi-Annual Reports 2019-2 and 2020-1.

Staff and Training

The preventative maintenance staff includes crews dedicated to routine cleaning and inspection, and includes three field supervisors and a collection system manager who focus on the collection system and lift stations. Safety training is required monthly for all staff and periodic classroom training is required for all treatment plant staff. Training for Sewer Maintenance and Treatment Plant employees is given on a monthly basis and includes the following:

- OSHA compliance training as outlined by the corporate safety officer
- Confined space entry
- First aid/CPR
- Emergency response
- Trenching and Shoring
- Hazardous Communication
- Machine and Hand Tool Safety
- Ladder Safety
- Lock Out-Tag Out
- Personal Protective Equipment
- Underground Safety
- Blood Borne Pathogens Protection

Other Employee Specific Training:

- **Inspection and Maintenance** – All personnel are provided on-the-job training for their specific duties. Lift station employees are provided training in pump inspection and troubleshooting, control panel troubleshooting, etc.
- **Process Operations/Control** - All personnel are provided on-the-job training for their specific duties. Monthly meetings are held to discuss the operations of the plant and to address any questions or concerns.
- **Pretreatment/Laboratory** - All personnel are provided on-the-job training for their specific duties. The supervisor conducts frequent meetings to discuss new techniques and to reinforce existing procedures.
- **CCTV Training** – Sewer Department and Engineering Department staff recently completed CCTV training. CCTV operators are PACP certified, and PACP training of department personnel is ongoing.
- **Emergency Response**: The Utility follows the guidelines presented in SORP 2.2 May 1, 2017. The Utility conducted semi-annual training sessions in June 2020. Annual training for all Utility staff will be conducted in November 2020.

Sewer Maintenance Equipment

The Utility owns and operates the following pieces of equipment for sewer maintenance:

- Five Vactor Trucks - Used to pressure wash and vacuum sewer lines, and for cleaning of storm inlets in the combined sewer areas
- Electric Valve Actuator – Used to open and close CSO sluice gates and lift station valves
- Two Easement Machines – Used for cleaning sewer segments that cannot be accessed from manholes within the right-of-way
- Two Sewer Televising Trucks – Used to evaluate and document conditions in the sewer system through video taping

- Two Pretreatment/Lab Trucks – Used to respond to abnormal odors, color, and chemical characteristics of the wastewater; also used for normal sampling activities of significant industrial users and the Treatment Plants
- Five Lift Station Service Trucks – Used to perform maintenance and repair at all lift stations and CSO structures
- 14 General Service Trucks (Tandem Dump Trucks, Crew Trucks, Pickups) – Used for transportation of personnel, equipment, and materials to and from job sites in the Collection System
- Miscellaneous Hand Tools
- Safety Equipment
- Three Sewer Line Rapid Assessment Tool (SL-RAT) for acoustic pipe inspection

Emergency Response

The Utility operated under the guidelines presented in SORP version 1.0 until the SORP 2.0 on May 1, 2011. Since 2011, the Utility has submitted two revisions to the SORP with the latest revision SORP 2.2 submittal on May 1, 2017. Please refer to the Sewer Overflow Response Plan (SORP) version 2.2.

Back Up Systems

Lift Stations

The Utility has a lift station inspection and maintenance program that includes the following tasks: RF communication and alarm testing, preventative maintenance, checking operation of sump pump, valve operation, and wet well cleaning. The Utility maintains Standard Operating Procedures regarding lift station inspections and preventative maintenance. Work orders for preventative maintenance are generated based on the task report.

All of Evansville's 92 stations have a telemetry alarm system notifying the manager on-call of a potential problem. The standard alarms codes for lift stations are High Water, Power Failure, and RF Communication Failure. The alarms are sent via text to the manager's cell phone reporting a specific alarm to a certain LS. The manager will then assign a crew to investigate

any and all alarms. The LS crews are on-call 24 hours, 7 days a week to respond to alarms. If it is a Power Failure alarm, Vectren, the Evansville power company, is called immediately. EWSU is a priority customer with Vectren and all alarms will be responded to immediately. The LS crews will remain onsite until the problem initiating the alarm is fixed.

The telemetry alarm systems have backup power to ensure that power failure alarms will be promptly transmitted. Lift stations are inspected per the preventative maintenance schedule and in response to alarms.

Additionally, the Utility completed an upgrade to the radios in April 2011 for all the lift stations due to the new FCC requirements that radios be equipped with a "narrow band" frequency range. The new radios have greater reliability and less potential for downtime.

Alarm Typical Response Time and Frequency

In the event of a power failure, Vectren makes the utility a priority and takes about an hour on average to reconnect power to the lift station. For high water alarms, EWSU crews can pump down the station in approximately two hours or less, after arriving on site. EWSU has not experienced recurring lift station overflow events resulting from inadequate response time to power failures.

Activity logs are kept in each station denoting any and all activities occurring at or to the particular station. The current and previous year LS logs are kept at the West WWTP. In addition, EWSU's SCADA records the frequency and location of all alarms. No LS activities are tracked using Cityworks, unless a customer complaint regarding a lift station is reported.

Backup Power and Emergency Pumping Capabilities

There are four lift stations (LS) in the CSS and SSS that have on-site generators. These stations, Lorraine Park (which is a storm water LS), Pfeiffer Road, PPG, and Weinbach Avenue, represent four of the six largest stations in the Evansville collection system, all of

which have pumps larger than 50 Hp. Two separate system lift stations with generators are new, smaller stations that were recently constructed as part of the Southeast side sewer project (Five Points and St. James Lift Stations). These two stations handle only separate sewer flows, but they are located within the CSS area.

All generators are located outside the lift station buildings on a concrete pad in a fenced area. The Utility has a maintenance agreement with Cummins Diesel for routine activities associated with the LS generators. Cummins Diesel performs routine oil changes, inspections and maintenance. In addition, the Utility's crews exercise all four generators for 30 minutes once a week.

All emergency LS equipment is stored at the West WWTP. The Utility's crews will pick up any necessary equipment to respond to the alarm at either the West WWTP or from a rental company. The Utility owns one portable 80kw generator and two diesel 6", 1960 gpm (2.8 MGD) portable pumps to use for backup power and emergency pumping capabilities. The Utility has used rental companies in the past to procure additional 6" diesel pumps. The Utility requires any new lift station to be plumbed for bypass pumping.

Due to the size of its pumps, only the Seventh Avenue lift station is not able to be operated with a generator. The Utility is currently exploring the cost and cost effectiveness of providing a dual power feed to this lift station, or of providing a diesel generator sized to power the entire station. Because the Seventh Avenue Lift Station is a critical component of the West WWTP collection system, and because the capacity of this station will be a major consideration in increasing percent capture of the Pigeon Creek CSOs, the evaluation and sizing of a backup power source will be included in the IOCP alternatives analysis and selection.

Backup Power at East and West Wastewater Treatment Plants

Both the East and West WWTPs have dual power feeds which can be switched manually by Vectren. EWSU is a priority customer with Vectren. In addition to the dual power feeds, the East WWTP has a 300kw emergency generator that can operate one of the headworks submersible influent pumps as a short-term measure to continue to pump 10 MGD in the event both power feeds are offline. The West WWTP has an emergency generator that can power the main building, which includes the control room where SCADA alarms are monitored. Additionally, gas-fired engines power two influent and one effluent pumps at the West WWTP, so these pumps can be operated and maintain flow to and from the plant in the event of both power feeds being disrupted.

Monitoring Information

The Utility has several systems in place to monitor CSO impacts via flow monitors, rainfall monitors, and stream flow monitors.

Flow Monitoring

CSO outfalls are monitored for duration, flow rate, and total gallons via Doppler flow monitors. These flow monitors are calibrated annually and data is gathered in real time via a wireless network. Seven of the CSO outfalls include automated structures that use upstream storage capacity to minimize overflows, including outfalls 011, 012, 013, 014, 016, 024, and 025.

As stated above, flow monitors have been installed on all of the CSOs. This allows for real-time CSO monitoring and provides real time public notification when CSO overflows are occurring. The Utility's site at http://cso.ewsu.com also provides a link to notify individuals via email that a CSO event has occurred.

In-System Flow Monitoring

As a part of the development of the City's Integrated Overflow Control Plan (IOCP), the Utility began collecting flow data in both the CSS and SSS. The wastewater flow and precipitation monitoring effort was conducted to establish the current average daily dry-weather flow (ADDF) and the impact that rainfall-derived infiltration and inflow (RDII) has on the SSS. The data collected during the monitoring program was used to assess collection system performance under a variety of rain events, and the impact that SSS flow has on the CSS. In addition, the CSS flow monitoring will be used to validate and verify hydraulic modeling results in both the East and West system models. The flow and precipitation monitoring program consisted of three phases:

- **Phase 1**, which concluded in July 2010, was a gross, short-term monitoring effort focused on defining the SSS inputs to the CSS, confirming the areas in the SSS that require further investigation, and gathering the initial flow and precipitation data that will be used for SSS hydraulic model development and calibration. Flow monitors and rain gauges were installed in April 2010 and began collecting data on May 1, 2010. Monitors were scheduled to remain in place for a 90-day period. Potential long-term flow monitoring sites will be identified based on the quality of the data collected and the practicality of collecting data in those locations for longer periods.
- **Phase 2** flow monitoring was conducted from March through August 2011. This phase was focused on defining RDII in the priority SSS subbasins and gathering additional flow data needed for hydraulic model development, refinement, and calibration. This phase was extended in order to adequately define RDII response in the subbasins and to prioritize subbasins for further investigation.
- **Phase 3** includes flow monitors and rain gauges in both East and West CSSs that will be used to refine and validate both CSS hydraulic models and that will become the foundation of the IOCP post-construction monitoring program. EmNet installed 25 flow monitors, transformed 4 existing monitors from level to flow and installed 7 rain gauges. The monitoring period started in July of 2012.

Exhibit 2.11 lists the locations monitored in the Phase 1 effort. **Exhibit 2.12** lists the Phase 2 flow monitors and **Exhibit 2.13** lists the Phase 3 flow monitors.

Exhibit 2.11
PHASE 1 FLOW MONITORS

Flow Monitor	Pipe Size	Location	Mfr.	Model
S1	36	S Tekoppel Ave (West WWTP)	ISCO	2150 AV
S2	15	Golfmoor Rd.	ISCO	2150 AV
S3	24	Florence & Grove St.	ISCO	2150 AV
S4	15	3544 N 1st Street	ISCO	2150 AV
S5	15	1st & Fairway St.	ISCO	2150 AV
S6	15	W Idlewild & N 1st Ave.	ISCO	2150 AV
S7	33	Kentucky & Hesmer Ave.	ISCO	2150 AV
S8	24	Lynch Road at School	ISCO	2150 AV
S9	12	Oak Hill	ISCO	2150 AV
S10	15	Morgan & Stockwell	ISCO	2150 AV
S11	42	In Red Cross lot	ISCO	2150 AV
S12	30	3298 Covert Ave.	ISCO	2150 AV
S13	24	S Weinbach & E Riverside Dr.	ISCO	2150 AV
S14	15	Frank St. (Dead End)	ISCO	2150 AV
C1	15	Sweetser & Kentucky	ISCO	2150 AV
C2	85	Cass & Governor	ISCO	2150 AV
C3	18	Riverside & Adams	ISCO	2150 AV
C4	54x59	1st & Chestnut	ISCO	2150 AV
C5	64x56	Court & Riverside	ISCO	2150 AV
C6	66	Franklin St. Parking Lot	ISCO	2150 AV
C7	75x58	Maryland & 9th St.	ISCO	2150 AV
C8	NA	1510 Florence	ISCO	2150 AV
C9	54	Dresden & 5th St.	ISCO	2150 AV
C10	NA	Humane Society	ISCO	2150 AV

Exhibit 2.11
PHASE 1 FLOW MONITORS

Flow Monitor	Pipe Size	Location	Mfr.	Model
C11	96	Diamond Ave. & Heidelbach Ave.	ISCO	2150 AV
C12	96	Oak Hill & Virginia St.	ISCO	2150 AV
C13	18	Diamond Ave. & Weinbach Ave.	ISCO	2150 AV

