Elkhart Public Works and Utilities
Combined Sewer Overflow Operational Plan

This document is the City of Elkhart's plan to comply with the minimum technology-based controls specified in the United States Environmental Protection Agency's National CSO Control Policy.

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Introduction

The U.S. Environmental Protection Agency (EPA) issued the National Combined Sewer Overflow (CSO) Control Strategy in 1989. This Strategy was expanded and updated, resulting in the National CSO Control Policy published in 1994. The Indiana Department of Environmental Management (IDEM) adopted the State's CSO Strategy in 1996, based on the National CSO Strategy and Policy. These three documents comprise the backbone for the site-specific NPDES permit requirements for combined sewer systems (CSSs) in the State of Indiana.

The Federal and State CSO policies were divided into two phases. Phase I focused on implementation of technology-based requirements referred to as the Nine Minimum Controls (NMCs). The NMCs listed below were developed to provide low-cost measures that could be implemented to reduce the magnitude, frequency and duration of CSOs:

1. Proper operation and regular maintenance of the collection system.
2. Maximum use of the collection system for storage of excess flows.
3. Review and modification of Industrial Wastewater Pretreatment programs.
4. Maximization of flow to the POTW for treatment.
5. Prohibition of CSO discharges during dry weather.
6. Control of solid and floatable materials in CSO discharges.
7. Pollution prevention programs.
8. Public notification to ensure that the public receives adequate notification of CSO occurrences and impacts.
9. Monitoring to characterize CSO impacts, identify problem CSO points, and identify the effectiveness of the previous eight control measures.

The City of Elkhart is located in north central Indiana, just south of the Michigan border. The City operates and maintains approximately 375 miles of sewer. The sewer system consists of combined sewers, separate sanitary sewers and separate storm sewers. Currently the system includes 29 active CSO outfalls that discharge into three receiving streams, the Elkhart River, St. Joseph River and Christiana Creek. The St. Joseph River is an interstate stream that originates in Michigan and enters Indiana northeast of the City of Elkhart. The river passes through Elkhart, Mishawaka and South Bend before re-entering Michigan where it eventually discharges into Lake Michigan at Benton Harbor. The Elkhart River flows northwesterly through Elkhart County and discharges into the St. Joseph River at N. Main Street in Elkhart. Christiana Creek is a tributary to the St. Joseph River consisting of a watershed that extends north into Michigan. **Figure 0-1** shows an overview of the City of Elkhart, its sewer service area and the receiving streams.

The City's initial CSO Operational Plan (CSOOP) addressed the first six minimum controls. Although not required by the City's NPDES permit, this document was initially submitted by the City to IDEM in 1992. Phase II of the federal and state CSO policies focused on meeting the water quality based requirements of the Clean Water Act. The City of Elkhart was issued its Phase II requirements in its NPDES permit in January of 1997. "Attachment A" of this permit outlined for the City its obligations to address CSO issues in the City. The City was required under this NPDES permit to:

- Prepare and submit to IDEM a Stream Reach Characterization and Evaluation Report (SRCER). The SRCER is intended to establish a "baseline" condition of the water quality of the receiving streams after implementation of the NMCs, prior to the implementation of any long-term control measures. Elkhart submitted its SRCER to IDEM in October 2000. From the SRCER, it is clear that CSOs do impact the bacterial quality of our receiving streams. However, it is also clear from the SRCER that CSOs are not the only source of bacterial contamination in the receiving streams, particularly in the Elkhart River.
- Modify the City's Sewer Use and Rate Ordinance (SURO), if necessary, to contain the following provisions:
    - Prohibit introduction of inflow sources to any sanitary sewer;
    - Prohibit construction of new combined sewers;
    - Require that new construction tributary to the combined sewer be designed to minimize or delay inflow contribution to the existing combined sewer; and
    - Provide that for any new building the inflow/clear water connection to a combined sewer shall be made separate and distinct from the sanitary waste connection to facilitate disconnection of the former if a separate storm sewer subsequently becomes available.
- The City's SURO does contain these provisions.
- Prepare and submit to IDEM a Long Term CSO Control Plan (LTCP) to reduce the water quality impacts from the CSOs in the City of Elkhart. This plan was submitted to IDEM in April of 2002. In April 2004, IDEM and the U.S. Environmental Protection Agency (U.S. EPA) sent joint comments on the 2002 plan.
- Update the City's CSOOP to include the three additional minimum control measures. In 1996, the CSOOP was updated and submitted to IDEM. Full implementation of the NMCs has now been in place since 1996.

Elkhart's permit was reissued in 2012. Attachment A of Elkhart's 2012 permit contained updated requirements related to CSOs. The permit requires the City to implement their LTCP, approved December 15, 2011, consistent with terms and conditions of Consent Decree 2:11-CV-00328-JVB-APR.

In April 2011 the City, IDEM, and EPA agreed on a final LTCP and entered into a consent decree. Elkhart will complete implementation of the LTCP on or before December 31, 2029.

The CSOOP is intended to be a dynamic plan that is updated to reflect regulatory changes and system modifications. This CSO Operational Plan has been revised to reflect the improvements made in the Elkhart combined sewer system and changes made in the City's CSO policies and procedures. It should be noted that the City of Elkhart has been and continues to be committed to excellence in the care of our environment. The City of Elkhart has spent more than $46.3 million since 1990 to reduce sewer overflows into the St. Joseph and Elkhart rivers. These improvements have eliminated eleven sewer overflow points, redirecting millions of gallons of raw sewage away from the rivers and sending it to the wastewater treatment plant during wet weather.

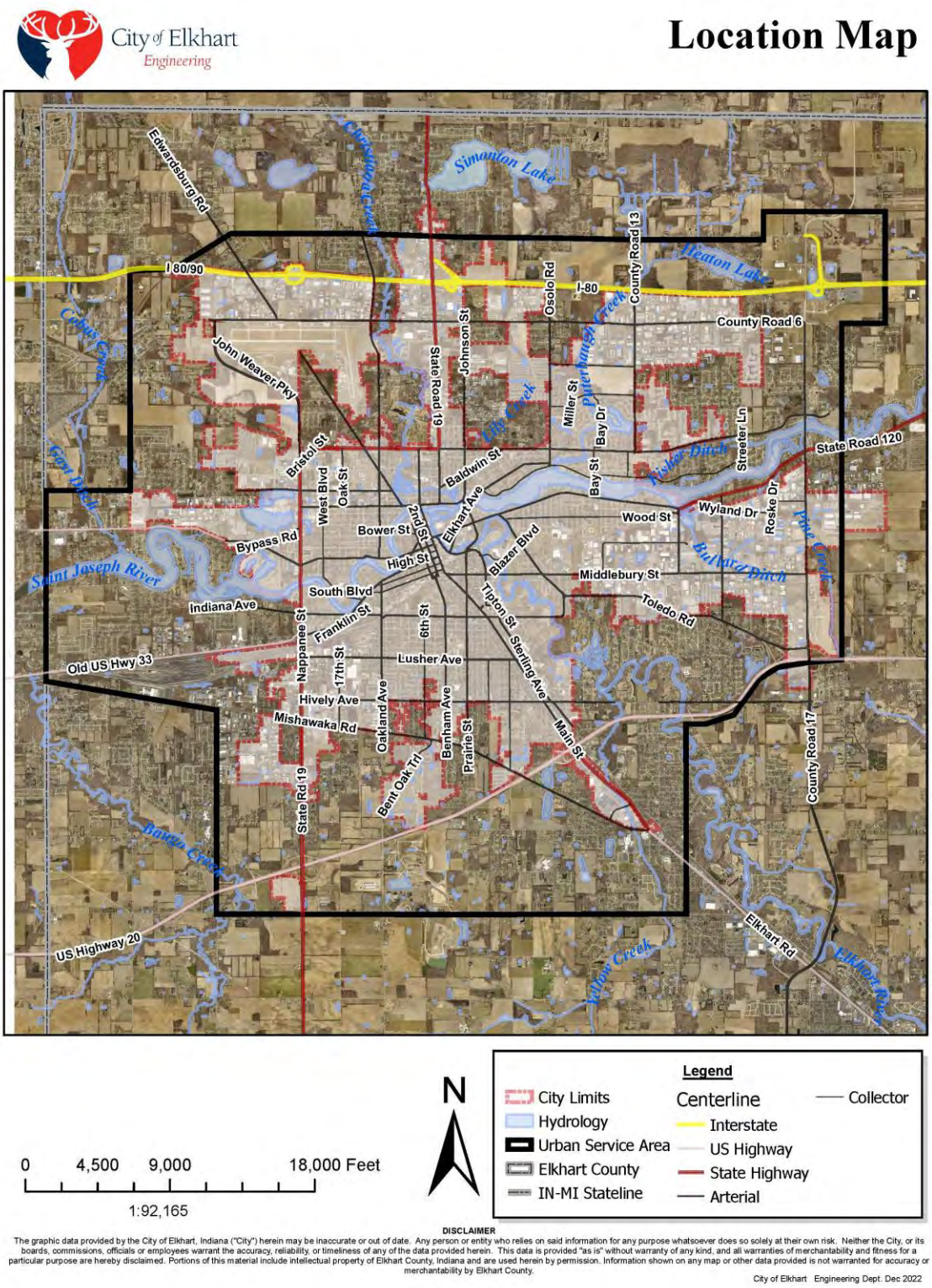


Figure 0-1 CSO Location Map

1) Proper Operation and Regular Maintenance Program

A) Organization Structure and Key Staff

The collection system is owned and maintained by the Elkhart Public Works and Utilities (PWU), a publicly owned treatment works (POTW) owned by the City and administered by the City of Elkhart Board of Public Works.

Elkhart Public Works and Utilities includes the Engineering Department, Utility Services Department, and Street Department and is overseen by the Director of Public Works. The Utility Services Manager leads the Utility Services Department. The Director of Public Works can redirect Public Works and Utilities' 160 employees as needed for emergencies. In regards to the collection system, key staff positions include the Utility Services Manager, Utility Engineer, Network Supervisor, Collection Systems Supervisor, Maintenance Supervisor, and Stormwater Manager. The Collection System Supervisor coordinates monitoring and preventative maintenance activities of the collection system and the Maintenance Supervisor coordinates the monitoring and preventative maintenance activities of the lift stations and the wastewater treatment plant. The Stormwater Manager manages the electronic monitoring of all CSO overflow. An abridged overview of PWU's organizational structure is provided in **Figure 1-1**.

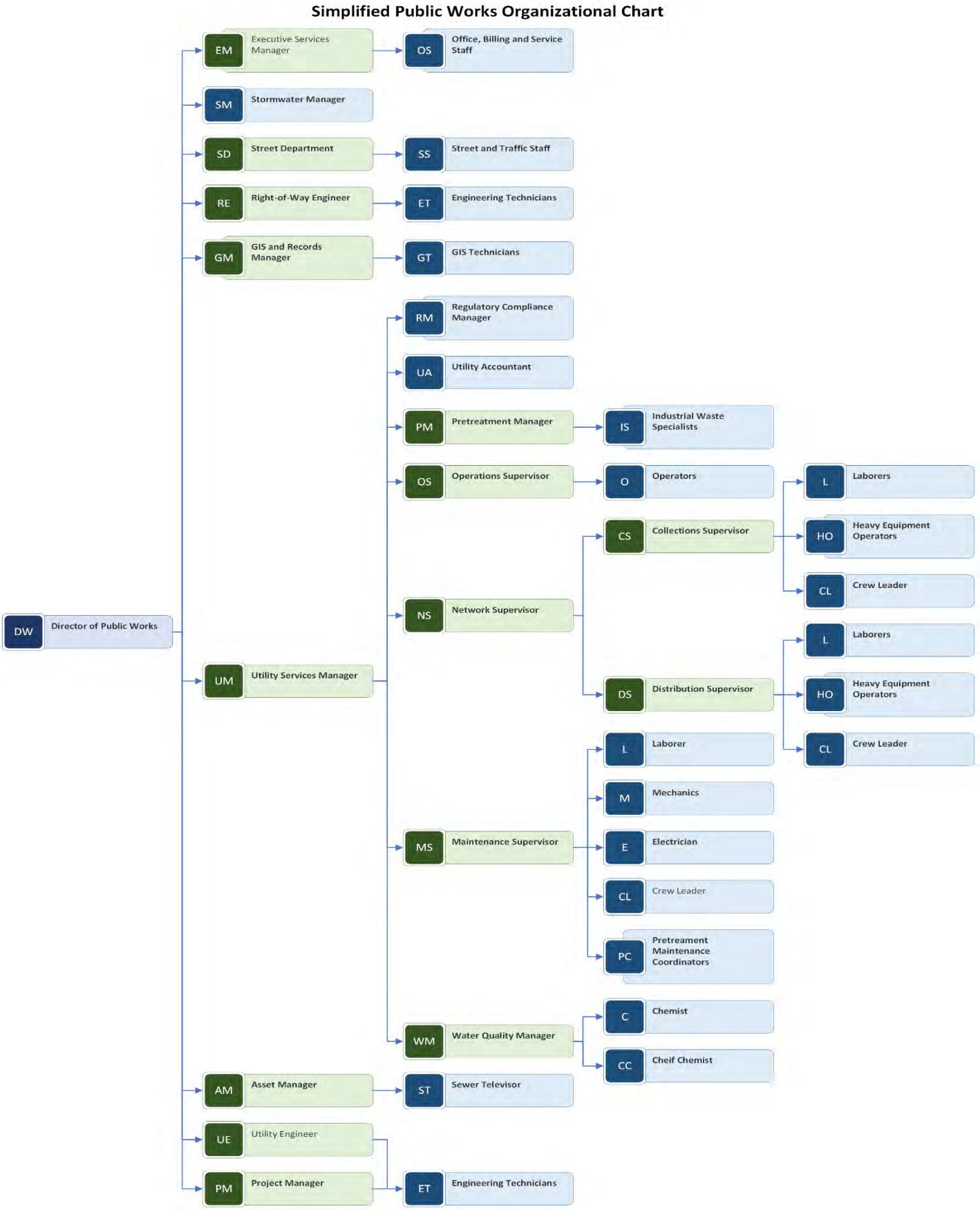


Figure 1-1 Organization Chart: Key Personnel

B) Key Equipment

Vehicles

Equipment	Department	Fuel Type	Capabilities/ Additional Equipment	Vehicle ID
2011 Ford F350	Collections	Gasoline	Lift gate	409
2017 Freightliner	Collections	Diesel	Vacuum	441
2020 Freightliner	Collections	Diesel	Vacuum	442
2023 Freightliner	Collections	Diesel	Vacuum	443
2019 Ford F550 Super Duty	Collections	Gasoline	Dump	467
2017 Ford F-250 4x4 Ext Cab	Collections	Gasoline	Snow Plow	468
2022 Ford F-250 Reg Cab 2WD	Collections	Gasoline	Lift gate, Snow Plow	469
2019 Ford F550	Collections	Gasoline	Dump	490
2019 Kenworth T-370	Collections	Diesel	Dump	496
2022 Ford F-550 Reg Cab 2WD	Collections	Gasoline	Lift gate	497
2010 Ford F-250 EX Cab 2WD	Collections	Gasoline	Supervisor pickup	498
2020 Ford E450	Engineering	Gasoline	Sewer Televising	440
2019 GMC Van	Maintenance	Gasoline		401
2010 Ford E150	Maintenance	Gasoline		407
2008 Ford F250	Maintenance	Gasoline		408
2011 Ford F350	Maintenance	Gasoline		411
2017 Ford F350	Maintenance	Gasoline	Snow Plow	414
2018 Ford F350	Maintenance	Gasoline	Snow Plow	415
2007 Ford F750	Maintenance	Diesel	70' Reach See Load Capacity on Vehicle	444
2016 Kenworth	Maintenance	Diesel	30' Reach See Load Capacity on Vehicle	454
2009 Ford F550	Maintenance	Gasoline	20' Reach See Load Capacity on Vehicle	455
2011 Ford F350	Maintenance	Gasoline	Snow Plow	495
2022 Ford F350	Maintenance	Gasoline	Snow Plow	499
2015 Ford F350	Maintenance	Gasoline	Snow Plow	710
2020 Ford F150	Maintenance	Gasoline	Snow Plow	735
2020 Ford F150	Maintenance	Gasoline		744
2020 Ford F150	Maintenance	Gasoline		745
2020 Kenworth T880	Operations	Diesel	Dump	422
2015 Kenworth T800	Operations	Diesel	Dump	423
2011 Ford F250	Operations	Gasoline		469
2018 Ford F150	Operations	Gasoline		711

Backhoes, Loaders, Skid Steers, Tractors, and Lifts

Equipment	Department	Fuel Type	Capabilities/ Additional Equipment	Vehicle ID
2013 John Deere 744K	Operations	Diesel	Loader with bucket	434
2018 Gehl R135 Skidsteer	Collections	Diesel	Forks, loader bucket, pavement breaker and snow blower	474
753 Bobcat Skid Streer	Collections	Diesel	Snow Blower	475
2013 John Deere Backhoe	Collections	Diesel		476
2003 John Deere Backhoe	Collections	Diesel		477
Genie Man Lift	Maintenance	Diesel	45’	
John Deere 1025 R Tractor	Maintenance	Diesel	Snow Blower	
2014 John Deere Tractor	Maintenance	Diesel	Front Bucket	4114
2001 Mitsubishi Forklift	Maintenance	Propane	Man Basket	456

Generators

Equipment	Department	Fuel Type	Capabilities/ Additional Equipment	Vehicle ID	Locations
Onan, Stationary Generator	Maintenance	Diesel	300 KW/375 KVA	G1	Lexington LS, 135 N. 6th St
Onan, Portable Generator	Maintenance	Diesel	100 KW	G2	Beardsley LS, 731 E. Beardsley
Onan, Stationary Generator	Maintenance	Diesel	300 KW/375 KVA	G4	Studebaker LS, 1200 Grand Ave
Onan, Stationary Generator	Maintenance	Natural Gas	35 KW	G5	Suburban LS, 28769 CR 16W
Onan, Stationary Generator	Maintenance	Diesel	300 KW	G6	High Dive LS, 619 Baldwin St
Onan, Stationary Generator	Maintenance	Natural Gas	35 KW	G9	Public Works (Admin Bldg, 1201 S. Nappanee)
Generac, Stationary Generator	Maintenance	Natural Gas	8 KW	G10	Public Works (Ops Center, 1201 S. Nappanee)

Onan, Portable Generator	Maintenance	Diesel	100 KW	G11	Public Works (Portable (Garage) 1201 S. Nappanee)
Onan, Portable Generator	Maintenance	Diesel	450 KW/562.5 KVA	G12	Public Works (Head Works, 1201 S. Nappanee)
Onan, Stationary Generator	Maintenance	Diesel	50 KW/62.5 KVA	G13	Grant & Bristol LS, 2401 E. Bristol
Kohler, Stationary Generator	Maintenance	Diesel	200 KW/ 250 KVA	G15	Edgewater LS, 1347 Edgewater
Kohler, Stationary Generator	Maintenance	Diesel	51KW/ 63 KVA	G16	8th & Franklin LS 734 W. Franklin
Kohler, Stationary Generator	Maintenance	Diesel	42KW/ 52 KVA	G17	Bridge St LS 305 Bridge St.
Kohler, Stationary Generator	Maintenance	Diesel	16KW/ 20 KVA	G18	Bay St LS 1323 Bay St.

Pumps

Equipment	Department	Fuel Type	Capabilities/ Additional Equipment	Vehicle ID
Portable Trash Pump	Maintenance	Diesel	6"	NA
Portable Trash Pump	Maintenance	Gasoline	4"	NA
Portable Trash Pump	Maintenance	Gasoline	4" hydraulic	NA
Portable Trash Pump	Maintenance	Gasoline	3"	NA

Other Equipment

Equipment	Department	Fuel Type	Capabilities/ Additional Equipment	Vehicle ID
2014 Husqvarna Cement Saw	Collections	Gasoline		4330
225 Miller welder / generator	Maintenance	Electric		NA

C) Budget

The Wastewater Utility and the City of Elkhart have a commitment to protecting the environment and for the last 30 years have directly funded the operation and maintenance of the collection system with a set of dedicated budget lines.

The approved budget for the Wastewater Utility is allocated to the various divisions. The division supervisors then have control of the funds and are responsible for assuring that the goals and objectives are realized while staying within their approved budgets.

The portion of the Utility budget dedicated to the collection system is summarized below in **Table 1-1**.

Table 1-1: Collection System Operating Budget Summary

Year	Personnel Budget	Material Budget	Service and Capital	Total Budget
2003	$ 631,331	$ 130,675	$ 148,455	$ 910,461
2004	$ 693,033	$ 134,675	$ 104,475	$ 932,183
2005	$ 684,496	$ 151,000	$ 76,309	$ 911,805
2006	$ 660,639	$ 150,600	$ 69,500	$ 880,739
2007	$ 458,245	$ 112,450	$ 66,060	$ 636,755
2008	$ 446,974	$ 131,550	$ 68,400	$ 646,924
2009	$ 446,749	$ 151,550	$ 70,685	$ 668,986
2010	$ 398,305	$ 155,315	$ 70,685	$ 624,305
2011	$ 400,225	$ 158,315	$ 69,185	$ 627,725
2012	$ 441,599	$ 158,315	$ 69,185	$ 669,097
2013	$ 372,953	$ 158,315	$ 67,160	$ 598,428
2014	$ 389,644	$ 153,195	$ 67,160	$ 609,999
2015	$ 401,220	$ 192,195	$ 67,160	$ 660,675
2016	$ 445,655	$ 188,445	$ 65,500	$ 699,600
2017	$ 451,817	$ 188,445	$ 75,800	$ 716,062
2018	$ 450,815	$ 169,682	$ 66,850	$ 687,347
2019	$ 495,312	$ 155,625	$ 110,350	$ 761,287
2020	$ 624,393	$ 161,979	$ 110,100	$ 896,472
2021	$ 644,769	$ 158,168	$ 113,600	$ 916,537
2022	$ 639,999	$ 168,181	$ 108,600	$ 916,780
2023	$ 874,364	$ 197,362	$ 204,500	$ 1,276,226
2024*	$ 839,266	$ 199,350	$ 152,969	$ 1,191,585

*2024 figures reflect approved budget amounts

The Utility also has a dedicated depreciation budget per GASB 34 that averages approximately $2,000,000 to replace large capital items such as vehicles, as much as $400,000 towards capital projects to enhance the collection system. These costs are not reflected in the O&M budget.

In addition, over $5,000,000 per year is being spent on collection system improvements related to the City's Long-term Control Plan.

The budget for the Wastewater Utility is prepared annually and approved by the Board of Public Works. The budget process has always solicited input from the collection system staff and weighed their request with other utility work areas. A brief summary of the process is as follows:

- Collections Supervisor and the Utility Accountant review the previous year's budget and spending.
- They prepare a first draft of the new budget
- The budget requests for all work groups and the revenue projections are combined for a draft Utility budget.
- If the revenues are insufficient to support the expenditure requests, the managers of the separate areas meet with the Utility Accountant to determine where savings may be found without compromising the basic duties of the Utility.
- The final budget is prepared and it is presented at a public meeting of the Board of Public Works.
- At the meeting the staff may defend their requests and answer other questions from the Board.
- After any modifications are made the Board approves the final budget.

D) Critical Facilities

The City of Elkhart is served by a primarily combined sewer system. As of March, 2023, the collection system consisted of approximately 375 miles of sewer, 66 lift stations, seven (7) river crossings and 29 combined sewer overflow outfalls. **Tables 1-2**, **1-3**, **1-4**, and **1-5** provide a summary of the critical components of the City's collection system and **Figure 1-2** shows the overall system.

The entire system was surveyed in 1989 and again in 2000. The system is mapped and is continuously updated. The system maps are maintained in digital formats.

The City created a Geographic Information System (GIS) in the mid 1990's. This computer-based intelligent mapping tool links various databases to a digital map allowing trained staff to access records such as system inventory, televising records, Significant Industrial Users (SIUs), CSO basins, lift station basins, and land use information through individual work stations. Today, City staff utilizes sub-meter or better GPS units to collect new and existing critical infrastructure components. In 2002, the City further developed the GIS tool by creating an interactive GIS for the City's Intranet using ESRI's ArcGIS. This tool, available to all City employees, provides access to many of the Utility's records and maps.

Table 1-2 City of Elkhart's Utility Owned System Sewer Types

Type Of Sewer	Length (mi) 2023
Combined Sewer (includes Storm Runoff, Effluent)	121 Miles
Separate Sanitary Sewer passing through a Combined Sewer Area	129 Miles
Separate Sanitary Sewer	28 Miles
Separate Storm Sewers	77 Miles
Sanitary Force Mains (all non-Storm Only)	18 Miles
Storm Only Force Mains	0.09 Miles
Misc. (unknown, stubs, etc.)	1.5 Miles
Total Length	375 Miles

Table 1-3 Utility Owned Structures

Type Of Structure	Count 2023
Manholes	6,800
Lift Stations	66
CSO Outfalls	29
Catch Basins	5,422
Total Structures	12,330

Table 1-4 System wide* Sewer Types within the Collection System

Type Of Sewer	Length (mi) 2023
Combined Sewer (includes Storm Runoff, Effluent)	123 Miles
Separate Sanitary Sewer passing through a Combined Sewer Area	147 Miles
Separate Sanitary Sewer	65 Miles
Separate Storm Sewer	130 Miles
Sanitary Force Mains (all non-Storm Only)	58 Miles
Storm Only Force Mains	0.09 Miles
Misc. (unknown, stubs, etc.)	3.5 Miles
Total Length	527 Miles

Table 1-5 System wide* Structures**

Type of Structure	Count 2023
Manholes	9,023
Lift Stations	167
CSO Outfalls	29
Catch Basins	7,354
Total Structures	16,672

*System Wide Includes: Utility Owned (City of Elkhart), Elkhart County, State of Indiana, Ontwa Township, Heaton Lake, Simonton Lake, Private, Unknown
** Not all structure types listed (i.e. grease separator, air release, etc.)

E) Combined Sewer Overflow Outfalls

The City has 29 active permitted CSO outfalls. The permitted outfalls are listed in **Table 1-6** and mapped on **Figure 1-3**.

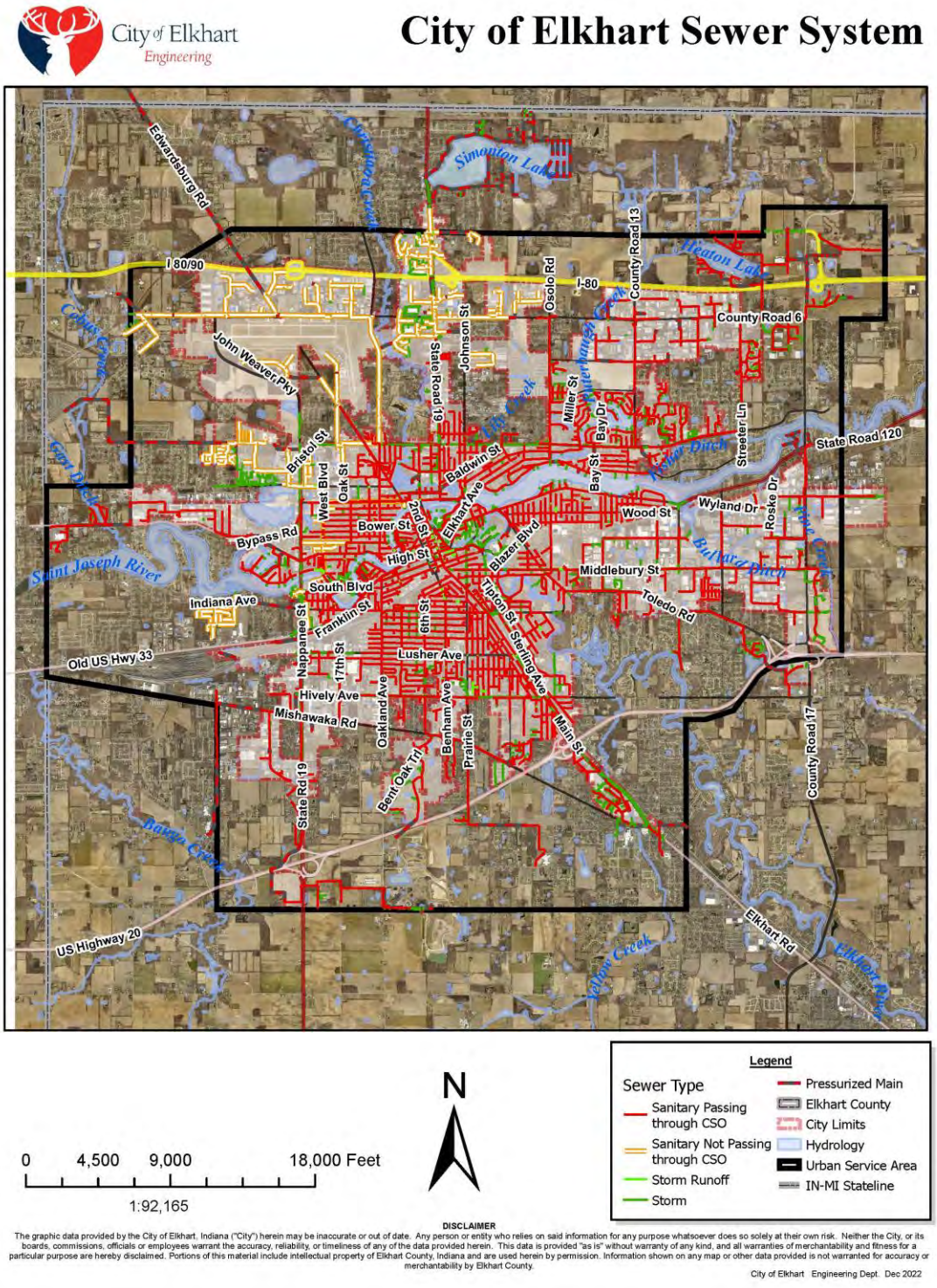


Figure 1-2 City of Elkhart Sewer System

Table 1-6 Combined Sewer Overflow Outfalls

CSO	Status	Elimination Date	Electronic Monitoring	Outfall Location	Receiving Water	Latitude*	Longitude*
001	ELIMINATED	November 18, 2005	-	-	-	-	-
002	ELIMINATED	November 18, 2005	-	-	-	-	-
003	ELIMINATED	November 1, 2003	-	-	-	-	-
004	ELIMINATED	April 27, 2011	-	-	-	-	-
005	Active	-	No	Arch & Bar, Northwest of Intersection	Elkhart River	41d 40' 23.488" N	85d 56' 45.750" W
006	Active	-	No	Jackson Blvd, North of Bridge and West of Elkhart River	Elkhart River	41d 41' 16.050" N	85d 58' 20.699" W
007	Active	-	No	Jackson Blvd, North of Bridge and East of Elkhart River	Elkhart River	41d 41' 16.571" N	85d 58' 18.929" W
008	Active	-	No	Waterfall & Elkhart Ave, Northwest of Intersection	Elkhart River	41d 41' 5.657" N	85d 58' 8.945" W
009	Active	-	No	Northwest Corner Kardzhali Park	Elkhart River	41d 41' 14.475" N	85d 58' 16.970" W
010	ELIMINATED	May 14, 1999	-	-	-	-	-
011	Active	-	No	Waterfall & Elkhart Ave, Northeast of Intersection	Elkhart River	41d 41' 6.140" N	85d 58' 10.163" W
012	Active	-	Yes	Beardsley & Cassopolis, Southwest of Intersection	St. Joseph River	41d 41' 33.986" N	85d 58' 18.596" W
013	Active	-	Yes	Beardsley & Johnson, Southeast of Intersection	St. Joseph River	41d 41' 37.600" N	85d 57' 57.179" W
014	Active	-	Yes	Erwin & Cone, West of Intersection	Christiana Creek	41d 41' 42.580" N	85d 58' 4.042" W
015	Active	-	No	Fulton & Riverside, East of Intersection	St. Joseph River	41d 41' 16.857" N	85d 59' 0.254" W
016	Active	-	No	Superior & Goshen, West of Intersection	Elkhart River	41d 41' 20.280" N	85d 57' 21.593" W
017	Active	-	No	Lawn & S West, West of Intersection	St. Joseph River	41d 40' 48.764" N	85d 59' 54.594" W
018	Active	-	Yes	Northwest Edge of McNaughton Park	St. Joseph River	41d 40' 43.893" N	85d 59' 50.134" W
019	Active	-	No	Stamp & Michigan, Southwest of Intersection	St. Joseph River	41d 40' 57.555" N	85d 59' 8.791" W
020	Active	-	No	Bridge & Hudson, Southwest of Intersection	St. Joseph River	41d 40' 36.895" N	85d 59' 25.457" W
021	ELIMINATED	February 8, 2013	No	South Shore & Cottage	St. Joseph River	41d 40' 53.160" N	85d 59' 27.264" W

022	ELIMINATED	November 1, 1996	-	-	-	-	-
023	Active	-	No	Franklin & 8th, North of Intersection	St. Joseph River	41d 40' 53.339" N	85d 58' 54.966" W
024	Active	-	No	Indiana & Franklin, Northwest of Intersection	St. Joseph River	41d 40' 28.929" N	85d 59' 34.607" W
025	Active	-	No	Pottawattomi & 2nd, Northwest of Intersection	St. Joseph River	41d 41' 30.856" N	85d 58' 38.827" W
026	Active	-	No	Pottawattomi & Main, Northwest of Intersection	St. Joseph River	41d 41' 30.779" N	85d 58' 33.152" W
027	Active	-	No	Edgewater & Navajo, Northwest of Intersection	St. Joseph River	41d 40' 35.596" N	85d 59' 47.698" W
028	Active	-	No	Washington & Clyde, Northwest of Intersection	St. Joseph River	41d 41' 21.440" N	85d 58' 52.360" W
029	Active	-	No	Jefferson & Clyde, West of Intersection	St. Joseph River	41d 41' 15.965" N	85d 58' 56.504" W
030	ELIMINATED	December 12, 2012	No	Charles & Princeton	Elkhart River	41d 40' 44.035" N	85d 57' 30.024" W
031	Active	-	No	Lusher & Elizabeth, Northwest of Intersection	Elkhart River	41d 40' 2.477" N	85d 56' 46.955" W
032	Active	-	Yes	Edgewater & Okema, North of Intersection	St. Joseph River	41d 40' 47.474" N	85d 59' 58.107" W
033	Active	-	No	Evans & Grace, East of Intersection	Elkhart River	41d 40' 47.867" N	85d 57' 10.324" W
034	Active	-	No	Lexington & 6th, Southwest of Intersection	St. Joseph River	41d 41' 2.726" N	85d 58' 49.601" W
035	N/A	-	N/A	WWTP Outfall (non-CSO)	St. Joseph River	41d 40' 48" N	85d 60' 04" W
036	ELIMINATED	June 1, 1995	-	-	-	-	-
037	Active	-	No	Krau & Franklin, Northwest of Intersection	St. Joseph River	41d 40' 32.262" N	85d 59' 26.856" W
038	ELIMINATED	June 1, 2001	-	-	-	-	-
039	Active	-	No	High & Hillside, Northwest of Intersection	St. Joseph River	41d 40' 58.843" N	85d 58' 50.140" W
040	Active	-	No	Southwest Edge of McNaughton Park	St. Joseph River	41d 40' 37.277" N	85d 59' 45.255" W
041	ELIMINATED	September 28, 2012	No	Nappanee & Lexington	St. Joseph River	41d 40' 47.623" N	86d 0' 11.543" W

F) Lift Stations

Sewage reaches the wastewater treatment plant via 66 lift stations which are listed in **Table 1-7** and mapped with the CSO's on **Figure 1-3**. As of January, 1989, this city-wide pumping operation has been monitored by computer. The telemetry system consists of computers, printers and 63 remote terminal units (RTUs). The RTUs report, via radio frequency, to the central computer the following information:

1. High/low wet well
2. Hands-off-auto, not in automatic position
3. Pump(s) overloaded
4. Loss of communication
5. Intrusion or entry into lift station
6. Dry well flooding
7. Low temperature within station
8. Power failure

Additionally, the RTUs reports when any pump is running. The central computer uses this information to log run times of each pump and calculate flow at each station. Flow is reported on a printout each morning at 6:00 a.m. The use of this reporting system enables the Utility staff to respond immediately to prevent or minimize raw sewage discharges, sewer backups and costly damage to equipment.