Exhibit 2.12: PHASE 2 FLOW MONITORS

Flow Monitor	Pipe Diameter (inches)	Status	Description of Location	Module ID	Sensor ID	Mfr.	Model
1	12	Phase 2	In swamp behind school	211B01491	211B01321	ISCO	2150AV
2	27	Phase 2	Broadway/Johnson L/S	210D00407	210D00595	ISCO	2150AV
3	15	Phase 2	Patriot Westside	210D00379	210A01461	ISCO	2150AV
4	12	Phase 2	Daves Concrete	210D00393	211B01319	ISCO	2150AV
5	15	Phase 2	Ball diamond	210A00191	210C02372	ISCO	2150AV
6	24	Phase 2	Grove & Florence	210D00395	210C00844	ISCO	2150AV
7	15.5	Phase 2	Ball diamond	210D00384	210C02375	ISCO	2150AV
8	12	Phase 2	In sidewalk	211B01657	211B01313	ISCO	2150AV
9	15	Phase 2	In trees by creek	211A00547	211B01309	ISCO	2150AV
10	15	Phase 2	Nail care lot	210A00187	210C02373	ISCO	2150AV
11	15	Phase 2	Wendy's	210D00392	207B01716	ISCO	2150AV
12	30	Phase 2	In trees by house	210D00406	210C02381	ISCO	2150AV
13	24	Phase 2	School perimeter road	210D00385	210D00597	ISCO	2150AV
14	12	Phase 2	Across from cemetery	211B01555	211B01355	ISCO	2150AV
15	15	Phase 2	Marshall Safety	211B01478	211B01318	ISCO	2150AV
16	12	Phase 2	South of church	210D00381	210C02367	ISCO	2150AV
17	15	Phase 2	Church daycare	211B01881	211B01323	ISCO	2150AV

Exhibit 2.12: PHASE 2 FLOW MONITORS

Flow Monitor	Pipe Diameter (inches)	Status	Description of Location	Module ID	Sensor ID	Mfr.	Model
18	15	Phase 2	Advanced Auto Parts	210D00380	210D00593	ISCO	2150AV
19	21	Phase 2	Denny's	211B01660	211B01314	ISCO	2150AV
20	24	Phase 2	Green River ramp from Lloyd	211B01652	211B01322	ISCO	2150AV
21	18	Phase 2	Burkhardt/Walnut	211B01658	211B01325	ISCO	2150AV
22	9.5	Phase 2	Sandalwood and Lincoln	211B01654	211B01317	ISCO	2150AV
23	27	Phase 2	Covert /Victoria Green	211B01652	210C02371	ISCO	2150AV
24	30	Phase 2	Golden Buddha sign	210D00401	210C02376	ISCO	2150AV
25	36	Phase 2	Waggoner/Koch	211B01490	211B01324	ISCO	2150AV
26	24	Phase 2	Riverside and Weinbach	211B01653	210D00598	ISCO	2150AV
27	27	Phase 2	Holiday Inn	208D02272	209B01644	ISCO	2150AV
28	66	Phase 2	Parking lot 156	211B00291	209L00930	ISCO	2150AV
29	54	Phase 2	Park and Florence	211B00284	209C00936	ISCO	2150AV
30	54	Phase 2	Animal shelter	211A01003	209B01645	ISCO	2150AV

Exhibit 2.13
PHASE 3 FLOW MONITORS

Facility ID	Pipe Size	Location	Mfr.	Model
11984	90	CSO 25	ISCO	2150 AV
4910	48	CSO 25	ISCO	2150 AV
15679	36	CSO 25	ISCO	2150 AV
7667	72	CSO 25	ISCO	2150 AV
4922	60	CSO 24	ISCO	2150 AV
11619	60	CSO 24	ISCO	2150 AV
4639	60	CSO 14	ISCO	2150 AV

Exhibit 2.13
PHASE 3 FLOW MONITORS

Facility ID	Pipe Size	Location	Mfr.	Model
4642	15	CSO 14	ISCO	2150 AV
8048	84 elliptical	CSO 12	ISCO	2150 AV
7687	15	CSO 12	ISCO	2150 AV
2015	60 elliptical	CSO 13	ISCO	2150 AV
4992	54	CSO 13	ISCO	2150 AV
98772	48x60 rect.	CSO 16	ISCO	2150 AV
2043	15	CSO 16	ISCO	2150 AV
9868	60 elliptical	CSO 15	ISCO	2150 AV
41616	54 elliptical	CSO 20	ISCO	2150 AV
8458	66	7th Ave LS	ISCO	2150 AV
8369	66	WWTP / CSO 22	ISCO	2150 AV
50181	120	CSO 001	ISCO	2150 AV
3637	72	CSO 001	ISCO	2150 AV
3323	96	CSO 001	ISCO	2150 AV
15955	96	CSO 002	ISCO	2150 AV
1573	72x48	CSO 004	ISCO	2150 AV
41925	60x48	CSO 038	ISCO	2150 AV
7998	48x60	CSO 008	ISCO	2150 AV
5124	96	CSO 011	ISCO	2150 AV
7981	39x30	CSO 010	ISCO	2150 AV
7965	48x60	CSO 010	ISCO	2150 AV
8009	48x60	CSO 010	ISCO	2150 AV

Pigeon Creek Interceptor Study

The Pigeon Creek Interceptor (PCI) Monitoring System monitors conditions in the interceptor at eight locations between Diamond Avenue and the 7th Avenue Lift Station. There are an additional six locations downstream of 7th Avenue lift station leading up to the West WWTP. A combination of flow meters and level sensors have been placed at key locations along the sewer line. This combination of sensors will allow the Utility to understand the flows and hydraulic grade line along the interceptor, while keeping initial equipment and installation costs and long term maintenance costs at a minimum. The monitoring locations listed in **Exhibit 2.14**.

Exhibit 2.14: EMNET PCI AND BROADWAY INTERCEPTOR MONITORS

Node Type	Site name	Location	Sensor Type	Manhole ID	Monitor
Logicover-SA	Pigeon Creek Int 1	Franklin and 7th	0-30 psi Druck Sensor	2039	Level Sensor
Logicover-SA	Pigeon Creek Int 2	Grove and Fountain	0-30 psi Druck Sensor	4507	Level Sensor
Logicover-SA	Pigeon Creek Int 3	Grove and Shanklin	0-30 psi Druck Sensor	4490	Level Sensor
Logicover-SA	Pigeon Creek Int 4	1st and Uhlhorn	0-30 psi Druck Sensor	4532	Level Sensor
Logicover-SA	Pigeon Creek Int 5	Lloyd and 7th	Isco 2150	2050	Flow Meter
Logicover-SA	Pigeon Creek Int 6	Florence and Park	Isco 2150	42607	Flow Meter
Logicover-SA	Pigeon Creek Int 7	Read and Morgan	Isco 2150	7645	Flow Meter
Logicover-SA	Pigeon Creek Int 8	Main and Richardt	Isco 2150	4910	Flow Meter
Logicover-SA	West Int. 1 (8452)	Ohio and Ray Becker	Isco 2150	8452	Flow Meter
Logicover-SA	West Int. 2 (283219)	Ohio and Ray Becker	0-10 psi Druck Sensor	283219	Level Sensor
Logicover-SA	West Int. 3 (8530)	Ohio and Ray Becker	Isco 2150	8530	Flow Meter

Exhibit 2.14: EMNET PCI AND BROADWAY INTERCEPTOR MONITORS

Node Type	Site name	Location	Sensor Type	Manhole ID	Monitor
Logicover-SA	West Int. 4 (122692)	Ray Becker and Lemcke	Isco 2150	122692	Flow Meter
Logicover-SA	West Int. 5 (8354)	Broadway and Claremont	0-10 psi Druck Sensor	8354	Level Sensor
Logicover-SA	West Int. 6 (8343)	Broadway and C	0-10 psi Druck Sensor	8343	Level Sensor

Permanent Monitors

The Utility currently monitors all of the CSOs in the Combined System and has flow and precipitation monitors in other locations as well. The flow monitors listed in **Exhibit 2.15** were part of studies done by the Utility that remained in the system to continue to record system flows. These monitors are shown in **Figure 4**.

Exhibit 2.15: PERMANENT COLLECTION SYSTEM FLOW MONITORS

Program Name	Location Description	Mfr.	Model
West Plant Influent Flow Metering and CSO Control Project	Influent	ISCO	ADFM
West Plant Influent Flow Metering and CSO Control Project	Broadway	ISCO	ADFM
West Plant Influent Flow Metering and CSO Control Project	Diversion Structure 1	ISCO	ADFM
East Plant Interceptor Metering	Cass Interceptor West of CSO 002	ISCO	2150AV
East Plant Interceptor Metering	Riverside Interceptor East of Shawnee Dr.	ISCO	2150AV

Exhibit 2.16: CSO OUTFALL FLOW MONITORS

CSO	Description of Location	Mfr.	Model
CSO 001	Bee Slough @ Kentucky Ave.	ISCO	2150 AV
CSO 002	Bee Slough @ Cass Ave.	ISCO	Signature 310
CSO 004	Adams and Sunset	ISCO	2150 AV
CSO 005	Shadewood	ISCO	2150 AV
CSO 006	Fulton Pump Station	ISCO	2150 AV
CSO 008	Chestnut	ISCO	2150 AV
CSO 010	Dress Plaza, Court	ISCO	2150 AV
CSO 010	Dress Plaza, Locust	ISCO	2150 AV
CSO 010	Dress Plaza, Sycamore	ISCO	2150 AV
CSO 011	Oak Hill	ISCO	2150 AV
CSO 012	Maryland	ISCO	2150 AV
CSO 013	Delaware	ISCO	2150 AV
CSO 014	Dresden	ISCO	2150 AV
CSO 015	7th Ave. East	ISCO	2150 AV
CSO 016	Franklin	ISCO	2150 AV
CSO 017	6th Ave.	ISCO	2150 AV
CSO 018	Oakley	ISCO	2150 AV
CSO 020	9th Ave.	ISCO	2150 AV
CSO 022	St. Joe Ave.	ISCO	2150 AV
CSO 024	Baker	ISCO	2150 AV
CSO 025	Diamond Ave.	ISCO	2150 AV
CSO 026	Read St.	ISCO	2150 AV
CSO 038	Oak & Riverside	ISCO	2150 AV

The Utility manages a network of rain gauges, which are capable of recording rainfall duration, intensity, and total rainfall. The information is downloaded and maintained by the Utility. In addition, the City also may access rainfall information from USGS, the National Weather Service, and local television satellite stations. The City also installed a rain gauge at the West Plant. **Figure 5** shows the Phase 1, Phase 2, and permanent gauge locations in the CSS and SSS. In addition to the rain gauges mentioned above, the City has also installed three additional rain gauges as previously discussed with EPA/IDEM. The two new rain gauges on the East side (Stockwell and Lorraine) use the ISCO 2105 Flow Logger and ISCO 674 tipping bucket rain gauge. The Software used to read the data is Flowlink 5.1, and rain data can be isolated down to 1 minute intervals. (http://www.isco.com/products/products3.asp?PL=2027020). The two rain gauges are located at Lorraine Park Pumping Station- 37 57' 32" N, 87 31' 13" W, and Stockwell Lift Station- 37 59' 26"N, 87 30' 07"W. An additional rain gauge was added at the Willow Lift station in the West system to allow for the gathering of a quasi-triangulated pattern of rain data in each system.

Exhibit 2.17 lists the locations of the rain gauges included in the Phase 1 flow and precipitation monitoring program. **Exhibit 2.18** lists the locations of the rain gauges included in the Phase 2 flow and precipitation monitoring program.