Table 1-7 Utility Owned Lift Stations

Name	LS #	Nearby Address
Edgewater	1	1347 Edgewater Blvd
Bridge St	2	305 Bridge St
Cottage Ct	3	104 Cottage Ct
8th and Franklin	4	734 W Franklin St
Lexington	5	135 N 6th St
Cass & Beardsley	6	401 E Beardsley Ave
Beardsley	7	731 E Beardsley Ave
CR 6/Airport	9	2925 County Road 6 W
Lexington Landing	11	418 River Pointe Dr
CR 6 West	12	625 County Road 6 E
CR 6 East	13	25722 County Rd 6 E
Meridian	14	1900 Jeanwood Dr
East Lake	15	1707 W East Lake Dr
Nadel Ave (Storm)	16	150 Nadel Ave

Holly Lane	17	2001 Greenleaf Blvd
Grant & Bristol	18	2401 Bristol St E
Walnut Trails	19	3706 Bordeaux Ct
Ames	20	3400 Middlebury St
Ind Park East	21	2000 Industrial Pkwy
Ind Park West	22	2320 Industrial Pkwy
Studebaker	23	1200 Grand Ave
Windsor Crossing	24	531 Windsor Ct
Knights Inn	25	3110 Interchange Dr
Park Six	26	1805 Leer Dr
CR 15/Holiday Park	27	4599 Wyland Dr
Bay St	28	1323 Bay St
OMC	29	2105 W Mishawaka Rd
Meadow Farms	30	1739 Woodland Dr
Lawndale (Storm)	31	1403 Lawndale Rd
Concord Mall	32	3581 Main St S
Lexington Park	33	2746 Old US 20 Hwy
Eastwood	36	2605 County Rd 15
Pinewood	37	3422 E Bristol St
Summit Ridge	38	2707 Toledo Rd
Airport Road	39	2129 Airport Rd
Reedy	40	2802 Northland Dr
Green Haven	41	3503 Charlotte Ave
Lewis & 13	42	59150 County Road 13
North Interceptor	44	1201 S Nappanee St
CR 17	45	5225 Hoffman St
CR 6 & 10	46	3000 County Road 6 W
Laurelwood	47	1620 Laurelwood Dr
Emerson	48	2685 Emerson Dr
Banks Ind	50	2800 Henke St
Cobus Creek	51	55459 Osborn Dr
Suburbun/TIV	52	28769 County Road 16 W

Johnson & Borg	53	2400 Johnson St
Glenwood	54	3601 Holly Dr
North Lake Apts	55	25800 Brookstream Cir
Starlight	56	55473 Corwin St
Aeroplex	57	2040 N Aeroplex Dr
Public Works Sump Pumps (Storm)	58	1201 S Nappanee St
Indiana Underpass (Storm)	59	801 E Indiana Ave
CR 20 & 3	60	57642 County Road 3
American Countryside	61	28239 County Road 26
Concord Jr High	62	25348 County Road 22
Pine Creek Plaza	63	5320 Verdant Dr
Ivy Tech	64	22531 County Road 18
Martin's Supermarket	65	12 Center Dr
High Dive	76	619 Baldwin St
New Jackson	77	121 Jackson Blvd E
CSO 31	78	1215 & 1425 Folsom St
Seahawk	79	22170 County Road 4
Granmas	80	3711 S Main St
Collections Pad	81	1201 S Nappanee St
Amazon LZ	82	21498 Walorski Pkwy, Bristol, IN

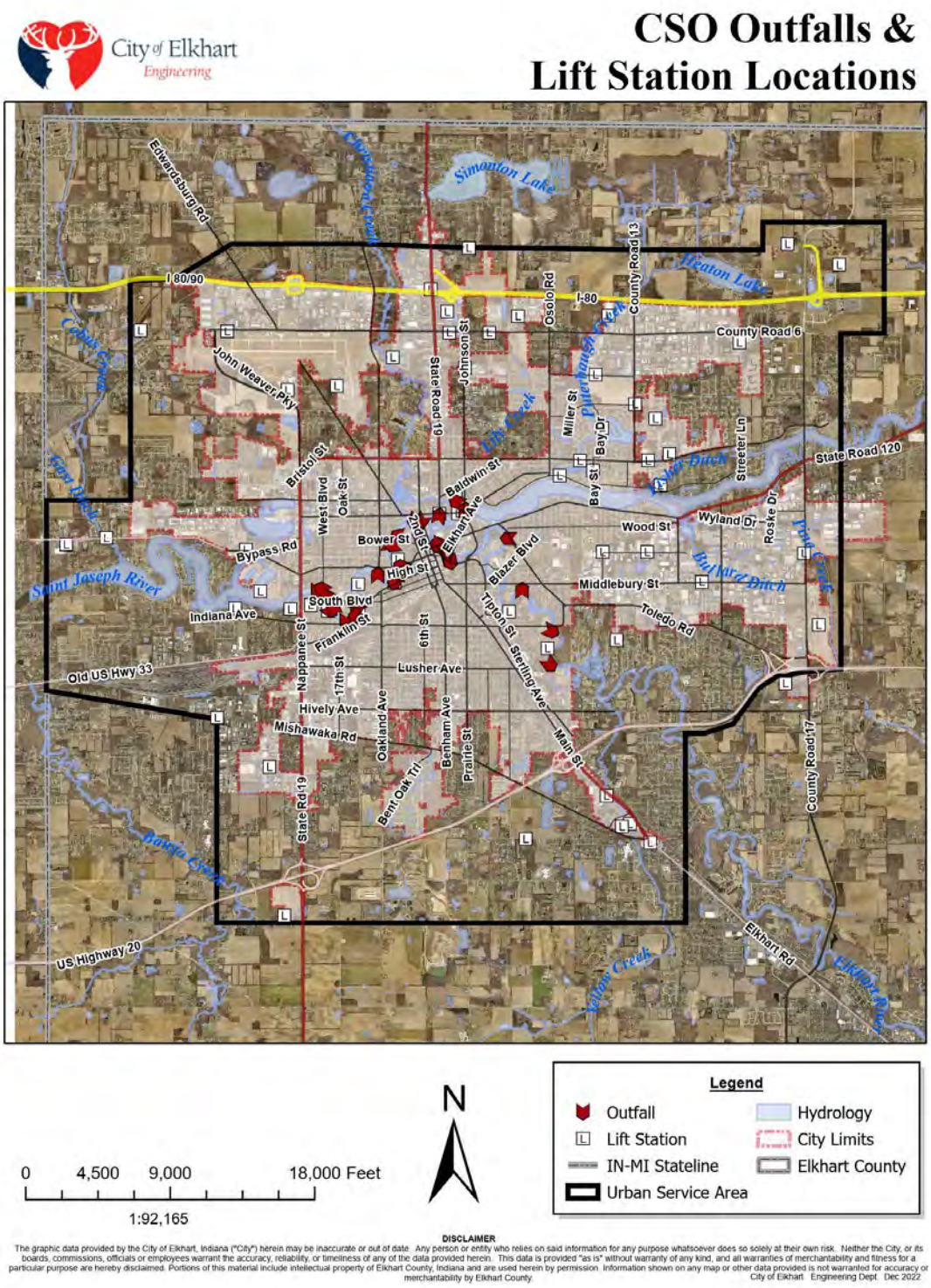


Figure 1-3 CSO Outfalls and Lift Station Locations

G) Wastewater Treatment Plant

The City of Elkhart has a long history of sewage treatment. The original wastewater treatment plant (WWTP), which was constructed in 1956, provided primary treatment of up to 2 million gallons per day (mgd) including anaerobic digestion. As flows to the plant have increased, it has expanded to meet the community's needs. The WWTP is currently undergoing expansion to include cloth media disc filters and additional capacity. These changes will be completed in 2024 and will be reflected in future versions of this plan.

Elkhart's Wastewater Treatment Plant (WWTP) provides preliminary, primary, secondary treatment by step feed extended aeration and year around disinfection. Solids treatment consists of gravity thickening, anaerobic digestion, and belt filter presses for dewatering. It is designed to treat and annual average flow of 20 Million Gallons per Day (MGD) and a daily maximum flow of 44 MGD. The treatment process and WWTP layout are illustrated on **Figures 1-4** and **1-5**, respectively.

Most of the flow enters the treatment plant from a 54" interceptor sewer (54") which services primarily the west, southwest, near-northeast and east sections of the city. Screw pumps lift the water from the 54" to preliminary treatment consisting of 1/4" bar screens and Pistagrit tanks. The remaining flow from the northern, far northwest and northeast portion of the City enters through a 48" interceptor sewer (North Interceptor). This flow enters a lift station at the WWTP and is lifted by submersible pumps to preliminary treatment. The Pistagrit tanks remove a high percent of grit. This grit is pumped to the grit handling equipment which is located above a truck bay in the Headworks building. The grit is washed, concentrated and dumps directly into a dumpster which is taken to the landfill.

From the Pistagrit tanks, flows enter primary clarification tanks by gravity. Primary sludge is collected and pumped to anerobic digestion. Grease and scum collected in the primary clarifiers are pumped to the Headworks facility where they are concentrated and collected for landfill disposal.

A 22.9% (2012-2015) decrease in organic loading has enabled standard operating procedures to maintain efficient removal of organic material in the primary clarifiers with only six primary clarifiers.

Primary effluent is pumped to extended aeration process tanks which has the ability to step-feed the primary effluent. The contents of the aeration tanks, commonly referred to as mixed liquor, consist of primary effluent mixed with return activated sludge (RAS). Air is supplied with fine bubble diffusers.

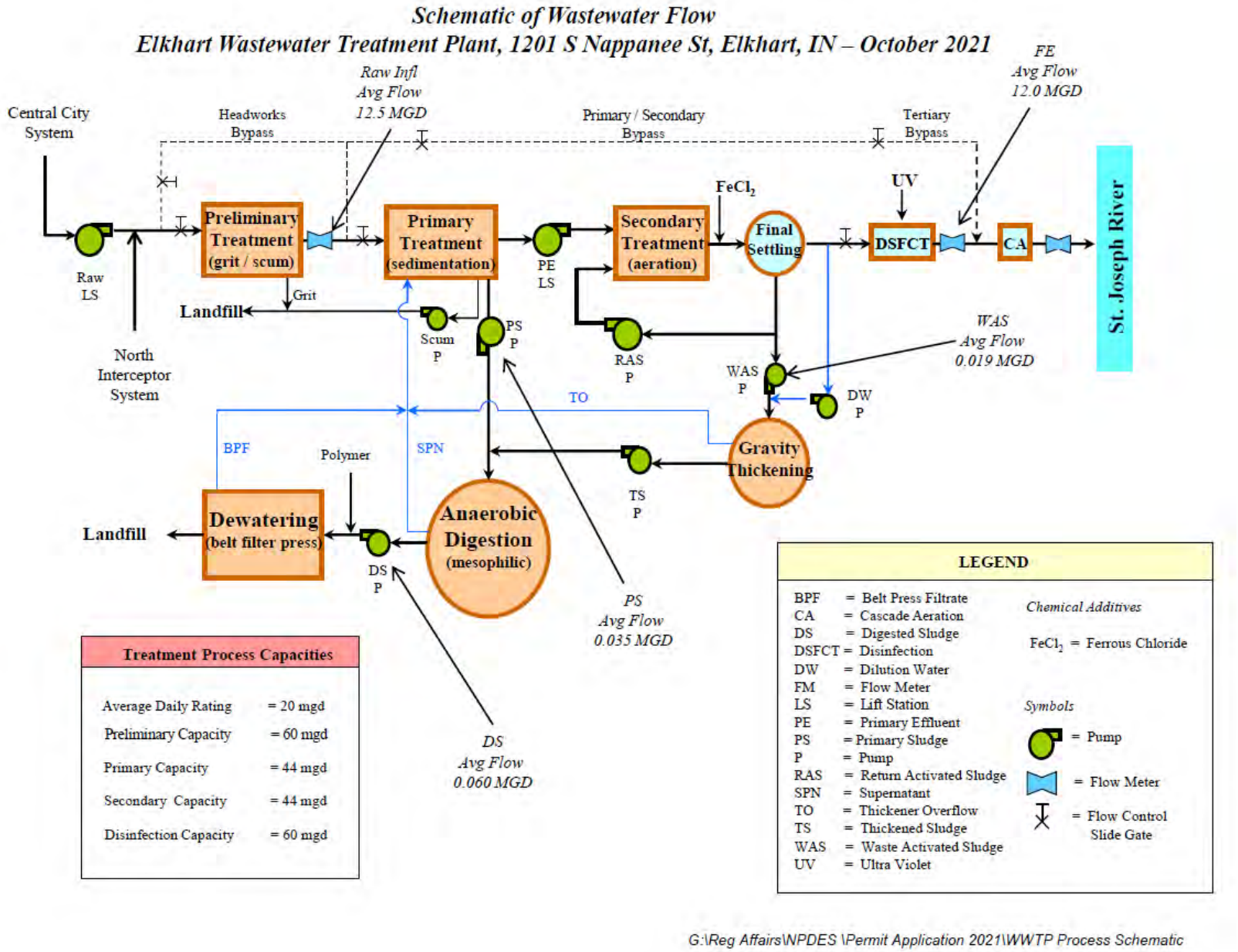


Figure 1-4 Elkhart Wastewater Treatment Process Flow Diagram

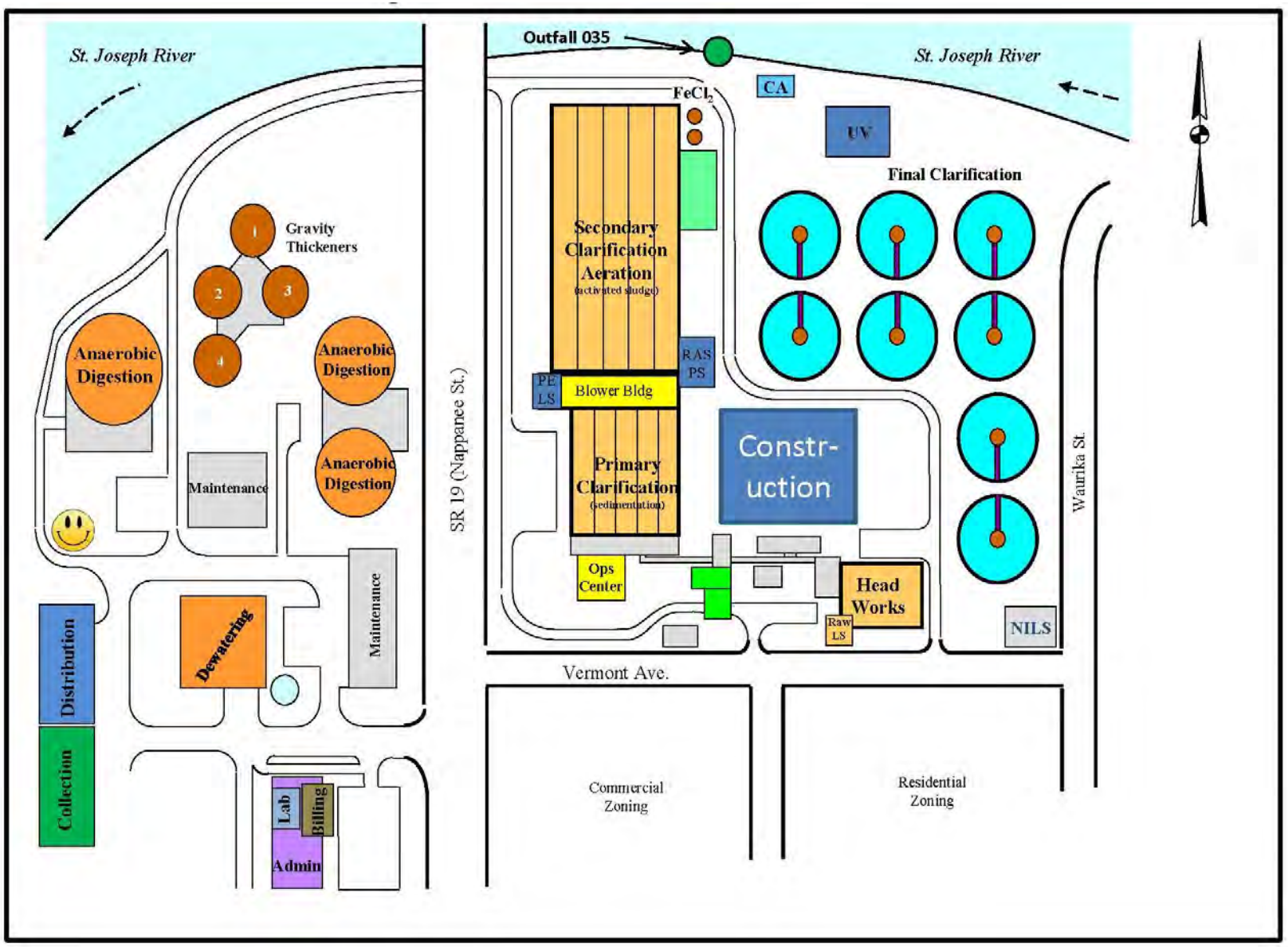


Figure 1-5 Elkhart Wastewater Treatment Plant

Effluent from the aeration tanks flow by gravity to secondary clarifiers. From that point the mixed liquor is either returned to the aeration tank (RAS) or wasted to the gravity thickeners (WAS) as a means of removing water from excess solids that are generated in the aeration system. The clear effluent from the secondary clarifiers is disinfected by ultraviolet, metered, passes over the cascade aerator, and then discharged to the St. Joseph River.

Thickener overflow is returned to the treatment system upstream of the primary clarifiers. Thickened sludge is pumped to the anaerobic digester.

Anaerobic digestion of the primary and thickened sludge is settled then supernated to remove excess water created during the digestion process. Methane that is produced as a by-product of the digestion process is used to fuel the boilers. The boilers provide hot water for heating the digesters and can also be used as a supplemental energy for heating some of the facilities.

Digested sludge is dewatered using belt filter presses. Liquid removed from the dewatering process (Filtrate) is recycled upstream of the primary clarifiers along with the thickener overflow.

The Elkhart Wastewater Treatment Plant (WWTP) currently has a peak capacity of approximately 44 MGD. In combination, a number of plant components limit the current WWTP capacity. These components are hydraulic components (various channels and pipes) and step-feed aeration capabilities. Under normal wet-weather operations, all flow reaching the WWTP, up to the hydraulic capacity of 44 MGD, passes through all processes.

When the plant was first designed, the WWTP was provided with four-unit process bypasses that were used under wet-weather conditions, according to common practice at the time. Currently, all unit process bypasses are utilized only under emergency conditions such as a major equipment or power failure and only to avoid severe damage to vital plant equipment or treatment process. Under such emergency conditions, unit process bypasses are operated independently, dependent upon the specific hydraulic conditions at the time. Any such activities are reported to IDEM as required by the plant's NPDES permit.

During wet weather events, though significant volumes of combined sewage are discharged to the local receiving streams, the collection system conveys peak hydraulic loads to the plant. The plant's hydraulic peak is 44 MGD. The system is designed so that during even the most extreme precipitation events, volumes surcharge in the collection system and discharge through the network of CSO outfalls.

The hydraulic peak capacity of the Headworks facility is 60 MGD. Any volume bypassed is conveyed directly to the primary process. Operators do have the option to bypass the primary unit process. This unit bypass serves to avoid plant flooding and protect the critical blowers for the activated sludge system which are installed below grade and immediately adjacent to the primary clarifiers. The secondary unit process is also designed with a unit bypass. Should the biological community become vulnerable, it is possible to temporarily change the biological operational mode from plug-flow to step-feed mode. This bypass is directed to the

disinfection facilities. The last unit bypass is for redirection of a portion of flow from the secondary process around the disinfection unit directly to the receiving stream.

All unit process bypasses are utilized as emergency bypasses rather than wet weather bypasses and may become necessary in the event of a major equipment or power failure. All unit bypasses are operated independently and are dependent of current hydraulic conditions at the time.

H) Regular Maintenance

i) Sewers, Manholes and Catch Basins

The Collection System Division has established a preventive maintenance program for its sewer lines, manholes and catch basins. The Collection Supervisor uses the GIS, quarter section maps, Elkhart's numbering system, and inventory and maintenance software ("Lucity") to assign, track and record the routine maintenance of the sewer system as follows:

(1) The GIS is used to divide the system into seven sections that have approximately the same footage of sewers. Each year the schedule of maintenance within these rotating sections is performed **(**see **Figure 1-6).**

(2) There are two cleaning crews, Cleaning Crew A and B, each consisting of two staff members and a combination Jet-Vac truck. Routine procedures have been established to keep each cleaning crew productively cleaning through most of the day without additional support from other staff.

(3) The cleaning crews are assigned preventative maintenance by quarter section within their section.

(4) Upon completion of the tasks outlined on the preventative maintenance work order the crew submits the completed work order to the Collection Supervisor for approval.

(5) The preventative maintenance is recorded in Lucity.

(6) The preventative maintenance program is weather dependent. The cleaning equipment uses high pressure water therefore; crews cannot work outside for extended periods of time when the temperature is below 28 degrees Fahrenheit.

(7) Cleaning Crew A, performs all preventive maintenance on catch basins and catch basin leads. This includes, but is not limited to:

(a) Pumping out all sumps

(b) Jetting the leads as needed

(c) Removing roots

(d) Making a structural status report.

(e) Updating data in GIS that may be wrong or incomplete.

Cleaning crew A may also respond to any emergencies or special projects that may come up.

(8) Cleaning Crew B performs all preventive maintenance on the sewer mains. The abbreviated standard procedures that Crew B follows are outlined below:

(a) The upstream manhole is cleaned first if needed.

(b) Moving to and starting from the downstream manhole, the Jet-Vac uses low-volume, high-pressure water to drag sand, grit and other solids back to the downstream manhole where the vacuum apparatus removes it.

(c) After the line is jetted 10'-20' at a time until the full distance of the line is jetted, a root saw is run through the line to clear any intruding roots.

(d) If necessary, the root saw is run through the line a second time and the line is jetted again to complete the cleaning process.

(e) Updating data in GIS that may be wrong or incomplete

(9) Preventive Maintenance is also performed on all CSO related throttle lines at a minimum of twice annually. The typical procedure is:

(a) Using the combination Jet-Vac Truck, the cleaning crew will start at the CSO Chamber and remove any debris with the vacuum system.

(b) Moving to the downstream manhole the crew will use high pressure water jet the throttle line removing any sand, grit, or other solids from the line, while vacuuming out any material that enters the downstream manhole.

(c) After the line has been jetted a root saw is run through the line to remove any roots that may be present. This material is then vacuumed out.

(10) Preventive Maintenance is performed every fall in areas with a history of grease problems. These mains are typically those that receive effluent directly from restaurants. Cleaning Crew B follows the same procedure as outlined in method #8 above.

ii) Combined Sewer Overflow Structures

The Collection System Division understands the importance of proper maintenance of its combined sewer overflows. The City also utilizes electronic monitoring with real time reporting at all 29 of its CSOs. CSO inspections are performed on the first and last day of the regularly scheduled work week and after significant rainfalls on weekends and holidays. The Utility relies on the CSO Inspector and the CSO daily activity summary to schedule and perform necessary maintenance of the CSOs.

Routine Maintenance of Combined Sewer Overflow Structures includes the following:

(1) Diversion Chamber

(a) Throttle lines are jetted and sawed semiannually or as needed when reported by the CSO Inspector.

(b) Chamber is pumped out when throttle line maintenance is performed and if any debris buildup is reported by the inspector.

(c) Weir walls are repaired as needed.

(2) Backwater gate and chamber

(a) Backwater gates are kept free of debris either by the inspector or by use of the Jet-Vac Truck.

(b) Backwater gates are exercised as needed; cables have been attached so this can be done without making a confined space entry.

(c) Tideflex check valves are kept free of debris by the inspector or by use of the Jet-Vac Truck.

(d) Tideflex check valves require a bottom clearance below the pipe invert. Debris is pumped out of the chamber as needed to maintain clearance to prevent the valve from hanging open and possibly allowing inflow.

(3) Outfalls

(a) Headwalls are repaired as needed.

(b) Tideflex check valves are kept free of debris by the inspector or the Collection System Construction Crew.

(c) Outfall pipes are cleaned by Jet-Vac Truck if any obstructions are reported by the inspector.

(d) Bar Screens are kept free of debris by the inspector or jet/vac truck.

(4) Public Notification Signage

(a) Signs are cleaned by the inspector as needed

(b) Signs that have been stolen or vandalized are replaced by the inspector.

(c) The Utility keeps extra signage in stock and simply adds the correct CSO number when replacement is needed.

(5) CSO Sites

(a) Mowing, brush trimming and trash removal is done by the inspector as needed to maintain site appearance and to maintain access for inspections.

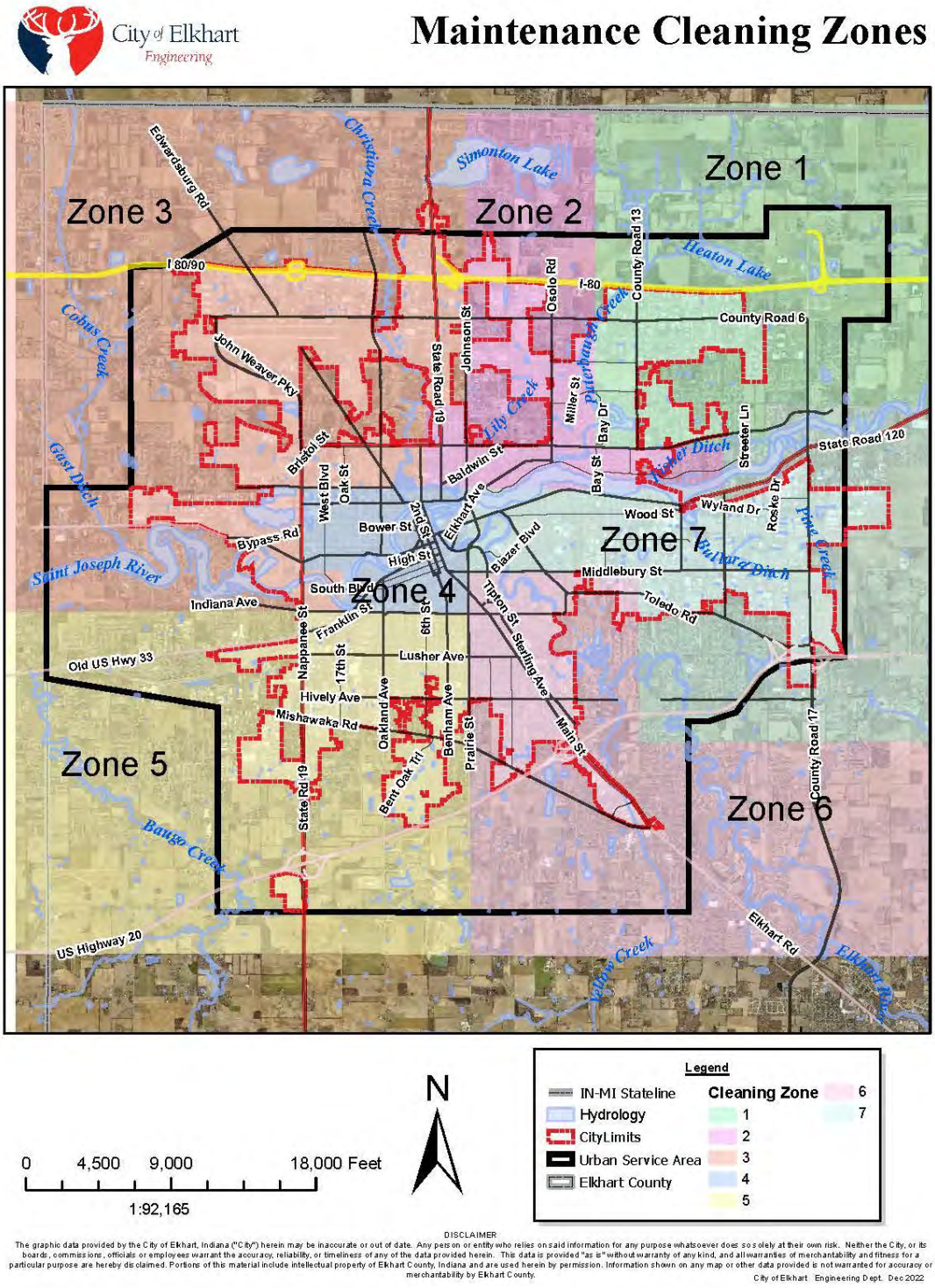


Figure 1-6 Collection System Division Maintenance Cleaning Zones

iii) Lift Stations

The Maintenance Division is responsible for maintaining all of the lift stations in the collection system. The Division has established a routine maintenance program to ensure that all of the lift stations are functioning properly and to minimize any issues. The routine maintenance program is managed and tracked through Lucity. To accomplish this, the Maintenance Division maintains the following staff:

- Maintenance Supervisor
- Two Preventative Maintenance Coordinators
- One Electrical Technician
- One Instrumentation Technician
- Four Crew Leads
- Four Mechanics
- One Laborer

There are 66 lift stations throughout the City of Elkhart (see **Figure 1-3** and **Table 1-7**). Of these 66, seven major stations have an average flow over 1 million gallons per day (MGD). The major lift stations are:

Table 1-8 Major Lift Stations

SITE #	Site Name	ADDRESS
LS 01	Edgewater	1347 Edgewater
LS 05	Lexington	135 N 6th Street
LS 07	Beardsley	731 E. Beardsley
LS 08	Jackson	121 E. Jackson
LS 18	Grant & Bristol	2401 E. Bristol Street
LS 23	Studebaker	1200 Grand Avenue
LS 65	High Dive Park	619 Baldwin Street

64 lift stations are monitored 24 hours a day, 7 days a week at Operations Center located at the WWTP. This is accomplished using a Motorola Supervisory control and data acquisition system (SCADA). The following alarms are generated to SCADA:

1. Pump fail
2. High wet well
3. Dry well flood
4. Communication fail
5. Loss of power
6. Intrusion

Alarms are both audio and visual. Audio alarms can be silenced at operation center; the visual cannot be reset until problem is corrected at the lift station. The SCADA system also records operation information on each station. The following information is logged for each station:

1. Pump starts
2. Pump run time
3. Generator status
4. Pump status

The following is a summary of the procedures used to inspect and maintain lift stations:

1. On a daily basis a two-man crew:

    a. The SCADA log checked beginning of the shift

    b. Any abnormalities become priority

2. Weekly Inspections - All major lift stations are visited at least on Monday and Friday of each week

3. Quarterly Lift Station Maintenance - Separate electrical and mechanical preventative maintenance is performed at every lift station quarterly

4. Semi-Annual Lift Station Maintenance (as determined necessary)

    a. With assistance from the Collection System Division, pump and inspect all wet wells

    b. Pull grinders for service, inspect condition of cutting blades, change or align if necessary, grease the bearings and check for leaks.

5. Annual Lift Station Maintenance (as determined necessary)

    a. All pumps performance tested

    b. Amp draw done and recorded on each pump

    c. Service generators, check fluids, change oil & filter

    d. Hook up and run stations on generator power

iv) Wastewater Treatment Plant

The Maintenance Division is also responsible for the maintenance of all of the equipment at the Wastewater Treatment Plant (WWTP). The Division has established a routine maintenance program to ensure that all components of the treatment plant are functioning properly and to minimize any issues.

The WWTP is divided into seven areas:

1. Headworks
2. Primary
3. Secondary
4. Digestion
5. Dewatering
6. Disinfection
7. Administration

A record for all the equipment in each area is kept in Lucity. All pertinent information on that piece of equipment is recorded. The preventative maintenance program adheres to the manufacturers' recommended schedule of maintenance, parts, lubrication and procedures. Each time it is serviced, the technician records the date, type of service, and who serviced it.

Monday-Friday Inspections:

Each of the six areas of the plant are inspected Monday-Friday by a maintenance technician or utility operator.

Inspections are recorded electronically.

If at any time during the inspection the mechanic notices a problem, an electronic work order is generated.

The equipment inspections are submitted to the preventive maintenance coordinator for review. If problems or issues are noted, a work order will be generated in Lucity.

I) Non-routine Maintenance and Emergency Situations

i) Sewers, Manholes, Catch Basins, Lift Stations and Combined Sewer Overflow Structures

Non-routine maintenance and emergency situations are handled through a call in system. The Utility staff person that is notified and required to respond is dependent upon whether the situation occurs during normal working hours or after normal working hours (evenings, weekends, and holidays). After the appropriate staff person is notified, the response plan, as outlined below, is implemented.

1. Normal Working Hours

    a. Staff initially receiving the call is often office reception staff.

    b. Staff contacts Collections Supervisor or their designee.

    c. Collection System Supervisor or their designee conducts initial investigation and will coordinate a response plan as appropriate.

2. Evening, Weekends and Holidays

a. Staff initially receiving the call is plant operation staff.

b. Staff contacts call-in person following Emergency Call-in procedure

c. Call-in person will conduct initial investigation and will coordinate the response plan as appropriate.

3. The Utility has all CSOs equipped with flow monitoring equipment and early warning alarms to help prevent dry weather overflows. The plant operations staff receives alarm notifications via email and notifies the Collections Supervisor, or their designee depending on when the alarm is received.

Response Plan Overview for Sewers, Manholes, Lift Stations and Catch Basins:

1. If the situation is determined to be related to a lift station, the Maintenance staff is notified who will then assess the situation and initiate corrective actions.

2. If the situation is determined to be a minor system blockage:

   a. A cleaning crew is mobilized to clear the blockage

   b. Staff then report details to either the Operations staff or the Collection System Supervisor by completing a work order in Lucity.

ii) Lift Stations

Non-routine maintenance and emergency situations involving lift stations may be discovered during routine inspections, through SCADA alarms, and also through routine inspections conducted by the Collections Group.

When a problem is discovered during routine inspections:

1. Determine nature of the problem, mechanical, electrical, physical.

2. Isolate problem if possible to keep from interruption of station. (switch to another pump, revert to secondary controls, shut discharge valve, pull pump and check for clog)

3. Report problem to Maintenance Supervisor

4. The Maintenance Supervisor will then organize a crew with team members that will be needed to correct the situation.

5. Secure materials and personnel to job site to resolve the problem

During an emergency situation involving lift stations:

1. Notify on call maintenance person.

2. For power outages, determine outage parameters. Assemble crews as appropriate and then mobilize portable generator or generators.

3. For situations other than a power outage, the on call maintenance person, with the assistance of crew leader or supervisor when needed, establish a plan of correction, determine job assignments, and determine equipment needs.

iii) Wastewater Treatment Plant

Any non-routine maintenance needs are processed via Lucity. Once the work order is received the Maintenance Supervisor assigns the task according the nature of the work requested.

During an emergency situation at the WWTP the Maintenance Division follows the basic procedure outlined below:

1. Notify Maintenance Supervisor of problem

2. Lead mechanics or Supervisor evaluate the problem, determine what will be needed and course of action for correction

3. Lock out / tag out failed equipment

4. Bring back-up equipment on line

5. Notify Operations Staff that the equipment is off-line

6. Secure equipment and personnel for repairs.

7. Inform Operations Supervisor of repair plan and time frame for completion of emergency repair.

8. Make repairs and put equipment back on line.

9. Inform Operations of completed work.

J) Inspection

i) Collections System

Inspection of the Collection System is accomplished in a number of ways. Cleaning crews perform system inspection while conducting preventive maintenance. Televising is also utilized as an inspection tool. The CSO inspector checks the bar screens at our River Crossing Chambers weekly. Each year prior to the start of Street Department's annual street paving program, the Utility receives a list of streets that will be paved. The Collection System Division uses this list to inspect structures prior to paving. Reports from Utility customers and citizens are also another opportunity to inspect system components. The following is a summary that gives more information about how each of the above listed items contributes to the inspection of the collections system.

1. Cleaning Crews A and B perform visual inspection of Catch Basins and Manholes while performing routine maintenance. They fill out a cleaning work order note any problems or defects. These work orders are turned into the Collections Supervisor to determine the best method to make repairs to the system.

2. The Wastewater Utility has been doing sewer televising in house since 2022. Televising is used as an inspection tool in the following ways:

    a. Televising is used to verify the effectiveness of our preventative maintenance program. The goal is to televise 5% to 10% of all our preventative maintenance annually.

    b. Televising is used to troubleshoot system problems such as inflow and infiltration, cave-ins, sinkholes and other problems found by our cleaning crews while doing system maintenance.

    c. Televising is used to close gaps in record keeping such as lateral location and finding manholes that may be buried or paved over.

    d. Televising is sometimes used to inspect new construction before it is accepted by the Utility.

    e. Televising is sometimes used to inspect existing structures for repair/replacement during the design phase of a project.

    f. Sonar technology has been used to inspect and profile river crossing lines and lines with high flow.

3. The Collections Supervisor and the Crew Leader, use the paving list, schedule crews to inspect all manholes, catch basins and inlet structures in the proposed paving area. It is then determined what structures if any may need to be repaired or replaced prior to paving.

4. Calls from customers and citizens are routed through the office staff during normal business hours and through operations staff after hours, weekends and holidays. Calls during normal business hours are generally handled by the CSO Inspector. After hours, weekends and holidays are handled by the Collection System employee on call. While very few of these issues are a result of problems with the Collection System, it is an opportunity to inspect manholes, catch basins and main line sewers.

ii) Combined Sewer Overflow Structures

The Utility is committed to inspecting all our remaining CSOs. Currently the Utility has flow monitoring equipment installed at all CSO sites. Monitored sites are visually inspected on the first and last day of the regular work week. In the event a monitor goes offline for any reason, that CSO site is visually inspected on all regularly scheduled workdays until the monitor is repaired.

The normal workday inspection includes the following tasks:

1. Diversion Chamber
    a. Check that flow level has not risen to the point where an overflow has occurred.
    b. Note if the flow level, while not causing an overflow, is rising at a rate that may indicate an overflow is possible in the immediate future.
    c. Verify that the effluent line does not have any debris that could cause a partial or complete blockage.
    d. Verify that the diversion structure, weir or orifice is in good repair.
2. Backwater Gate, Tideflex Check Valve and Chamber
    a. Check backwater gate or Tideflex check valve to ensure that it is free of debris and closed completely.
    b. Note if a backwater condition exists.
    c. Verify that the gate or check valve is in proper working condition by visual inspection, exercise gate as needed.
3. Outfall
    a. Inspect the outfall structure to ensure it is in good repair.
    b. Inspect bar screen if present.
    c. Inspect Tideflex check valve if present.

4. Reporting

    a. If any issue or situation exists that may cause a dry weather overflow, contact the Collection System Supervisor immediately and assist in corrective actions. In the event the Collection System Supervisor cannot be reached, the CSO inspector has been given authority to call on Maintenance staff for immediate assistance.

    b. At each site, record the required information on the CSO inspection work order.

    c. The completed CSO inspection work order is sent to the Collections System Supervisor for review.

iii) Wet Weather or Suspected Dry Weather Overflow CSO Inspection Procedure

In addition to visual inspections of all Combined Sewer Overflows (CSOs) on the first and last day of the regularly scheduled work week by the Collection System staff, the following procedure is used to inspect CSOs after wet weather events or suspected dry weather overflow even on weekends or holidays, barring exceptional circumstances.

CSOs shall be inspected:

A) After a **Wet Weather** event of 0.20 inches or more (determined by the Utility Operators using the rain gauge at the Wastewater Treatment Plant), or

B) If the Operators suspect there may be a **Dry Weather Overflow** based on information from the Supervisory Control and Data Acquisition (SCADA) system, early warning, dry weather alarm or other information such as public reports of overflows.

K) Response Plan for Combined Sewer Overflow Event Situations

The following actions are taken in response to a combined sewer overflow.

i) Operators

Once the Operators have identified a potential CSO based on dry weather, SCADA, alarm sensor information, or public reports, the Operators shall:

For a **Dry Weather Overflow,** immediately call the Collection System Call Person (CS Call Person) for an overflow inspection and provide details regarding the specific problem, such as lift station location, address of an overflow complaint, etc.

ii) Collection System Call Person

Upon receiving the call from the Operators, the CS Call Person shall follow the inspection procedure below:

1. For a **Wet Weather** event, inspect all of the CSOs to verify that they have stopped overflowing. CSO inspections shall begin no sooner than two hours after the end of the rain event. Inspections shall be completed no later than 20 hours after the end of the rain event.

2. For a **Dry Weather Overflow** event, the response shall be as soon as possible.

    a. Inspect the effluent lines between the CSO(s) and any associated lift station(s) to determine (where possible) if there is debris buildup plugging the lines. If necessary, jet the line to clear debris from any effluent line that appears to be blocked.

    b. If the overflow continues, notify the Operator of the situation.

iii) Operators

Upon receiving a notification from the CS Call Person of a continuous overflow, the Operator shall immediately call the Maintenance Call Person and request an inspection of the bar screens and lift stations associated with the overflow. The Operator shall provide to the Maintenance Call Person all available information relevant to the overflow such as:

1. Lift station and overflow location

2. Relevant SCADA data

3. Complaint information, if applicable

4. Collection system information

iv) Maintenance Call Person

Upon receiving the call from the Operator, the Maintenance Call Person shall immediately respond to the call as an emergency and take any necessary corrective actions as needed to stop the overflow. The Maintenance Call Person shall do the following:

1. When present, inspect flowminutor and clean.
2. Inspect the lift station(s) and, where possible, back flush pump(s) and verify the discharge from the pumps. Use all available measures to stop the overflow.
3. Once the overflow is stopped, the CS Call Person shall document the cause of the overflow, the date, and the time the overflow stopped.
4. If the overflow cannot be stopped using all available measures, immediately notify the Operator.

v) Operators

If all of the corrective measures do not stop the overflow, the Operator shall immediately contact a manager in the following order to determine the next steps:

1. Maintenance Supervisor, if not available, contact

2. Collection System Supervisor, if not available, contact

3. City Engineer, if not available, contact

4. Utility Services Manager.

vi) Management

If the situation is not a minor blockage, or involves a dry weather overflow that can't be stopped by maintenance or a cleaning crew, Management will take the following steps:

1. Use situation support staff as needed to formulate a response

2. Hire an emergency Contractor to initiate corrective actions

vii) Recording & Reporting

1. Wet weather overflow events shall be recorded on the monthly CSO Discharge Monitoring Report.

2. After a dry weather event overflow has been verified it must be reported in accordance with NPDES requirements. The event shall also be recorded on the CSO Discharge Monitoring report. A copy of these forms shall be kept on file at the Wastewater Treatment Plant.

L) Training

Training has always been a key element of the Collection System and Maintenance Divisions.

i) Collection System Division

The training program consists of three basic elements. These are on-the-job training, in-house training, and seminars and conferences.

1. On-the-job Training

    a. New Staff is assigned to a cleaning crew where they learn:

    - System problem diagnostics
    - Basic Operation of the Jet-Vac truck
    - Proper technique for cleaning sewers including blocked lines
    - Proper work site and traffic safety
    - How to read Quarter Section Maps and use GIS
    - Use Lucity to complete work orders and work requests
    - CSO inspection
        - Appropriate emergency response procedures
        - Where the CSO Sites are located
        - How to inspect CSOs
        - How to safely access the CSO sites
        - What information to collect for reporting purposes

    b. After the Employee shows competence in the above the employee is moved to the Construction Crew where they learn:

    - How to repair sewer lines
    - How structures are installed and repaired
    - Trench Safety
    - More advanced traffic safety
    - How to work safely around other utilities

2. In-house training

    a. The Collection System Supervisor coordinates several training classes in house each year. Normally all staff attend the sessions.

    a. The regulatory compliance manager holds safety training for employees including confined space entry.

    c. The Utility maintains training manuals for staff's use.

3. Seminars and Conferences

    a. There is adequate funding to allow a few staff each year to attend seminars and conferences.

    b. Attendance at these is rotated to make sure that all who wish or need to attend are given the opportunity.

ii) Maintenance Division

1. On-the-job Training

    a. All maintenance personnel positions require mechanical abilities. All mechanics are required to maintain these skills.

    b. Jobs are assigned on a rotating personal schedule allowing for learning each piece of equipment and how to service them.

    c. Equipment manuals are up to date with replaced part numbers/ changes made to equipment.

    d. All mechanics are required to be familiar with the equipment service manual before starting repairs. Service manuals contain cut away views with procedure for disassembling and reassembling the equipment.

    e. New equipment requires training from the manufacturer of the equipment. Maintenance personal are trained on new equipment.

2. In-house training

    a. Equipment sales people will bring in manufacturer's representative to train our personal on the proper operation and maintenance of their equipment.

    b. We bring in vendors of various types of materials and equipment to properly train on the use of their products.

    c. Tools: Specialized or unique tools are demonstrated for proper use by the representative of the tool company. These include items such as slings, chain falls, presses, pullers, booms, vacuum pumps, etc.

    d. The regulatory compliance manager holds safety training for employees including confined space entry.

    e. Company policies change from time to time. When a change is made, maintenance will meet to discuss the changes and insure that all understand the change and how it will affect them.

f. When equipment such as motorized lifts, scaffolding, power washers, cement mixers are rented from a company or borrowed from another department, a thorough training session of the equipment is held before the equipment is used.

3. Seminars and Conferences

   a. Manufacturers offer many seminars off campus for training on the maintenance of their equipment. Maintenance will send as many staff as work strength will allow.

   b. Technical courses such as electric trouble shooting, controls, panel building, problem solving & diagnosis are encouraged to be utilized by our staff.

   c. Annual conferences that are designed for our industry are attended by staff as work strength allows.

M) Periodic Review of Operations & Maintenance Program

Review of the Operations & Maintenance (O & M) Program is ongoing. The Program was designed to satisfy the specific needs of Elkhart's system. This continues to be the approach as the Utility strives to enhance efficient operations of our systems while minimizing customer complaints and the impact of CSOs on our receiving streams. The following components of the O&M program are critical to success:

1. Personnel are the most important element to any maintenance program. The staff is well trained and many key positions are interchangeable through the cross-training that each employee receives. All current Collection System Division employees have Commercial Driver's License. All new employees are required to obtain a CDL. All employees are trained on the proper operation of our Combination Jet/Vac Trucks, Bobcat skid steer loader, front end loader and a variety of other tools and equipment. Safety training is provided annually. All employees are trained to make proper inspections and diagnosis of possible problems requiring maintenance of the WWTP and collection system, including CSOs.

2. The Utility recognizes the need to provide the staff with the proper tools to run an effective maintenance program. The annual budget allows the staff to procure the latest tools and equipment in order to run the best maintenance program possible. The Utility replaces vehicles on an approximate ten-year cycle which allows it to upgrade combination Jet-Vac trucks regularly. Construction crew trucks and tools are also upgraded regularly. This includes trucks with lift gates, truck cranes, combination loader backhoe with pavement breaker, skid steer loader with numerous accessories, laser level and a core drill to boot our manholes, and catch basins.

3. Cleaning methods are evaluated annually by use of Closed Circuit Television Inspection. The input of the Combination Jet/Vac truck crews is critical to the success of the maintenance program. The Supervisors meet frequently with the staff to discuss equipment needs and methods. Cleaning crews and lift station crews also keep records each day cleaning and preventive maintenance is performed. These records note any problems or defects encountered during maintenance operations. These records are turned into the Supervisors daily for review and scheduling of any corrective action that may be necessary.

4. Inspection of critical elements of the collection system is accomplished through a number of methods. These include televising, visual inspection by cleaning crews, semi-weekly inspections of CSOs by the CSO Inspector, daily inspection of all major lift stations, and follow up of resident's complaints.

5. Record keeping is essential to the maintenance program. It is used to keep our crews working on a zoned preventive maintenance schedule. Daily records kept by crews indicate problem areas that may need more frequent cleaning. Crews also note any defects to structures or associated pipes. These daily maintenance records are turned into the Supervisor at the end of each workday. The Supervisor then schedules any necessary repair or replacement of system components.

6. Record keeping is also a useful tool to identify problem areas for planning future projects. Updating quarter section maps of our sewer system along with our GIS ensures that the staff has the most up to date information on our system. Updating our records is an ongoing process.

2) Maximization of Storage in the Collection System

The City of Elkhart has undertaken extensive efforts over the last three decades to maximize storage in the collection system. These efforts have included relatively simple measures, such as installation of tide flex gates and raising diversion dams, to much more complex system modifications such as addition of interceptors and storage tanks.

A) Removal of Debris

The City routinely performs preventative maintenance on the collection system. The City has two (2) vac/jet trucks and crews that clean sewers and structures on a daily basis, weather permitting. This prevents the system from becoming clogged with debris or sediment, increasing the storage capacity.

In addition to the cleaning crews, the CSOs are visually inspected on the first and last day of the regularly scheduled work week, as discussed in *Section I: Proper Operation and Regular Maintenance Program*. These inspections identify when diversion dams or structures are in need of repair.

B) Inflow Reduction

In order to reduce inflow from the river to the City's CSS system, tide flex backwater gates were installed at six major inflow points. These tide flex gates replaced aging cast iron backwater gates, and have reduced inflow by as much as 4 million gallons per day during times when the river level is high.

Many homes in Elkhart's center were originally built with roof drains connected directly to the combined sewer system. Beginning in 1992 the City's EnviroCorps program, part of the federal AmeriCorps program, separated 900 roof leads on approximately 390 homes. The City estimates that during a 1-inch rainfall event, the roof lead disconnections have diverted more than 400,000 gallons of stormwater away from the CSS.

These two programs have decreased the river/stormwater entering the CSS at minimal cost, and has increased the transportation and storage capacity in the CSS during storm events.

C) Adjustment of Regulators

The City has carefully raised all diversion dams/weirs in all CSO regulator structures as high as practical without causing basement back-ups. This has increased the in-line storage capacity of the system.

D) Optimize Lift Station Pumping

Each of the City's lift stations has been equipped with a remote telemetry system for monitoring wet well levels and pumps, among other things. This is an automated system, but also allows the operators to monitor sewage levels. The computer systems and the City's operators continually monitor the lift station system 24 hours a day 7 days a week.

E) Flow Diversion and Separation

The City's largest public works projects have been sewage collection system projects. In 1986 the City embarked on a three phase sewer improvement project. It included construction of the North Interceptor Sewer, expansion of the sanitary sewer system to serve new customers, and extension to and elimination of several small unstaffed private treatment plants on the City's perimeter.

Since sewer studies in the 1970s and '80s, the City has worked to separate combined sewers whenever rehabilitation or reconstruction projects occurred. Since 1990, approximately 22 miles of storm sewer has been constructed, separating an equivalent amount of combined sewer. A summary of the sewer separation projects since 1990 is provided in Table 2-1. This effort is discussed at length in the LTCP.

As of 2010 the City began implementation of the LTCP. To increase storage in the system, a 1-million-gallon storage tank and pump station was completed at High Dive Park. This new facility redirects the sewer from the entire northeast portion of the City, directing it to a sanitary-only trunk line routed straight to the WWTP. The pump station allows the flow to bypass numerous CSOs and has a maximum capacity of 9 MGD. Excess flow above the 9 MGD capacity can be temporarily stored in the 1-million-gallon storage tank and released slowly back into the system once a storm event has passed.

Additional sewer separation project were completed in 2010, 2012, 2013, 2014, 2018, 2019, 2020, and 2021. Two additional storage tanks were completed in 2016. An 80,000-gallon tank to reduce overflows at CSO 31 and a 1-million-gallon off-line storage tank to reduce overflows at CSOs 6 & 7 with upgrades to the system to allow the redirection of flow to Oakland Avenue Control Measure when it is completed.

Table 2-1 Sewer Separation Projects Since 1990

Year	Project Title	Storm Sewer (Ft)
1990	Indiana Storm Sewer Phase 2	3,043
1990	S. 6th St. Storm Sewer	488
1990	Vistula St. Revitalization	665
1990	NE Elkhart Storm Sewer – Phase 1 & 2	2,571
1990	Benham West Site Improvements	557
1993	Carolyn Ave. Storm Sewer	680
1993	McPherson St. Curb & Gutter / Storm	218
1994	Johnson St. Project Phase 2	1,730
1994	Middleton Run Rd.	2,712
1995	Nadel Sewer Separation	1,029
1996	Southdale Storm Sewer Phase 1 & 2	3,043
1996	Crawford St. Revitalization	1,425
1996	Kilbourn St. Revitalization	1,250
1997	Middlebury St. Reconstruction	330
1997	Johnson St. & Howard Ave. Phase 3	1,187
1997	Kenwood Storm Sewer	1,000
1997	Howard Ditch Storm Sewer	1,507
1997	Vistula St. Revitalization Phase 2	1,381
1998	Benham Ave. Revitalization	3,101
1998	Garfield Ave. Revitalization	3,923
1998	Grand & Moyer Sanitary & Storm	3,318
1999	Marion St. Revitalization	4,381
2000	Cleveland Ave. Revitalization	3,623
2001	Wolf Ave. Revitalization	1,027
2001	Baldwin St. Revitalization	1,375
2002	Middlebury St. Revitalization	8,199
2002	Blaine Ave. Revitalization	3,880
2003	Aspenwald Ave. Revitalization	1,610
2003	Riverwalk Commons	1,011
2005	Strong Ave. Revitalization	4,315
2005	CSO 1 & 2 Elimination	4,415
2005	Franklin St. Revitalization	2,697
2006	Garfield & Cleveland Revitalization	2,278
2007	CSO #21 Elimination	1,346
2007	West Blvd. & Mishawaka St. Storm Separation	133
2008	Hively Ave. Reconstruction	6,456
2010	CSO 14 Project	2,900
2010	CSO 4 & 30 Sewer Separation	7,395
2012	Pierre Moran Storm Sewer	3,144
2012	CSO #30 Elimination	587
2013	Baker Park Drainage Improvement	450
2013	CSO 33 Separation	3587
2014	Prairie Grade Separation	3587

2018	Jackson Blvd Reconstruction & Elkhart	2858
2019	Clark & Hannah St Improvements	645
2019	JA Drive & Lexington Streetscape	1338
2020	River District Zone I Earthwork & Utilities	1354
2020	Benham Avenue Reconstruction	2777
2021	S Main St Lusher to Hively	3668

3) Review and Modification of Pretreatment Requirements

Elkhart has an approved Pretreatment Program. Elkhart's Wastewater Utility Use Ordinance, No. 5746 provides the legal authority for the program's implementation. The Enforcement Response Plan (ERP) contains details of the implementation protocol.

Industrial Wastewater Discharge Permits are the control mechanisms by which specific industries are regulated; renewed on a four or five-year rotation and issued by the Board of Public Works.

On June 1, 2015 Ordinance No 5434, an Ordinance Regulating the Discharge of Fats, Oils and Grease (F.O.G.) from Food Service Establishments became effective. On July 2, 2019 this Ordinance was amended by Ordinance No. 5745. Since the implementation of the Ordinance in 2015 the Utility has seen some significant decreases in the occurrences of blockages caused by F.O.G.

The F.O.G. program targets neighborhoods where grease blockages have shown to be a challenge. It provides informational flyers and grease scrapers to help prevent problems in the future.

The program is also focusing on the problems with personal hygiene wipes and rags. These products should not be flushed after use as they cause major maintenance issues in our lift stations. We have several informational flyers that are shared in those problem areas and with the general public.

4) Maximization of Flow to the POTW for Treatment

A) Future Flow and WWTP Upgrades

As part of the City's LTCP, some of the remaining CSO locations will be eliminated, and the number of CSO events will decrease in the future, increasing the flow to the WWTP. As significantly higher hydraulic peaks need to be handled at the plant during wet weather, additional facilities will need to be constructed. A major challenge facing Elkhart's ability to expand is the availability of adequate physical space to construct new facilities. With the combination of residential/commercial development surrounding the site and numerous expansions of the plant during the last 50 years, the site is limited in space to develop new facilities.

The Oakland Avenue Control Measure in the selected LTCP plan will add a force main from Oakland Avenue to capture and reduce overflows from CSO's 24 and 37. The additional force main will require WWTP system improvements to provide a peak sustained flow rate of up to 60 MGD. This is the peak sustained flow rate that is expected to be delivered to the WWTP, based upon the SWMM model at the selected LTCP level of control. At the WWTP, modifications to the influent pumping, preliminary treatment, improvements to primary influent channels, diffuser replacement, aeration blower replacement, RAS system replacement, and cloth media disk filtration (CMDF) installation are expected to meet the new peak sustained flow rate. A minimum of 30 MGD will be able to go through secondary treatment, and up to 30 MGD through CDMF.The contracted price of the improvements of the WWTP from Phase I through Phase II cost a total of approximately $43,203,000. Headworks and UV disinfection projects have already been completed to increase those capacities to 60 MGD. Future plant improvements are illustrated in **Figure 4-1**. We anticipate no plant bypasses in a Typical Year, assuming normal plant operations. Anticipated costs associated with the City's LTCP are listed in **Table 4-1**.

Figures 1-4 and **1-5** illustrate the current WWTP process flow and layout.

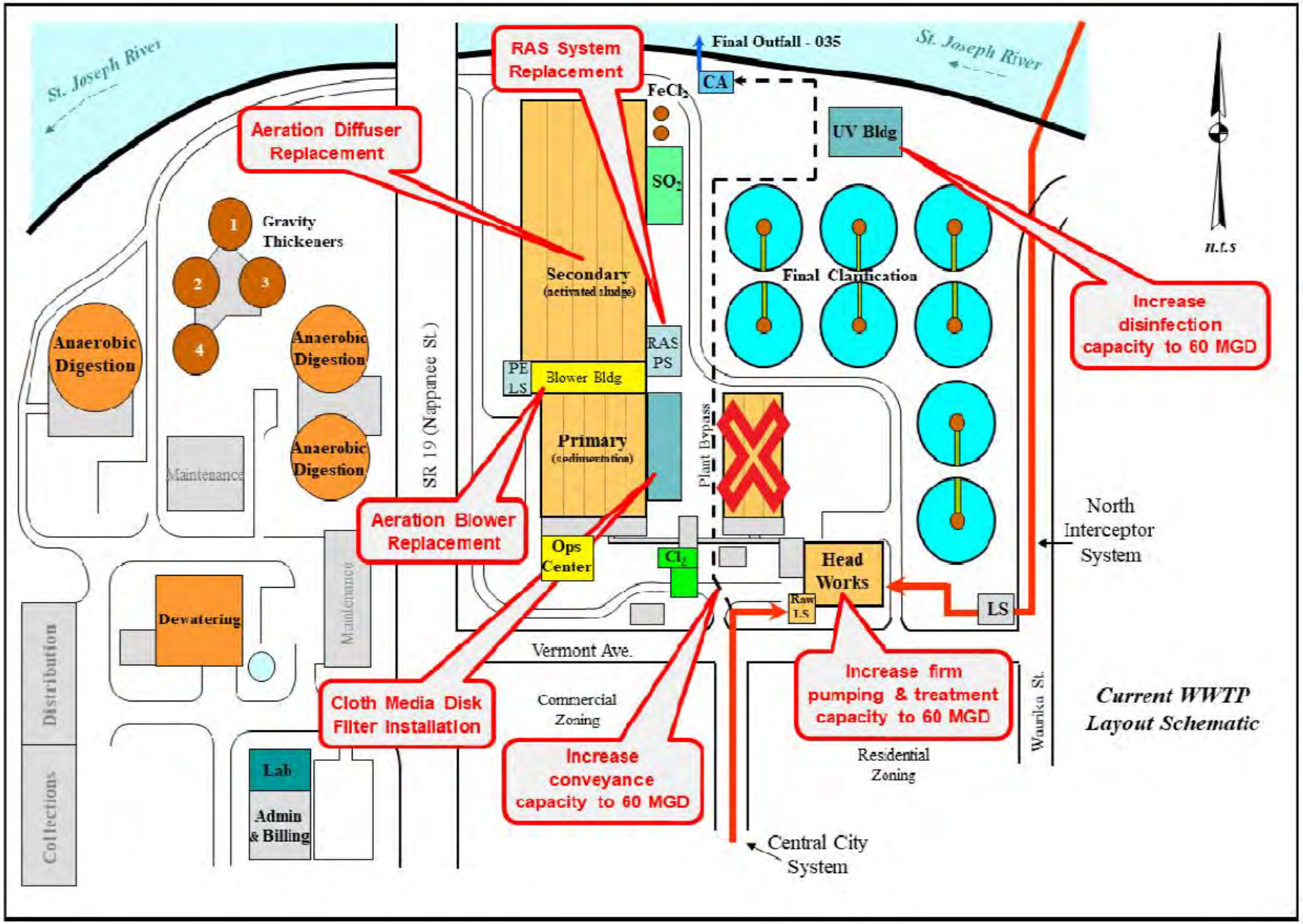


Figure 4-1 Future Elkhart Wastewater Treatment Plant Capacity Expansion

Table -1-1 LTCP Component Costs by Watershed[1]

	CSO Number	Description	Capital Cost Estimate
Christiana Creek CSO Control			
	CSO 14	High Dive Park 1 MG Storage & Pump	$ 10,650,000
	CSO 14	High Dive Park Pump Station	$ 975,000
	CSO 14	Force Main: High Dive Park Pump Station to North Interceptor	$ 3,255,000
		Christiana Creek Subtotal	**$ 14,880,000**
Upper Elkhart River CSO Control			
	CSO 30	Separation	$ 6,150,000
	CSO 4	Separation - Partial	$ 2,400,000
	CSO 33	Separation - Partial	$ 8,760,000
	CSO 31	EEC 80,000-Gal. Storage & Pump	$ 2,970,000
		Upper Elkhart River Subtotal	**$ 20,280,000**
WWTP Plant Upgrades			
	WWTP	Preliminary and Additional Disinfection for 60 MGD (complete)	$ 13,618,000
	WWTP	Cloth Media Disks and Piping[2]	$ 9,564,000
	WWTP	Aeration Process Improvements[2]	$ 4,967,000
	WWTP	RAS System Replacement and Pump Capacity Improvements[2]	$ 774,000
	WWTP	Primpary Clarification System Improvements[2]	$ 2,708,000
		Wet Weather Treatment Subtotal	**$ 31,631,000**
Lower Elkhart River Control			
	CSOs 6&7	Direct East Waterfall Dr to Jackson Blvd. Storage Facility	$ 495,000
	CSOs 6&7	Jackson Street 1.0 MG storage facility	$ 10,665,000
	CSOs 6&7	Jackson Street Storage Facility Lift Station	$ 2,145,000
		Lower Elkhart River Subtotal	**$ 13,305,000**
Oakland Avenue Control			
	CSOs 24 & 37	Force Main from Oakland Ave. LS to WWTP	$ 3,060,000
	CSOs 24 & 37	Interceptor of CSO 37 Overflow (CSO 37.0)	$ 840,000
	CSOs 24 & 37	Interceptor of CSO 37 Overflow (CSO 37.02)	$ 630,000
	CSOs 24 & 37	Interceptor of CSO 37 Overflow (CSO 37.03)	$ 555,000
	CSOs 24 & 37	Interceptor of CSO 37 Overflow + Jackson LS	$ 1,140,000
	CSOs 24 & 37	Interceptor of Flow to CSO#24 L-TUFF 1	$ 405,000
	CSOs 24 & 37	Interceptor of Flow to CSO#24 L-TUFF 1B	$ 1,350,000
	CSOs 24 & 37	LS 8 Force Main To Oakland Ave. Storage facility	$ 3,255,000
	CSOs 24 & 37	CSO 24 LS 1.1 MG Storage and Pump	$ 16,080,000
		Oakland Avenue Subtotal	**$ 27,315,000**
Upper St Joe River CSO Control			
	CSO 13	Separation - Partial	$ 5,010,000
	CSO 25	Effluent Line Upgrade: CSO 25 to Interceptor	$ 405,000
	CSO 29	Plug Overflow (Jefferson)	$ 1,500
	CSO 28	Plug Overflow (Washington)	$ 1,500
	CSO 39	Separation	$ 960,000
		Upper St. Joe River Subtotal	**$ 6,378,000**
Lower St Joe River CSO Control			
	CSO 18	Plug Overflow (McNaughton Park)	$ 1,500
	CSO 27	Plug Overflow (Navajo)	$ 1,500
	CSOs 17 & 18	Redirect Flow to North Interceptor	$ 390,000
	CSO 21	Separation	$ 1,695,000
	CSO 23	Effluent Line Upgrade CSO#23 to LS#4	$ 165,000
	CSO 23	LS 4 Force Main	$ 405,000
	CSO 23	LS 4 (8th & Franklin) Improvements	$ 1,545,000
	CSO 23	Separation - Partial	$ 3,870,000
		Lower St. Joe River Subtotal	**$ 8,073,000**
Riverside Drive Control			
	CSO 15	AACOA Redirection	$ 300,000
	CSO 15	Riverside Dr. 0.43 MG Storage & Pump	$ 6,000,000
	CSO 15	Separation - Partial	$ 7,575,000
		Riverside Drive Subtotal	**$ 13,875,000**
Total Estimated Capital Cost (Includes contingencies)			**$ 135,737,000**
Systemwide Estimated Present Worth Operation & Maintenance Costs			**$ 21,449,000**
Total Estimated Present Worth Cost (2007 Dollars)			**$ 157,186,000**

[1] **Notes:** Capital cost estimates include construction and engineering/legal contingencies. Costs are expressed in 2007 dollars. (Engineering News Record Construction Cost Index: 8000 (Aug. 2007)).
[2] To sustain peak sustained flow rate up to 60 MGD. Up to 30 MGD through cloth media disks. Does not include design costs, which are above and beyond a proposed increased spending commitment.

Table 4-1 CSO LTCP Project Cost

5) Elimination of CSOs During Dry Weather

The City of Elkhart continually works to prevent the occurrence of dry weather overflows (DWOs). Almost all of the City's DWOs occur either because of lift station failure or blocked effluent lines.

A) Inspection Program

All CSO structures are visually inspected on the first and last day of the regularly scheduled work week. A more detailed description of the inspection program can be found in *Section I: Proper Operation and Regular Maintenance Program*.

B) Lift Stations

The city has had instances of DWOs occurring because of lift station failures, and has taken a number of steps in order to reduce and prevent DWOs.

In order to prevent large debris from clogging or damaging pumps, the City has installed comminutor (grinder) pumps in the major lift stations to break up debris. This also eliminates the need for bar screens, which can become easily clogged and require regular maintenance.

Remote telemetry systems have been installed at each pump station allowing for the monitoring of wet well levels, unauthorized entries, pump overloads, low temperature, power failure, etc. This critical information allows operators to immediately respond to developing situations, such as the loss of power to a station.

Most of the City's major lift stations have back-up generators on site, and all of the lift stations can accommodate quick connections for portable generators. The City maintains a number of portable generators, which can be used in emergencies to operate pumps to prevent DWOs. The City maintains the equipment necessary to bypass pump, should the pumps in the lift station fail.

The City also regularly inspects and performs preventative maintenance on all of the lift stations. These actions, combined with monitoring and emergency response help prevent most DWOs from occurring.

C) Blocked Effluent Line

DWOs have also occurred in the past due to a blocked effluent line. In order to prevent DWOs, the City has raised all diversion dams and weirs to the highest level practical. The City currently has monitoring devices installed in all twenty-nine (29) of its CSO chambers. These devices monitor the sewage level, and send an alert to Operations staff if the sewage level reaches 70% during dry weather. This provides timely notification to operations and maintenance staff when the level is rising during dry weather flow so they have time to respond and check the sewer lines for debris before a DWO occurs.

D) Notification

Upon confirmation of a dry weather overflow event, the location, start time, end time, duration and reason for the event are documented and submitted to the Operator of Record. This information and more is necessary to accurately fill out the most recent version of State Form 48373, Bypass / Overflow Incident Report (**available at https://www.in.gov/idem/cleanwater/wastewater-compliance/sewer-bypassoverflow-incident-reporting/**), as prescribed by IDEM.

Our current NPDES Permit requires an oral report within 24 hours and a written report within 5 days. A complete written report submitted within 24 hours satisfies both the oral and written reporting requirements.

6) Control of Solid and Floatable Materials in CSOs

The City of Elkhart has no history of solid and floatable materials in CSOs thanks to extensive efforts to prevent extraneous solids and floatables from entering the CSS. These efforts include street sweeping, solid waste collection and recycling programs. The City has taken a prevention first mentality, believing it is preferable to avoid floatables from entering the CSS rather than trying to remove them once they have entered the system.

The City of Elkhart will continue to monitor and report its CSO events. Should floatable materials become apparent the City will take additional corrective actions to modify its system to prevent future floatables during CSO events. However, the current preventive actions taken by the City are accomplishing the goal of preventing visible floatables during CSO events. Many of the City's programs accomplish multiple goals towards improving the condition of area waterways.

A) Sweeping and Waste Collection

The City has a street sweeping, solid waste collection, and recycling program described in *Section VII* to help prevent floatables from entering the system.

B) Public Education

The City has a public education program described in Section VII which has raised awareness of CSOs and helped prevent extraneous solids and floatables from entering the CSS.

7) Pollution Prevention Programs to Reduce Contaminants in CSOs

The City of Elkhart takes extensive steps to prevent contaminants from entering the CSS. These programs have been extremely successful.

A) Street Sweeping and Catch Basin Cleaning Program

To prevent the introduction of floatables into the conveyance system, the City of Elkhart uses a combination of 2-3 street sweepers and a dump truck to sweep all of the city streets approximately every four to five weeks.

To collect sediment and debris from stormwater entering the system, the City of Elkhart uses two types of stormwater collection devices; inlets that tend to be a shallow, 2 to 3 feet in diameter, structure with no sump and catch basins that tend to be 2 to 3-foot diameter structures with a sump 2 to 4 feet deep. Normally, both devices have a slotted casting in the gutter and a curb box in the curb line. Typical configuration is to route one or two inlets into a catch basin before routing into the storm sewer. Storm sewer manholes do not have sumps. All new installations of curb boxes in castings are stamped with the symbol of a fish and text reading "Drains to River".

The City of Elkhart has a preventative maintenance program for its entire collection system, including the combined and separated sewer areas. This program includes routine sewer and catch basin cleaning. Based on data from the last 10 years, the Collection System Division cleans an average of 151,004 feet of sewer and approximately 1,403 catch basins and inlets each year. This includes catch basins and sewers for both the storm only and combined systems. Cleaning typically includes removal of sediment and debris from the sump and washing down of the sidewalls and vacuum removal of debris. Collected debris is managed and disposed of depending on the source. Debris collected from any sanitary sewer is sent to a licensed landfill and debris from catch basins is dewatered and reused by other City departments as fill (the debris has been tested and approved for this method of disposal). The water from the debris dewatering is collected and sent to the City's wastewater treatment plant.

B) Industrial User Outreach

Elkhart's Significant Industrial Users continue to implement water conservation methods where possible within their facilities. Many have demonstrated substantial decreases in flow through improved metering, reduction in overflow rates, increases in water reuse and better housekeeping.

In addition, numerous industries have implemented solvent substitution measures and are now using biodegradable, water-based materials where possible.

C) Public Education Program

In the mid-1980's Elkhart began to evolve from an environmentally-challenged community to become one of the best stewards of the environment in the State of Indiana. Although the City

invested significant resources in people, technology and equipment for our sewers and treatment plant, it has also invested a lot of time and resources educating the public in general, particularly our Utility customers.

The Elkhart Environmental Center has been open to the public since 1991. This environmental education facility offers environmental educational programs, events and volunteer opportunities for all citizens. Programs offered include trash reduction, non-point source pollution, water conservation, pollution prevention and sustainability. The EEC has multiple outdoor settings including the Edible Education Garden, Reflective Grove, wetlands, hiking trails, a boat launch, and more.

D) Solid Waste and Recycling

Another element of Elkhart's Pollution Prevention Program is a solid waste collection program which has instituted a 96-gallon trash cart for each residence to minimize trash on the street. The City also offers solid waste curbside recycling for all residents. The recycling program was started for three main reasons:

- The program helps reduce the amount of material that goes to the landfills;
- The Recycling Program helps reduce street litter, thus reducing floatables entering the Combined Sewer System;
- The program, which has widespread public support, has been an excellent tool to continue the positive change of the public's attitude toward their environment in general and pollution prevention in particular…Reduce, Reuse, Recycle and Rethink.

The City of Elkhart's Recycling Program began as a pilot program in two neighborhoods in 1990. It was so popular that the City was convinced to expand the program in mid-1991; it continues as a very successful program today.

The most recent data for recycled material volume follows:

2011	1,788,000 lb.
2012	1,920,000 lb.
2013	2,268,000 lb.
2014	2,358,000 lb.
2015	2,556,000 lb.
2016	----------
2017	2,307,030 lb.
2018	2,448,950 lb.
2019	2,942,820 lb.
2020	3,199,800 lb.
2021	3,546,165 lb.
2022	4,097,720 lb.
2023	1,859,700 lb.

E) Constructed Wetland

The City has also undertaken a unique approach to eliminating the impact from one of the CSO outfall points, CSO 5, through the construction of a wetland designed to treat combined sewer overflows. CSO 5 is located at the corner of Arch Street and Bar Street on the Elkhart River.

The preliminary design considerations consisted of quantifying and characterizing the combined sewer overflows as they vary with rain events and antecedent conditions, and characterizing the groundwater conditions and its interaction with the wetland waters. Data was collected over a period of months to determine specific design parameters necessary for the construction of the wetland.

The engineering of the wetland is based on hydraulics, along with biological and ecological principals, while taking CSO regulatory objectives into consideration. Because the water table fluctuates up to four feet, the wetland was constructed below the high water table elevation. This allows the water supply to be continuously refreshed and circulate through the wetland, eliminating the concern of stagnation. This is illustrated in **Figure 7-1**.

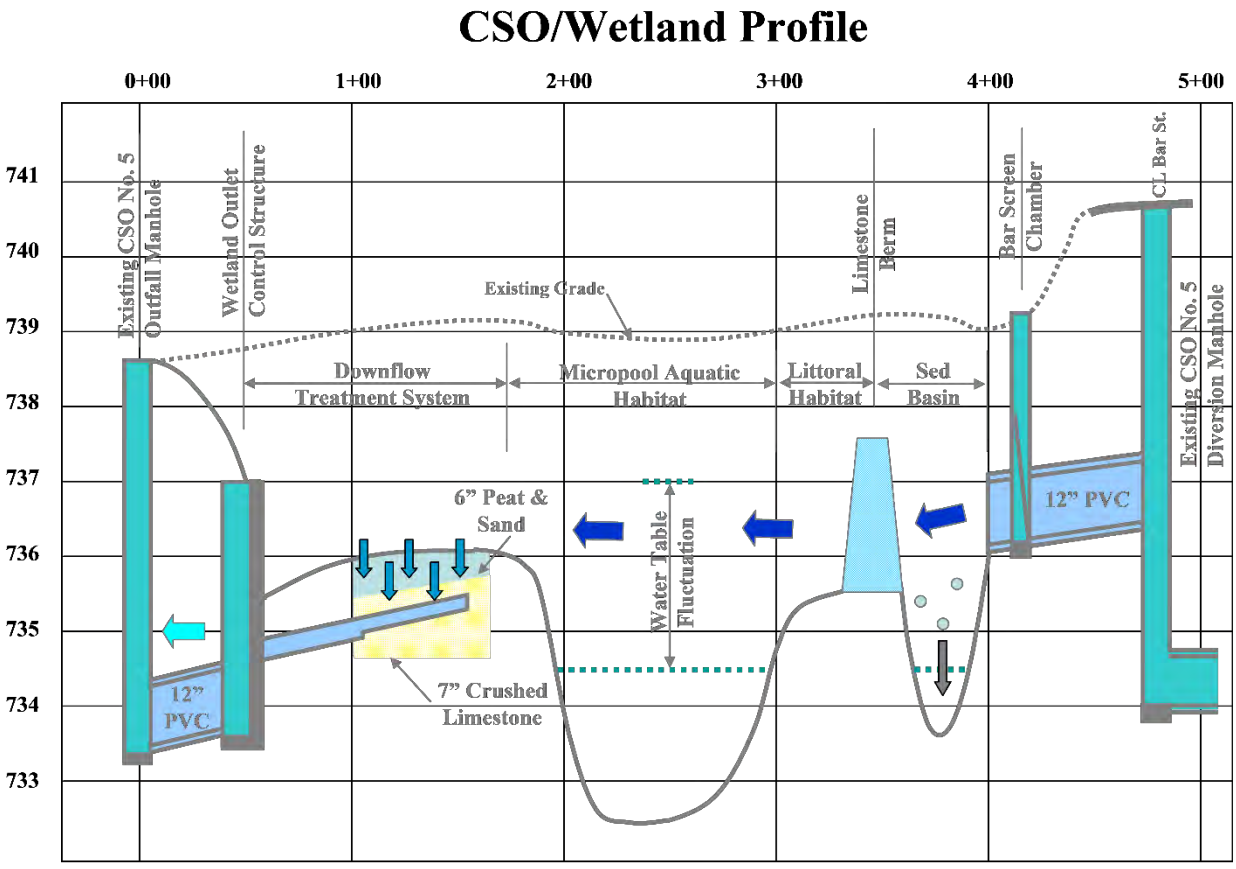


Figure 7-1 CSO/ Wetland Profile

The outlet control for the wetland is designed with the objective of optimizing treatment. By creating a variable height weir, the hydraulic retention time within the wetland can be modified to accommodate runoff volumes and hydraulic loading to maximize efficiency. The configuration of the wetland and CSO outlet are shown in **Figure 7-2**.

In order to sustain established growth, several of the selected emergent and submergent species were planted in clusters. This planting strategy promotes competitiveness against other less desirable and more robust species. Additionally, clustering promotes aesthetic quality, shelter and food for wildlife habitat.

A literature search, followed by a bench test, was conducted to assess the tolerance of aquatic plants to hydraulic fluctuations. Results of the research provided valuable guidance to the ecological design of the wetland. The results allowed for specific plant selection for specific locations within the wetland.

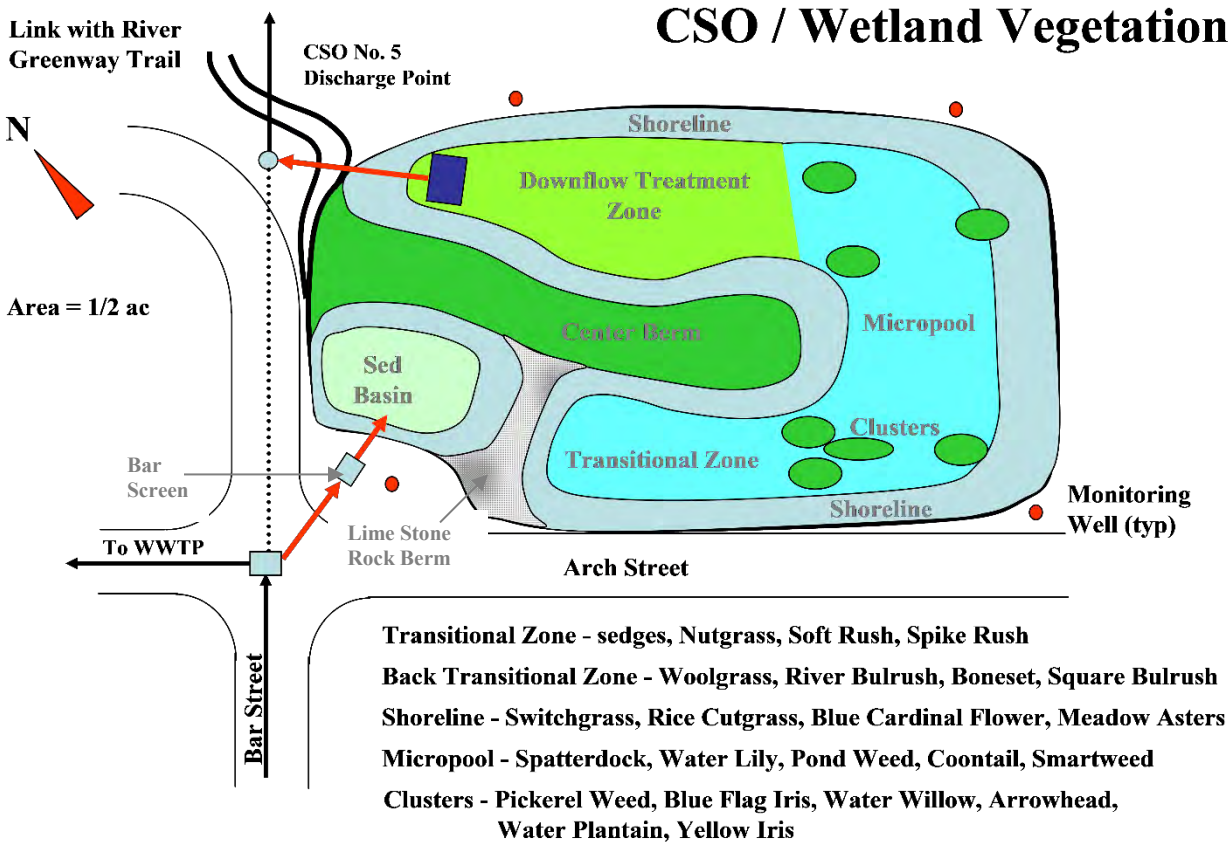


Figure 7-2 CSO/ Wetland Vegetation

With regard to regulatory objectives, the wetland's design included physical components to control floatable materials and to maximize in-line storage. These measures are consistent with the State's CSO Control Strategy. Floatable controls were achieved by the installation of the bar screen and the lime stone rock berm separating the sedimentation basin from the aquatic treatment zones of the wetland.

Since CSO's were first identified as a source of pollution, alternatives have been sought. Constructed wetlands are a cost effective option that conforms to the long-term goals for improving water quality while providing and restoring natural habitat; however, their application

is limited. When CSO communities constructed their interceptors years ago, they commonly intercepted the overflow points along the river's edge. This concept paired with the fact that most river banks in urbanized areas are fully developed, leaves little to no area available for a wetland facility. Therefore, though wetlands are a viable treatment alternative, they may have limited opportunity for implementation due to the lack of available land.

8) Public Notification

In accordance with the Public Notification Requirements for Combined Sewer Overflows to the Great Lakes Basin (40 CFR Part 122), the City of Elkhart has developed a plan which includes this procedure for notifying the public of occurrence of combined sewer overflows (CSOs). The rule requires communities in the Great Lakes Basin with combined sewer overflows (CSOs) to provide public notification to the public, local health departments, and other potentially affected entities as soon as possible, but no later than four hours after becoming aware a discharge has occurred with follow up to the notification to occur with seven days after becoming aware of the discharge of CSOs. Our method of notification will allow any person to determine if a CSO discharge is occurring or has occurred within the last seven days.

The City of Elkhart has 29 CSOs that discharge to the Elkhart, St. Joseph Rivers, or Christiana Creek. These CSO outfall locations are shown on **Figure 1-3**. The "affected waters" means "those waters where the *E. coli* criteria may be exceeded due to a combined sewer overflow discharge." Based on surface water monitoring and water quality modeling used in the development of Elkhart's Long Term Control Plan, the affected waters for purposes of this procedure are shown in **Figure 8-1**. The affected waters include the stream reach on the Elkhart River beginning at the farthest upstream CSO and ending at the confluence with the St. Joseph River. The affected water on Christiana Creek is a very short segment beginning at CSO 14 and ending at the confluence with the St. Joseph River. The affected waters on the St. Joseph River start just downstream of the Johnson Street Dam in Elkhart and ends at the upstream side of the Twin Branch Dam in Mishawaka. There are numerous public access points to the affected waters including parks, schools and greenways. The locations of these access points to the affected waters are shown on **Figure 8-1**. According to IDEM records, there are no drinking water suppliers having surface water intakes located within 10 river miles downstream of the Elkhart CSOs.