Exhibit 2.17: PHASE 1 PRECIPITATION MONITORING

Rain Gauge	Description of Location	Manufacturer	Model
1	East	Teledyne/ISCO	677c
2	West	Teledyne/ISCO	677c
3	EO	Teledyne/ISCO	677c
4	Keystone	Teledyne/ISCO	677c
5	Pfeiffer Rd.	Teledyne/ISCO	677c
6	Seventh Avenue	Teledyne/ISCO	677c
7	East Plant 2	Teledyne/ISCO	677c
8	Maryland	Teledyne/ISCO	677c

Exhibit 2.17: PHASE 1 PRECIPITATION MONITORING

9	Diamond	Teledyne/ISCO	677c
10	Oak Hill	Teledyne/ISCO	677c
11	Stockwell	Teledyne/ISCO	677c
12	Millersburg	Teledyne/ISCO	677c
13	Daylight South	Teledyne/ISCO	677c
14	V.I.P.	Teledyne/ISCO	677c
15	280302	Teledyne/ISCO	677c
16	Chickasaw	Teledyne/ISCO	677c
17	PPG	Teledyne/ISCO	677c
18	Ashley Place	Teledyne/ISCO	677c
19	West Plant 2	Teledyne/ISCO	677c

EXHIBIT 2.18: PHASE 2 PRECIPITATION MONITORING

Rain Gauge Name / Location Description	Status	Manufacturer	Model
Ashley Place	Leased Phase 2	Teledyne/ISCO	677c
Chickasaw	Leased Phase 2	Teledyne/ISCO	677c
Daylight South	Leased Phase 2	Teledyne/ISCO	677c
Stockwell	Leased Phase 2	Teledyne/ISCO	677c
V.I.P.	Leased Phase 2	Teledyne/ISCO	677c
PPG	Leased Phase 2	Teledyne/ISCO	677c
Millersburg	Leased Phase 2	Teledyne/ISCO	677c
Maryland	Leased Phase 2	Teledyne/ISCO	677c
Oak Hill	Leased Phase 2	Teledyne/ISCO	677c
West (WWTP)	Leased Phase 2	Teledyne/ISCO	677c
Schutte Road	Leased Phase 2	Teledyne/ISCO	677c
Mesker Park	Leased Phase 2	Teledyne/ISCO	677c
North Park	Leased Phase 2	Teledyne/ISCO	677c
Yokel Road	Leased Phase 2	Teledyne/ISCO	677c

EXHIBIT 2.18: PHASE 2 PRECIPITATION MONITORING

Rain Gauge Name / Location Description	Status	Manufacturer	Model
Martins Lane	Leased Phase 2	Teledyne/ISCO	677c
Iroquois Gardens	Leased Phase 2	Teledyne/ISCO	677c
Greencove	Leased Phase 2	Teledyne/ISCO	677c
Riverside-Vann	Leased Phase 2	Teledyne/ISCO	677c
Farmington	Leased Phase 2	Teledyne/ISCO	677c
Roselawn	Leased Phase 2	Teledyne/ISCO	677c
Deerfield	Leased Phase 2	Teledyne/ISCO	677c
Beverly Heights	Leased Phase 2	Teledyne/ISCO	677c
Metro Avenue	Leased Phase 2	Teledyne/ISCO	677c
Keystone #7	Leased Phase 2	Teledyne/ISCO	677c
Eagles	Leased Phase 2	Teledyne/ISCO	677c

The Utility maintains permanent rain gauges which are listed in **Exhibit 2.19**.

EXHIBIT 2.19: PERMANENT RAIN GAUGE INVENTORY

Description of Location	Status	Manufacturer	Model
West WWTP	Owned	ISCO	674
Lorraine Park Pumping Station	Owned	ISCO	674
Stockwell Lift Station	Owned	ISCO	674
Willow Lift Station	Owned	ISCO	674
Baker CSO Building	Owned	ISCO	674
Cass CSO Outfall	Owned	ISCO	674

Stream Flow

Information on stream flow is provided by stream gauging by the National Weather Service Ohio River Forecast Center at mile marker 792 for the Ohio River in Evansville. The USGS maintains a stream gauging station on Pigeon Creek north in Gibson County at Fort Branch, and a gauging station on Pigeon Creek at the US 41 bridge north of Diamond Avenue, but it has backwater influences that have caused questions regarding data reliability.

2.2 NMC 2: Maximum use of the collection system for storage

Excess storage capacity is defined as the available hydraulic capacity of a given pipe to convey and/or store the combined discharges in addition to the sanitary flow it already carries. Due to the restricted size of the combined sewers, there is very little excess storage capacity in the combined sewers. However, the Utility maximizes the use of the collection system for wastewater storage by using elevated weirs and lined sewers, installing backflow prevention devices, and working to remove clear water sources.

Weir Elevation

Weirs are elevated in order to assist in the prevention of CSOs without triggering basement backups. The weirs have been raised for the Pigeon Creek and most of the Ohio River CSO outfalls. The Utility will continue to evaluate the optimization of weir heights.

Sewer Lining and Repair

Sewer lining is a rehabilitation method to renew the structural integrity of the sewer, reduce future maintenance, and reduce infiltration. The Utility lines sewers on an as-needed basis, based on results of sewer inspection. The sewer lining is performed as a capital project, using outside contractors.

While cleaning a sewer, if the sewer crew encounters a sewer that may need repair the supervisor is notified. The supervisor may request that the sewer be televised, and the inspection report is given to the sewer supervisor for review. If the supervisor determines that repair is not necessary, the report is filed. If the supervisor determines that repair is necessary, the report and inspection data is submitted to the sewer manager. The sewer manger reviews the inspection to determine whether to line, replace, or point repair the sewer. Sewers are replaced if they are collapsed, do not have structural integrity or cause problems that result in basement back-ups. Sewers containing significant roots may be lined after roots are removed. Sewer lining is also performed for sewers

with infiltration and inflow, and/or radial cracks. A point repair is performed if the problem is less than 10 feet in length. If the sewer has been identified for lining, the inspection video is sent to engineering to be included in a future lining contract.

Exhibit 2.20 lists the work orders that were completed between October 2017 through September 2018 to repair cave-ins, voids, and other sewer problems. Proactive and reactive cleaning and root removal are also included.

EXHIBIT 2.20
Sewer Department Work Orders Closed

Month	Year	Total
October	2019	69
November	2019	76
December	2019	51
January	2020	478
February	20	312
March	20	273
April	20	355
May	20	189
June	20	228
July	20	234
August	20	233
September	20	152

Automated Gates and Backflow Prevention Devices

Automated CSO control gates were designed to maximize the surcharge level prior to flooding within the service area, thus maximum storage within the interceptors themselves could be achieved. The CSOs with this capability include 011, 012, 013, 014, 016, 024, and 025. This capability helps maximize storage in the trunk sewers reducing the possibility of a CSO discharge.

In addition, backflow prevention devices have been installed on 18 CSO outfalls as seen in **Exhibit 2.21**. Flap gates and sluice gates have been installed in most diversion and regulating structures for the protection of the interceptor sewer from backflow. Outfall sluice gates are generally hydraulically operated based on manual control and can be open or closed depending on specific system requirements. Flap gates open and close based on system head conditions without manual

control or intervention. In-line storage is being more thoroughly investigated and included in the City's LTCP.

Exhibit 2.21: BACKFLOW DEVICES

CSO	Name	Outfall Gate	Throttle Gate
001	Bee Slough at Kentucky Avenue	None	N/A
002	Bee Slough at Cass Avenue	Flap Gate	N/A
004	Bee Slough (Adams, K-4)	Tide-Flex Backflow Valve	None
006	Fulton Avenue Pumping Station	Flap Gate	N/A
008	Chestnut Street	Flap Gate	Unknown
010	Dress Plaza	Sluice Gate	N/A
011	Oakhill \ Weinbach [1]	Sluice Gate	None
012	Maryland Street-West Bank [1]	Sluice Gate	Sluice Gate
013	Delaware Street [1]	Flap Gate	Sluice Gate
014	Dresden Street [1]	Sluice Gate	Sluice Gate
015	7th Avenue East	Tide-Flex Backflow Valve	Sluice Gate
016	Franklin Street [1]	Sluice Gate	Knife Gate
017	6th Avenue	Sluice Gate	None
018	Oakley Street	Sluice Gate	Sluice Gate
020	9th Avenue	Flap Gate	None
022	St. Joseph Street	Flap Gate	None
024	Baker Street [1]	Sluice Gate	Sluice Gate
025	Diamond Avenue [1]	Sluice Gate	Sluice Gate
038	Oak/Riverside	Flap Gate	None

[1] ***Automated***

	East Plant
	West Plant

Downspout Disconnection

Another method to maximize storage capacity of the sewers and thus maximize flow to the WWTPs is to reduce Clearwater, which the Utility does through its downspout disconnection program. Upon the discovery of an illegal connection, the Utility mandates disconnection. The Utility has implemented the downspout disconnection program in areas throughout the system where sewer separation has, or will be, conducted. During the separation process, inflow sources are removed from the newly separated area. Sewer separation projects that involved downspout disconnection projects include the Southeast Alvord (142 connections removed); Dexter Villa (82 removed); and E-9 and E-11 sewer subsystems (sump pump inspection and removal project).

Eliminating the direct connection of downspouts in areas not separated, especially in the combined – densely populated area of the City, is only possible where sufficient land area is available for adequate drainage. Thus, as part of its CMOM Program the Utility will continue to carry out the downspout disconnection programs where it is possible.

CSO Gate Set Points

Each Outfall gate location has a programmable logic controller which utilizes a custom proportional integral derivate algorithm to automatically adjust the outfall gate position to maintain the sewer level at or below the setpoint. Each setpoint was determined from a study by EmNet based upon maximizing storage without causing flooding in the service area. The outfall gate will remain fully closed below this setpoint and open when the trunk sewer level exceeds the setpoint.

The Interceptor gates are controlled based upon the sewer level at the 7th Avenue Lift Station and the gates close to approximately a 20% position to maximize storage.

Automated CSO structure gate set points and their corresponding trunk sewer heights are listed below in **Exhibits 2.22 & Exhibit 2.23.**

Exhibit 2.22 Outfall Gates

CSO	Name	Outfall Gate Setpoints	
		Setpoint Depth (ft)	Setpoint Elevation (ft)
011	Oakhill Road	7.0	367.35
012	Maryland Street	10.8	367.65
013	Delaware Street	15.2	359.60
014	Dresden Street	6.0	365.70
016	Franklin Street	5.9	373.70
024	Baker Street	9.0	363.65
025	Diamond Avenue	19.1	364.35

Exhibit 2.23 Interceptor Gates

CSO	Name	Interceptor Gate Setpoints	
		Setpoint Depth (ft)	Setpoint Elevation (ft)
012	Maryland Street	9.3	337.30
013	Delaware Street	9.3	337.30
014	Dresden Street	9.3	337.30
016	Franklin Street	9.3	337.30
024	Baker Street	9.3	337.30

Regulator or Diversion Structures Adjusted

The Evansville combined sewer system contains automated gates that function as regulator type structures. These gates are inspected according to the schedule outlined in this CSOOP to ensure they are functioning properly.

Each overflow structure has a fixed weir which controls the CSO. The Utility has raised the weir heights on the following CSO diversion structures. This was done in an effort to provide temporary storage for a portion of the wet weather flow in the trunk sewers upstream of the diversion structures. For large storms, it was intended to increase the capture of the first flush and delay the discharge of wet weather flow to receiving water. In 2008, EMC field surveyed the weir elevations, which are shown as the Post-Adjustment column in **Exhibit 2.24.**

Exhibit 2.24 Elevated Weir Levels

Diversion Structure	Completed	Pre-Adjustment Elevation (ft.)	Post-Adjustment Elevation (ft.)
Adams (004)	8/2003	353.42	354.21
Court (010)	8/2003	365.94	367.8
Locust (010)	8/2003	367.69	368.7
Oak (038)	8/2003	366.9	367.44
Chestnut (008)	8/2003	355.00	355.93
Oakley (018)	2004	369.63	369.81
6th Avenue (017)	2004	367.64	368.09
9th & Ohio (020)	5/1998	361.80	362.72
Diamond (025)	2004	350.67	351.39
7th East (015)	5/2001	351.8	353.69

2.3 NMC 3: Review and modification of pretreatment programs to assure that CSO impacts are minimized

The Utility monitors thirty-three (33) permitted Significant Industrial Users (SIUs). **Figure 3** depicts the industrial discharger locations and the industry location within the SSS or CSS.

Evansville currently has nineteen (19) Categorical Industries and fourteen (14) non-categorical SIUs. **Exhibit 2.25** lists the industrial categorical dischargers and **Exhibit 2.26** lists the non-categorical industrial dischargers. Most of the industries are continuous dischargers. Batch dischargers include Ditto Sales, CSX, and Aramark. Batch discharge provisions have been added via permit modification to two of the relevant permits. The Utility's Pretreatment Manager personally delivered the permit amendments to the industries, explained the provisions, and answered any questions. The email address of the person in charge for each of the relevant industries has been added to the public notification list, which will be used to alert the batch dischargers when their discharges are to be held. Once notification is received by the facility, the permit requires that all necessary steps should be implemented to minimize the discharge from the facility. To further enhance this process, the Utility can identify which CSO is discharging, or about to discharge, and alert any discharger that could contribute to that CSO area to hold any discharge until the CSO discharge has ceased.