A) Notification Method

The CSO notification procedure for the City of Elkhart utilizes in-place technologies. Currently, the City has wireless monitoring devices on all twenty-nine (29) CSOs. The monitoring devices consist of a set of sensors that monitor water levels within each CSO chamber. When the water level is high enough to pass over the regulator weir indicating a discharge, a signal is then sent to a web-based server that houses the monitoring data. This server generates a notification message that is sent to the City of Elkhart's Internet web server. The City of Elkhart's server then posts a CSO alert on the City of Elkhart's home web page, which can be found at www.elkhartindiana.org. The concept of this process is shown schematically on **Figure 8-2**.

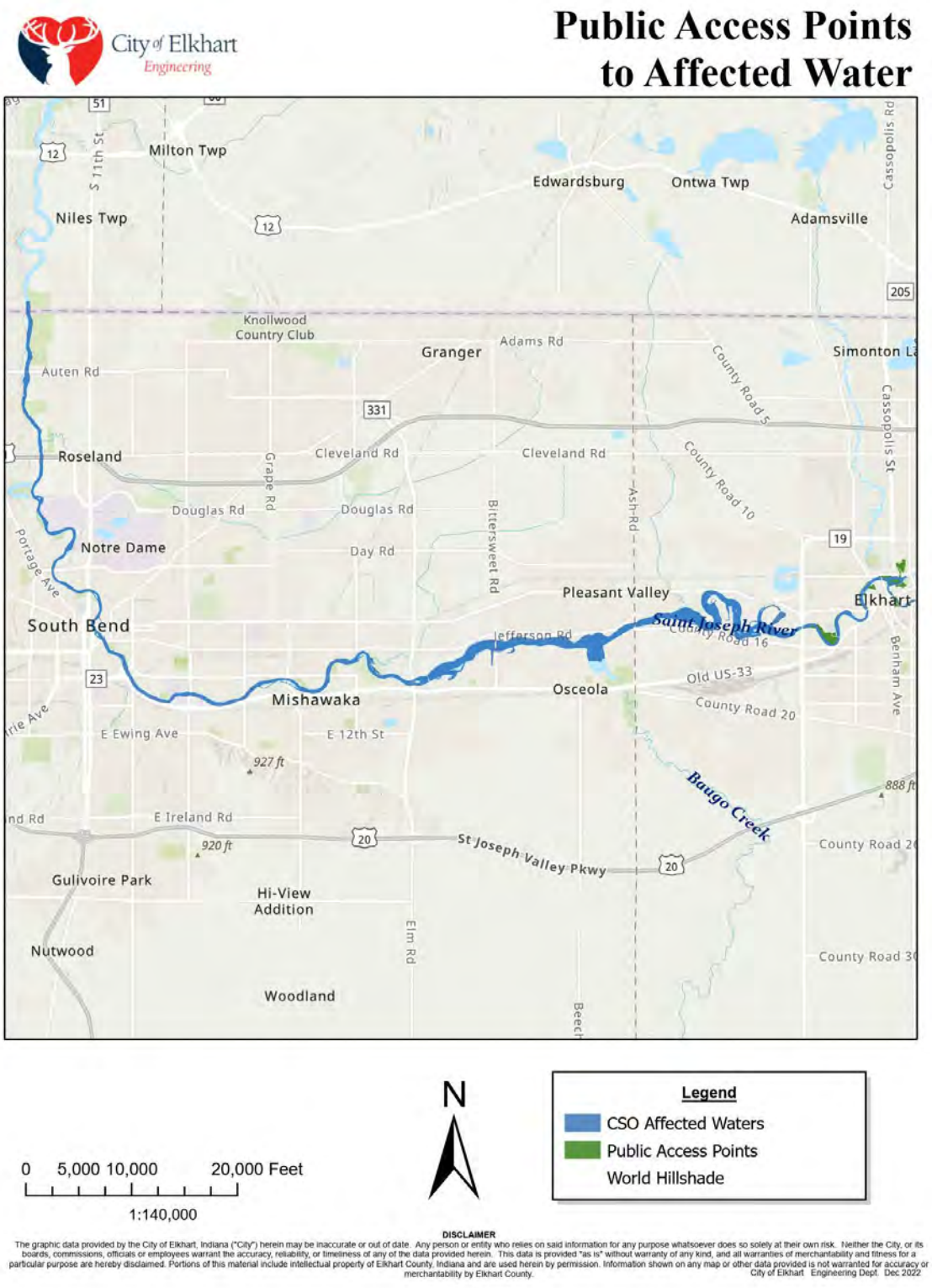


Figure 8-1 Public Access Points to Affected Water

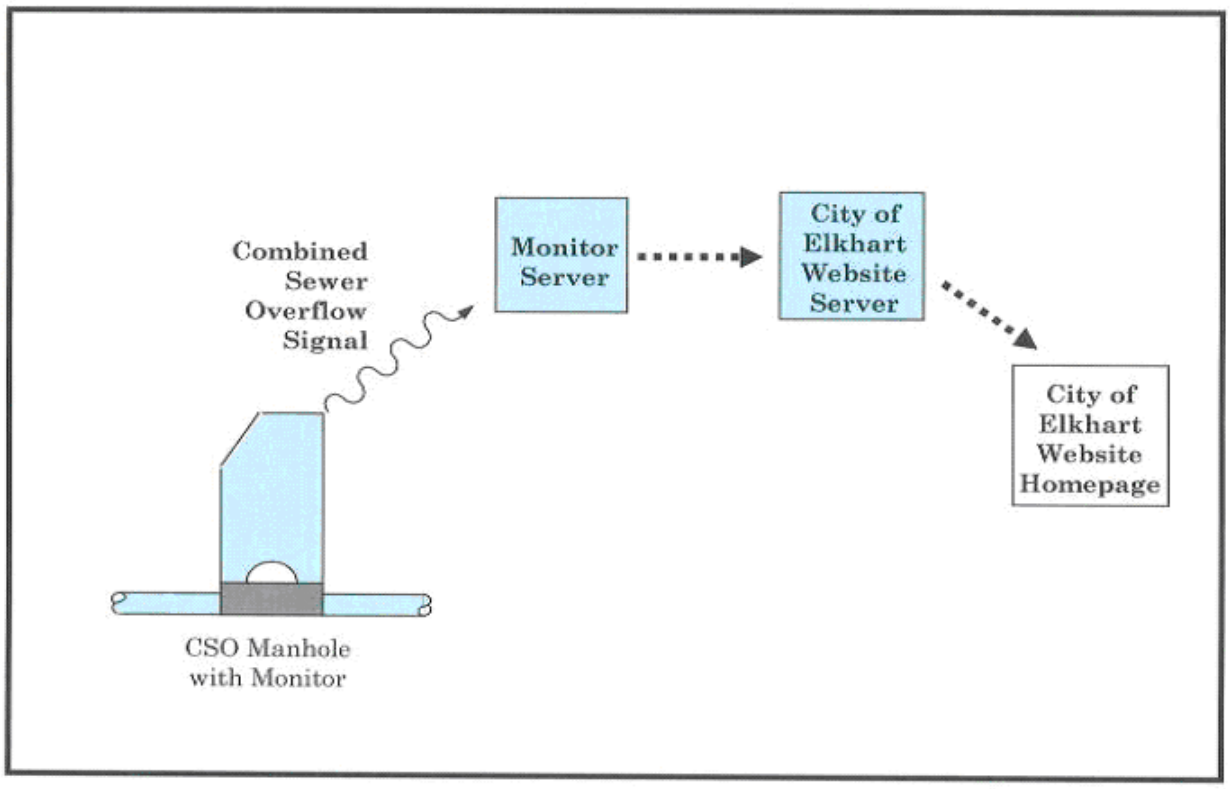


Figure 8-2 Electronic Monitoring Notifications

When the sensor equipment is out of service or disabled at a CSO location, then visual inspections are conducted in accordance with the CSO inspection procedures.

When an overflow discharge is detected by the in-line monitors an icon on the homepage, www.elkhartindiana.org, of the City of Elkhart's webpage is activated to show that there is an overflow. This icon is linked to another website hosted by FlowWorks that contains a map of all of Elkhart's CSO outfall locations. The map shows where there are active overflows, overflows that have occurred within in the last 7 days or where there have been no overflows in the last 7 days. This website is open and accessible to all in the public. Once at the site, the user can click on an outfall icon to access overflow information including start time, end time, and volume estimates of the overflow event. **Figures 8-5** and **8-6** are examples of the FlowWorks site.

An email list has been created that includes the Elkhart County Health Department and the other impacted entities. When an overflow occurs an email is sent to the list notifying all of the overflow. The email states which CSO is overflowing and provides a hyperlink to the website that has the map with the overflow information.

Additionally, when any CSO event is detected by an in-line monitor, an e-mail message is immediately sent to multiple staff members notifying them of the time the event started. When the event ends another e-mail message is sent to the same staff members notifying them of when the event ended and its duration.

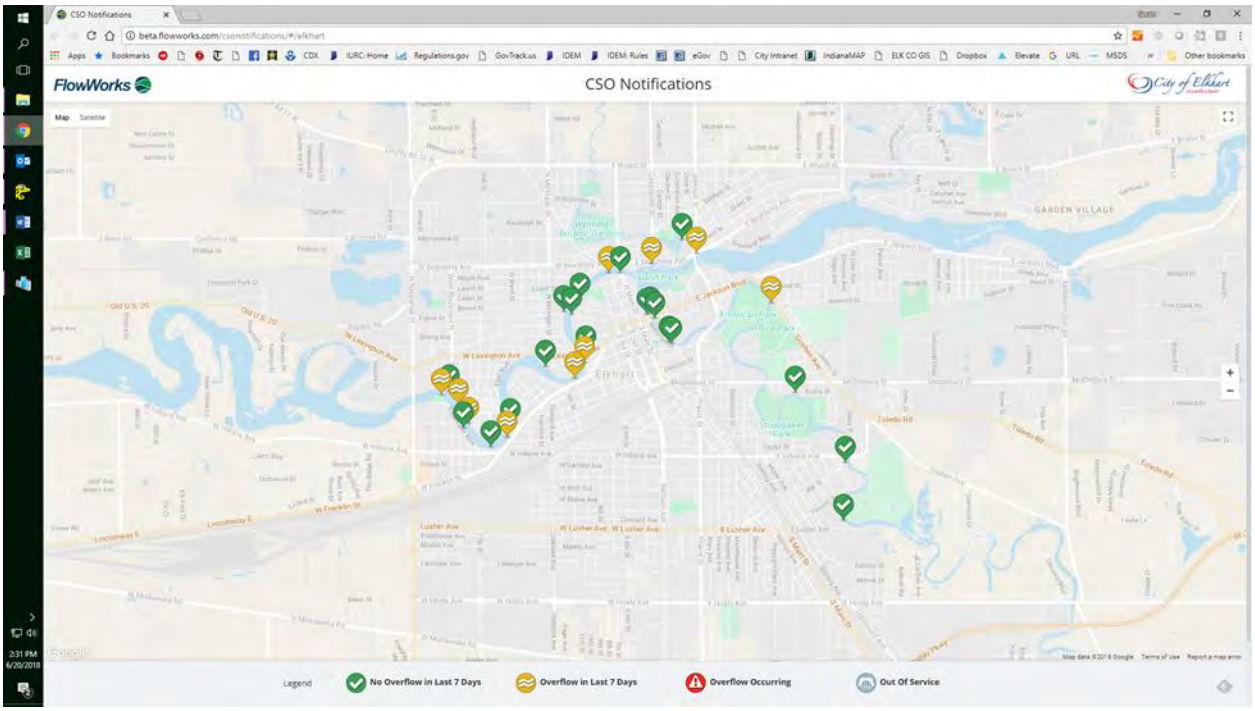


Figure 8-3 Overview of Flow Works Site

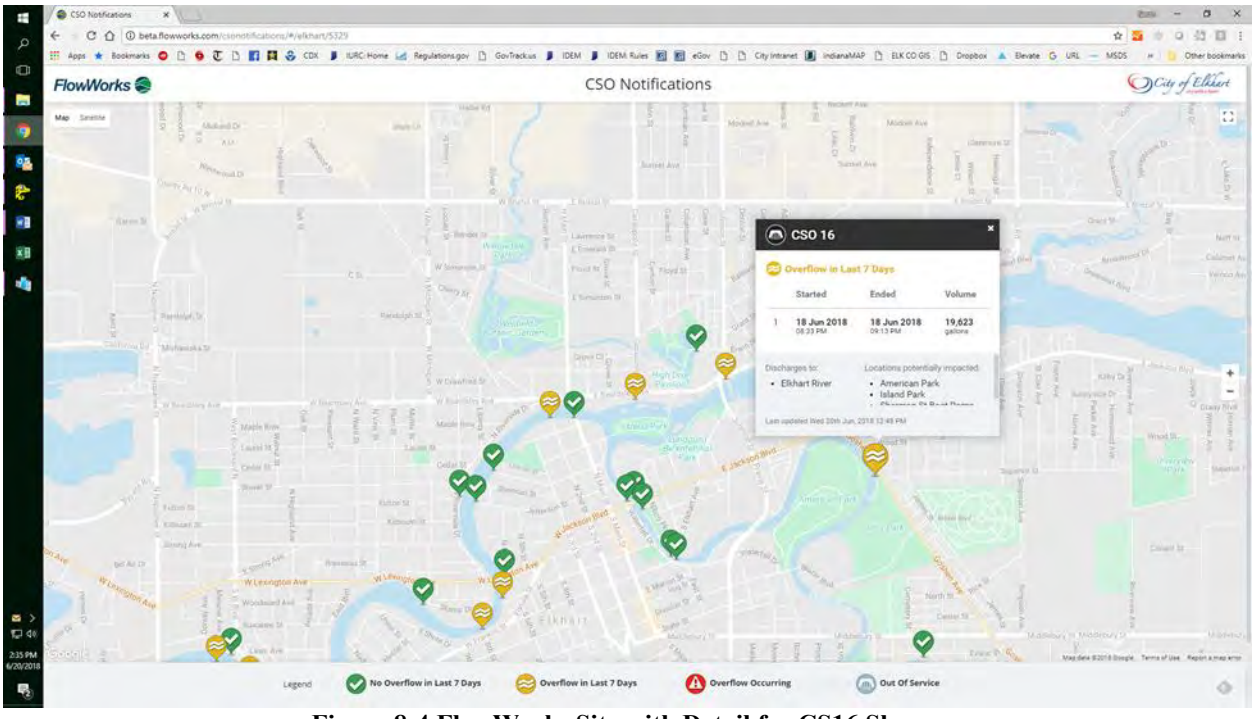


Figure 8-4 FlowWorks Site with Detail for CS16 Shown

The duration of the activation of the icon on Elkhart's home web page depends on essentially two situations. The first case is fairly simple and involves an overflow detected at just one site. For this case, the posting is made at the time of overflow detection, and the total time the posting remains on the Elkhart website is the duration of that event plus 48 hours following cessation of the overflow. The second situation involves more than one overflow detected, though not

necessarily detected simultaneously. For this case, as in the first case, the posting is made at the time the initial overflow is detected. The 48-hour post-overflow "timer" would again begin at the cessation of the overflow. But, if another overflow is detected from any of the sites before the "48-hour" posting timer expires, then the posting remains and the "48-hour" clock resets to zero at the end of the second recorded overflow duration. In essence, the posting will always remain for 48 hours following the cessation of the most recently detected overflow. These two cases are illustrated for clarity in **Figure 8-5**.

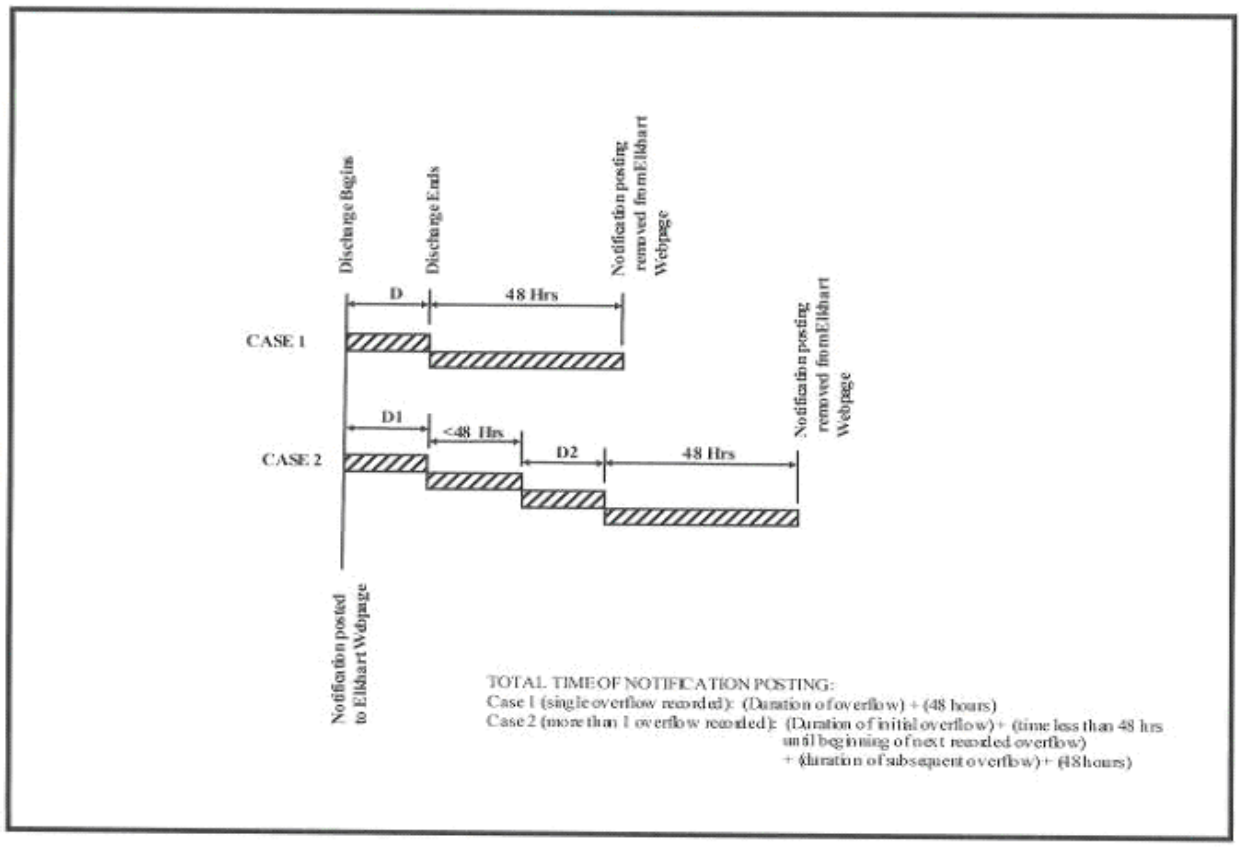


Figure 8-5 CSO Alert Duration Scenarios

B) Annual Public Notification

In accordance with 40 CFR Part 122.38(b), by May 1st of each year, an annual notification detailing the CSO discharges from Elkhart's CSOs that occurred in the previous calendar year will be posted on the City website. Details will include:

1. A description of the location and receiving water for each CSO discharge point, and, if applicable, any treatment provided;

2. The date, location, approximate duration, measured or estimated volume, and cause (e.g., rainfall, snowmelt) of each wet weather CSO discharge that occurred during the past calendar year. Where CSO discharges from the same system occur at multiple locations during the same precipitation related event, the Great Lakes

Basin CSO permittee may provide an estimate of the cumulative volume discharged to a given waterbody;

3. The date, location, duration, volume, and cause of each dry weather CSO discharge that occurred during the past calendar year;

4. A summary of available monitoring data for CSO discharges from the past calendar year;

5. A description of any public access areas potentially impacted by each CSO discharge;

6. Representative precipitation data in total inches to the nearest 0.1 inch that resulted in a CSO discharge, if precipitation was the cause of the discharge identified in (2);

7. Permittee contact information, if not listed elsewhere on the website where this annual notice is provided;

8. A concise summary of implementation of the nine minimum controls and the status of implementation of the long-term CSO control plan (or other plans to reduce or prevent CSO discharges), including:

    (i) A description of key milestones remaining to complete implementation of the plan; and

    (ii) A description of the average annual number of CSO discharges anticipated after implementation of the long-term control plan (or other plan relevant to reduction of CSO overflows) is completed.

The public may also view a copy of the report by contacting the City of Elkhart Public Works and Utilities. The public will be informed of the availability of the report and where they may access a copy via a posting in the local newspaper by May 1 of each year.

C) Posting of Informational Signs

In accordance with Section 6 of the rule, the City of Elkhart has posted 20 informational signs at public access points within the City's jurisdiction. The sign locations are described below in **Table 8-1** and shown on **Figure 8-5**. The sign language and layout are illustrated on **Figure 8-6**. The signs are 11" x 17" in size.

Table 8-1 CSO Informational Sign Locations

Sign ID#	Sign Location	Affected Water
CSON-1	Along trail under Indiana Ave. bridge	Elkhart River
CSON-2	Boat landing at Studebaker Park	Elkhart River
CSON-3	Canoe launch at Studebaker Park	Elkhart River
CSON-4	Auto bridge to American Park	Elkhart River
CSON-5	Pedestrian bridge to American Park	Elkhart River
CSON-6	NE pedestrian bridge to High Dive Park	Christiana Creek
CSON-7	SE pedestrian bridge to High Dive Park	Christiana Creek
CSON-8	South pedestrian bridge to High Dive Park	Christiana Creek
CSON-9	Parking lot entrance to High Dive Park	Christiana Creek
CSON-10	NE pedestrian bridge to Island Park	St. Joseph River
CSON-11	SE pedestrian bridge to Island Park	St. Joseph River
CSON-12	West pedestrian bridge to Island Park	St. Joseph River
CSON-13	Parking lot in Beardsley Park	St. Joseph River
CSON-14	Trailhead to river in Langle Park	St. Joseph River
CSON-15	Boat landing at Sherman Street bridge	St. Joseph River
CSON-16	Along shoreline in McCreary's Point Park	St. Joseph River
CSON-17	Along shoreline in McNaughton Park	St. Joseph River
CSON-18	Between boat landings at McNaughton Park	St. Joseph River
CSON-19	Boat landing at Edgewater Park	St. Joseph River
CSON-20	Trailhead to river in Elliot Park (currently closed)	St. Joseph River

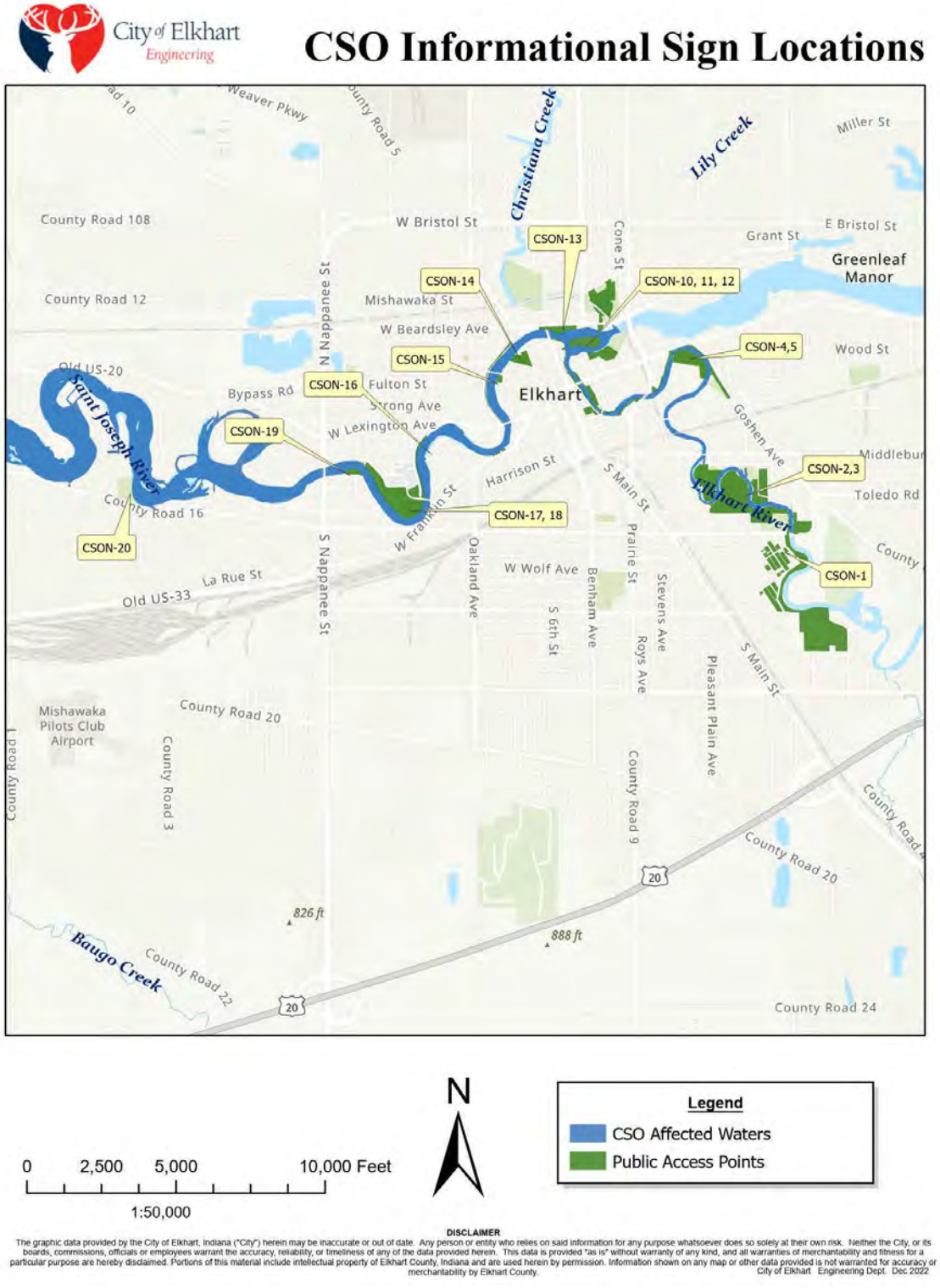


Figure 8-6 CSO Informational Sign Locations

Figure 8-7 CSO Public Access Points Signs

Four access points to affected waters outside of Elkhart's jurisdiction have been identified. These are listed below and identified on **Figure 8-8**.

- Treasure Island Park located at 56226 Armour Ave., Elkhart County Park & Recreation Department, 211 West Lincoln Avenue, Goshen IN 46526
- Midway Marine, 56183 Ash Road, Osceola, IN 46561
- Wyland's Mishawaka Marina, 13100 Jefferson Blvd., Mishawaka, IN 46545
- Margarett H. Prickett Marina Park located on Jefferson Blvd, Mishawaka Parks & Recreation Department, 1122 Lincoln Way West, Mishawaka, IN 46544

The City of Elkhart has a standing offer to provide CSO informational signs to Midway Marine and the Elkhart County Parks Department (for Treasure Island Park). In accordance with the City of Mishawaka's CSO public notification procedure, Mishawka will post a CSO

informational sign at Margarett H. Prickett Marina Park and will offer to provide signage to Wyland's Mishawaka Marina.

These informational signs are in addition to the existing CSO signs posted in compliance with the Nine Minimum Controls as part of the CSO Operational Plan. The existing CSO signs are posted at all of the CSO outfall locations shown on **Figure 8-1**. An example of the language on these posted CSO outfall signs is illustrated in **Figure 8-9**.

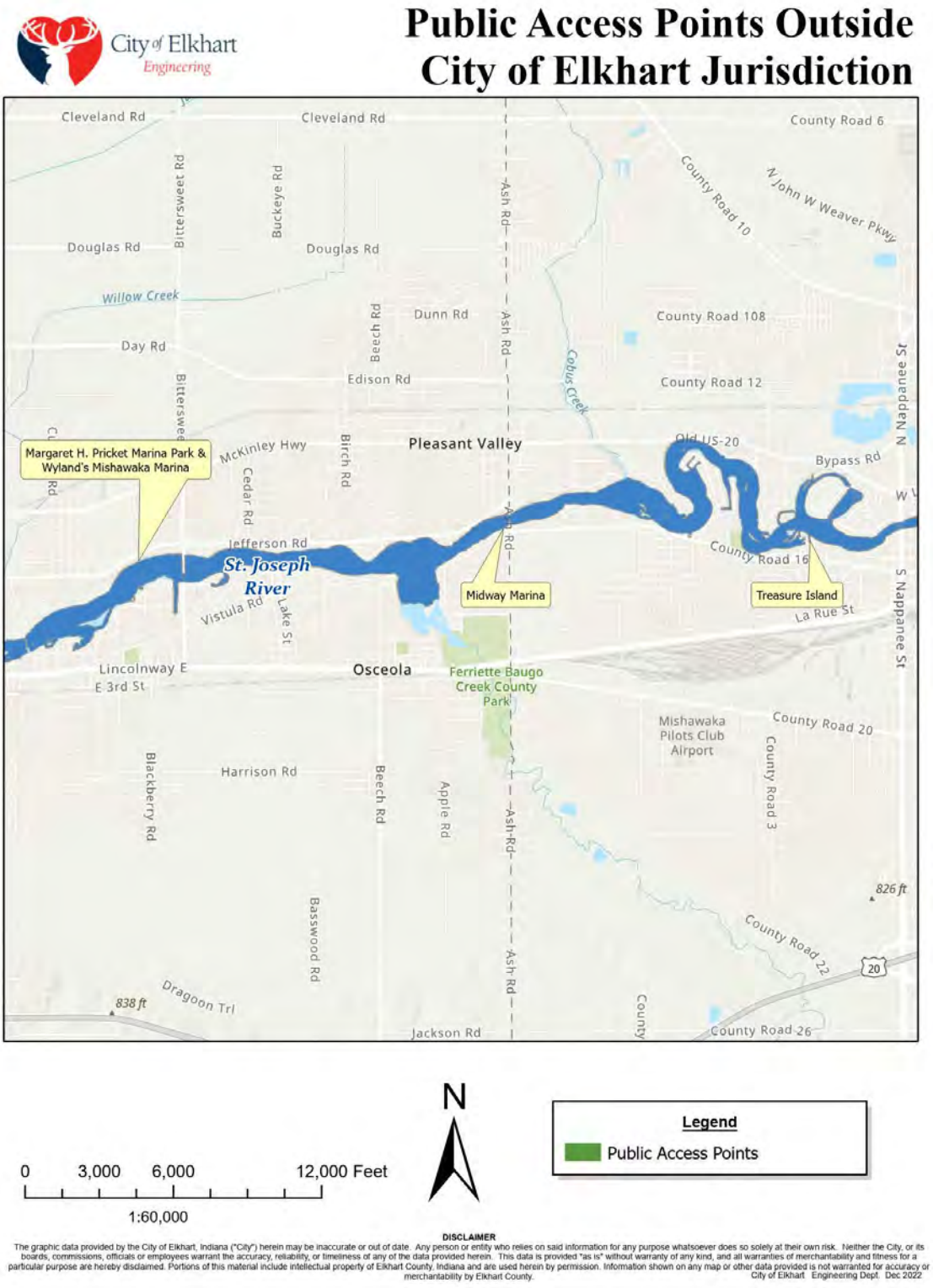


Figure 8-8 Public Access Points Outside City of Elkhart Jurisdiction

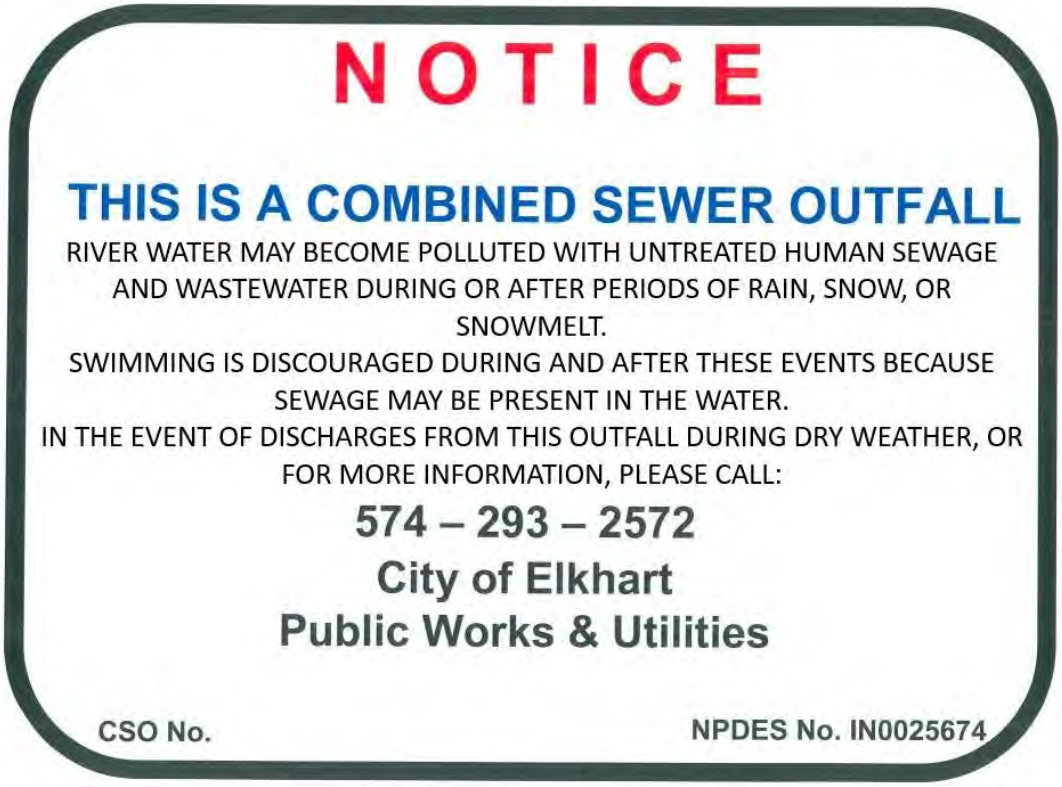


Figure 8-9 CSO Outfall Sign

D) CSO Outfall Sign Maintenance

Signs will be inspected twice annually to ensure they are properly intact, legible, visible and factually correct. If the inspector finds that the sign is damaged, illegible, or no longer factually correct, it will be replaced. If the sign is not visible it will be moved or the area surrounding the sign will be cleaned up to make it visible. When the signs are replaced they will be updated with a description of the discharge to meet the requirements of 40 CFR Part 122

E) Record Keeping and Reporting

The CSO events are reported on the CSO Discharge Monitoring Report (CSO DMR) submitted to IDEM monthly. These reports are kept on file at the Public Works Administration Building. The Utility Services Manager is responsible for maintaining these records.

9) Monitoring to Characterize CSO Impacts and the Efficacy of CSO Controls

A clear understanding of the sewer system and its response to wet weather is required in long-term planning to control CSO's. This involves documenting the existing system and operational practices and developing a computer model of the system that can be used to predict how it will respond to CSO control measures. This section provides documentation of 2023 sewer conditions in the City of Elkhart.

A) History

Portions of Elkhart's sewer system date back to the early 1890's. The original system directed all flows from homes and industries to the receiving waters without any treatment. In the late 1950's and early 1960's Elkhart began a series of projects to intercept the dry weather sewage flow and convey it to a new wastewater treatment plant. Those projects, which took more than 10 years to design and build and represented the best management practices of the day, became the backbone of the current interceptor system. The interceptor projects built large sewers and lift stations located adjacent to the rivers. The original sewer outflows to the rivers were then connected to these interceptors with Combined Sewer Overflow diversion structures. These structures were built so that all the dry weather flow, and the initial portion of wet weather flow, would be diverted to the interceptor. Volumes exceeding the initial wet weather capture capacity of the interceptors were bypassed to the rivers.

By the early 1980's Elkhart began using best management practices to increase the flow conveyed to the wastewater treatment plant and reduce the flow and floatables discharged to the rivers. A CSO Operation Plan formalized practices such as sewer cleaning, raising dams in CSO regulator structures to increase in-line storage, and reducing inflow and infiltration by use of superior backwater gates. During the late 1970's and early 1980's several studies were conducted to address the City's desire to separate its storm sewers and sanitary sewers. Separate storm sewer construction began in the mid-1980's as part of neighborhood revitalization projects.

B) Service Area

Figure 9-1 shows the Elkhart service area as of 2023, along with the primary subsystem lines (mains, trunks and interceptors) colored coded by size category. Included on this figure are the locations of the 66 lift stations and their respective force mains with the five largest stations highlighted. Also shown are the locations of the 41 permitted Significant Industrial Users (SIU's). All but six of the SIU's release wastewater that flow past active CSO's. **Figure 9-2** illustrates the area of the City designated as the combined sewer area. **Table 9-1** provides statistics about Elkhart's sewer system as of 2023.