Exhibits 2.25 and 2.26 also note the WWTP and CSO(s) associated with each industry. The Utility enforces its industrial pretreatment program by the wastewater discharge regulations found in the Evansville Municipal Code on the City's web site: http://www.codepublishing.com/in/evansville/. Information can be found in the annual pretreatment report regarding the specific enforcement of these provisions. Permitting for discharge is regulated by the wastewater discharge regulation section of the City's Municipal Code. Additionally, the Utility has SCADA (real-time) system capability to identify which CSO is discharging, or about to discharge, and alert any discharger to hold any discharge until the CSO discharge has ceased.

The Utility also issues pretreatment permits to site remediation facilities. Each of these permits contains a clause that prohibits the discharge if there is 0.25-in of rain in the Evansville area. With real time data available at each CSO outfall, the Utility can notify each permit holder when a CSO discharge is likely to occur.

Exhibit 2.25 Categorical Industrial Dischargers

Industry Name	Address	Categorical	CSOs	SIC	Permit Number
American Custom Extrusion	14020 Hwy 57 47725	428.50	025	3061	IWP059
LyondellBasell	5001 O'Hara Drive 47711	463.15	001, 002, 103, 004	3087	IWP015
LyondellBasell (Matrix)	15000 Hwy 41 North 47725	463.15	025	3087	IWP073
Bootz Plumbingware Company	2301 Maryland Street 47712	466.14	012	3431	IWP011
Craddock Finishing Corp.	1400 W. Illinois Street 47710	433.17	016	3999	IWP040
Crescent Plastics	955 Diamond Avenue 47711	463.15	025	3079	IWP054
Ditto Sales *	1817 W. Virginia Street 47713	433.15	020	3499	IWP053
DSM	2267 W. Mill Road 47732	463.15	013	3087	IWP036
EMI	5701 Old Boonville Hwy 47715	433.17	001, 002, 103, 004, 011	3471	IWP045
Guardian Auto Trim	601 N. Congress Avenue, 47716	433.17	011, 001, 002, 103, 040	3089	IWP052
Hoosier Stamping	700 Schrader Avenue 47712	433.15	020	3449; 3460; 3469	IWP010
Hoosier Stamping	1825 W. Franklin Street 47712	433.15	020	3449; 3460; 3469	IWP004
Indiana Tube Corporation	2100 Lexington Avenue 47730	433.15	009	3317	IWP051
JIC Enterprises Inc.	1404 N Evans Avenue 47711	463.16	025	3087	IWP072
LyondellBasell	1800 Lynch Road	Yes	011	3087	IWP074
Master Manufacturing	4703 O'Hara Drive 47711	433.15	001, 002, 103, 040	3469; 3398; 3471	IWP008
Ticona Polymers	2300 Lynch Road 47711	463.15	011	3087	IWP061
PGW Industries Inc.	424 E. Inglefield Road 47711	426.64	025	3231	IWP024
Red Spot Paint & Varnish	1016 E. Columbia Street 47711	446.10	025	2851	IWP005

* Batch Discharger

	East Plant
	West Plant

Exhibit 2.26: Non-Categorical Industrial Dischargers

Industry Name	Address	Categorical	CSOs	SIC	Permit Number
Ameriqual Foods	18200 N. US Hwy 41 North 47724	No	025	2032	IWP025
Aramark *	1112 Florence Street 47710	No	014	7218	IWP050
Azteca Milling	15700 Hwy 41 North 47711	No	025	5149	IWP123
Browning Ferris Ind.	2020 Laubscher Road 47720	No	013	4953	IWP007
Carson's Brewery	2404 Lynch Road 47711	No	011	5181	IWP009
Cintas	7232 Enterprise Circle 47715	No	001, 002, 103, 040, 011	7218	IWP021
CSX *	2710 Dixie Flyer Road	No	022	4011 4013	IWP075
Deaconess Hospital	600 Mary Street 47747	No	013	8069	IWP006
Hartford Bakery	500 N. Fulton Avenue 47710	No	006, 015	2051	IWP003
Kerry, Inc	1515 Park Street 47710	No	014	2051	IWP071
Reckitt Benckiser	2400 Lloyd Expressway 47721	No	022	2834	IWP039
Royal Crown Bottling Company	1100 Independence Avenue 47714	No	001, 002, 103, 040	2086	IWP018
St. Vincent's Medical Center	3700 Washington Avenue 47750	No	001, 002, 103, 040	8069	IWP037
PGP International Inc.	5404 Foundation Drive 47725	No	025	2041	IWP020

* Batch Discharger

	East Plant
	West Plant

The Utility enforces its industrial pretreatment program by the wastewater discharge regulations found in the Evansville Municipal Code on the City's web site: http://www.codepublishing.com/in/evansville/. On May 22, 2017, the USEPA transmitted a letter to the Utility Pretreatment Coordinator which included a detailed review and request for revisions to the existing Municipal Code Chapter 13.20 Wastewater Discharge Regulations (SUO). The revisions requested by the USEPA focused on modifying the SUO to mirror the structure/language of Title 40 of the Code of Federal Regulations Part 403 for General Pretreatment Standards (40 CFR 403) as well as incorporating provisions of the 2005 Streamlining Rule.

Within the 2005 Streamlining Rule, thirteen (13) changes were identified as more stringent than previous federal provisions in 40 CFR Part 403, and required SUO changes. The more stringent provisions incorporated into the Utility SUO include:

- Updated removal credits provisions relating to Overflows [§ 403.7(h)]
- Slug control requirements must be included in SIU control mechanisms [§ 403.8(f)(1)(iii)(B)(6)]
- SIUs must be evaluated for the need for a plan or other action to control slug discharges within a year from the final rule's effective date or from becoming a SIU [§ 403.8(f)(2)(vi)]
- SIUs are required to notify the POTW immediately of any changes at its facility affecting the potential for a slug discharge [§ 403.8(f)(2)(vi)]
- Significant Noncompliance (SNC) definition is expanded to include additional types of Pretreatment Standards and Requirements [§ 403.8(f)(2)(viii)(AC)]
- SIU reports must include BMP compliance information [§ 403.12(b),(e),(h)]
- SIU control mechanisms must contain any BMPs required by a Pretreatment Standard, local limits, state or local law [§ 403.8(f)(1)(iii)(B)(3)]
- Documentation of compliance with BMP requirements must be maintained as part of the SIUs and POTWs record keeping requirements [§ 403.12(o)]

- Control Authorities which preform sampling for SIU's must perform any required repeat sampling and analysis within 30 days of becoming aware of a violation [§ 403.12(g)(2)]
- Require periodic compliance reports to comply with sampling requirements, require Control Authority to specify the number of grab samples necessary in periodic and noncategorical SIU reports, and require noncategorical SIUs to report all monitoring results [§ 403.12(g)(3),(4),(6)]
- Non-Categorical SIUs are required to provide representative samples in their periodic monitoring reports [§ 403.12(g)(3)]
- Require notifications of changed discharge to go to the Control Authority and the POTW, where the POTW is not the Control Authority [§ 403.12(j)]
- How and when the POTW can designate a "duly authorized employee" to sign POTW reports [§ 403.12(m)]

The latest draft of the SUO was sent to the USEPA on September 14, 2018. The revision and review process between the Utility and USEPA was deemed complete on January 4, 2019 when no further changes were requested by USEPA. Overall, the Utility believes the changes requested by USEPA reflect administrative amendments and are not considered material changes to the way in which the Utility operated and manages the Pretreatment Program.

2.4 NMC 4: Maximization of flow to the POTW for treatment

According to EPA Guidance on the NMCs, maximizing flow to the WWTPs entails simple modifications to the CSS and treatment plant to enable as much wet weather flow as possible to reach the treatment plant. The objective of this minimum control is to reduce the magnitude, frequency, and duration of CSOs that flow untreated into receiving waters. Municipalities should identify and evaluate more complex CSS and WWTP modifications as part of their LTCPs.

The City's implementation of other NMCs as described in this 2020 CSOOP Update (e.g., proper operation and maintenance of the CSS, maximizing storage in the CSS) are important to assuring that the City maximizes flow to its WWTPs. The City has implemented and continues to implement other measures to maximize flow as well. As described below, these include sewer rehabilitation projects, implementation of the Storm Water Management Plan, projects at the WWTPs, and other measures.

2012 Wet-Weather Operating Plans and Stress Testing

The Utility resumed direct, in-house control of WWTP operations in 2010 and began adjusting and modifying operation of both WWTPs to increase the amount of flow treated during wet weather, recognizing that using any underutilized wet-weather treatment capacity can result in significant capital cost savings to capture and treat more CSO. As a result, the Utility developed an initial wet-weather operating plan at the East WWTP and developed a similar plan for the 7th Avenue Lift Station and West WWTP and submitted it to the USEPA January 31, 2011. Comments were received back from the USEPA April 15, 2011 and the Utility submitted responses to the USEPA comments May 16, 2011. The Utility's responses and the WWTP operating plans are included electronically with the CD attached to this document.
In addition, the Utility conducted stress testing of both WWTPs in April 2012 after making capital improvements focused on maximizing flow and after completing process and hydraulic models to identify any remaining bottlenecks.

The following improvements were made:

- Installation of a new screen and pump in the East WWTP headworks
- Density baffles installation in the West WWTP secondary clarifiers
- Bubbler system installation at all CSOs

Stress testing results were documented and submitted to EPA in July 2012. The results can be seen in Exhibits 2.4 and 2.5. While the Utility has responded to comments made by EPA on these reports, WWTP staff have begun operating the WWTPs in accordance with stress testing results. Once the comment-response procedure is completed for the stress testing reports, the Utility will revise the wet-weather operating plans for both WWTPs, revise the maximum treatable flow designations for each WWTP and the conditions under which the flow can be maximized, and begin operating the WWTPs in accordance with the revised operating plans.

Stormwater Master Plan

The 1997 Stormwater Master Plan contained several projects that were implemented. A sewer rate increase was enacted which allowed the Utility to see approximately $45 million in bonds. A total of $30 million of these funds were earmarked to construct stormwater improvements. The remaining $15 million was targeted for rehabilitation of aging sanitary and combined sewer systems. In 2006, the Utility used $16 million of a $63 million State Revolving Fund loan to construct stormwater improvements complementing the combined sewer systems. Storm sewers were constructed for flooding control at the following locations in the combined sewer area with a total cost of approximately $28,000,000.

1. Fulton and Columbia

2. North Weinbach

3. St. Joe and Maryland

The 2007 Stormwater Master Plan Update identified 30 projects with a total cost of $116 million. The list of recommended initial projects which are complete is as follows:

Project	**Cost**
Eastview Terrace	$6,400,000
Southeast Brookside & Covert Outfall	$24,000,000
Cass Avenue	$19,000,000
Jeanette-Cass Addition	$3,400,000

Oakhill/Weinbach Project

In an effort to reduce wet weather overflows at CSO 11 (Oakhill), the S-5 Relief Sewer Project was undertaken in 2001 near the Evansville State Hospital. It involved the construction of a forty-two (42) inch sanitary sewer from Division Street to Villa Street to redirect the sanitary flows from subsystems E-9, E-10 and E-12, to subsystem E-5. This reduced the average daily and peak hourly flows to the Weinbach Avenue diversion structure by approximately three (3) MGD and twelve (12) MGD, respectively. The redirected wastewater eventually flows to Diversion Structure 001 just upstream of CSO 001, before continuing on to the Eastside WWTP. Surface drainage in the State Hospital area, located in subsystem E-5, was diverted to the forty-eight (48) inch pipe that flows to the Weinbach Avenue Lift Station. Future projects to remove the State Hospital storm flow from CSO 011 (Oakhill) will be beneficial to CSO reduction efforts. In 2019, the Utility initiated design of the force main sewer portion of the State Hospital Pumping Station for the Oak Hill sewer separation projects (Appendix G Control Measure 8)

West Plant Flow Maximization Upgrades

Treatment capacity at the West WWTP has increased from 35 mgd to 40 mgd on a sustained basis, with 26 mgd being treated by the activated sludge process (8.7 mgd through each of the three aeration/clarifier trains) and 14 mgd being treated by the BAF. As mentioned above in the early actions projects section, the baffle installation project was completed April 18, 2011 and the secondary clarifiers were placed back into service April 19, 2011.