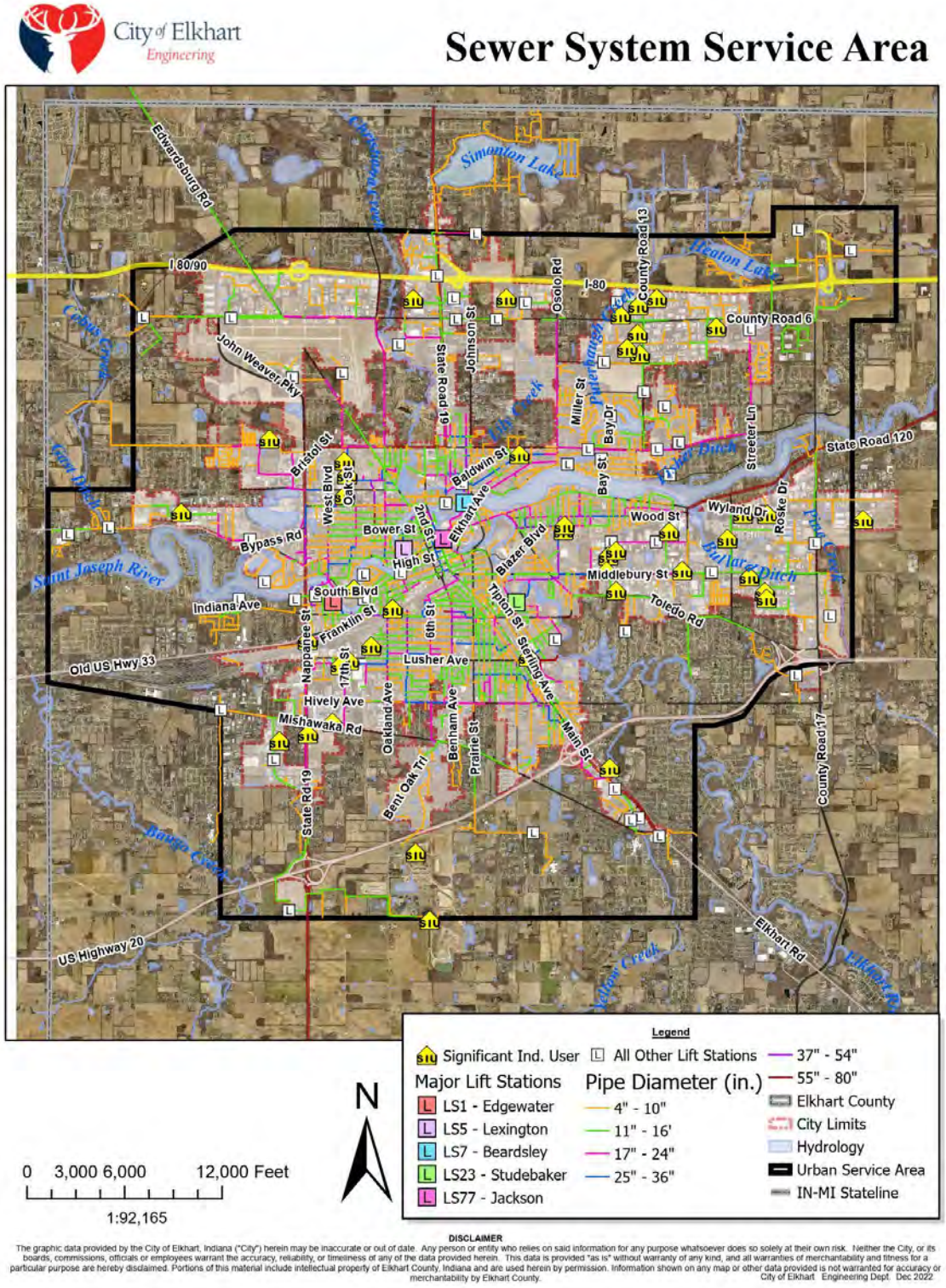


Figure 9-1 Elkhart Service Area

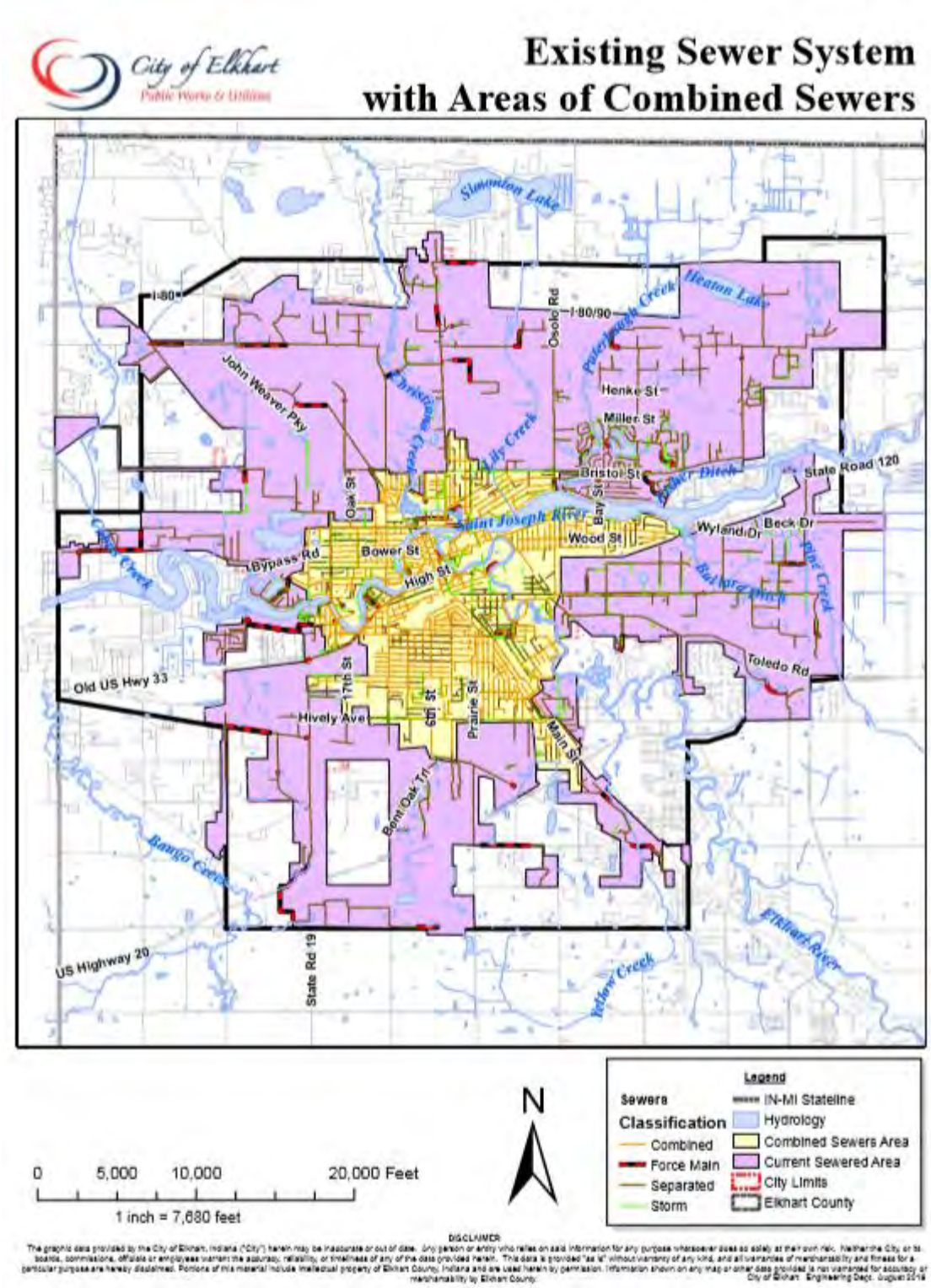


Figure 9-2 Combined Sewer Areas

Table 9-1 Elkhart Sewer System Area Statistics- Not Including Heaton, Granger, Ontwa, Simonton

Elkhart Utility Statistics	
Feature	**Quantity (2023)**
Current Sewer Service Area	39,893 Acres
Area Actually Served	27, 375 Acres
Area Contributing to Combined Sewer System (removed Heaton from 2016 figures)	16,930 Acres
Area Physically Constructed as a Combined Sewer	6,045 Acres
Area Physically Constructed as Separated Sanitary and Storm Sewer Contributing to Combined Sewer Area	11,174 Acres
Area Physically Constructed as Separated Sanitary and Storm Sewer Going Directly to WWTP	2,451 Acres
Active CSOs	29
Number of Operating Lift Stations	66
Number of Catch Basins and Inlets	5,422
Length of Sewer (includes sewage, combined & storm runoff)	375 Miles
Length of Storm Lines	77 Miles
Length of Combined Sewers (includes Storm Runoff)	121 Miles
Length of Separated Sanitary lines that contribute to CSO Area (includes misc. unknown, stubs, etc.)	129 Miles
Length of Separated Sanitary	28 Miles
Length of Sanitary Force Mains	18 Miles
Length of Storm only Force Mains	0.09 Miles
Length Misc. Mains (unknown, stubs, etc.)	1.5 Miles
Length of separated sanitary lines that discharge directly to WWTP	0.18 Miles
Combined Sewer Area Statistics	**Length (mi) 2023**
Length of Sewer	169 Miles
Length of Storm Lines	50 Miles
Length of Combined Sewers (includes Storm Runoff)	121 Miles
Length of Sanitary-only Sewers	48 Miles

C) Combined Sewer Overflows

Table 9-2 shows the location of 29 CSO outfalls and their annual average overflow volume, overflow duration and number of activations, based on XP-SWMM modeling analysis using sewer system conditions in 2004-05. CSO diagrams and coordinates are provided in *Appendix A*. **Table 9-2** does not include a number of outfalls that have been eliminated in recent years, including CSO's 1, 2, 3, 10, 21, 22, 30, 36, 38 and 41. Outfall 35 is the permitted outfall for the Wastewater Treatment Plant. The table also shows the size of the surface drainage area contributing to each CSO outfall. These areas are not necessarily cumulative because many of the CSO's have overlapping drainage areas.

The frequency and total discharge volume at each CSO is calculated using six hours of inter-event time and a threshold value of 0.05 cfs. Overflow events occurring less than six hours apart are counted as a single activation. Any model predicted flow less than 0.05 cfs was assumed to be zero to account for model limitations.

Table 9-2 CSO Locations and Modeled Annual Average Volume, Duration and Activations

CSO No.	CSO Location	Baseline Annual Average Results			
		Overflow Volume (MG)	Overflow Duration (hours)	Number of Activations	Area of Basin (Square Feet)
5	Arch & Bar, Northwest of Intersection	0.0	0.0	0	4,077,535
6	Jackson Blvd, North of Bridge and West of Elkhart River	8.4	138.0	39	6,810,674
7	Jackson Blvd, North of Bridge and East of Elkhart River	0.5	6.0	6	193,016,350
8	Waterfall & Elkhart Ave, Northwest of Intersection	0.0	10.0	1	1,6220,020
9	Northwest Corner Kardzhali Park	0.0	0.0	0	216,808
11	Waterfall & Elkhart Ave, Northeast of Intersection	0.2	7.0	6	5,475,538
12	Beardsley & Cassopolis, Southwest of Intersection	0.0	0.0	0	3,463,935
13	Beardsley & Johnson, Southeast of Intersection	14.0	222.0	44	6,911,316
14	Erwin & Cone, West of Intersection	4.7	36.0	14	140,156,617
15	Fulton & Riverside, East of Intersection	11.2	45.0	12	36,467,635
16	Superior & Goshen, West of Intersection	1.2	15.0	8	24,837,156
17	Lawn & S West, West of Intersection	1.1	13.0	8	49,751,092
18	Northwest Edge of McNaughton Park	3.9	84.0	23	49,887,048
19	Stamp & Michigan, Southwest of Intersection	10.3	143.0	27	39,366,092
20	Bridge & Hudson, Southwest of Intersection	0.3	8.0	6	2,268,547
23	Franklin & 8th, North of Intersection	5.3	49.0	16	9,095,806
24	Indiana & Franklin, Northwest of Intersection	73.2	362.0	57	355,269,751
25	Pottawattomi & 2nd, Northwest of Intersection	1.0	56.0	16	2,425,657
26	Pottawattomi & Main, Northwest of Intersection	4.0	69.0	18	201,239,891
27	Edgewater & Navajo, Northwest of Intersection	0.0	0.0	0	2,118,476
28	Washington & Clyde, Northwest of Intersection	0.0	0.0	0	1,085,814
29	Jefferson & Clyde, West of Intersection	0.0	2.0	1	1,795,686
31	Lusher & Elizabeth, Northwest of Intersection	5.0	343.0	19	54,075,169
32	Edgewater & Okema, North of Intersection	0.2	34.0	8	1,304,809
33	Evans & Grace, East of Intersection	4.9	23.0	9	123,719,959
34	Lexington & 6th, Southwest of Intersection	0.0	0.0	0	1,546,933
37	Krau & Franklin, Northwest of Intersection	23.1	327.0	25	281,963,867
39	High & Hillside, Northwest of Intersection	0.1	26.0	6	724,213
40	Southwest Edge of McNaughton Park	0.0	0.0	0	2,073,523

D) Combined Sewer System Management, Operation and Maintenance

The initial characterization of the Collection System was done as part of the CSO Operation Plan. This document was initially submitted to the Indiana Department of Environmental Management in 1992 and updated in 1997, with approvals received. The plan included goals to 1) improve the existing sewer system and reach City residents without sewer service; 2) improve collection system management and preventive maintenance; and 3) remove solids before they reach the combined sewer system.

E) Sewer Construction Strategy

To achieve the first goal, the City developed a three-phase sewer construction strategy. Phase 1 sought to repair, replace and reinforce the sewer system backbone throughout the central City. Projects included replacing and upgrading river crossings as well as repairing, reducing infiltration, streamlining the major interceptors, and repairing and upgrading lift stations. A major component of this phase was the construction of the North Interceptor sewer and lift station, which cost over $2.5 million and was a direct connection to the WWTP, bypassing all CSOs. Several of Elkhart's largest industrial users were connected to the North Interceptor, removing them from the combined sewer system. The flow from these industries was approximately 10-15 percent of the City's total sewer flow, and approximately 70-80 percent of the industrial flow of the City.

Phase 2 extended sanitary sewer service to unsewered areas of the City. Homes on septic systems were identified as a significant water quality concern in Elkhart County in a 2003 report prepared by the Elkhart County Commissioners under an IDEM Section 319 grant.[1] Approximately 33 sewer service projects were dispersed throughout the City and were estimated to cost $2.5-3 million. Approximately 600 new connections to the City sewers were created through these projects. The City estimates that approximately 260 residential properties within the City limits remained without sewer service in 2009.

Phase 3 sought to extend sewers to areas near several small, unstaffed private treatment plants and to extend trunk sewers to the growth areas on the perimeter of Elkhart. These projects were completed at an estimated cost of $3 million. In addition to these projects, the City partnered with a satellite utility to redirect another large area of industrial use directly to the North Interceptor sewer, bypassing the combined sewer system entirely. This program removed treatment plant discharges at Suburban Utilities, Concord Mall, Concord High School, Ox Bow Grade School and the Elkhart Baptist School from receiving waters. The City of Elkhart's sewer system and its Wastewater Treatment Plant now receive all discharges from these entities.

F) Collection System Management

The City merged its engineering department with its two utility groups in 1991. The joining with the group in charge of underground infrastructure with the Collection System group facilitated more prompt responses to collection system problems. The City also developed a Preventive Maintenance Program. **Table 9-3** shows the amount of preventive maintenance performed on sewers and catch basins from 1993 to 2023, compared to sewer calls and system-related problems in those same years.

Table 9-3 Annual Preventive Maintenance and Sewer Calls 1993-2023

Year	Sewer PM (feet)	Catch Basin Cleaning	Sewer Calls	Sewer Problems
1993	103,375	1,200	624	76

[1] *Elkhart County Commissioners 319 Grant - Problematic Waste Disposal Systems: Education, Detection, Elimination, and Monitoring,* Lawson-Fisher and Associates, 2003.

Year	Sewer PM (feet)	Catch Basin Cleaning	Sewer Calls	Sewer Problems
1994	93,930	1,353	525	39
1995	94,590	797	504	58
1996	90,900	1,493	460	30
1997	117,200	1,218	428	23
1998	140,000	1,600	397	19
1999	153,935	1,680	423	26
2000	147,127	1,436	407	17
2001	110,389	1,660	451	18
2002	163,414	1,245	311	27
2003	165,183	1,083	263	25
2004	167,117	986	320	18
2005	165,358	1,124	280	10
2006	182,575	1,438	279	14
2007	140,222	946	357	11
2008	170,876	326	295	15
2009	90,151	1,266	253	16
2010	103,782	2,010	248	19
2011	177,557	2,312	243	17
2012	191,267	1,178	246	12
2013	141,798	1,866	264	18
2014	117,544	1,158	321	24
2015	164,597	2,048	251	13
2016	111,142	1,715	276	15
2017	227,238	2,115	222	4
2018	197,608	1,926	296	11
2019	247,990	2,155	299	20
2020	43,956	342	259	17
2021	181,195	221	246	40
2022	76,968	479	277	27

Year	Sewer PM (feet)	Catch Basin Cleaning	Sewer Calls	Sewer Problems
2023	128,496	1,269	247	22

G) Small Treatment Plant Elimination

In the past, seven small treatment plants contributed to the flow of the receiving waters in Elkhart. These plants were generally run by part-time semi-professional operators and were often problematic for IDEM regulators as well as for the environment. As described earlier in this chapter, Elkhart believed that the environment would benefit greatly if these flows could be diverted to our system where our full-time professional staff, running a 24-hour day operation, would be better able to guarantee high level of treatment for all wastewaters before entering the receiving streams.

H) Satellite Utilities

In addition to the small treatment plants mentioned above, Elkhart has worked with three major lake communities to provide treatment for their collected sewage. Simonton Lake, Heaton Lake and Ontwa Township, MI discharge directly to Elkhart's sewer system. The connections were made to the North Interceptor system that does not flow through or past any combined sewers.

I) Sewer Separation Program

The City of Elkhart has been investigating separation of combined sewer systems since the late 1970s. During the ’70s and early ’80s, several studies were done to evaluate priorities for system separation and estimate the associated cost. The City initially sought to capitalize on opportunities to separate combined sewers whenever rehabilitation projects occurred along streets with combined sewers. The plan took into account both the need for separation and the limited number of available outlets.

Originally, there were approximately 673,000 feet of combined sewers. By 2004, the City had extended 170,000 feet of storm sewers that separated 194,000 feet of combined sewer. The City of Elkhart has already separated 29 percent of its combined sewers and has the infrastructure in place to separate an additional 18 percent.

J) CSO and Non-CSO Impacts on Water Quality

This section describes the impacts of Elkhart CSO’s on water quality in the Elkhart and St. Joseph Rivers, as well as the impacts of non-CSO sources. Information is based upon the St. Joseph River Model Updated Calibration Report (LimnoTech 2007) and other river model documentation. The analysis describes the results of the model simulation of typical year (1992) conditions using the updated collection system models applied in a continuous simulation configuration for baseline (2004) conditions. *E. coli* source types included in the model include upstream sources, tributary inflows, CSO’s, stormwater outfalls (SWO’s), WWTP effluent, and drainage from areas adjacent to the rivers (direct drainage). A summary of the loads for each source type and a comparison to in-stream water quality standards are discussed in this section.

K) E. coli Loads

Figure 9-3 summarizes the simulated percent contributions of each source type to the total *E. coli* load during the typical year simulation to the St. Joseph River (including loads from the Elkhart River). **Figure 9-3** also shows the loading distribution solely to the Elkhart River. In the St. Joseph River, CSO's are the predominant source of *E. coli* (62 percent of the load) whereas in the Elkhart River, nonpoint source loads from tributaries are the predominant source (66 percent). Yellow Creek and Rock Run Creek are relatively large tributary watersheds contributing to the Elkhart River. The majority of the loadings in these tributaries are from agricultural sources (i.e., livestock grazing and manure application).

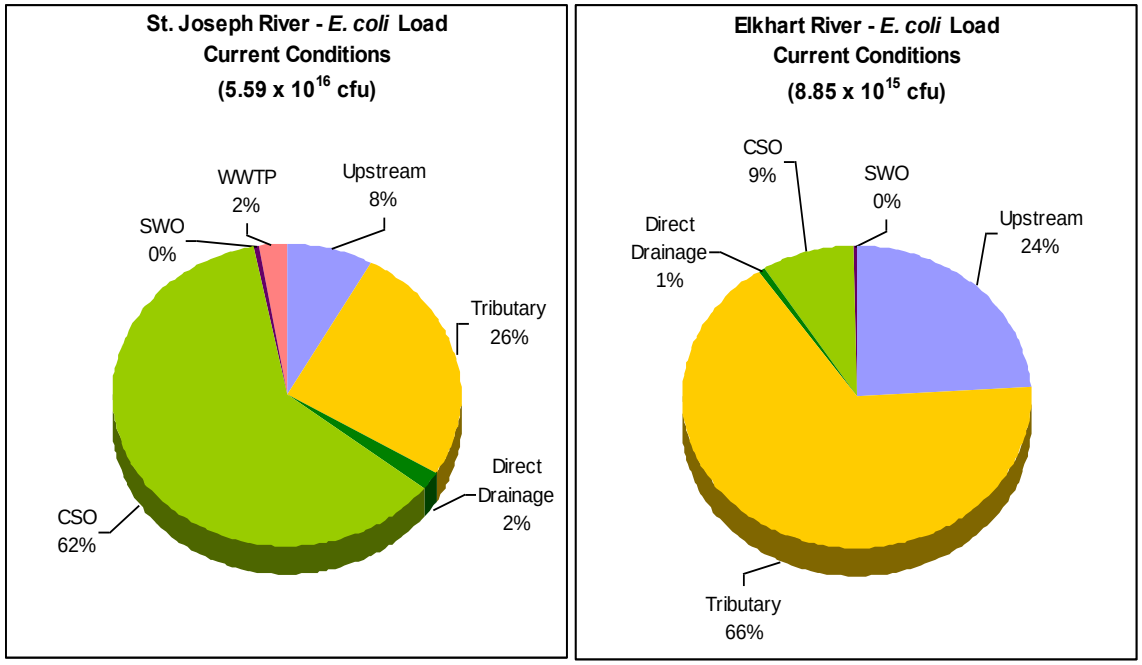


Figure 9-3 Modeled E. coli Loads to St. Joseph and Elkhart Rivers, by Source

L) Water Quality Criteria Exceedances

The typical year baseline scenario simulations were evaluated for the frequency with which in-stream *E. coli* concentrations are likely to exceed water quality criteria. The analysis below is based upon the Indiana single sample standard of 235 cfu/100 mL, applied at all locations during Indiana's recreation season (April-October). All analyses are based on the typical year (1992) rainfall patterns during the April-October recreational season.

At all in-stream locations, the frequency of exceedance of the single sample maximum criterion was evaluated considering the impact from: 1) all pollution sources and 2) loads attributable to Elkhart's CSOs (tracked separately within the model). **Figure 9-3** (left) illustrates exceedances of the single sample maximum criterion throughout the St. Joseph River. The blue line represents the percent of hours the single sample standard is exceeded during the recreational season due to all pollution sources. The green line represents the percent of hours that Elkhart CSOs alone cause exceedances of the single sample standard. **Figure 9-3** (right) represents the same analysis for the Elkhart River. There are 5,136 hours in Indiana's April-October recreation season.

This analysis demonstrates that Elkhart CSOs cause exceedances of the *E. coli* single sample maximum standard in the St. Joseph River between two to six percent of the time during the typical recreation season (percent depends on in-stream location), and zero to three percent of the time in the Elkhart River. Other sources combine to cause *E. coli* exceedances 4-18 percent of the time in the St. Joseph River, and 24-30 percent of the time in the Elkhart River. This graph demonstrates that Elkhart CSO controls alone are unlikely to allow the waterways to meet the current *E. coli* single sample standard at all times during the typical recreation season.

M) Summary

An analysis of baseline conditions in the Elkhart sewer system, treatment plant and CSO receiving streams led to the following conclusions:

- CSO discharges in wet weather appear to have no impact on either the dissolved oxygen or total suspended solids parameters of the receiving streams. In addition, the streams do not appear to be under any conditions of stress due to biodegradable organics, primary nutrients or heavy metals. Sediments and benthic communities are ecologically healthy and not adversely impacted by CSO discharges. Therefore, the receiving streams appear to be attaining their intended aquatic uses.
- Bacteria data collected by the City of Elkhart, IDEM and others since the 1990s indicate that the rivers and tributaries are impacted by elevated *E. coli* concentrations during dry- and wet-weather conditions. Data and modeling results suggest that multiple sources are contributing to the bacteria loads in the streams.
- Based upon modeling results, bacterial water quality declines gradually in the Elkhart and St. Joseph Rivers as those waterways move through the urban areas of Elkhart, Mishawaka and South Bend. Water quality does show an improvement within the Mishawaka area. However, the overall trend shows that bacterial water quality deteriorates as the river flows through Elkhart and St. Joseph counties.
- Based on modeling results using 1992 typical rainfall patterns, exceedances of the 30-day geometric mean water quality standard for *E. coli* appear to be more prevalent during months with more rainfall events and greater total rainfall.
- In the early 1980s Elkhart began using best management practices to increase the flow conveyed to the wastewater treatment plant and reduce the flow and floatables discharged through CSOs to the rivers. Separate storm sewer construction began in the mid-1980's as part of neighborhood revitalization projects.
- Of the total sewered area in the City of Elkhart (17,765 acres), 34 percent (6,052 acres) were served by combined sewers. The remaining 11,713 acres were served by separated systems. However, many of the newer separated systems connect to a combined system in the City core. The total area contributing to the combined sewer system in 2004 was 15,523 acres, or 87 percent of the total sewer system.
- During wet weather events, though significant volumes of combined sewage are discharged to the local receiving streams, the collection system conveys peak hydraulic loads to the wastewater treatment plant.
- In the St. Joseph River, CSOs are the predominant source of *E. coli* (62 percent of the load) whereas in the Elkhart River, nonpoint source loads from tributaries are the predominant source (66 percent).

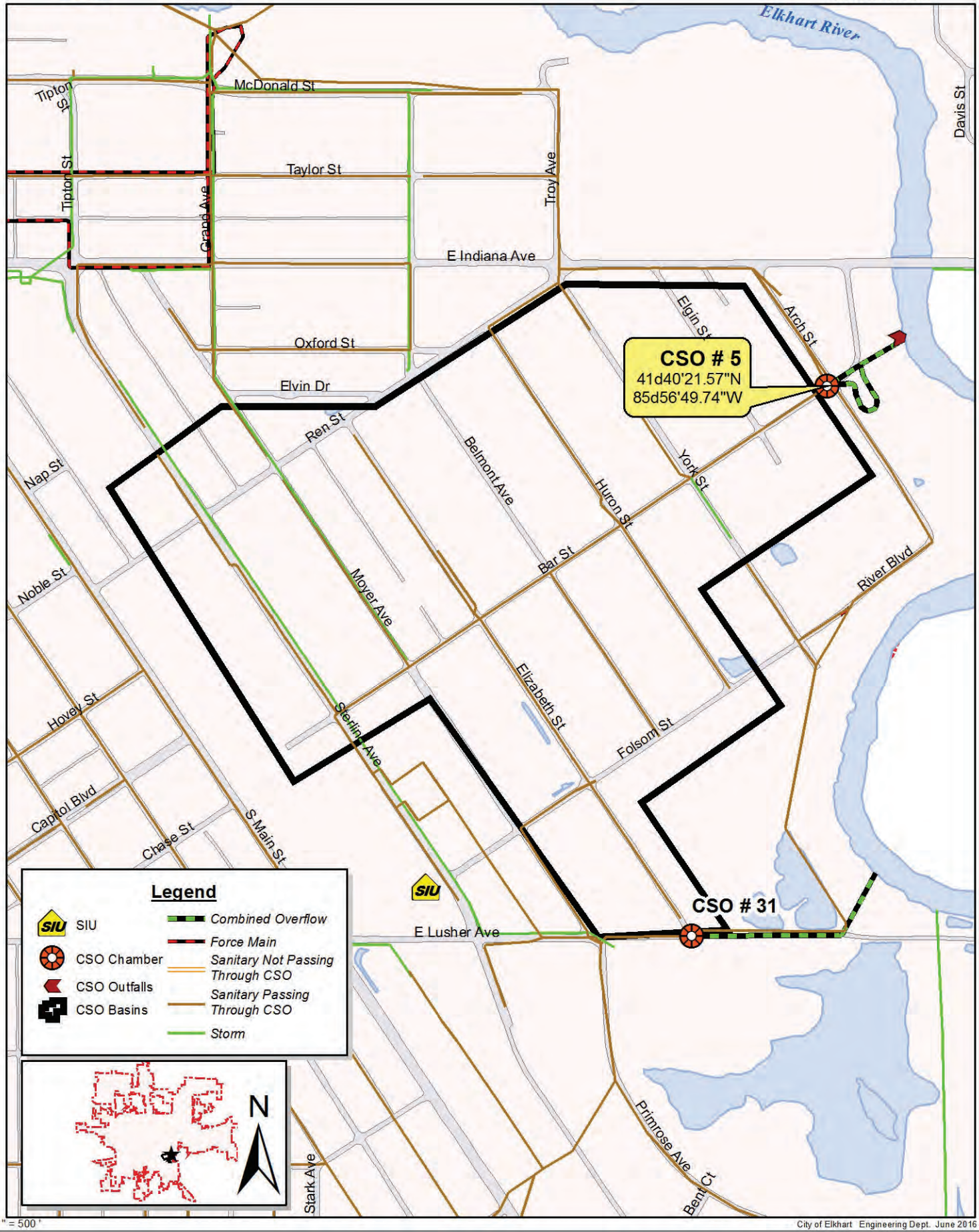
- Elkhart CSOs alone cause exceedances of the *E. coli* single sample maximum standard in the St. Joseph River 2-6 percent of the time during the typical recreation season, and 0-3 percent of the time in the Elkhart River.
- Other sources combine to cause *E. coli* exceedances 4-18 percent of the time in the St. Joseph River, and 24-30 percent of the time in the Elkhart River. Without controls on these other sources, Elkhart CSO controls alone are unlikely to allow the waterways to meet the current *E. coli* single sample standard at all times during the typical recreation season. Non-CSO sources include dry weather sources (failing septic, wildlife, agriculture) and non-point wet weather sources such as runoff of manure, pet waste and wildlife.

Appendix A – Active CSO Site Maps

City of Elkhart
Public Works & Utilities

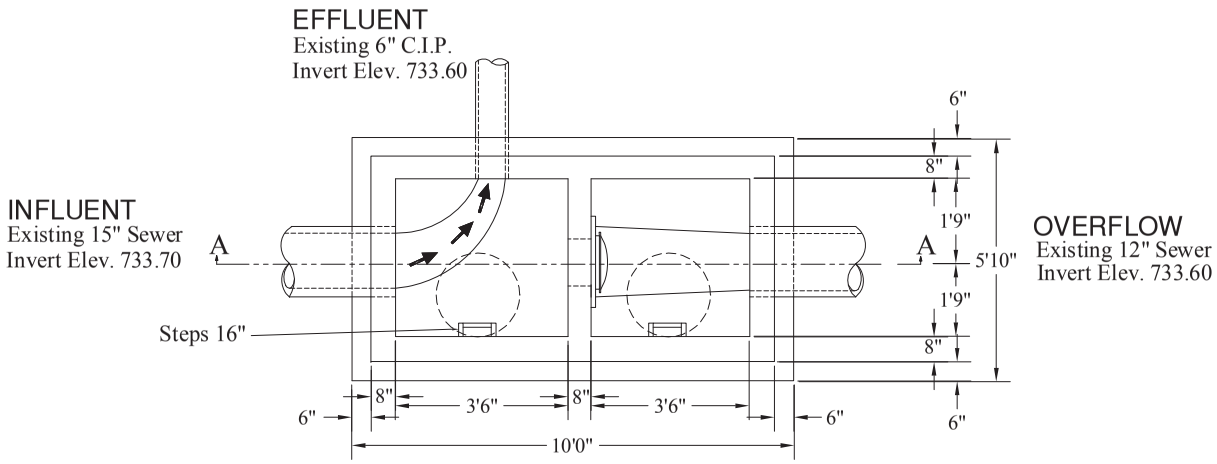
CSO 5

Intercepting Chamber at Arch and Bar

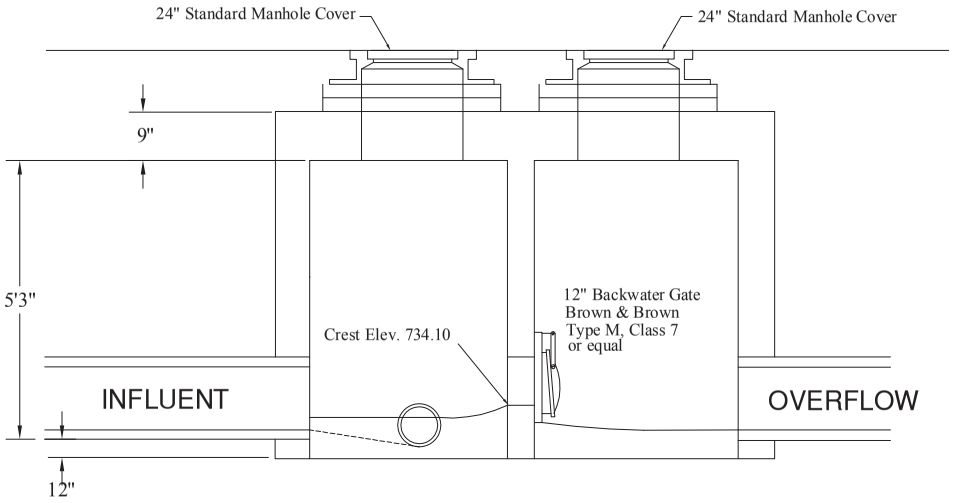


1 " = 500 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 5 - Arch & Bar
Site Measurements

RECEIVING WATER	Elkhart River
LATITUDE	41d40'21.11"N
LONGITUDE	85d56'50.28"W
Influent Lines Sizes	15"
Effluent Line Sizes	6"
Overflow Line Size	12"

Measurements

Influent Line to Rim	6.62
Influent Line to Rim	
InfluentLine to Rim	
Effluent Line to Rim	6.82
Effluent Line to Rim	
Overflow to Rim	3.42

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate
- Size
- Type

TideFlex Gate
- Size
- Mount (Wall or Pipe End)

Comments Overflows to a constructed wetland

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Arch and Bar

CSO 5

not to scale

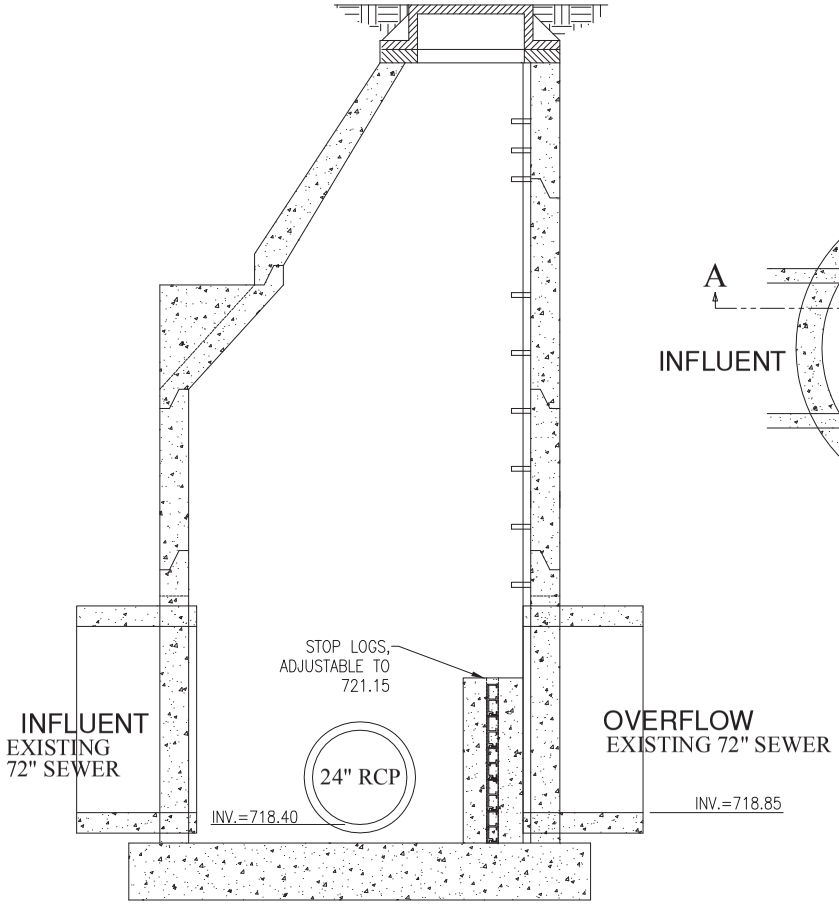
City of Elkhart
Public Works & Utilities

CSO 6

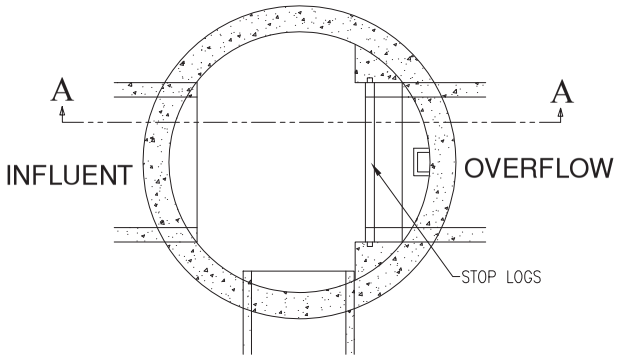
Intercepting Chamber at
Jackson West and Bridge

1 " = 783 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 6 - Jackson, West of Bridge
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'14.92"N
LONGITUDE85d58'22.44"W

Influent Lines Size	72"
Effluent Line Size	24"
Overflow Line Size	72"
Measurements	
Influent Line Elevation	718.85
Effluent Line Elevation	718.40
Overflow Elevation	718.85
Top of Dam Elevation	721.15
Backwater Gate	N/A
TideFlex Gate	N/A

Comments:

Conceptual Drawing

City of Elkhart

Intercepting Chamber on Jackson W. of Bridge

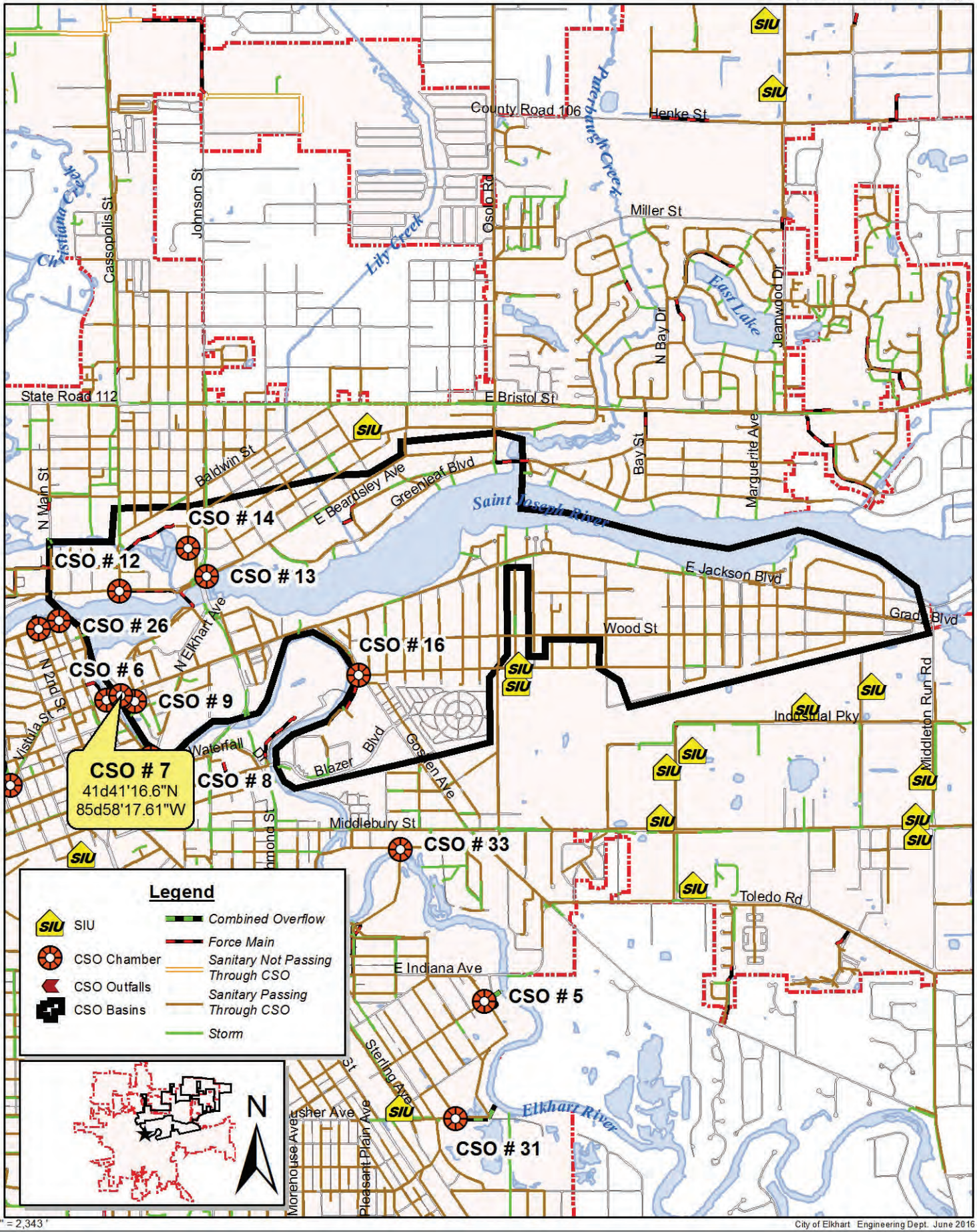
CSO 6

not to scale

City of Elkhart
Public Works & Utilities

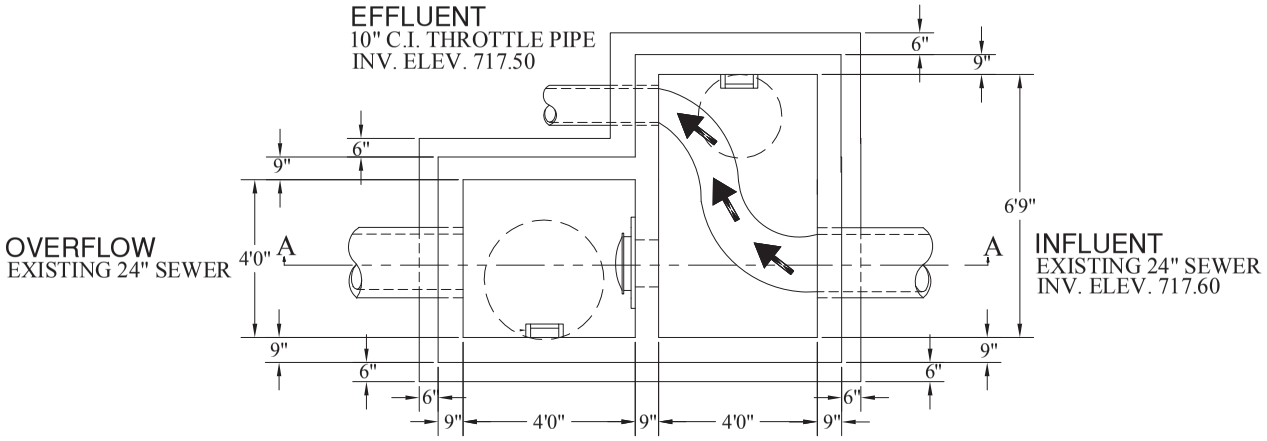
CSO 7

Intercepting Chamber at
Jackson East and Bridge

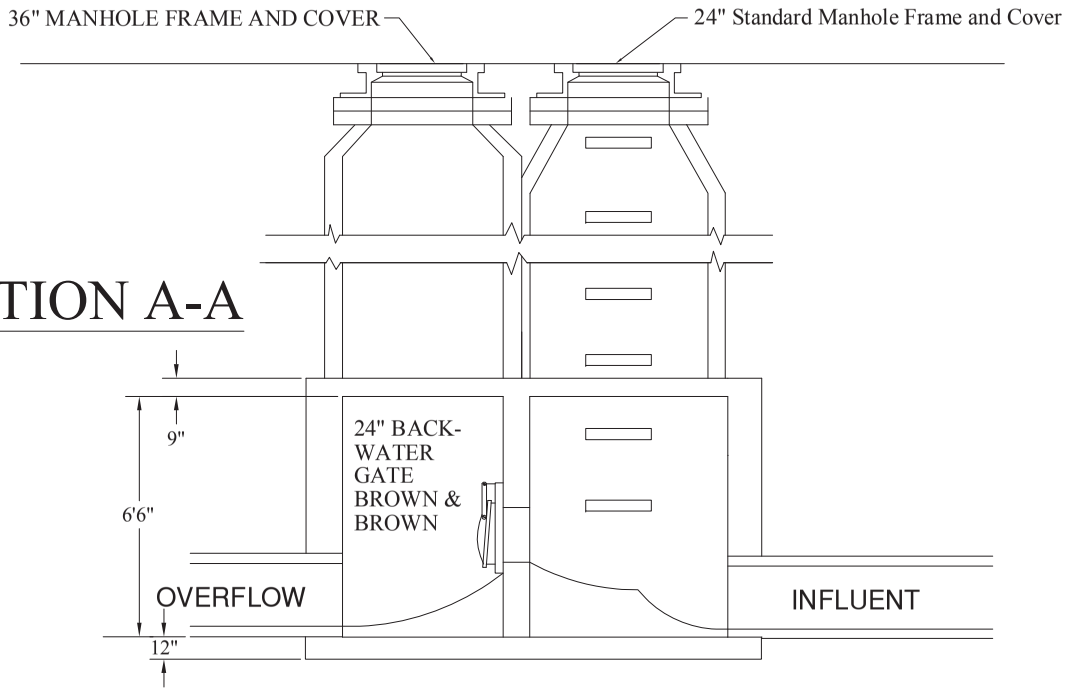


1 " = 2,343 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 7 - Jackson, East of Bridge
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'16.56"N
LONGITUDE85d58'17.34"W

Influent Lines Sizes 24"

Effluent Line Sizes 18"

Overflow Line Size 24"

Measurements

Influent Line to Rim 15.27
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim16.3
Effluent Line to Rim

Overflow to Rim 13.57

Top of Dam or Weir to Rim N/A

Dam Dimensions N/A

Backwater Gate
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments Chamber is 6' I.D.