The West WWTP and 7th Avenue Lift Station SOPs for maximizing the treatment of wet weather flows were submitted to the USEPA January 31, 2011 and responses to USEPA comments were submitted May 16, 2011. The West WWTP and 7th Avenue Lift Station SOPs are attached to this document at **Appendix B.** The Utility's responses to USEPA comments are included as **Appendix C.** SOPs based on the stress testing completed in April 2012 will be finalized following acceptance of the stress test results.

East Plant Flow Maximization Upgrades

At the East Plant, sustained treatment capacity has been increased from 18 to 27.1 mgd due, in part, to changing wet well channel levels, increased head on pumps, and reprogramming the programmable logic controllers (PLCs).

A fourth influent pump and second bar screen were installed at the East WWTP and were operational in February 2012.

The Eastside WWTP Wet-Weather SOP is attached to this document as **Appendix D**. SOPs based on the stress testing completed in April 2012 will be finalized following acceptance of the stress test results.

Capacity Testing

As stated above, as a result of resuming direct, in-house control of WWTP operations in 2010, the Utility began adjusting and modifying operation of both WWTPs to increase the amount of flow treated during wet weather. As a result, the Utility developed initial wet-weather operating plans at both the West and East WWTPs. In addition, the Utility conducted stress testing of both WWTPs in April 2012 after making capital improvements focused on maximizing flow and after completing process and hydraulic models to identify any remaining bottlenecks. The stress testing protocols and results for each WWTP are summarized in the West and East WWTP Facilities descriptions. Maximum capacities identified for each unit

process are displayed in Exhibit 2.4 and Exhibit 2.5. At the West WWTP, testing indicated that the primary clarifiers are the limiting process at 39.6 mgd. However, known hydraulic bottlenecks limit overall treatment capacity to 37 mgd. Therefore, until these hydraulic issues are resolved, the West WWTP treatment capacity is 37 mgd. At the East WWTP, testing indicated that the secondary clarifiers are the limiting process at 28 mgd. It should be noted that stress testing was conducted under controlled, dry-weather conditions and only offers an estimate of capacity in that "snap-shot" of time. Therefore, the results may not represent actual performance during all wet-weather events. It was recommended that stress testing results be confirmed by monitoring the unit processes under wet-weather conditions. Full details of stress testing can be found in the following documents:

- West WWTP Stress Test, CH2M HILL, July 2012
- East WWTP Stress Test, CH2M HILL, July 2012

WWTP - Peak Flow Rates

In addition to the flows discussed in previous sections, when the sewer system hydraulic model re-evaluation is completed and approved by EPA and IDEM, the wet weather treatment capacity of each of the two WWTPs will be determined and included in the LTCP for IDEM/EPA's review and approval.

Consistent with its prioritized operational objectives, the Utility follows usual CSO practices in order to maximize flows to and through the WWTPs during wet weather events. Prior to expected wet weather, the Utility ensures any unused basins or tanks are empty and available for use. During the rainfall even the Utility stops recycle flows, and following the event it would continue to maximize the flow to the plants until the CSO discharges end. If the East Plant starts losing solids, the East side sluice gate can be controlled manually by the Operator to reduce influent flow. It then bleeds back any stored wastewater for full treatment. It is especially important to note that the City is a river community, which greatly influences the duration of wet weather flow affecting the operation and time of travel in the collection system.

The Utility's 7th Avenue Lift Station and West WWTP operating plan focuses on maximizing wet-weather flow to the West WWTP for treatment. Data regarding capacities for the East and West WWTPs are provided in Exhibits 2.4 and 2.5.

2.5 NMC 5: Prohibition of CSOs during dry weather

According to EPA's Guidance on NMCs, control measures that can be implemented to eliminate CSOs during dry weather flow conditions include inspection of the system to identify Dry Weather Overflows (DWOs), correction of the DWOs, notification to the NPDES permitting authority when a DWO has occurred, and submittal of a description of the corrective actions taken.

Other NMCs support the prohibition of dry weather overflow, including proper O&M of the system; maximizing the storage in the collection system and maximizing the flow to the treatment plant. As indicated in the previous sections, since March 2010, EWSU has increased the budget of the utility and has improved sewer cleaning, repair and maintenance.

Since March 2010, EWSU has also improved the spill response, and has developed a new protocol for the discharges of fresh water to the system to prevent dry weather overflows. The new protocol is intended for the water utility and the fire department so that they will not open and test their hydrants without first communicating with the Sewer Utility.

As described previously, the City inspects all CSOs a minimum of five times per week either visually, or using telemetry, even during dry weather conditions. Capacity related DWOs do not occur in the CSS. If notification is received that a dry weather overflow may be occurring, the CSO Manager will take the appropriate actions consistent with the Sewer Overflow Response Plan (SORP). A CSO crew will investigate, and if assistance is required, a sewer cleaning crew will be contacted. The Utility is following the guidelines presented in SORP 2.2 (submitted May 1, 2017).

DWOs from the CSS are reported to IDEM by phone or electronically within 24 hours and completed Bypass Incident Report Form No. 48373 is submitted electronically to IDEM,

USEPA, and the Vanderburgh County Health Department within 5 days. DWOs are also reported monthly in the CSO MROs.

Inter-Departmental Communication

The Utility's Inter-Departmental Communication SOP requires other city departments and permitted entities to communicate with the Utility regarding the potential that large quantities of water could enter the sewers. The protocol states:

> *"Any event that allows water to enter the* ***combination sewer*** *may impact the operation of the Wastewater Treatment Plants or CSO Structures causing an illicit release into a waterway. All releases during dry weather are prohibited and every effort will be made by the utility to prevent a release. Communication of events in a timely manner will assist affected department managers to take action to prevent potential release."*

The SOP includes a map of the CSS in Evansville, a protocol for on the spot response and communication imperatives. This protocol was developed in response to hydrant flushing.

2.6 NMC 6: Control of solid and floatable materials in CSOs

Control measures to control solid and floatable materials in CSO discharges have been implemented for some of the CSO outfalls. CSO floatable controls currently include bar screens for CSOs 012 and 025.

The Utility will continue to consider floatable control as part of its LTCP. It would not be cost-effective to install floatable controls on the CSOs when several of the CSOs will either be relocated, eliminated or be provided treatment to meet water quality standards as part of the approved LTCP. The Utility's 2002 LTCP estimated the cost of adding fine screening to outfalls 009, 012, and 013 at three million dollars, which clearly is indicative that this type of expenditure is beyond the scope of the NMCs. In addition, the City of Indianapolis's Cost Estimating Procedures for their LTCP, included estimates for floatables controls for capacities of 20 MGD in excess of one million dollars. The Utility's outfalls in particular would pose a much more difficult challenge than Indianapolis due to the dynamics associated with the flow of the Ohio River and the fact that most of the CSO outfall pipes are often located underwater. The Utility has a fiscal responsibility to its citizens to ensure expenditures are prudent. Thus, spending what is estimated to be approximately one million dollars per outfall, for controls on outfall(s) that may be eliminated in the near future would clearly not be fiscally prudent. Instead, this money could be used prudently on CSO Long Term Control Plan projects which could actually result in the elimination/treatment of the discharges from CSO outfalls.

In EPA's CSO Guidance for the Nine Minimum Controls, it is stated that "an extensive monitoring program conducted by the City of New York suggests that most floatables in CSOs (about 95%) originate as street litter. The remainder includes personal hygiene items. Accordingly, source control programs that address the prevention or removal of street litter and the proper disposal of personal hygiene materials can contribute greatly to the control of floatables."

The Utility is implementing source reduction programs to reduce the entry of floatable and solids into the sewer system, rather than incurring the costly and potentially unnecessary expenditures to install screening devices. One of these programs is the Utility's extensive Public Notification program, which is beyond that required by EPA, in addition to progressive public education and participation programs. In addition, the City, through its GIS, will enhance its cleaning and maintenance activities to further eliminate the possibility of floatable/solids even entering the system in the first place.

Another source reduction program was the City's street sweeping program. The City of Evansville contracts with Republic Services for street cleaning services. The street sweeping schedule remains unchanged from 2010 and is listed in the Inspection / Maintenance schedule presented previously in Exhibit 2.10.

Ohio River Sweep

The River Sweep is sponsored by ORSANCO and it covers the Ohio River from Pennsylvania downstream through Illinois.

This year the Vanderburgh County River Sweep was postponed due to health concerns related to Covid-19.

2.7 NMC 7: Pollution Prevention

According to EPA's Guidance on NMCs, pollution prevention measures such as street cleaning, public education programs, solid waste collection, and recycling can keep contaminants from entering the CSS. Pollution prevention occurs throughout the City to eliminate or reduce the possibility potential contaminants getting into the combined sewer system. The City's street sweeping program was described in the previous section. As described below, the City also has a public education program, illegal dumping prohibition, recycling, and solid household hazardous waste programs in place. Lastly, the City has a Sewer Use Ordinance that contains pollution prevention components.

Public Education

Public Education programs can encourage the proper disposal of items. Utility staff conducts WWTP tours for grade schools, high schools, universities, and other interested groups, to teach about wastewaters link with the natural hydrologic cycle. In addition, the Utility participates in community projects that give young people an awareness of issues such as water conservation, water pollution, and the importance of water to our society. The Vanderburgh County Solid Waste Management District develops and distributes educational materials to citizens and businesses on waste reduction and recycling, composting, hazardous waste, improper waste disposal, and other issues.

Illegal Dumping Control

The Solid Waste District Board awarded a $5,000 grant to Keep Evansville Beautiful (KEB) for a litter cleanup program. For several years the District and KEB have joined efforts with state and local officials to remove litter from streets and highways.

Solid Waste Collection and Recycling Programs

Evansville's pollution prevention programs include solid waste collection and recycling programs. The Solid Waste District continues a number of programs and activities that have been successful for several years. These programs include the annual Tox-Away Day, drop off recycle days, holiday recycling, Tire Recycling Day, and Computer and Electronics Recycling Days. The Solid Waste District's education and promotion programs included sponsoring a billboard contest and speaking to students about waste reduction, recycling and household hazardous waste.

Republic Services is contracted by the city to conduct street cleaning, heavy trash pick-up, and leaf collection. The City works in conjunction with the sewer department to target areas that need more frequent cleaning. To encourage citizen participation in these programs and keep these items out of the waste streams, the City conducted a brochure mass mailing to the citizens. In January 2013, the City implemented a new single container automated refuse/yard waste service, along with a separate container single stream automated recycling program.

In 2020 to date, the Utility has collected:

- Sweeper Dirt – 1077.88 tons
- Heavy Trash – 1038.79 tons
- Recyclables – 3635.71 tons

Recycling stations are provided by Republic Services at the landfill and by Advanced Disposal at their transfer station. Tri-State Resource Recovery and the Wesselman Nature Society also provide recycling stations in the City. The City also has a single stream automated recycling program within City limits. The contract includes approximately 40,000 households. The Vanderburgh County Solid Waste District contracts with the Wesselman Nature Society to conduct bi-monthly drop-off recycle days at two county locations. Other

recycling locations and materials to be recycled can be found on the solid waste link at http://www.evansville.in.gov/recycle.

A Tire Recycling Day was held in the Civic Center parking lot on 10/10/2020 and 760 tires were collected. Electronics Recycling Days were cancelled due to health concerns related to COVID-19.