Conceptual Drawing

City of Elkhart

Intercepting Chamber on Jackson E. of Bridge

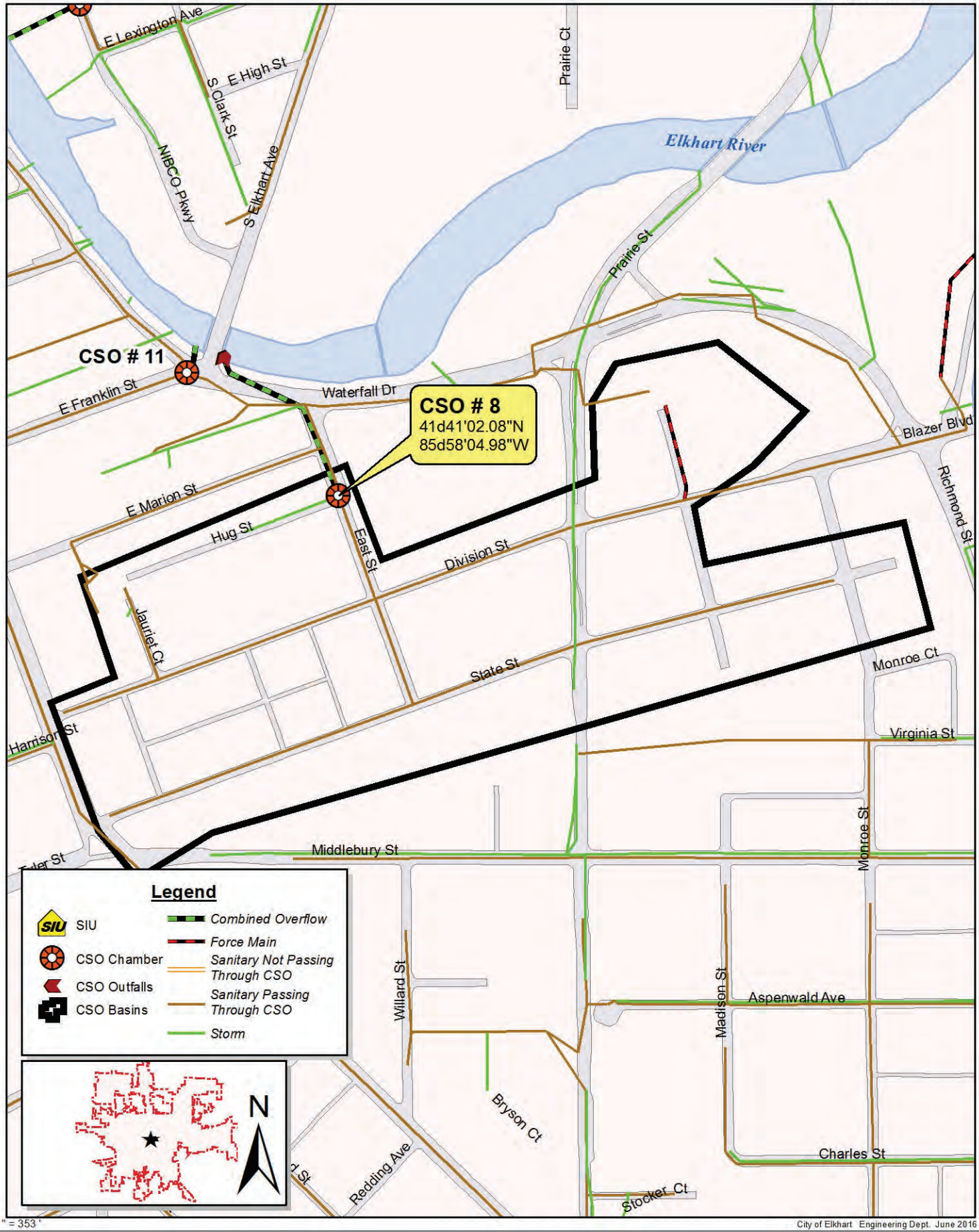
CSO 7

not to scale

City of Elkhart
Public Works & Utilities

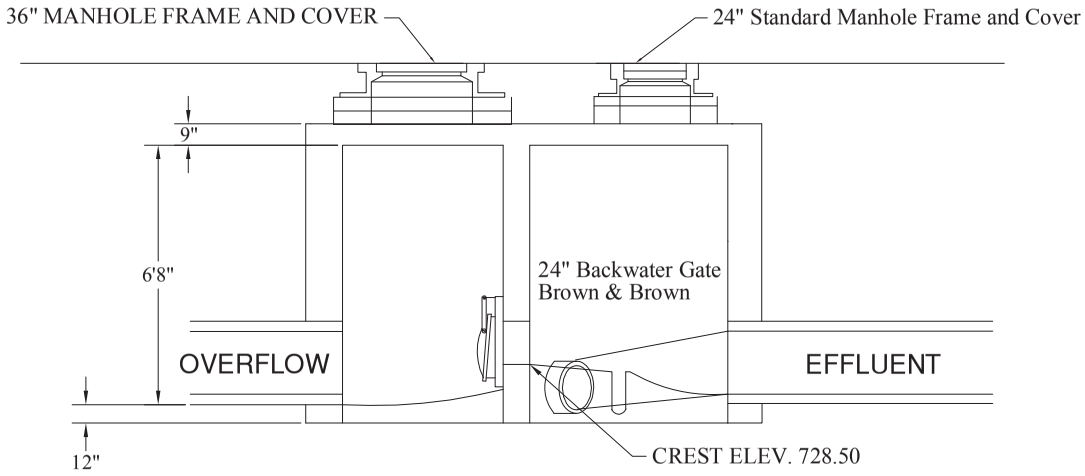
CSO 8

Intercepting Chamber at
Hug and East

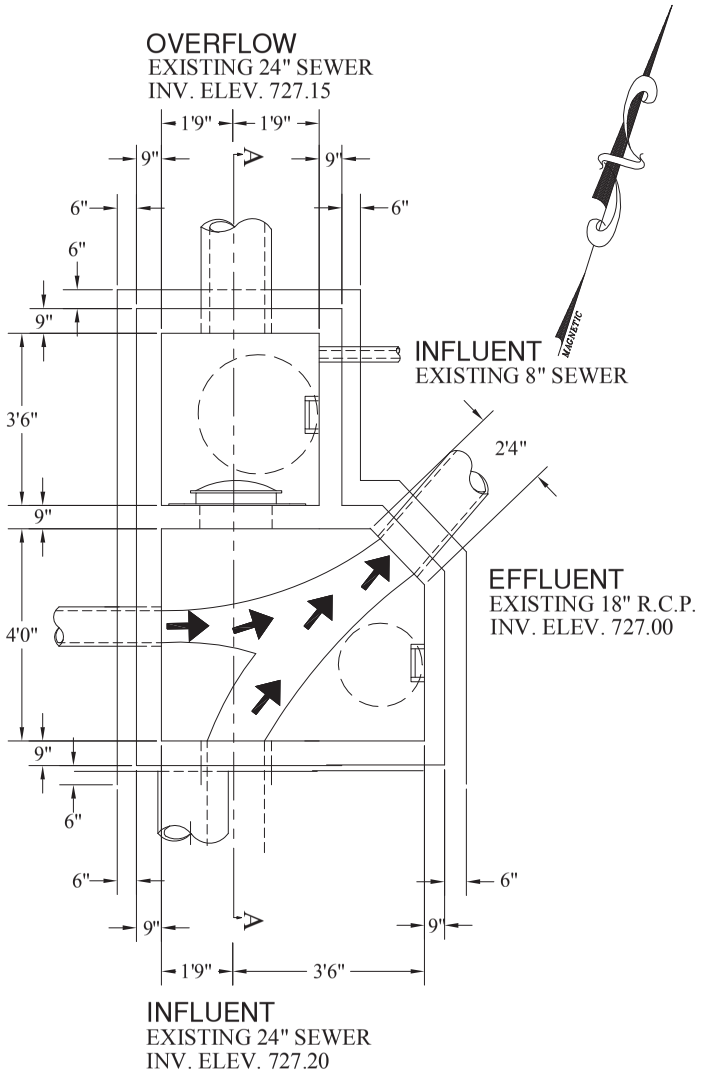


1 " = 353 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



INFLUENT
EXISTING 8" SEWER
INV. ELEV. 728.13

City of Elkhart
CSO 8 - Hug & East Street
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'01.74"N
LONGITUDE85d58'05.81"W

Influent Lines Sizes 8" & 24"

Effluent Line Sizes 18"

Overflow Line Size 24"

Measurements

Influent Line to Rim 8" West 6.87
Influent Line to Rim 24" South 7.80
InfluentLine to Rim

Effluent Line to Rim8
Effluent Line to Rim

Overflow to Rim 6.5

Top of Dam or Weir to Rim 6.5

Dam Dimensions

Backwater Gate
Size 24"
Type Brown & Brown

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments 24" Outfall Pipe invert to rim is 7.85

PLAN

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Hug and East

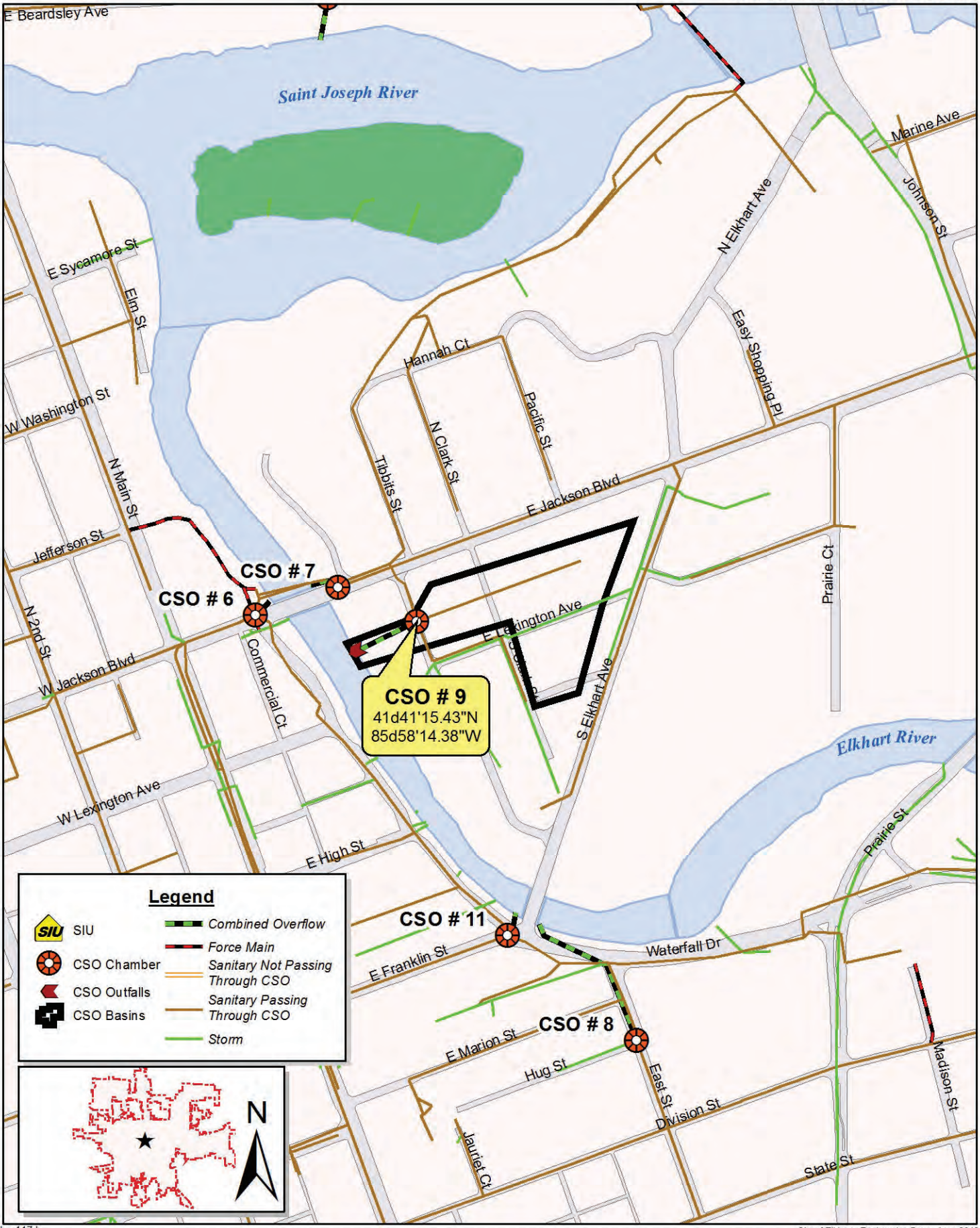
CSO 8

not to scale

City of Elkhart
Public Works & Utilities

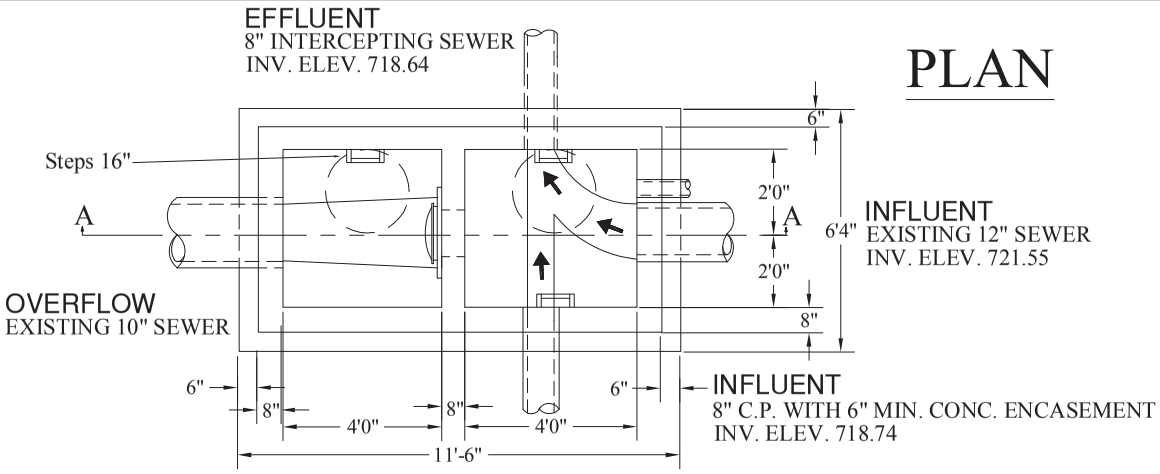
CSO 9

Intercepting Chamber at
NIBCO Pkwy and Jackson East

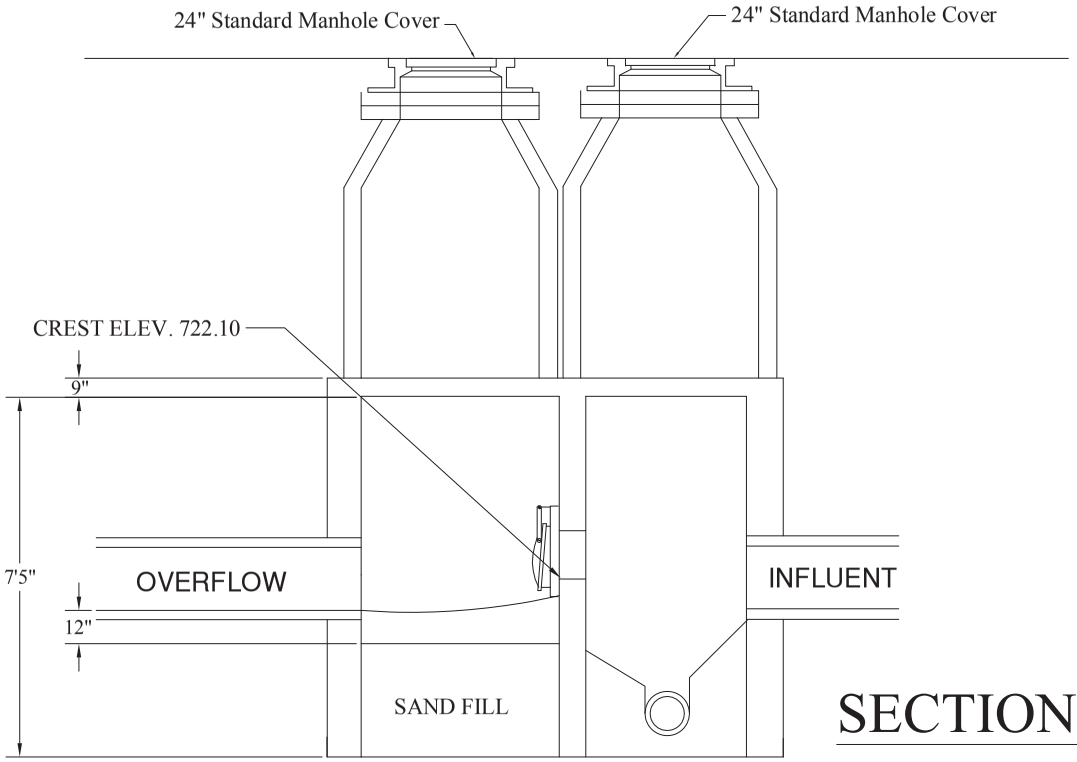


1 " = 417 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 9 - Junior Achievement & Y Drive North

Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'15.62"N
LONGITUDE85d58'14.48"W

Influent Lines Sizes East 12" South 8"

Effluent Line Sizes 8"

Overflow Line Size 10"

Measurements

Influent Line to Rim East 11.25
Influent Line to Rim South 13.35
InfluentLine to Rim

Effluent Line to Rim13.4
Effluent Line to Rim

Overflow to Rim 10.6

Top of Dam or Weir to Rim N/A

Dam Dimensions N/A

Backwater Gate
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments Chamber is 4' x 4'

Conceptual Drawing

City of Elkhart

Intercepting Chamber at JA and Y Drive North

CSO 9

not to scale

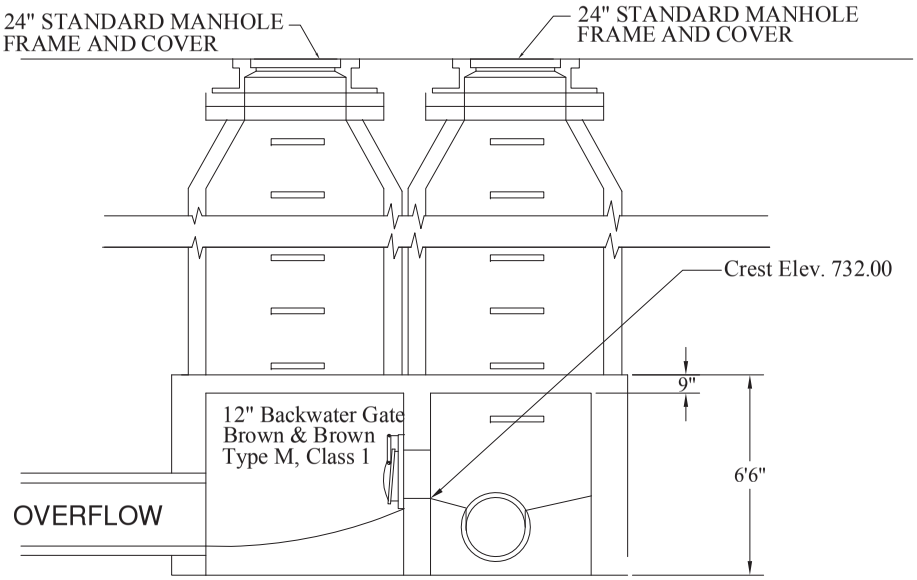
City of Elkhart
Public Works & Utilities

CSO 11

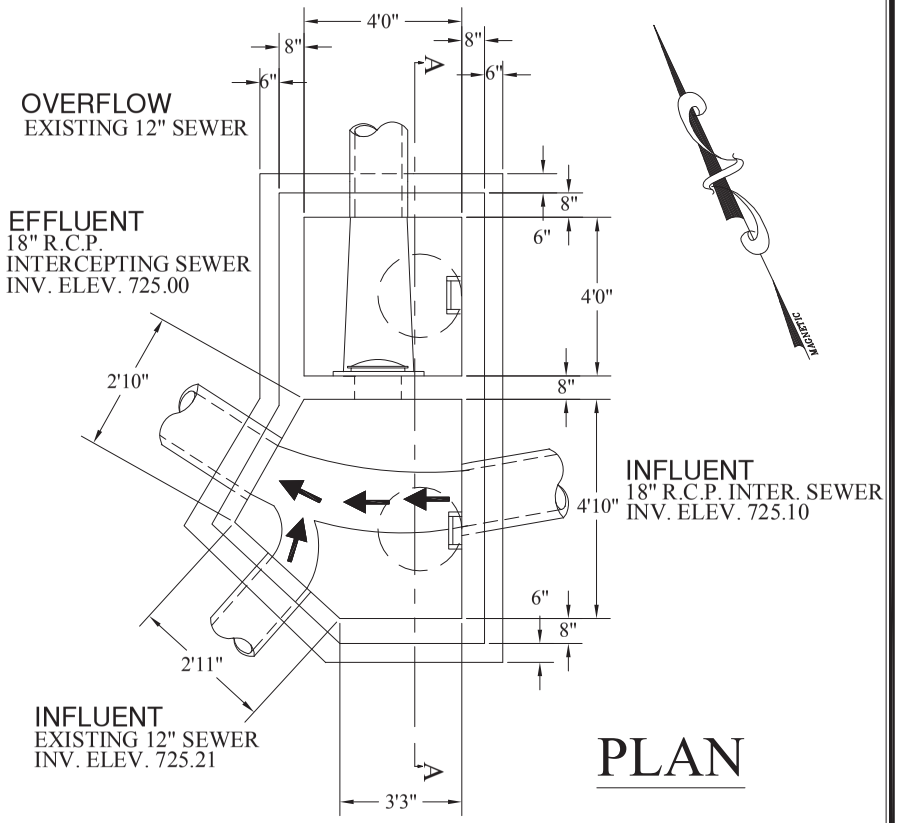
Intercepting Chamber at
Elkhart and Franklin

1 " = 683 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 11 - Elkhart & Franklin
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'05.04"N
LONGITUDE 85d58'11.29"W

Influent Lines Sizes 12" West 18" Southeast

Effluent Line Sizes 18"

Overflow Line Size 12"

Measurements

Influent Line to Rim 12" West 10.79
Influent Line to Rim 18" Southeast 10.90
InfluentLine to Rim

Effluent Line to Rim 11
Effluent Line to Rim

Overflow to Rim 9.82

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate
Size 12"
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Elkhart and Franklin

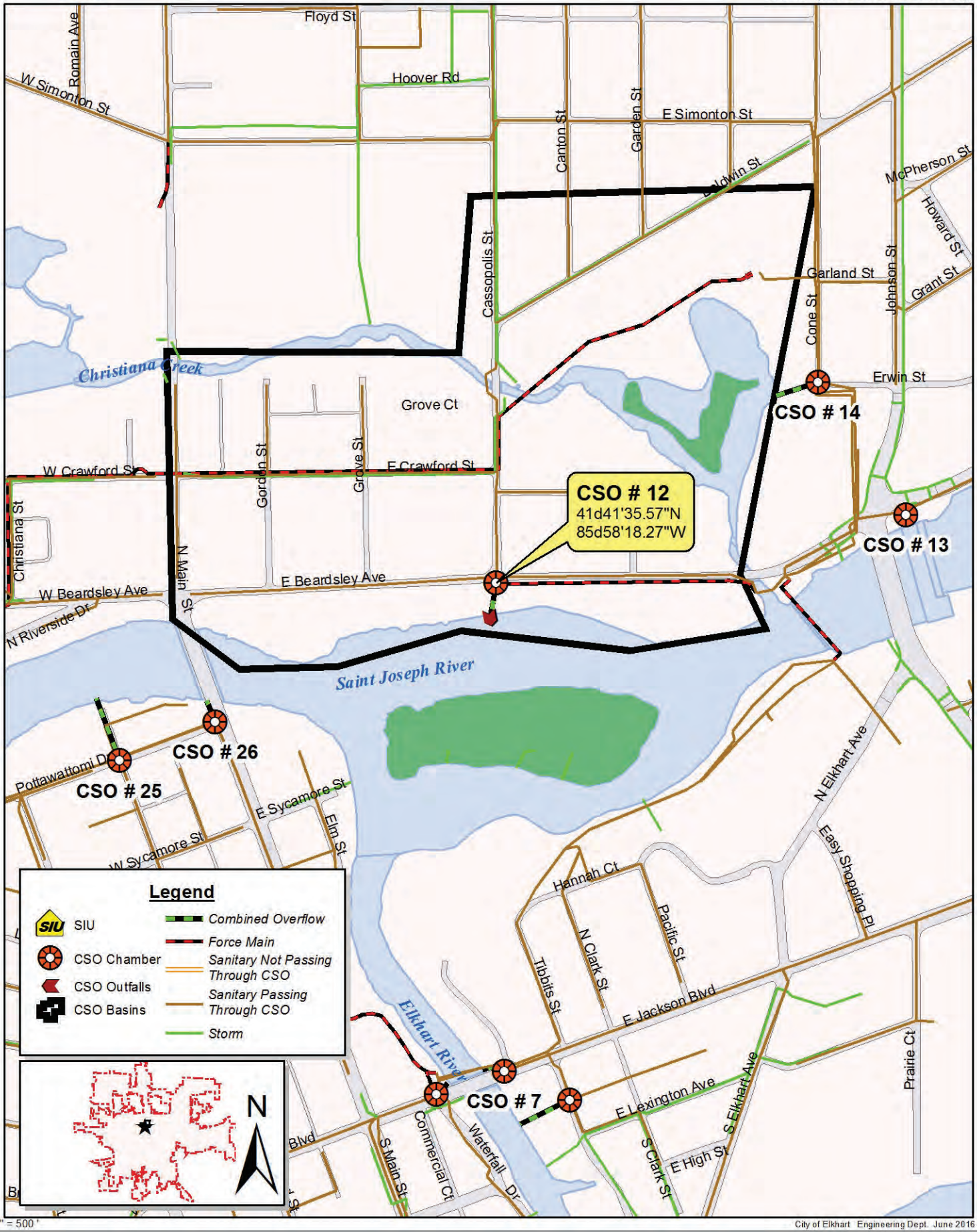
CSO 11

not to scale

City of Elkhart
Public Works & Utilities

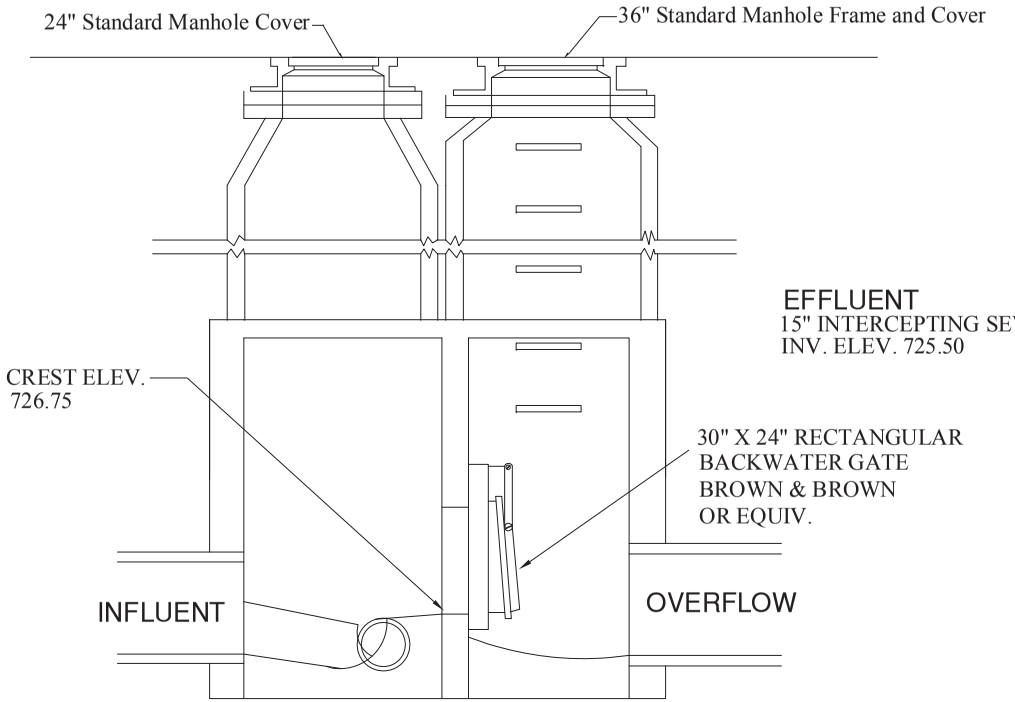
CSO 12

Intercepting Chamber at
Cassopolis and Beardsley

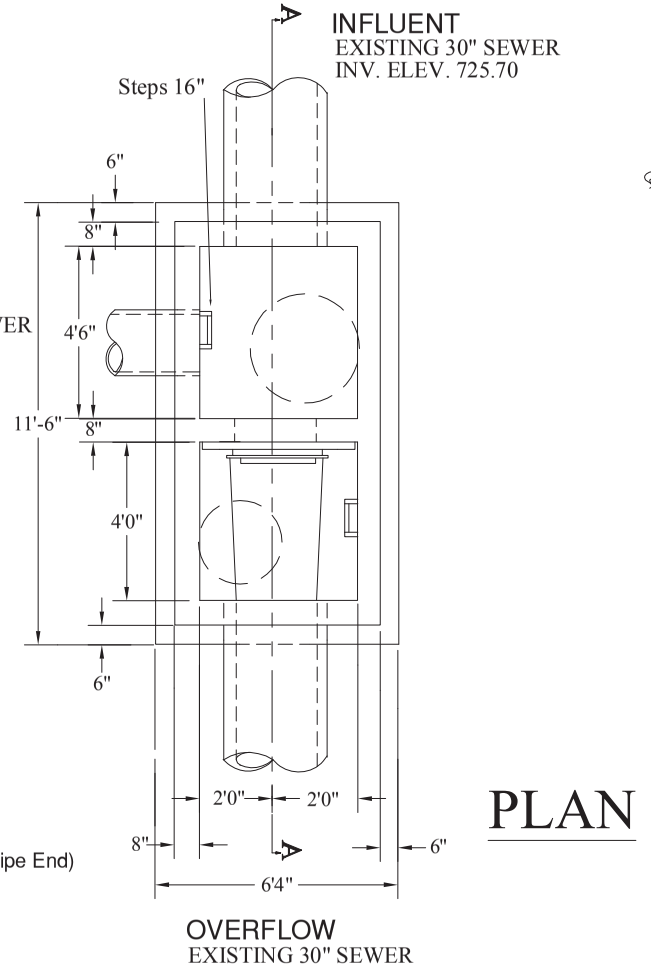


1 " = 500 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 12 - Cassopolis & Beardsley

Site Measurements

RECEIVING WATER St. Joseph River

LATITUDE 41d41'33.29"N
LONGITUDE85d58'17.86"W

Influent Lines Sizes 30"

Effluent Line Sizes 10"

Overflow Line Size 30"

Measurements

Influent Line to Rim 22.04
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 22.28
Effluent Line to Rim

Overflow to Rim 21.41

Top of Dam or Weir to Rim 19.72

Dam Dimensions 56"

Backwater Gate
Size 24" W x 30" H
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Cassopolis and Beardsley

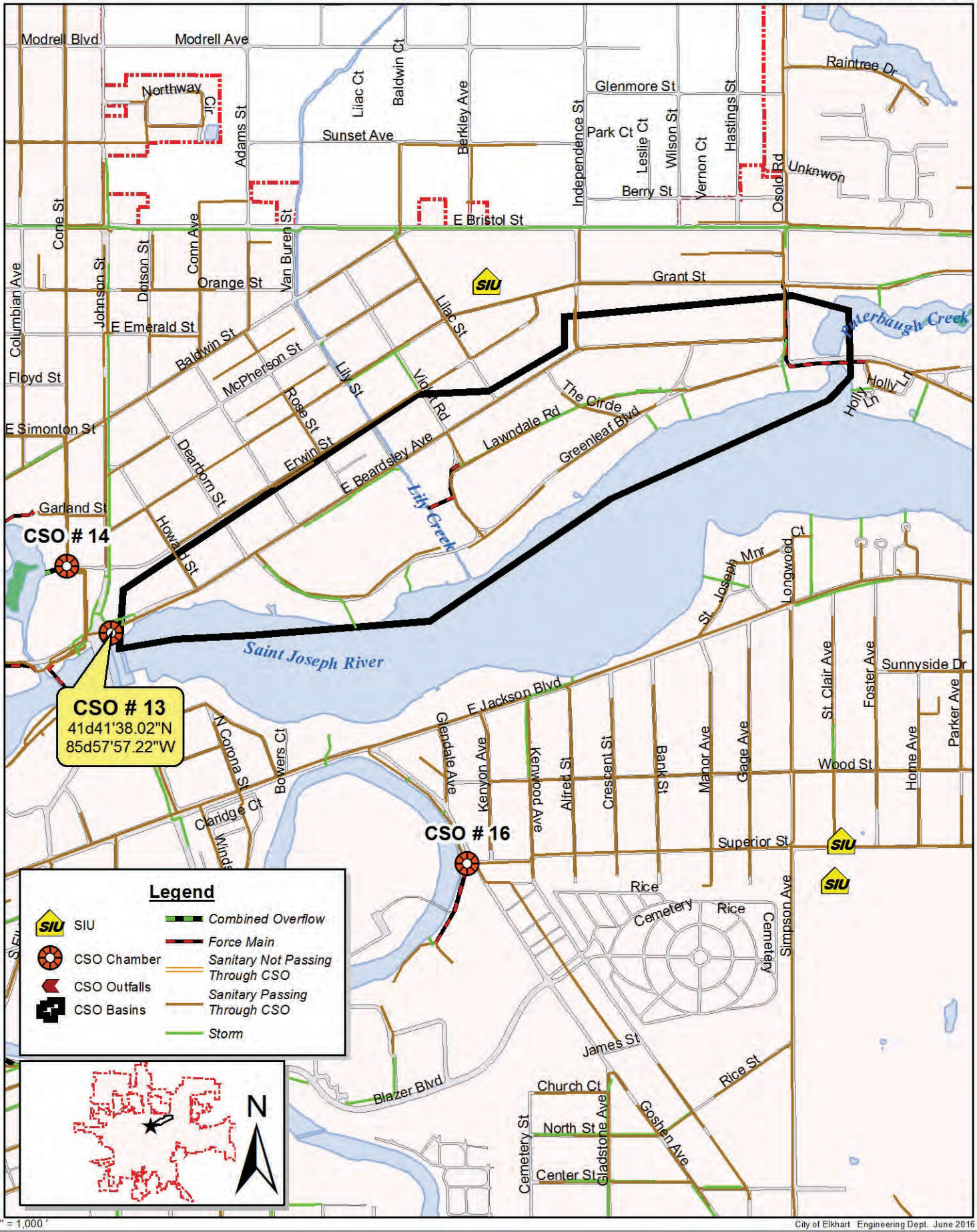
CSO 12

not to scale

City of Elkhart
Public Works & Utilities

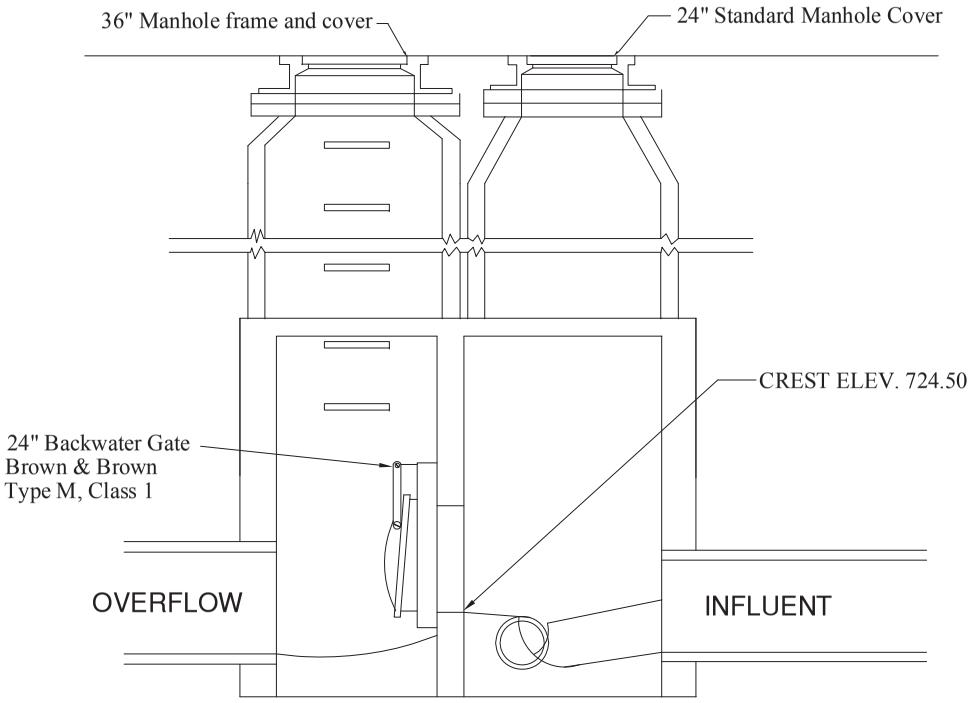
CSO 13

Intercepting Chamber at
Johnson and Beardsley

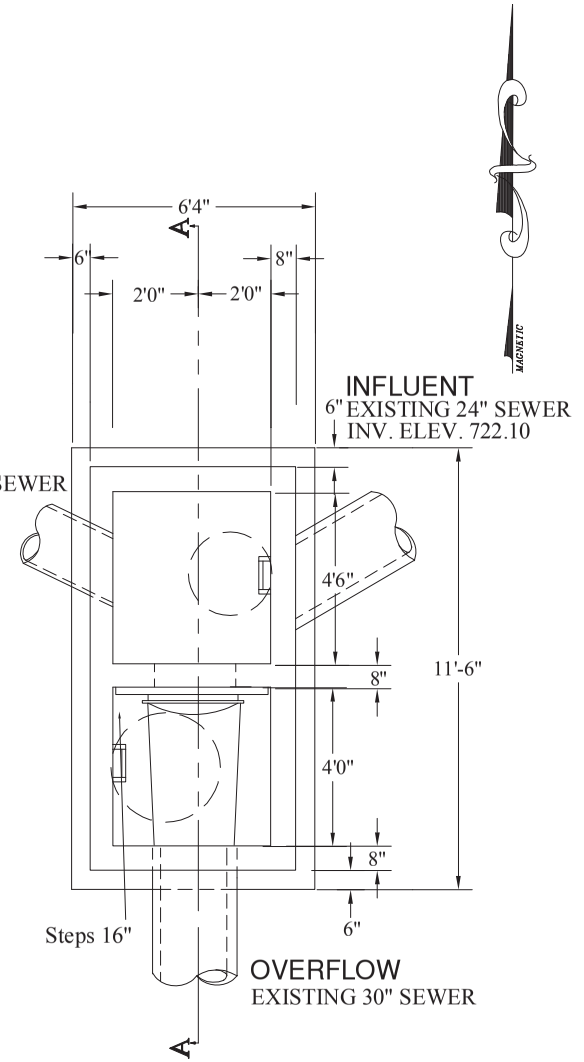


1 " = 1,000 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 13 - Johnson & Beardsley
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'36.72"N
LONGITUDE85d57'56.28"W

Influent Lines Sizes 24"

Effluent Line Sizes 15"

Overflow Line Size 24"

Measurements

Influent Line to Rim 17.07
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim17.37
Effluent Line to Rim

Overflow to Rim 14.57

Top of Dam or Weir to Rim 13.57

Dam Dimensions 24" Dam Height 12"

Backwater Gate
Size 24"
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Johnson and Beardsley

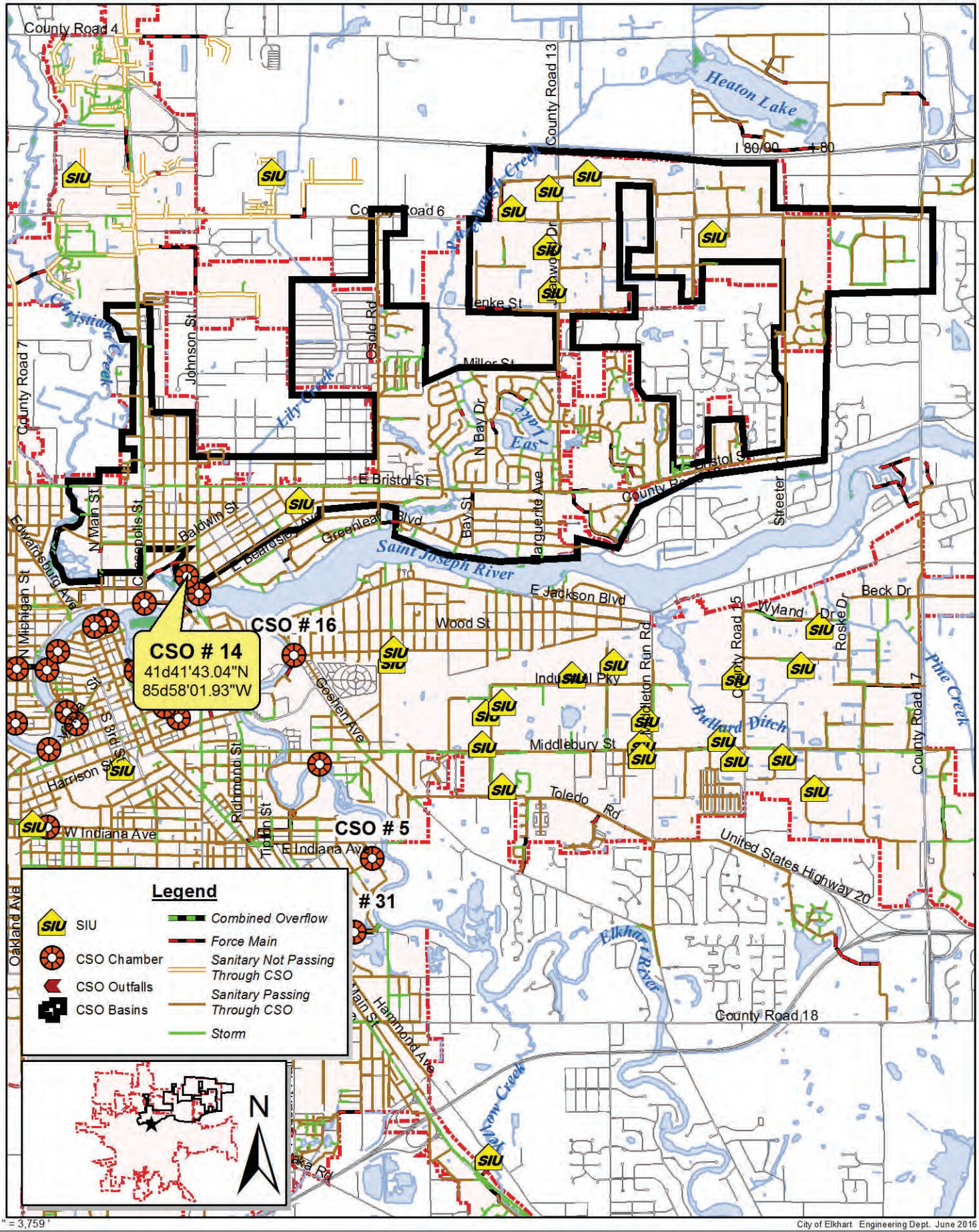
CSO 13

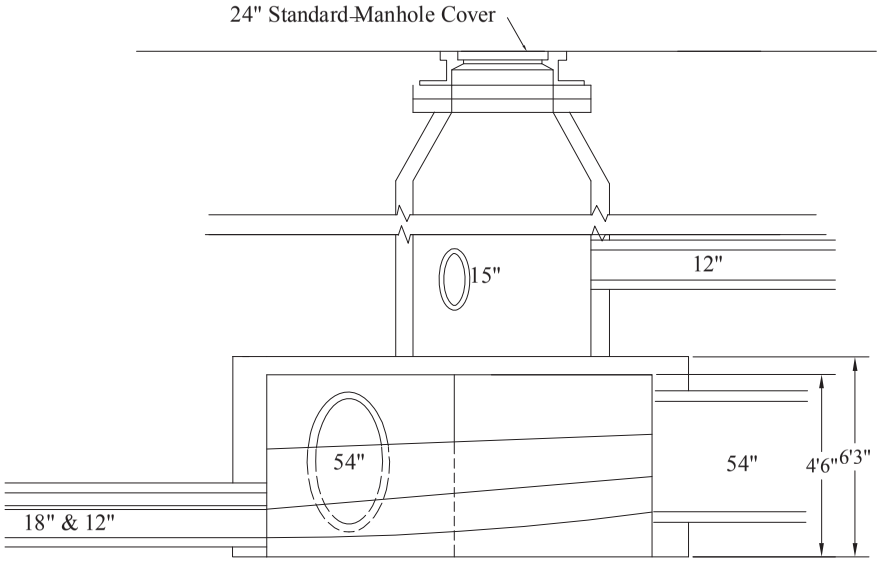
not to scale

City of Elkhart
Public Works & Utilities

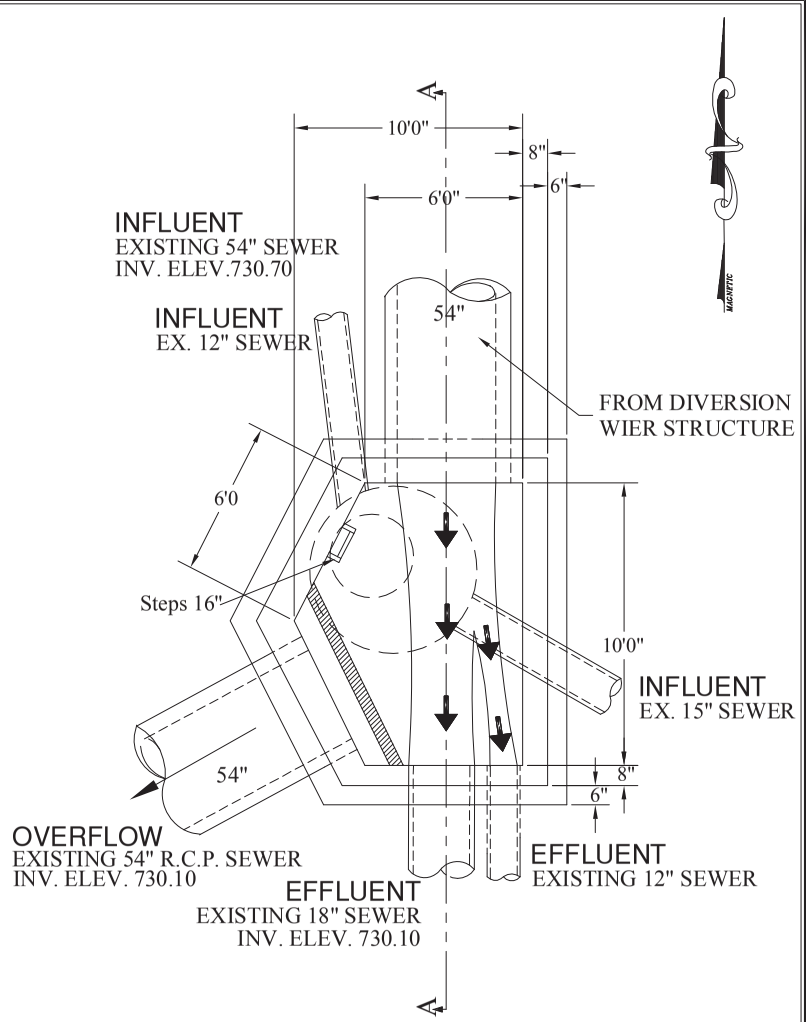
CSO 14

Intercepting Chamber at
Cone and Erwin





SECTION A-A



PLAN

City of Elkhart
CSO 14 - Cone & Erwin
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'41.82"N
LONGITUDE85d58'01.21"W

Influent Lines Sizes12", 15" & 54"

Effluent Line Sizes 12" & 18"

Overflow Line Size 54"

Measurements

Influent Line to Rim 54" 18.63
Influent Line to Rim 12" ?
Influent Line to Rim 15" ?

Effluent Line to Rim12" 18.63
Effluent Line to Rim18" 18.50

Overflow to Rim 18.76

Top of Dam or Weir to Rim 16.18

Dam Dimensions 54" Wide x 31" High

Backwater Gate N/A
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Cone and Erwin

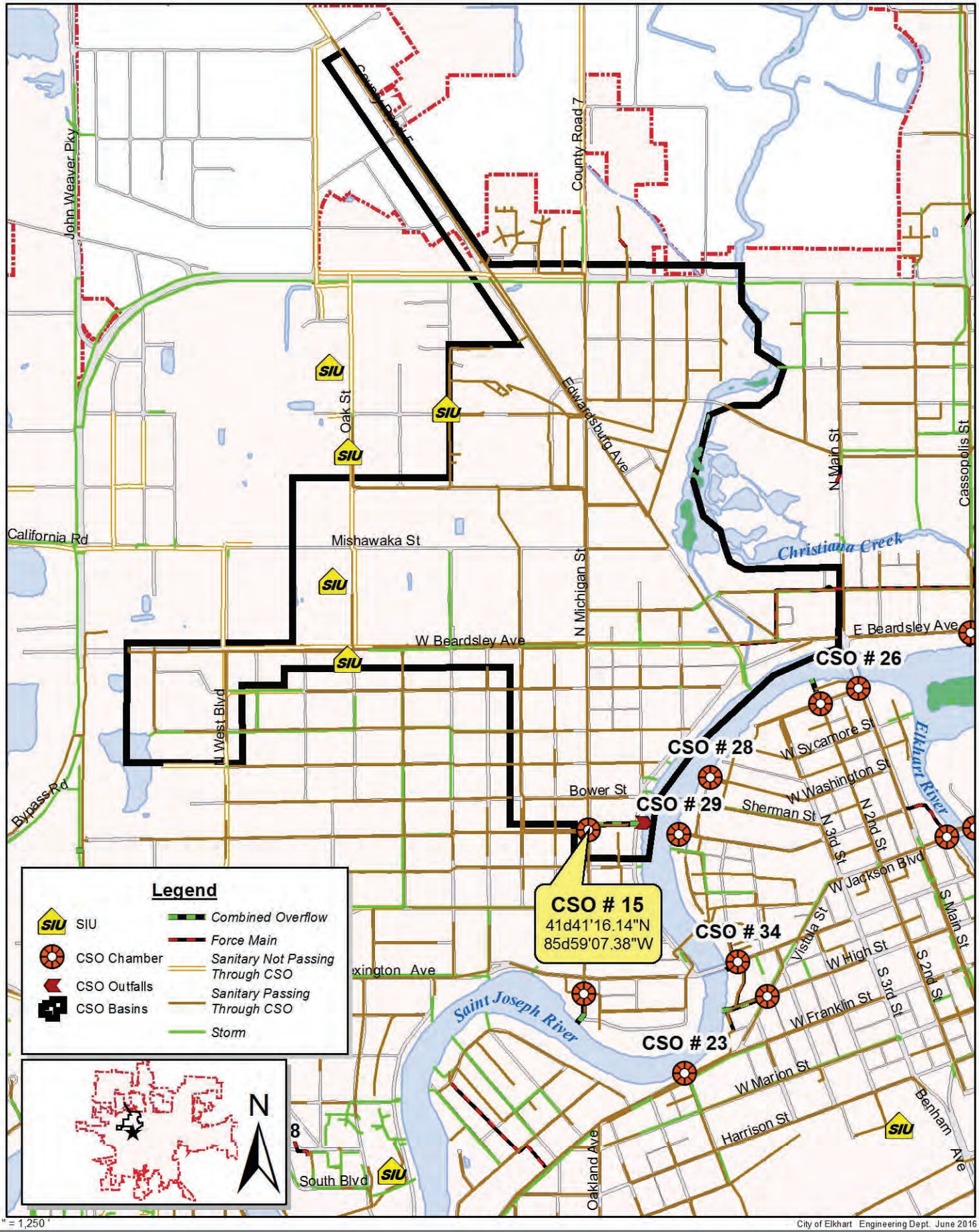
CSO 14

not to scale

City of Elkhart
Public Works & Utilities

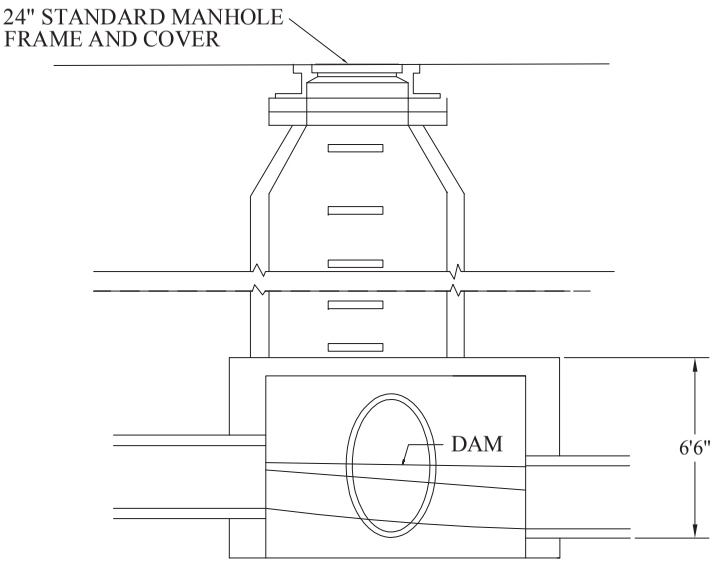
CSO 15

Intercepting Chamber at
Michigan and Fulton

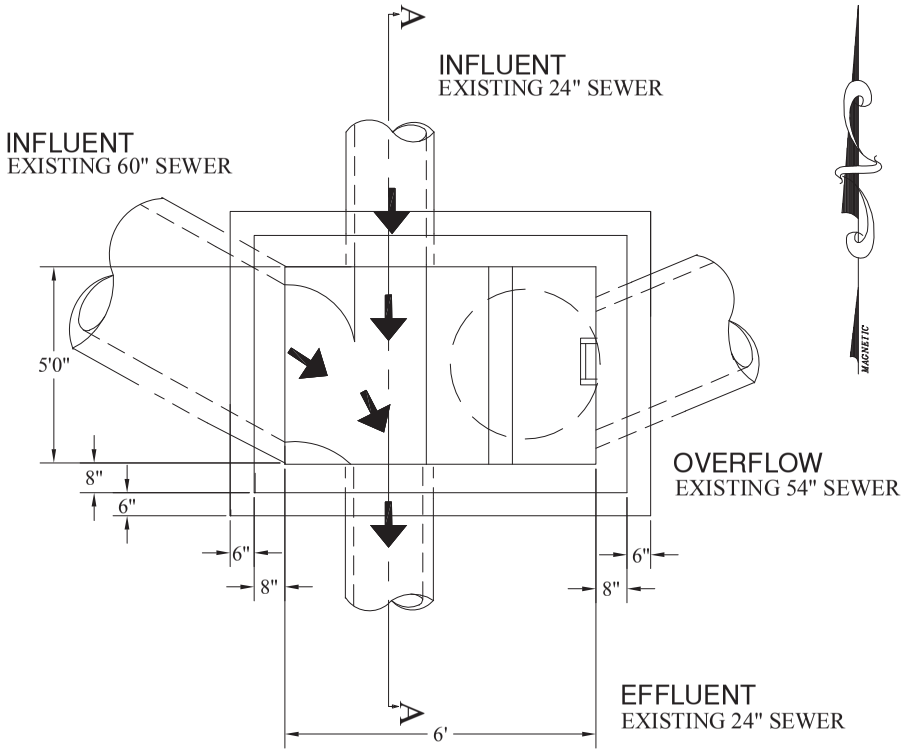


1 " = 1,250 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 15 - Michigan & Fulton
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'14.48"N
LONGITUDE85d59'07.57"W

Influent Lines Sizes 24" North & 60" West

Effluent Line Sizes 24"

Overflow Line Size 54"

Measurements

Influent Line to Rim 24" 16.54
Influent Line to Rim 60" 16.34
InfluentLine to Rim

Effluent Line to Rim16.69
Effluent Line to Rim

Overflow to Rim 16.46

Top of Dam or Weir to Rim 13.54

Dam Dimensions 7.8'

Backwater Gate N/A
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Michigan and Fulton

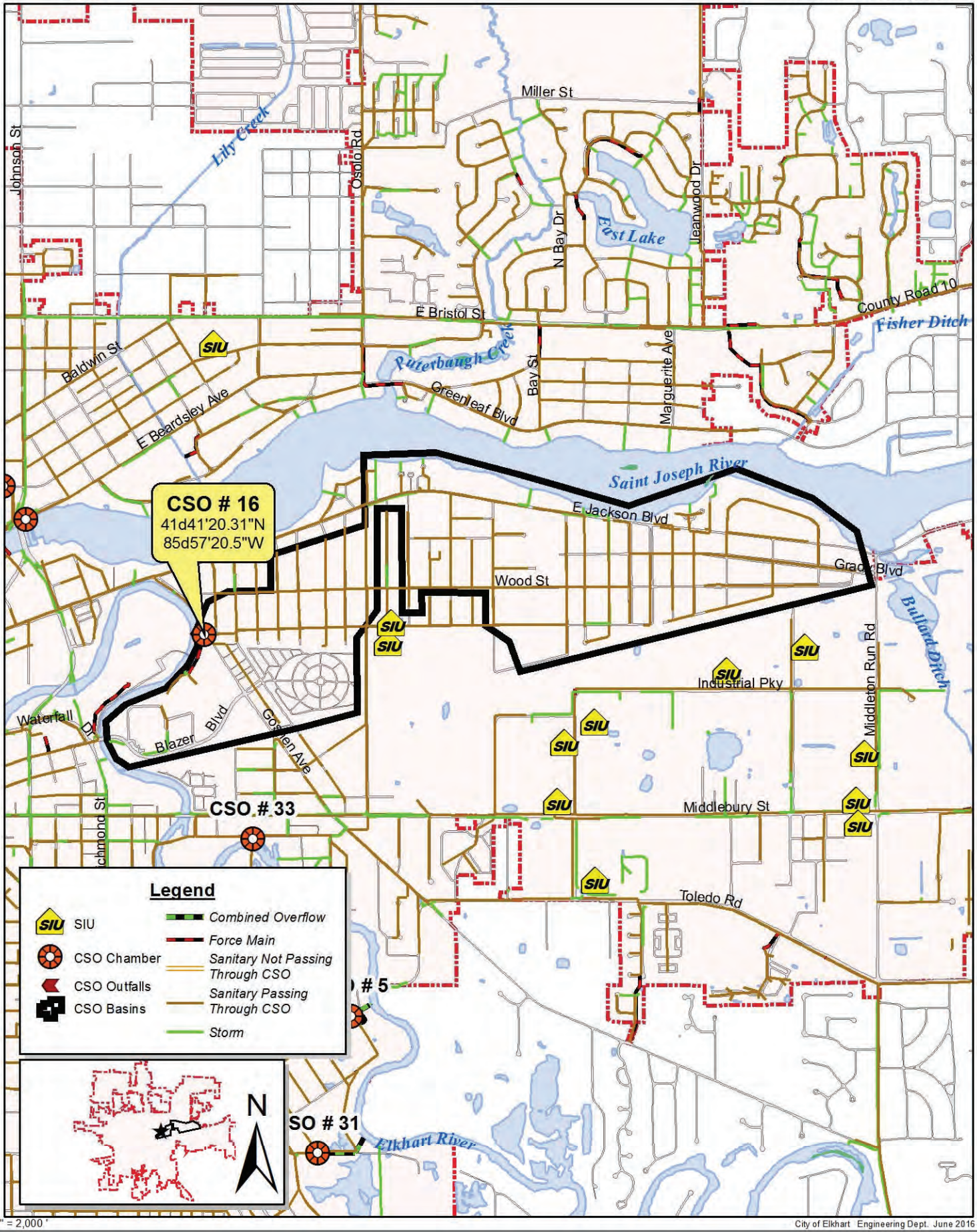
CSO 15

not to scale

City of Elkhart
Public Works & Utilities

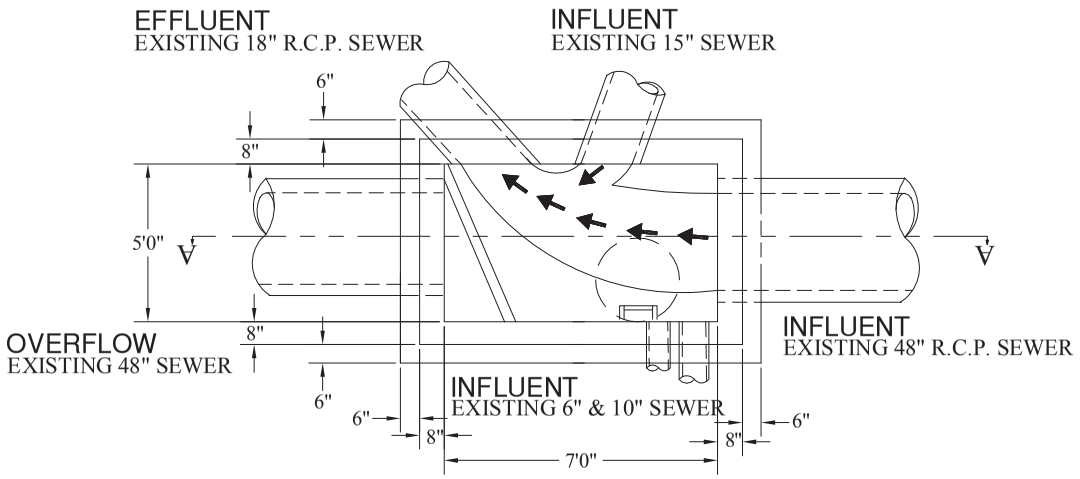
CSO 16

Intercepting Chamber at
Goshen and Superior

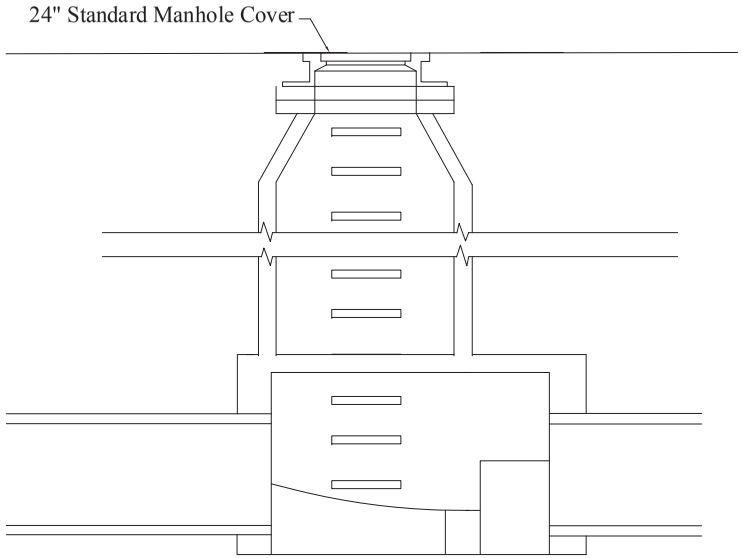


1 " = 2,000 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 16 - Goshen & Superior
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d41'19.30"N
LONGITUDE85d57'20.53"W

Influent Lines Sizes 12" East, 48" East,
4" Force Main South
& 6" Force Main South

Effluent Line Sizes 18"

Overflow Line Size 48"

Measurements

Influent Line to Rim 12" 10.20
Influent Line to Rim 48" 16.56
InfluentLine to Rim 4" 15.54 6" 15.24

Effluent Line to Rim16.6
Effluent Line to Rim

Overflow to Rim 16.58

Top of Dam or Weir to Rim 13.04

Dam Dimensions 5'

Backwater Gate
Size 48"
Type Rodney Hunt

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments 6" Force Main may not be in use anymore

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Goshen and Superior

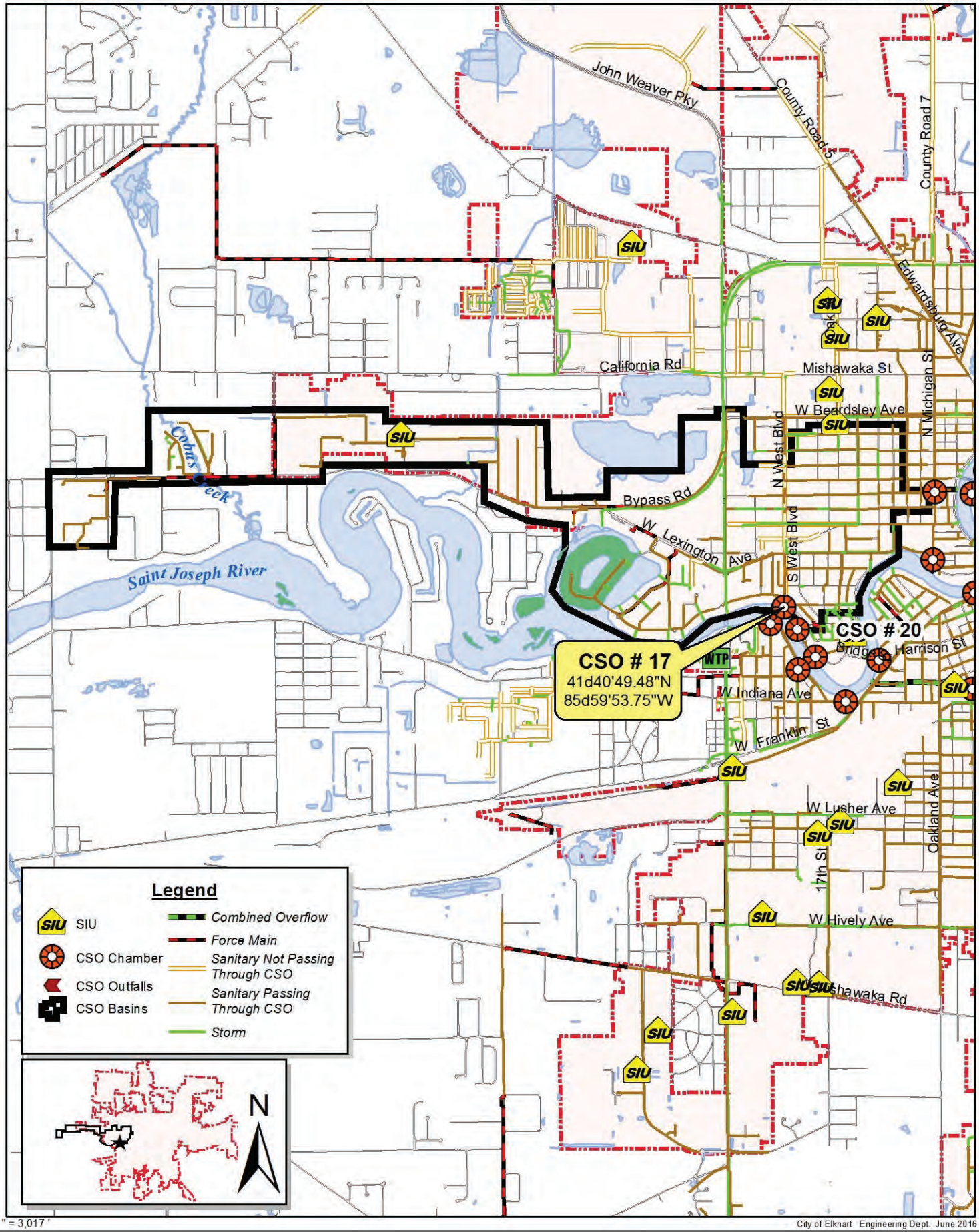
CSO 16

not to scale

City of Elkhart
Public Works & Utilities

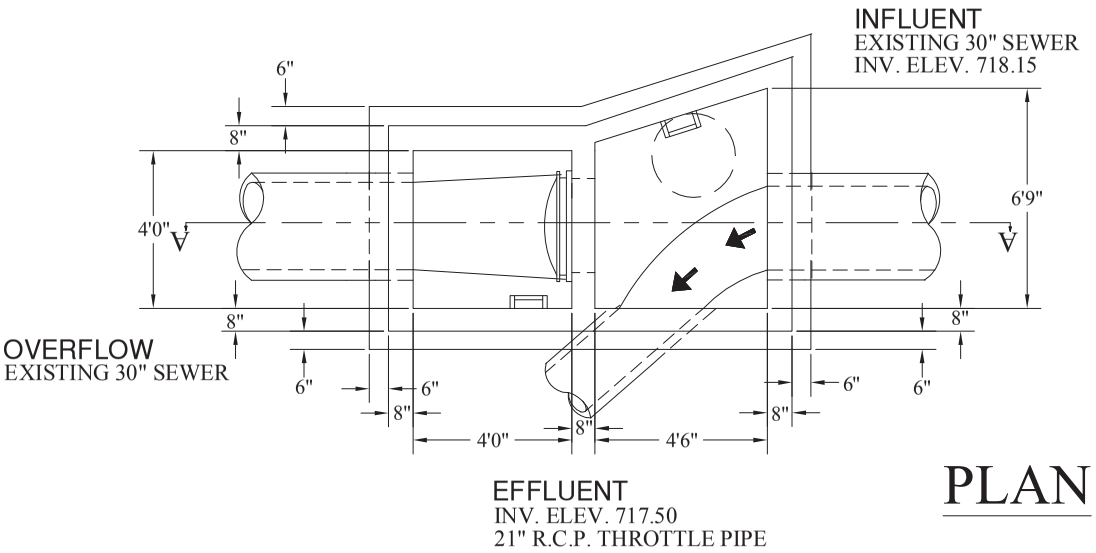
CSO 17

Intercepting Chamber at
West and McNaughton

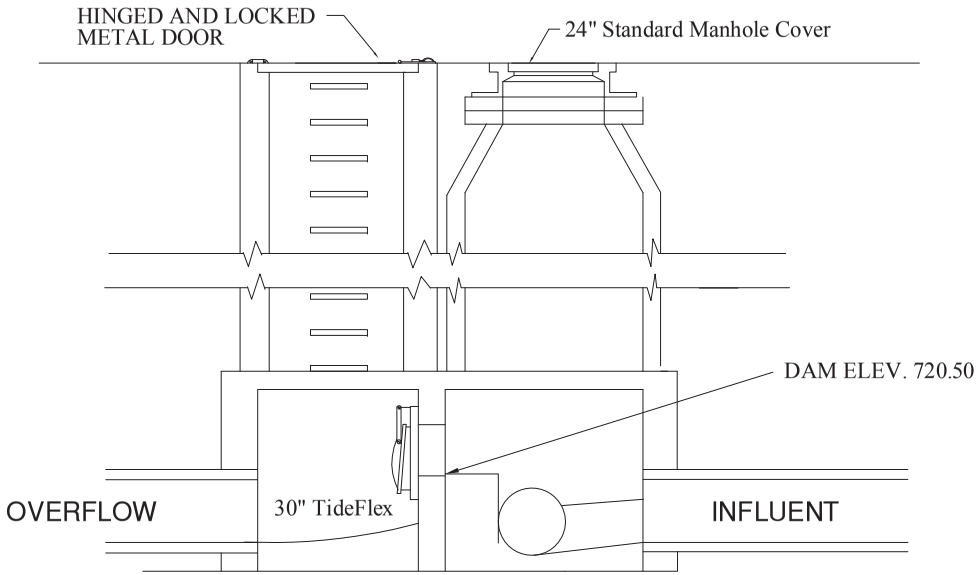


1 " = 3,017 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 17 - West Boulevard & McNaughton Park Drive

Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'47.83"N
LONGITUDE85d59'54.07"W

Influent Lines Sizes 30"

Effluent Line Sizes 21"

Overflow Line Size 30"

Measurements

Influent Line to Rim 21.83
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 22.48
Effluent Line to Rim