The District holds an annual Holiday Recycling Program. In addition to Christmas trees, the District accepted a wide range of items including the "standard" recyclables (aluminum and metal cans; plastic milk jugs, plastic soft drink bottles and other #1 and #2 plastic bottles; corrugated cardboard; newspaper and mixed household paper including magazines and catalogs)

Household Hazardous Waste collection Program

The District's annual Household Hazardous Waste Collection Program or Tox-Away Day is held each year in September. This program offers residents a safe disposal option for household hazardous chemicals as well as an opportunity to learn about ways to properly store, handle and dispose of these materials. Items such as oil-based paint, used motor oil, anti-freeze, chemicals, pesticides, pharmaceuticals and other hazardous materials are collected at this popular event. Paint continues to be the most common item by weight. The program was held on September 26, 2020, and some of the items and the amounts are listed in **Exhibit 2.27**:

Exhibit 2.27
Tox-Away Day – Materials Collected

Material	Gallons	Pounds
Paint		27,583
Oil		12,575
Antifreeze		2,999
Flammable liquids/fuels		10,639
Putty & Adhesives		5,775
Aerosols		3,205
Pesticides & Herbicides		6,156
Household Cleaners		2,338
Miscellaneous Chemicals		3,559
Lead Acid Batteries		2,767
Mixed Batteries		3,021
Mercury		26
Cylinders		818
Fire Extinguishers		111
Smoke Detectors		45
Fluorescent bulbs		2,545
Lamp Ballast		324

Sewer Use Ordinance

The City has implemented the CSO related Sewer Use Ordinance (SUO) items required by the Utility's NPDES Permits, including a prohibition of the introduction of inflow sources to any sanitary sewer, a prohibition of construction of new combined sewers, a requirement that new construction tributary to the sewer be designed to minimize or delay inflow to the combined sewer, and a requirement for the separation of inflow/clear water and sanitary connections to a combined sewer to facilitate disconnection of the former if a separate sewer becomes available. These items can be found in Title 13 Public Utilities and Services of the City's Municipal Code at: http://www.codepublishing.com/in/evansville/.

Interlocal Agreement

The City of Evansville's continues its Intermunicipal Wastewater Treatment Agreement with the Town of Darmstadt and Vanderburgh County. for this CSOOP Update, there are no changes in regards to the agreement.

Fats Oils and Grease (FOG)

The Utility's FOG program is currently consistent with the requirements of CMOM 3.1, which expands upon the requirements of CMOM 2.0, CMOM 2.1, and CMOM 3.0.

CMOM 2.0 (submitted May 1, 2011) required provisions for the control of FOG by cleaning or other effective methods, including procedures for attempting to prevent the introduction of FOG to the system, and the identification of areas where FOG blockages have recurred and where introduction of FOG to the system is likely. The FOG 2.0 program includes:

- Establishment and annual updating of a database of Food Establishments in the service area that are sources of FOG.

- Requirements that food establishments clean out grease control equipment at intervals appropriate to maintain grease capture effectiveness, and keep records of the dates and amounts of grease removed, and explain how and where the grease was disposed.
- Procedures for notice to new food establishment owners and operators about the requirement of grease capture and record keeping.

CMOM 3.0 (submitted November 30, 2012) and CMOM 3.1 (submitted February 14, 2014) required an enforceable mechanism to impose specific requirements for Food Establishments that are sources of FOG, enforcement procedures for non-compliant Food Establishments, and Food Establishment inspection requirements.

Current FOG Procedures

- The City's web site includes a section on managing FOG. Public outreach materials were distributed to food establishments in 2015. The materials communicated items such as:
  - Benefits of reducing FOG
  - Employee Education and Management Commitment
  - Grease trap cleaning and maintenance requirements
  - Enforcement regulations and compliance

- The Utility and Vanderburgh County Health Department worked jointly to enhance the Utility's FOG program. At the beginning of 2011, the Health Department focused on educating food establishments on best management practices for controlling FOG. Additionally, they distributed questionnaires to gather information and update their records regarding the number of grease interceptors in the system. Following the emphasis on education and data collection, inspection and enforcement actions were initiated.
- In March 2011, the Utility began inspecting grease traps. The Decree requires periodic and random inspections of food-preparation establishments' grease control measures at least once every five years, with at least 40% of establishments inspected every two consecutive years.

- Grease trap inspection statistics are reported in each Semi-Annual Report.
- On October 10, 2011 the Utility began issuing Notice of Violation (NOV) outlining corrective measures to be taken and a timeline for completion. Failure to address the issue, failure to respond or failure to meet the stipulated time frame(s) will be recourse for the issuance of a monetary penalty.
- A fine structure within the Utility's existing Sewer Use Ordinance was approved October 11, 2011 by the Utility Board for violations of FOG exceedances. The fine structure was amended and approved September 13, 2016 by the Utility Board. The FOG Corrective Action Plan and Fine Structure is listed in **Exhibit 2.28**.
- In 2014, the Utility hired a FOG Coordinator and FOG Inspector to enhance the FOG program, and increase inspections and oversight of food establishments.
- In 2017 the Utility adopted the "Policy for Design, Installation, and Maintenance of FOG Removal Systems guidance manual" and amended Sections of the Evansville Municipal Code pertaining to the manual to ensure that FOG establishments meet or exceed the standards set forth in the manual.

Exhibit 2.28
FOG Corrective Action Plan & Fine Structure

Violation Category	Corrective Action/Description	Ordinance or Utility Rule Reference	Compliance Due Date	2nd NOV	3rd NOV	Administrative Compliance Order
Failure to Submit FOG Questionnaire	The User must submit (fax /mail) the questionnaire.	Chapter(s) **13.05.090** Grease, oil or sand traps	**14 days from 1st NOV**	**14 days from 1st NOV *$50* fine**	**28 days from 1st NOV *$200* fine**	**Any non-compliance beyond the 3rd NOV may result in a Compliance Order**
Disallow Inspection	The User must reschedule the inspection with the Inspector.	Chapter **13.05.110** Right of entry and **13.10.180** Right of entry and **13.10.190** Compliance with order	**7 days from original inspection**.	**7 days from 1st Inspection *$250* fine**	**14 days from 1st Inspection *$500* fine**	**Any non-compliance beyond the 3rd NOV may result in a Compliance Order**
Failure to maintain records	The User must keep a maintenance log and manifests on site.	Chapter(s) **13.05.090** Grease, oil or sand traps	**14 days from 1st NOV**	**14 days from 1st NOV *$50* fine**	**28 days from 1st NOV *$250* fine**	**Any non-compliance beyond the 3rd NOV may result in a Compliance Order**
Failure to install/maintain removal devices in properly working order	Grease trap/interceptor needs repair (i.e. baffles, inlet/outlet "T's"), replaced, or installed. *Any discharge to the sewer that has more than 200 mg/l of fats, oils, greases or waxes is a violation.*	Chapter(s) **13.05.090** Grease, oil or sand traps ; **13.20.020** General discharge prohibitions	**30 days from 1st NOV (repairs)** **90 days from 1st NOV (installations)**	**30 days from 1st NOV *$100* fine** **90 days from 1st NOV *$250* fine**	**60 days from 1st NOV *$500* fine** **120 days from 1st NOV *$500* fine**	**Any non-compliance beyond the 3rd NOV may result in a Compliance Order**
Failure to clean outdoor or indoor grease removal devices("25% Rule)	The User must have device cleaned/pumped and fax manifest/log to Fog Coordinator. *The total operating depth of the grease trap/interceptor is more than 25% full (5% settles/bottom, 20% floats/top).*	Chapter(s) **13.05.090** Grease, oil or sand traps ; **13.20.020** General discharge prohibitions	**14 days from 1st NOV**	**14 days from 1st NOV *$50* fine**	**28 days from 1st NOV *$250* fine**	**Any non-compliance beyond the 3rd NOV may result in a Compliance Order**
Source of sanitary or combined sewer overflow	The User must have all maintenance issues fixed to ensure another overflow does not occur.	Chapter(s) **13.05.090** Grease, oil or sand traps; **13.20.020** General discharge prohibitions	**Within 24 Hours of Notice**			

Erosion Control

To limit contaminated construction site run-off from reaching the receiving waters and to limit the amount of solids entering the collection system the Board of Commissioners of Vanderburgh County, Indiana, developed, adopted and implemented a Construction Site Erosion Control Ordinance (Chapter 13.05), in addition to its MS4 related storm water ordinances. This type of ordinance limits the amount of solids that enter the collection systems which reduces the solids build up and maximizes collection system storage capacity.

The following Best Management Practices (BMPs) are mentioned in the Ordinance:

- infiltration of storm water runoff;
- flow reduction by use of open vegetated swales and natural depressions;
- installation of filter strips,
- buffer strips, parking lot tree islands, and riparian zones;
- minimization of land disturbance and surface imperviousness;
- maximization of open space; and storm water retention and detention ponds

Website Pollution Prevention Education

Evansville has made some improvements to the web site to engage the public on pollution prevention. There is a specific page under ReNew Evansville on the web site, entitled **Resources.** This contains downloadable and printable Renew Evansville materials, plus links to helpful and educational resources. The links urge the public to take simple steps to keep pollutants from the combined sewer system and storm drains.

2.8 NMC 8: Public Notification (PN) to ensure that the public receives adequate notification of CSO occurrences and CSO impacts

The Utility adheres to the procedures for public notification as described within the Sewer Overflow Response Plan version 2.2. The segments are described below.

Notification – Signs

CSO notification signs are placed at each CSO structure. A list of the CSO signage locations can be found in the SORP document. In accordance with CSO PN Rule 327IAC5-2.1-6, signs are also offered to property owners adjacent to waterways which may be affected by CSO discharges.

PN Language Posted Sign

Notification – Email/Internet

In addition to including the minimum notification procedures required by the State PN rule, the Utility has also customized the requirements by incorporating the ability to provide real time specific notifications with the website. The Utility has improved the website to provide

more information to the public about CSOs. The web site describes CSOs, what they are and why they happen, a characterization of CSOs in Evansville including a description and a map showing where they could happen, a section on solutions that Evansville is implementing to control CSOs and a resources page that provides documents from EPA, sections of the LTCP and a glossary of terms. The website contains educational links to regulatory web sites, copies of relevant City plans, and maps of CSO outfalls. A digital notification system completed in 2011, allows individual notification via email, or mobile telephone to alert them about a CSO's occurrence. The website address is http://cso.ewsu.com. The website also includes a sign up link for email notification regarding CSO events.

Newspaper Notifications

As with the notifications on the internet website, EWSU also sends notifications of CSO events to the Evansville Courier and Press.

Education

Public Education programs can encourage the proper disposal of items that could potentially enter the waste stream, such as motor oil, household chemicals, and lawn care products, etc. Utility staff conducts WWTP tours for grade schools, high schools, universities, and other interested groups, to teach about wastewaters link with the natural hydrologic cycle. In addition, the Utility participates in community projects that give young people an awareness of issues such as water conservation, water pollution, and the importance of water to our society. The Vanderburgh County Solid Waste Management District develops and distributes educational materials to citizens and businesses on waste reduction and recycling, composting, hazardous waste, improper waste disposal, and other issues.

A public information forum was conducted following the completion of Evansville's Study on Pigeon Creek. In addition, the Mayor in Evansville has a monthly traveling town hall meeting in locations throughout the city in which the public is welcome to comment or question members of city government about any issue, including CSOs. During the initial LTCP

development, a diverse and large Citizen's Advisory Committee (CAC) was created, and as detailed in the City's LTCP, several CAC meetings were held. This CAC will meet during the revisions, and later implementation, to the LTCP.

In May 2013, the Utility hosted a series of six public forums throughout Evansville to educate the public on the impacts of sewer overflows, the Utility's proposed plan to address overflows and the associated costs of a comprehensive program. Additionally, the Renew Evansville website, www.renewevansville.com, includes comprehensive information about combined sewer overflows, including short videos describing the CSO problem and Evansville's proposed solutions. In September 2013, the Utility also hosted a live call-in show on local public television station WNIN to discuss sewer overflows, their impacts on the Evansville community and the associated cost of addressing overflows. This community forum can be viewed on the WNIN website, www.WNIN.org.

Other Communications

Not all members of the public have computers or use them to obtain information. The Utility's public information strategy includes other methods for communicating with the public about CSOs. For example, Evansville sends a letter each year to residents adjacent to waterbodies that may be affected by CSO discharges explaining that heavy rains will potentially cause CSO discharges. The letters warn against contact with the water, Ohio River and Pigeon Creek after rains.

2.9 NMC 9: Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls

To monitor and characterize CSO impacts and improve CSO controls, the Utility:

- Completed installation of overflow alarms at all lift stations in 2010. All of the Utility's lift stations are equipped with overflow alarms to notify Utility personnel in the event of a high wet well level.

- Implemented real time monitoring of CSOs. Real time data is transmitted through the canopy system so that it is accessible by field staff. Cellular units have been installed at locations were telemetry is restricted.

- Initiated real time monitoring along Pigeon Creek Interceptor to understand system response during different wet weather conditions and to determine how to maximize conveyance through the Pigeon Creek Interceptor by using existing infrastructure while reducing CSOs.
- Procured 14 area-velocity flow monitors in April 2010 and deployed them throughout the sanitary sewer system (SSS) to record flow data for further analysis and input to the CSS hydraulic models.

- Leased 13 area-velocity flow monitors in April 2010 and deployed them throughout the CSS to measure in-system flows for update and validation of the CSS hydraulic models.

- Leased and collected data from 19 rain gauges as part of the 2010 flow monitoring effort (purchased 3 of the 19 for future use).

- Purchased 16 area-velocity flow monitors in January 2011 and deployed them throughout sewer system in a second phase of flow monitoring. Collected data from a total of 25 rain gauges as part of the Phase 2 flow monitoring.

- Installed 25 flow monitors, transformed 4 existing monitors from level to flow monitors, and installed 7 rain gauges to collect additional information that will be used to refine and validate the CSS hydraulic models, and that will become the foundation of the IOCP post-construction monitoring program.

3.0 Reference Documents

CH2M HILL. November 2011. Initial System Characterization Including Separate Sanitary Sewer Hydraulic Model Development. Prepared for Evansville Water and Sewer Utility.

EMC. November 2003. Combined Sewer Overflow Public Notification Rule 327 IAC 5-2.1 Plan (and responses). Prepared for Indiana Department of Environmental Management, and Evansville Water and Sewer Utility.

EWSU. March 2020. Semi-Annual Report 2019-2.

EWSU. September 2020. Semi-Annual Report 2020-1.

Harza Engineering Company, Inc. March 2001. Pigeon Creek Watershed Diagnostic Study. Prepared for Indiana Department of Environmental Management, Evansville Water and Sewer Utility, and Four Rivers Resource Conservation and Development Area, Inc.

HNTB. April 2002. Combined Sewer Overflow Long Term Control Plan. Prepared for Indiana Department of Environmental Management, and Evansville Water and Sewer Utility.

Rust Environmental and Infrastructure. June 1997. Combined Sewer Overflow Solid and Floatable Control and SRCER Protocol. Prepared for Evansville Water and Sewer Utility, Evansville, IN.

SEC Donohue Inc. October 1992. Combined Sewer Overflow Operational Plan (and responses). Prepared for Indiana Department of Environmental Management, and Evansville Water and Sewer Utility.

Appendices

Appendix A

Utility Organization

Submitted in attachment CD

Appendix B

7th Avenue Lift Stations and West WWTP Operation SOP

Submitted in attachment CD

Appendix C

Responses for USEPA Comments on 7th Avenue Lift Station and West WWTP SOP

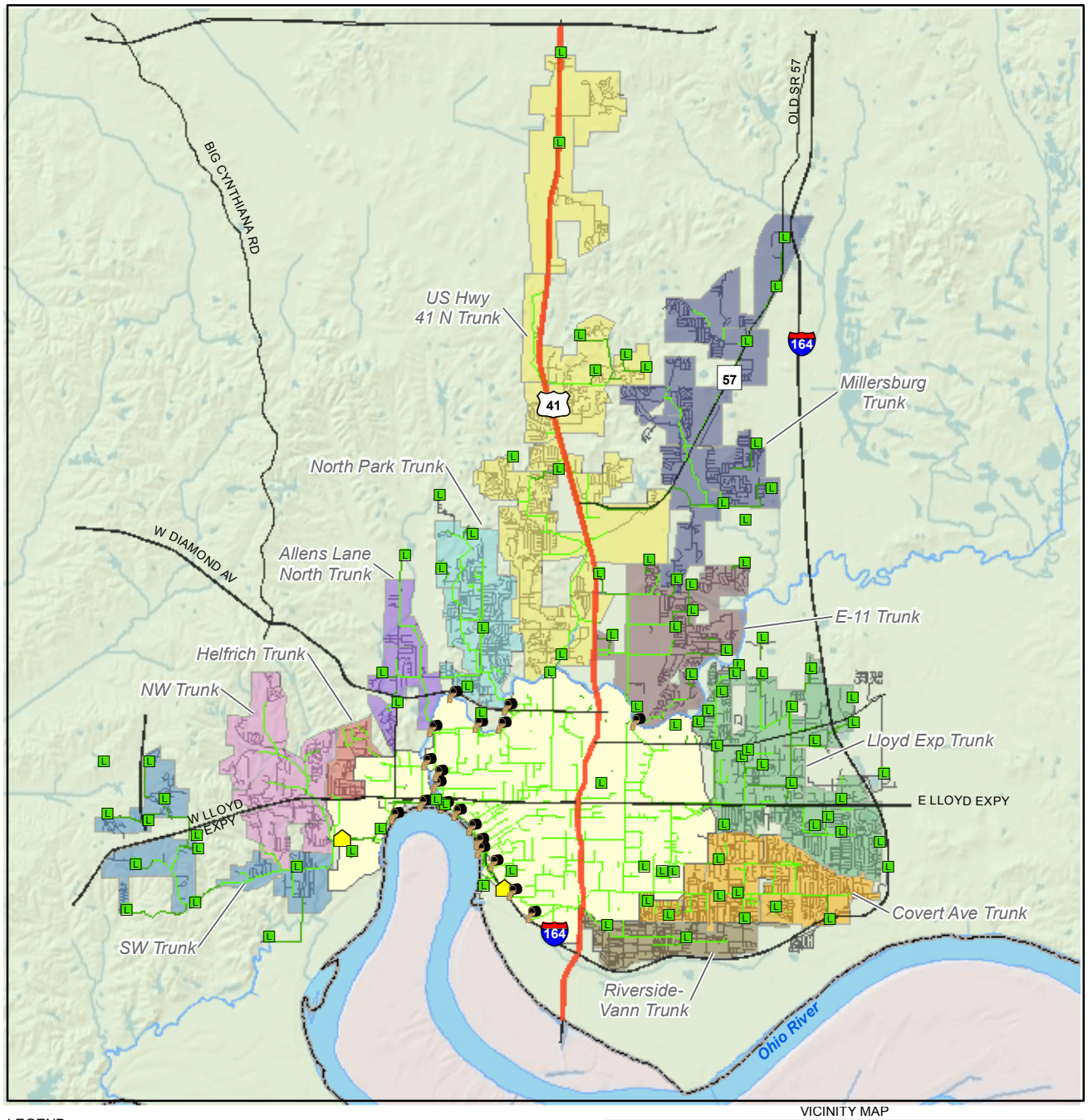
Submitted in attachment CD

Appendix D

East WWTP Operation SOP

Submitted in attachment CD

Figures



LEGEND

- CSO
- Wastewater Treatment Plant
- Wastewater Lift Station
- Forcemains
- Trunk Sewers
- Sewer Main
- Major Road
- US Hwy 41
- Hydrography
- Combined Area
- Indiana State Boundary

Sanitary Basins

- Covert Ave Trunk
- E-11 Trunk
- Helfrich Trunk
- Lloyd Exp Trunk
- Millersburg Trunk
- NW Trunk
- North Park Trunk
- Riverside-Vann Trunk
- SW Trunk
- Allens Lane North Trunk
- US Hwy 41 N Trunk

VICINITY MAP

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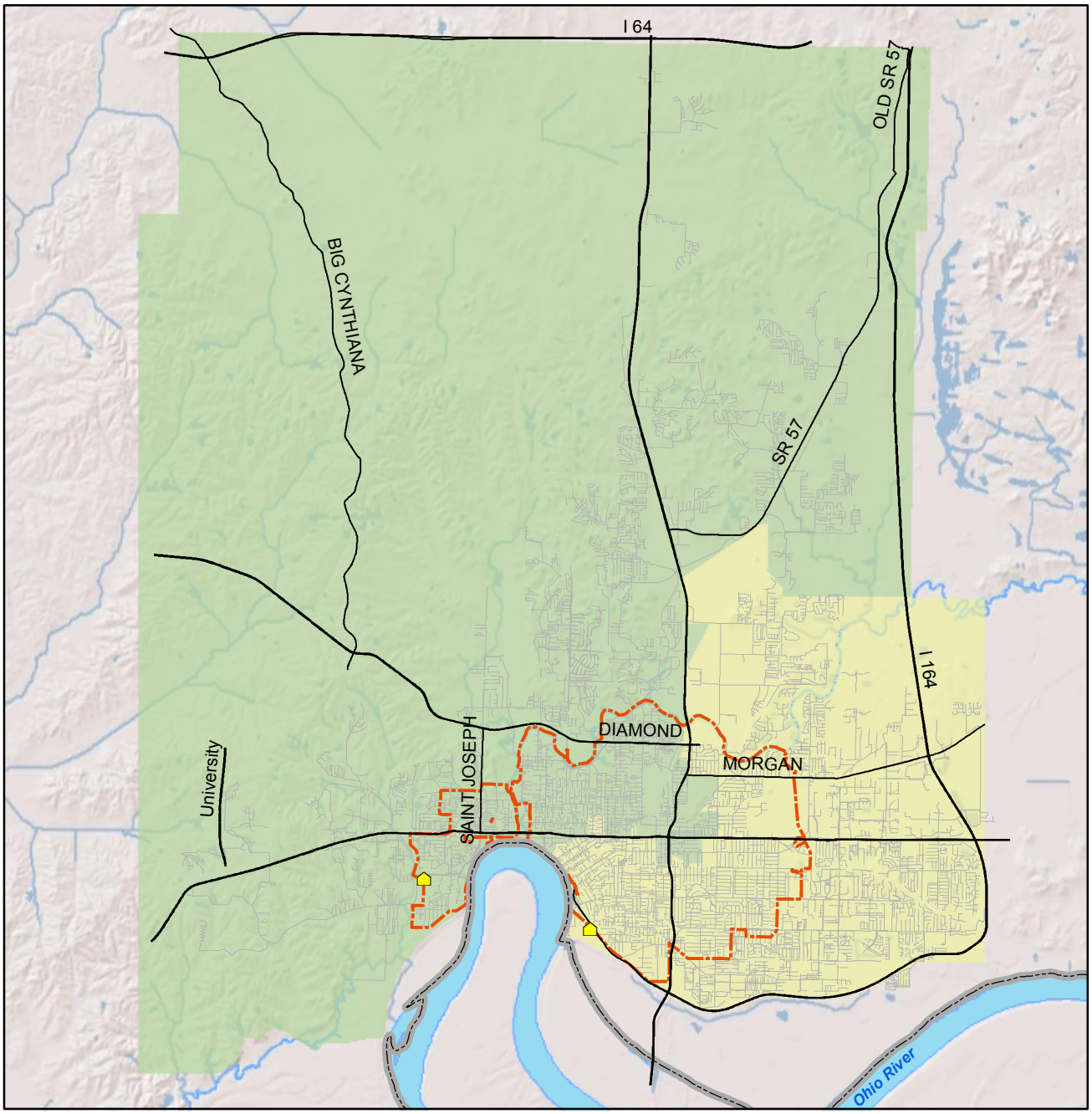
FIGURE 1
Collection System
CSOOP 2020
October 30, 2020



LEGEND

- Wastewater Treatment Plant
- Sewer Segment
- Combined Sewer Area
- Major Roads
- Hydrography
- Indiana State Boundary
- West Service Area
- East Service Area

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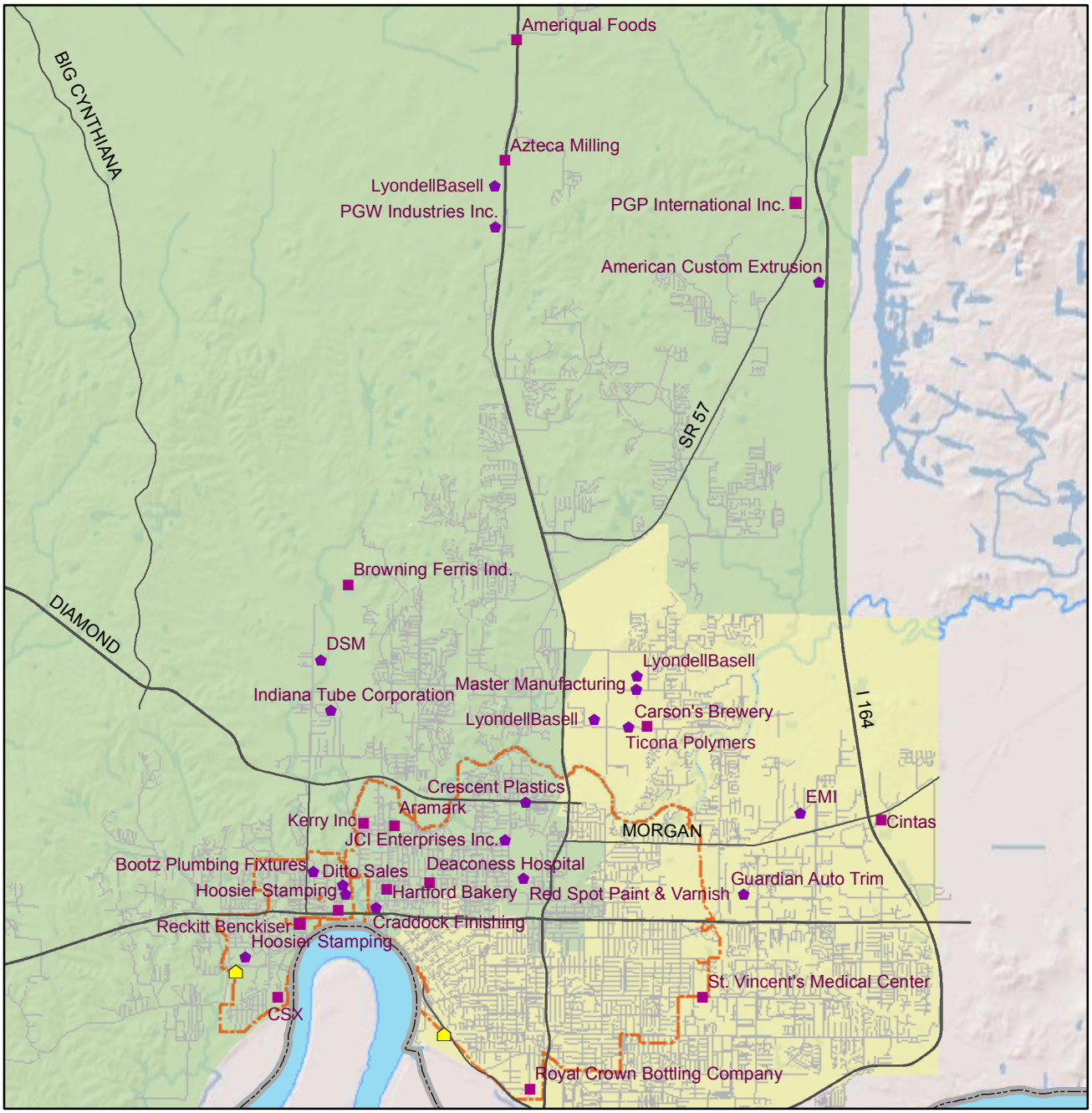
VICINITY MAP

FIGURE 2
WWTP Service Areas
CSOOP 2020
October 30, 2020



LEGEND

- Non-Categorical Dischargers
- Categorical Dischargers
- Wastewater Treatment Plant
- Sewer Segment
- Combined Sewer Area
- Major Roads
- Hydrography
- Indiana State Boundary
- West Service Area
- East Service Area

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Feet

VICINITY MAP

FIGURE 3
Industrial Discharge Locations
CSOOP 2020
October 30, 2020

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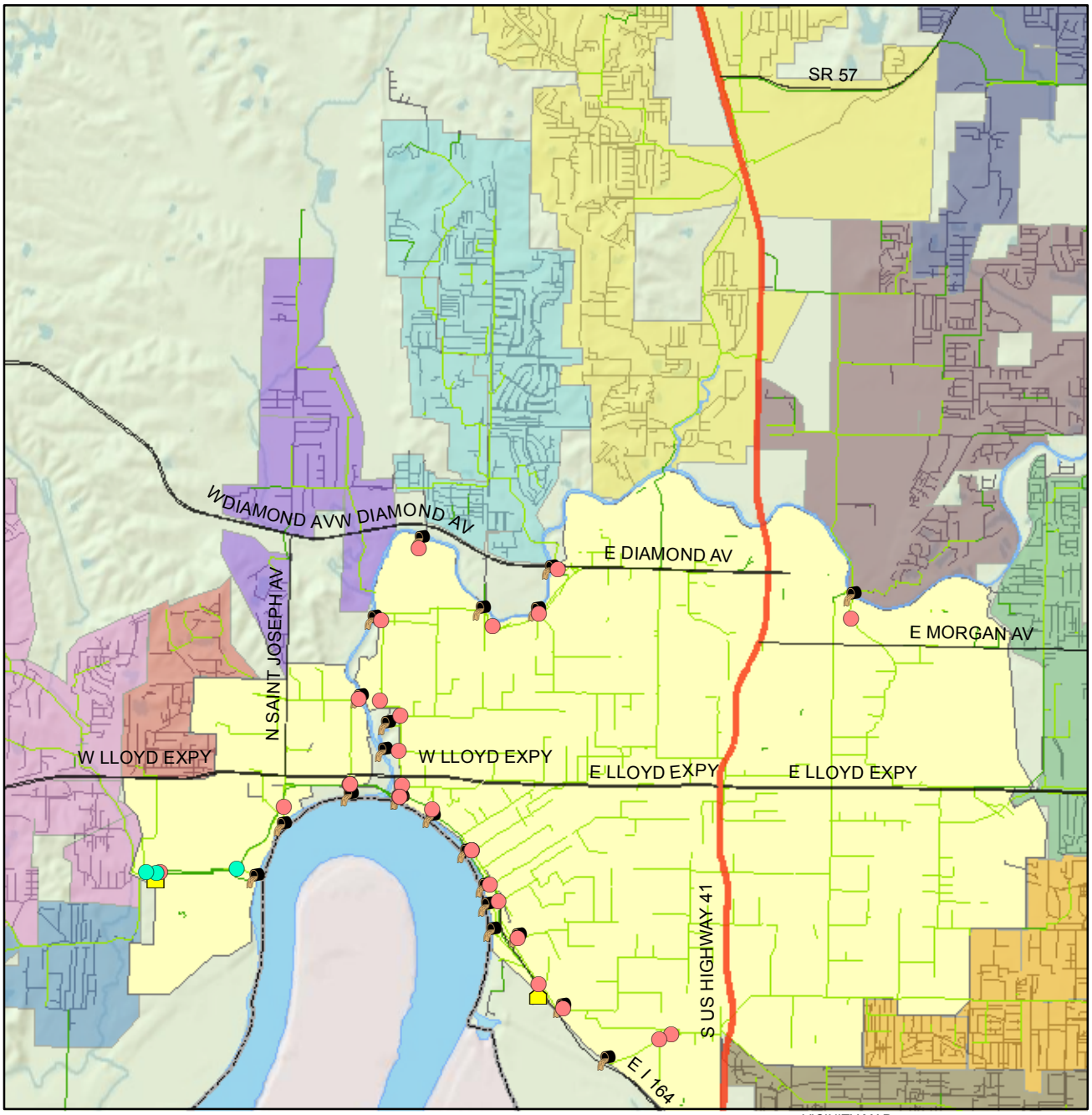

LEGEND

- Permanent System Monitors
- CSO Monitors
- CSO
- Wastewater Treatment Plant
- Forcemains
- Trunk Sewers
- Sewer Main
- Major Road
- US Hwy 41
- Hydrography
- Combined Sewer Area
- Indiana State Boundary

Sanitary Basins

- Covert Ave Trunk
- E-11 Trunk
- Helfrich Trunk
- Lloyd Exp Trunk
- Millersburg Trunk
- NW Trunk
- North Park Trunk
- Riverside-Vann Trunk
- SW Trunk
- Allens Lane North Trunk
- US Hwy 41 N Trunk

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Feet

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VICINITY MAP

FIGURE 4
Permanent Collection System Monitors
CSOOP 2020
October 30, 2020

CH2MHILL

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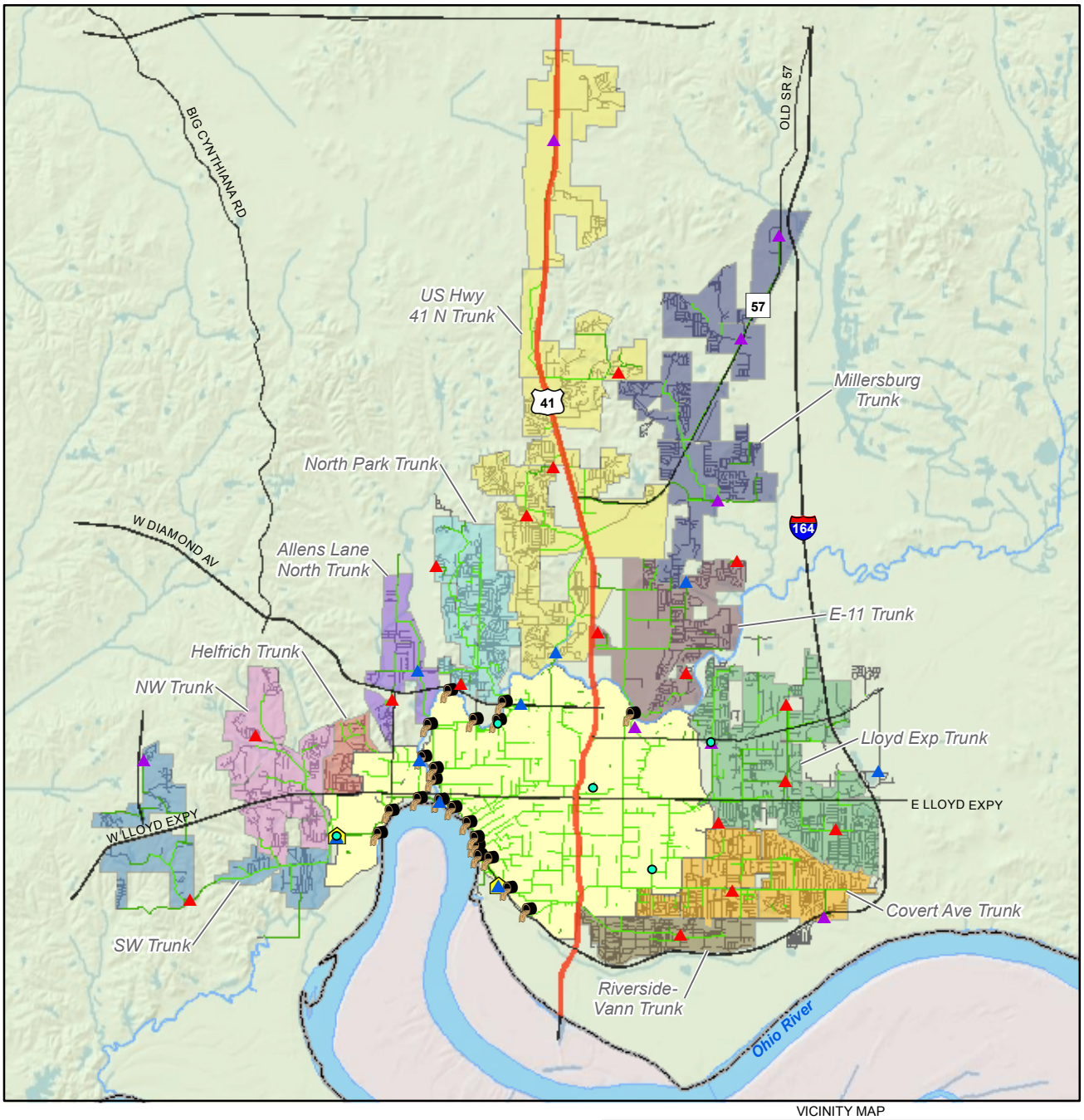

LEGEND

- Permanent Rain Gauge Location
- Phase 2 Rain Gauge Location
- Phase 1 Rain Gauge Location
- Phase 1 & 2 Rain Gauge Location
- CSO
- Wastewater Treatment Plant
- Forcemains
- Trunk Sewers
- Sewer Main
- Major Road
- US Hwy 41
- Hydrography
- Combined Sewer Area
- Indiana State Boundary

Sanitary Basins

- Covert Ave Trunk
- E-11 Trunk
- Helfrich Trunk
- Lloyd Exp Trunk
- Millersburg Trunk
- NW Trunk
- North Park Trunk
- Riverside-Vann Trunk
- SW Trunk
- Allens Lane North Trunk
- US Hwy 41 N Trunk

VICINITY MAP

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FIGURE 5
Evansville Rain Gauges
CSOOP 2020
October 30, 2020