Overflow to Rim 19.48

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate N/A
Size
Type

TideFlex Gate
Size 30"
Mount (Wall or Pipe End) Wall Mount

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at West and McNaughton

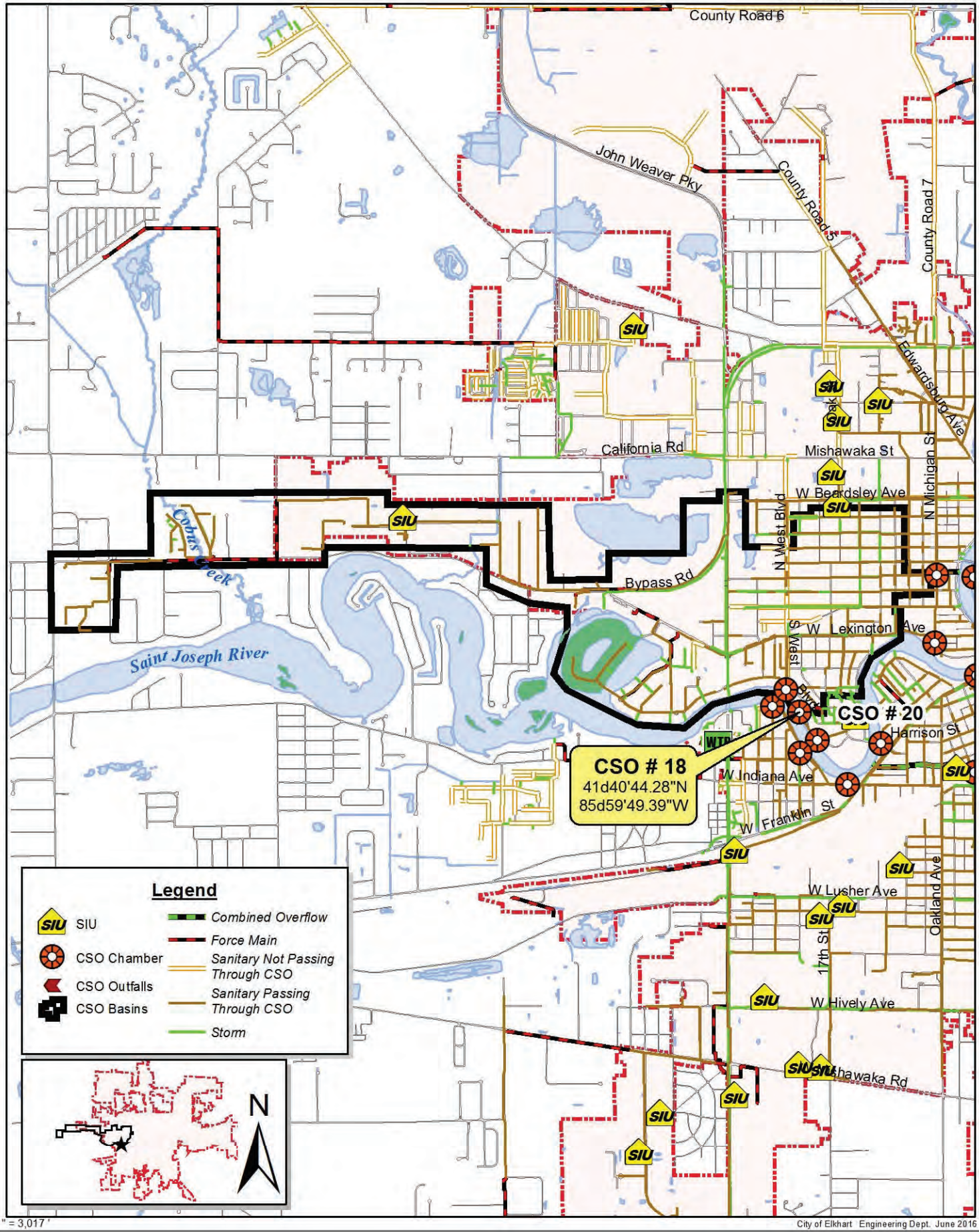
CSO 17

not to scale

City of Elkhart
Public Works & Utilities

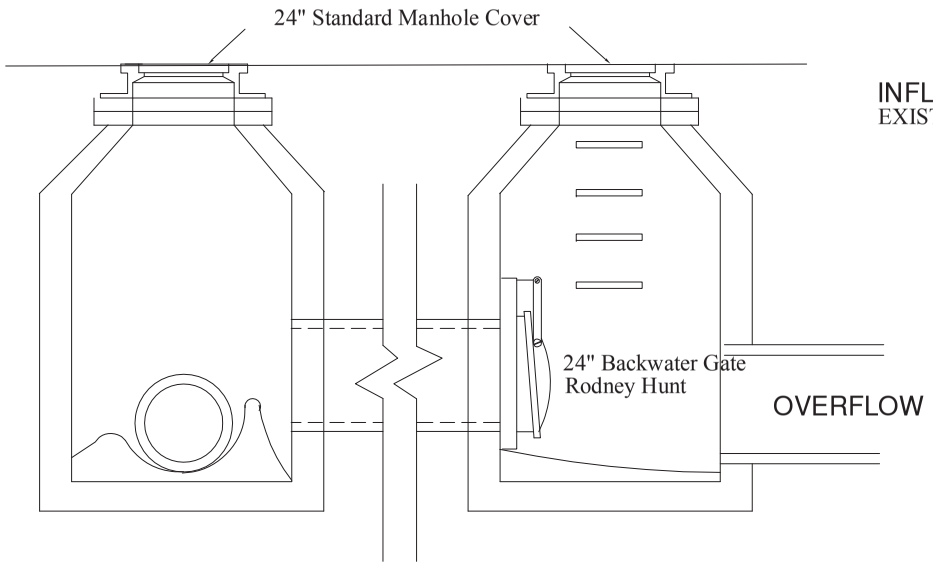
CSO 18

Intercepting Chamber at
McNaughton and West

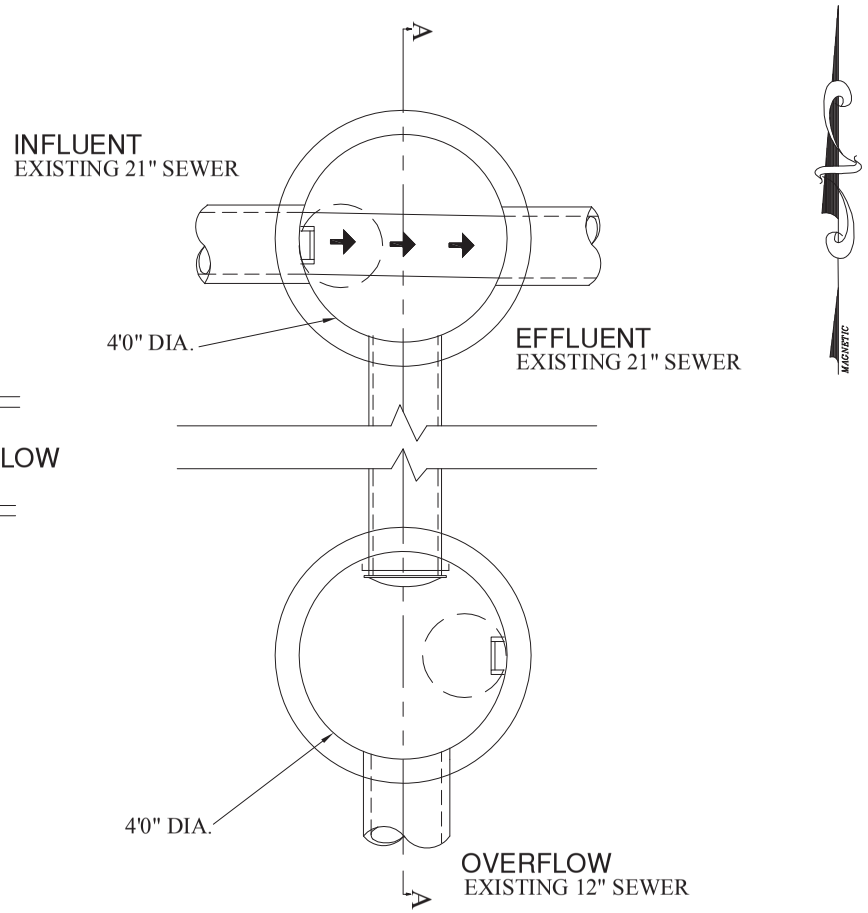


1 " = 3,017 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 18 - McNaughton Park West
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'42.48"N
LONGITUDE85d59'50.14"W

Influent Lines Sizes 21"

Effluent Line Sizes 21"

Overflow Line Size 24"

Measurements

Influent Line to Rim 4.77
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 4.77
Effluent Line to Rim

Overflow to Rim 3.02

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate
Size 24"
Type Rodney Hunt

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at McNaughton and West

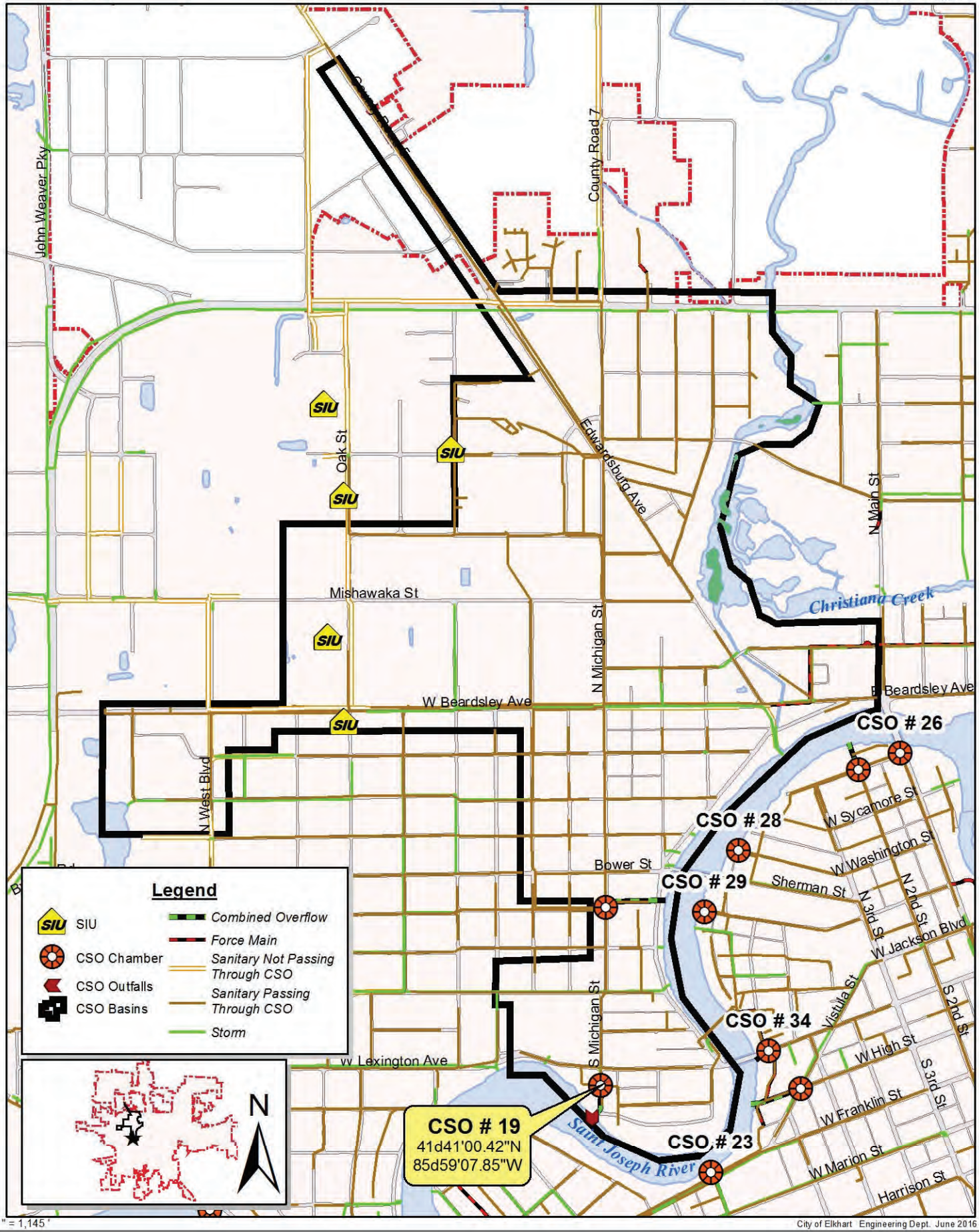
CSO 18

not to scale

City of Elkhart
Public Works & Utilities

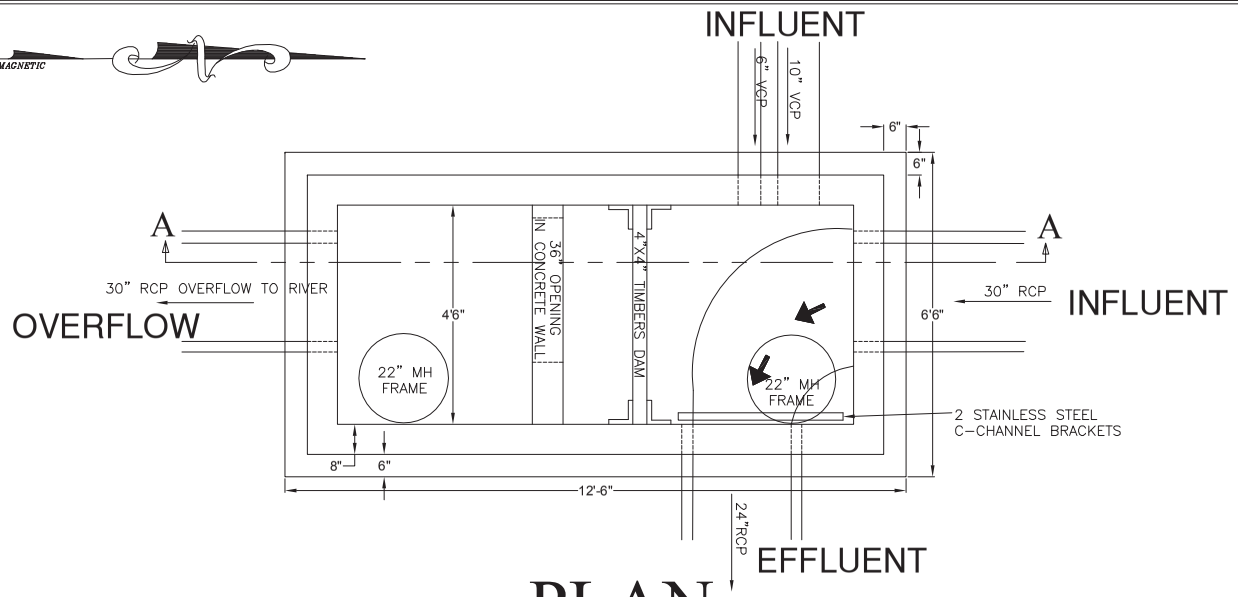
CSO 19

Intercepting Chamber at
Michigan and S. of Lexington

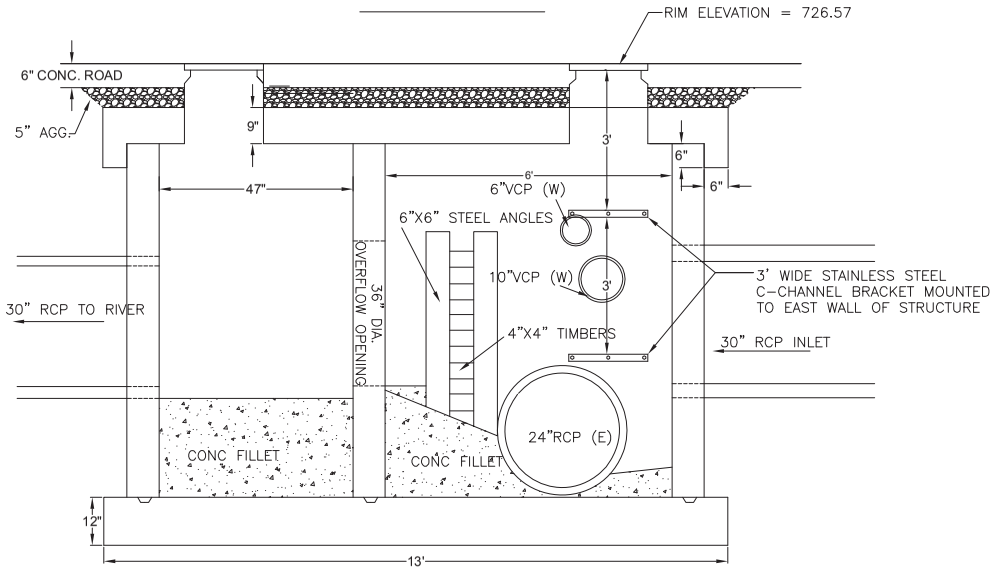


1 " = 1,145 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 19 - Michigan at River, South of Lexington
Site Measurements

RECEIVING WATER		St. Joseph River
LATITUDE		41d40'58.86"N
LONGITUDE		85d59'08.01"W
Influent Lines Sizes		30 " North 10" West 6" West
Effluent Line Sizes		24" East
Overflow Line Size		30" South
Measurements		
Influent Line	30"N	719.71
Influent Line	10"W	
InfluentLine	6"W	
Effluent Line		717.77
Overflow		719.90
Top of Dam		723.05
Dam Dimensions		
Backwater Gate		
Size		N/A
Type		
TideFlex Gate		
Size		
Mount (Wall or Pipe End)		
Comments		

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Michigan and S. of Lexington

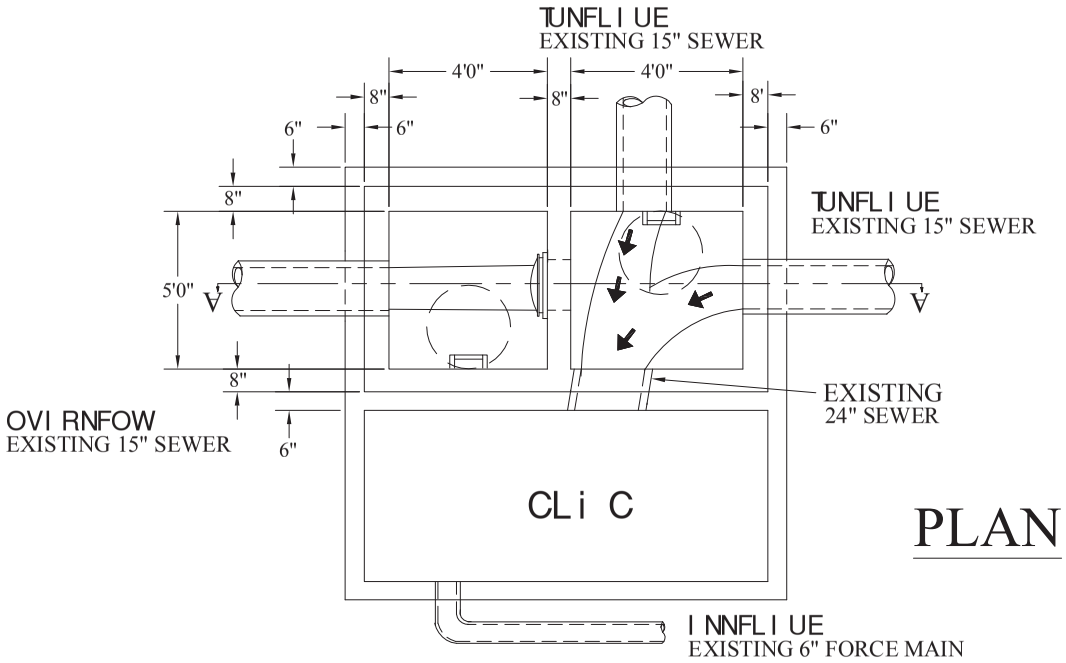
CSO 19

not to scale

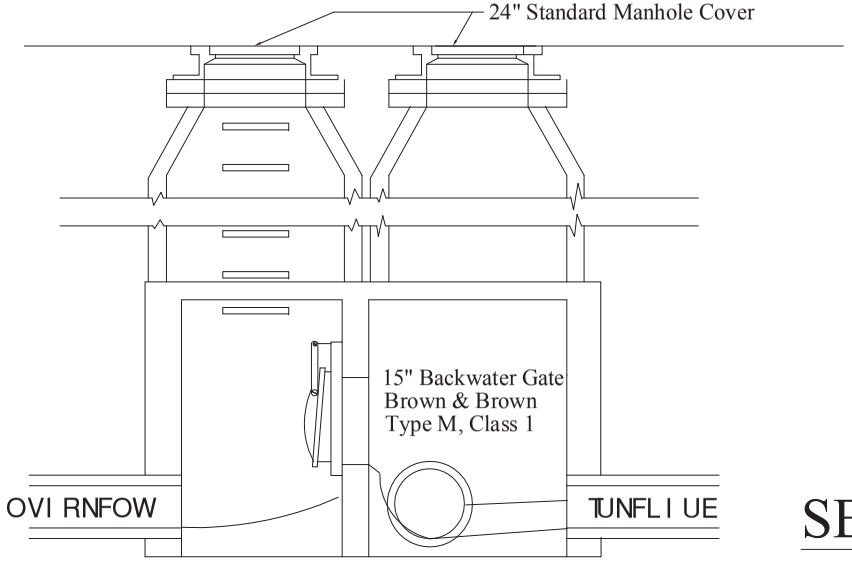
City of Elkhart
Public Works & Utilities

CSO 20

Intercepting Chamber at
Bridge and Hudson



PLAN



SECTION A-A

t yofl kfl lar S1
t 2Of- sfpf&1yBedfMfu mBnl G
2ydfi dSnmldA dGn

RI t I TVTU. fWJ El R 2 vfD nd4r fRy d1
FJ E'EL 3 I 9" B9ss57v6" zU
FOU. 'EL 3 I 07B7w8 9v56zW

TGkmrdGfFyGdnf2ycdn&1yBedf2 1dd f" 7zffu mBnl Gf2 1dd f" 7z

I kkmrdGfFyGdf2ycdn - 9z

O' d1kh x fFyGdf2ycd " 7z

i dSnmldA dGn

TGkmrdGfFyGdf l fRyA &1yBedf2 vf" 7zff" sv50
TGkmrdGfFyGdf l fRyA u mBnl Gf2 vf" 7zff" 7v9-
TGkmrdGFyGdf l fRyA

I kkmrdGfFyGdf l fRyA " 7vH6
I kkmrdGfFyGdf l fRyA

O' d1kh x f l fRyA " 9v77

El 4fl kf3 SA fl 1fWdyyf l fRyA

3 SA f3 yA dGnyGn

&S(ax S d1f. S d
fffff2ycd " 7z
fffffEo4d

EyBdNmdPf. S d
fffff2ycd
ffffi l mGf)WSHfl 1fCy4dfl GBg

t l AA dGn

t l G(d4 mSHf3 1Sx yGe

City of Elkhart

Intercepting Chamber at Bridge and Hudson

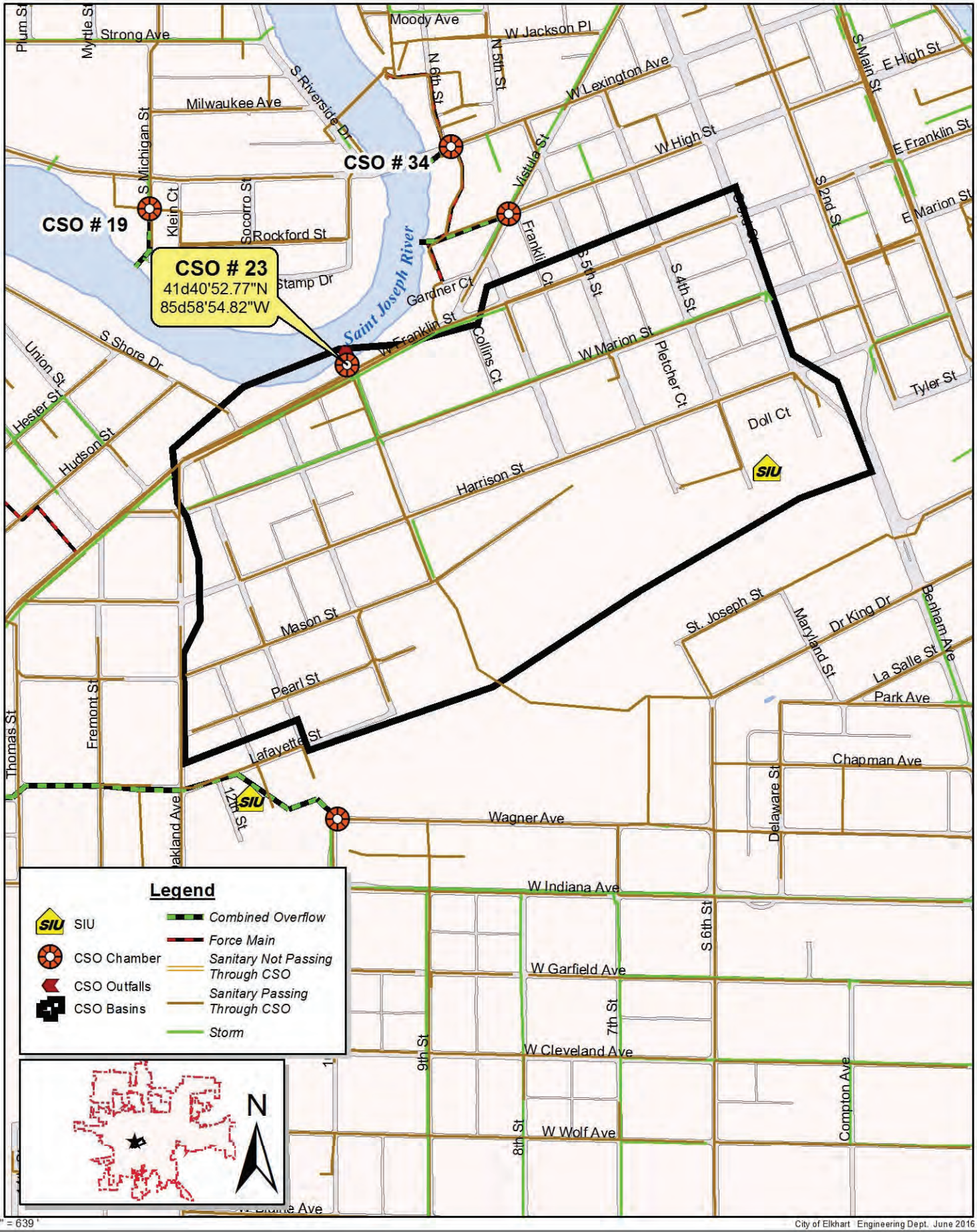
CSO 20

not to scale

City of Elkhart
Public Works & Utilities

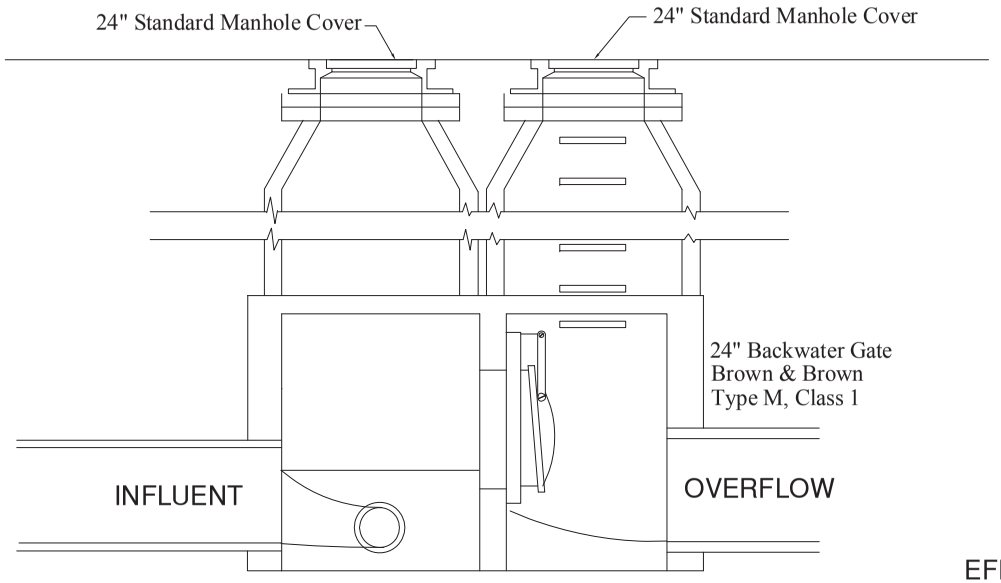
CSO 23

Intercepting Chamber at
8th and Franklin

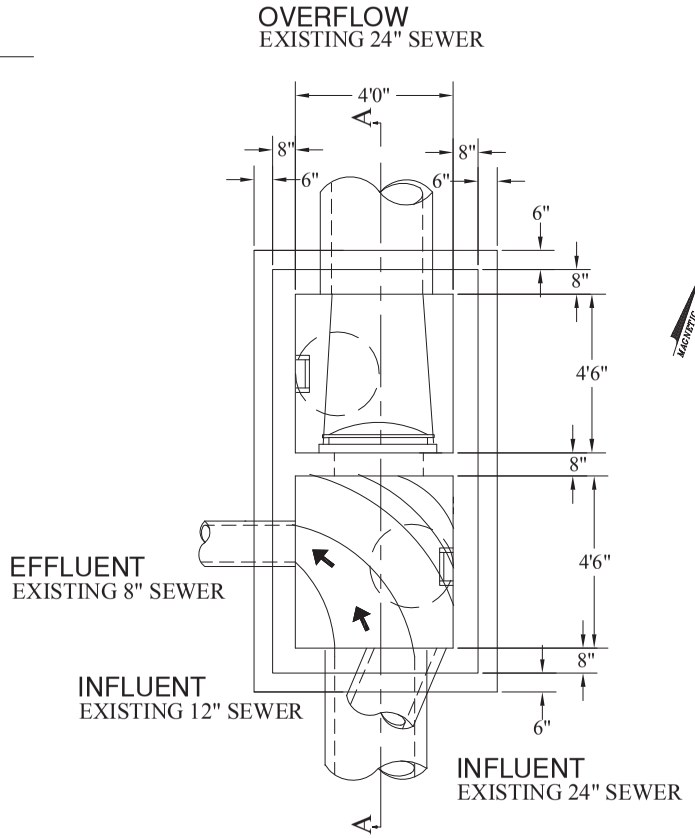


1 " = 639 '

City of Elkhart · Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 23 - Franklin & 8th
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'51.6"N
LONGITUDE85d58'54.82"W

Influent Lines Sizes18" & 12"

Effluent Line Sizes 8"

Overflow Line Size 24"

Measurements

Influent Line to Rim 22.84
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim23.22
Effluent Line to Rim

Overflow to Rim 22.69

Top of Dam or Weir to Rim 21.54

Dam Dimensions 4.0'

Backwater Gate
Size 24"
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at 8Th and Franklin

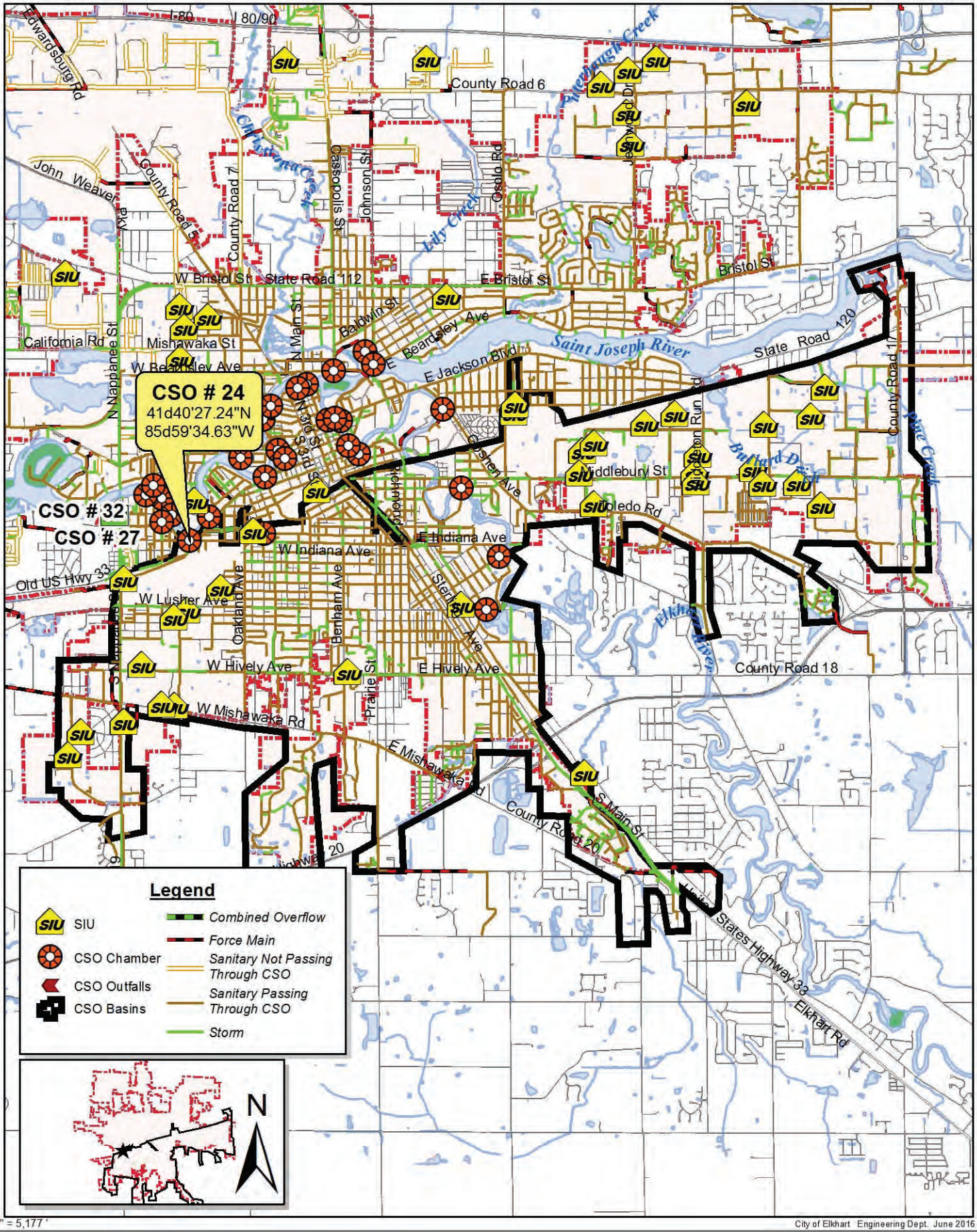
CSO 23

Scale: N.T.S.

City of Elkhart
Public Works & Utilities

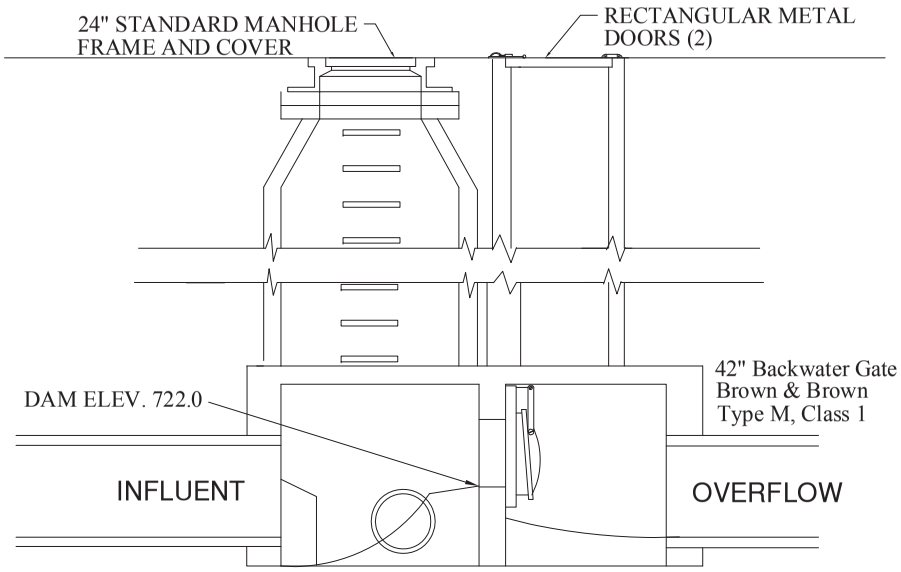
CSO 24

Intercepting Chamber at
Franklin and Indiana

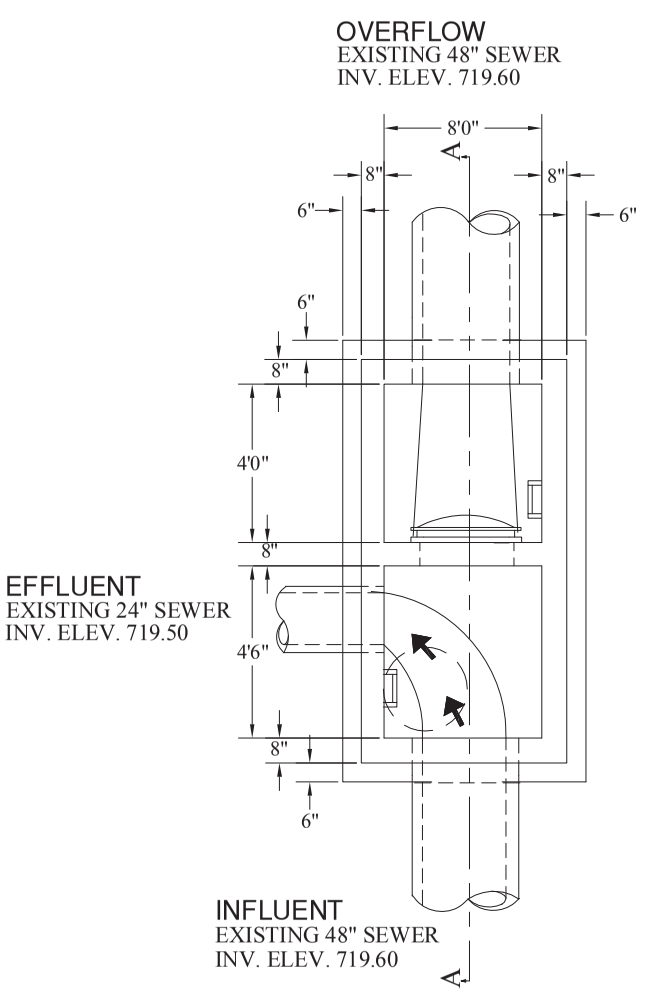


1 " = 5,177 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 24 - Indiana & Franklin
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'25.74"N
LONGITUDE 85d59'35.33"W

Influent Lines Sizes 48"

Effluent Line Sizes 27"

Overflow Line Size 48"

Measurements

Influent Line to Rim 18.68
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 18.68
Effluent Line to Rim

Overflow to Rim

Top of Dam or Weir to Rim 15.38

Dam Dimensions 3.75'

Backwater Gate
Size 42"
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Franklin and Indiana

CSO 24

not to scale

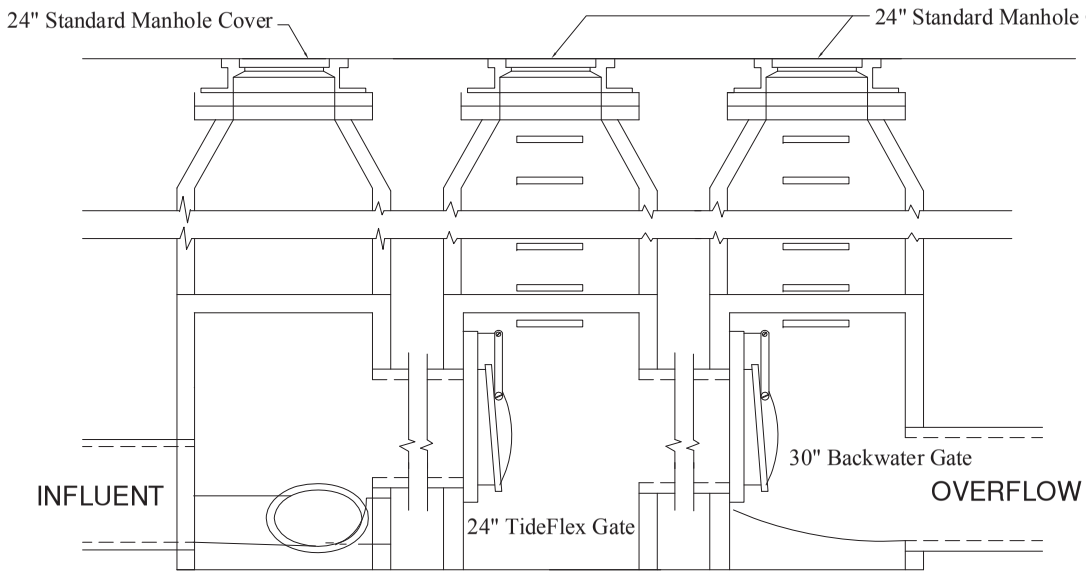
City of Elkhart
Public Works & Utilities

CSO 25

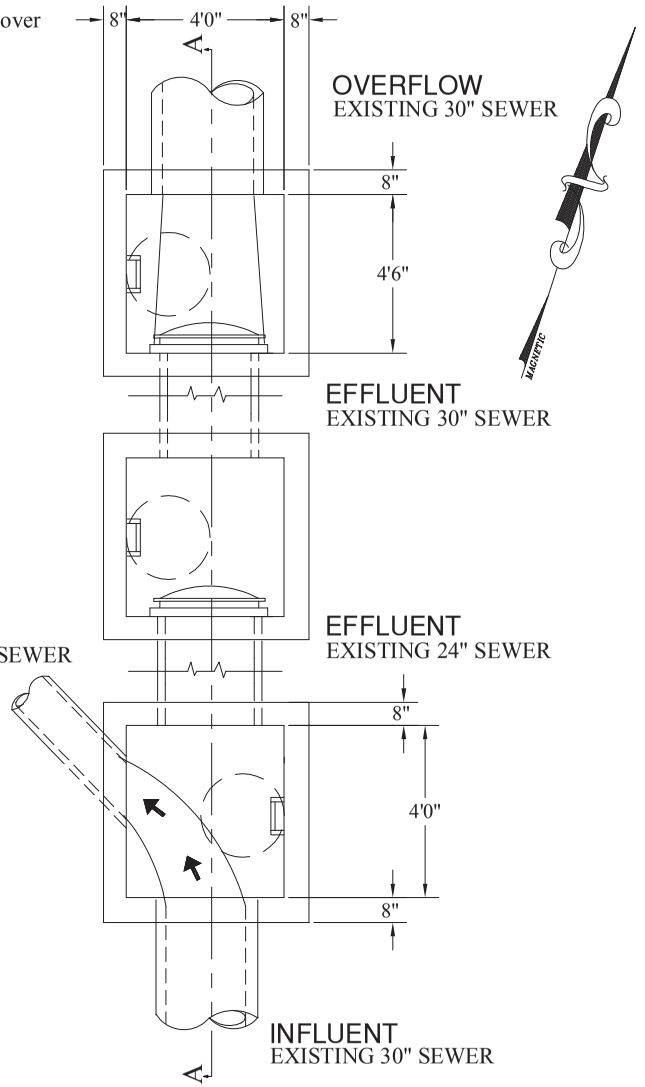
Intercepting Chamber at
Pottawatomi and 2nd

1 " = 500 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 25 - Pottawatomi & Second
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'27.09"N
LONGITUDE 85d58'38.92"W

Influent Lines Sizes 30"

Effluent Line Sizes 8"

Overflow Line Size 30"

Measurements

Influent Line to Rim 8.4
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 8.4
Effluent Line to Rim

Overflow to Rim 8.12

Top of Dam or Weir to Rim 7.16

Dam Dimensions

Backwater Gate
Size
Type

TideFlex Gate
Size 24"
Mount (Wall or Pipe End) Pipe Mount

Comments From CSO chamber to backwater gate chamber (20") the overflow pipe is 24",then to river 30"

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Pottawatomi and 2ND

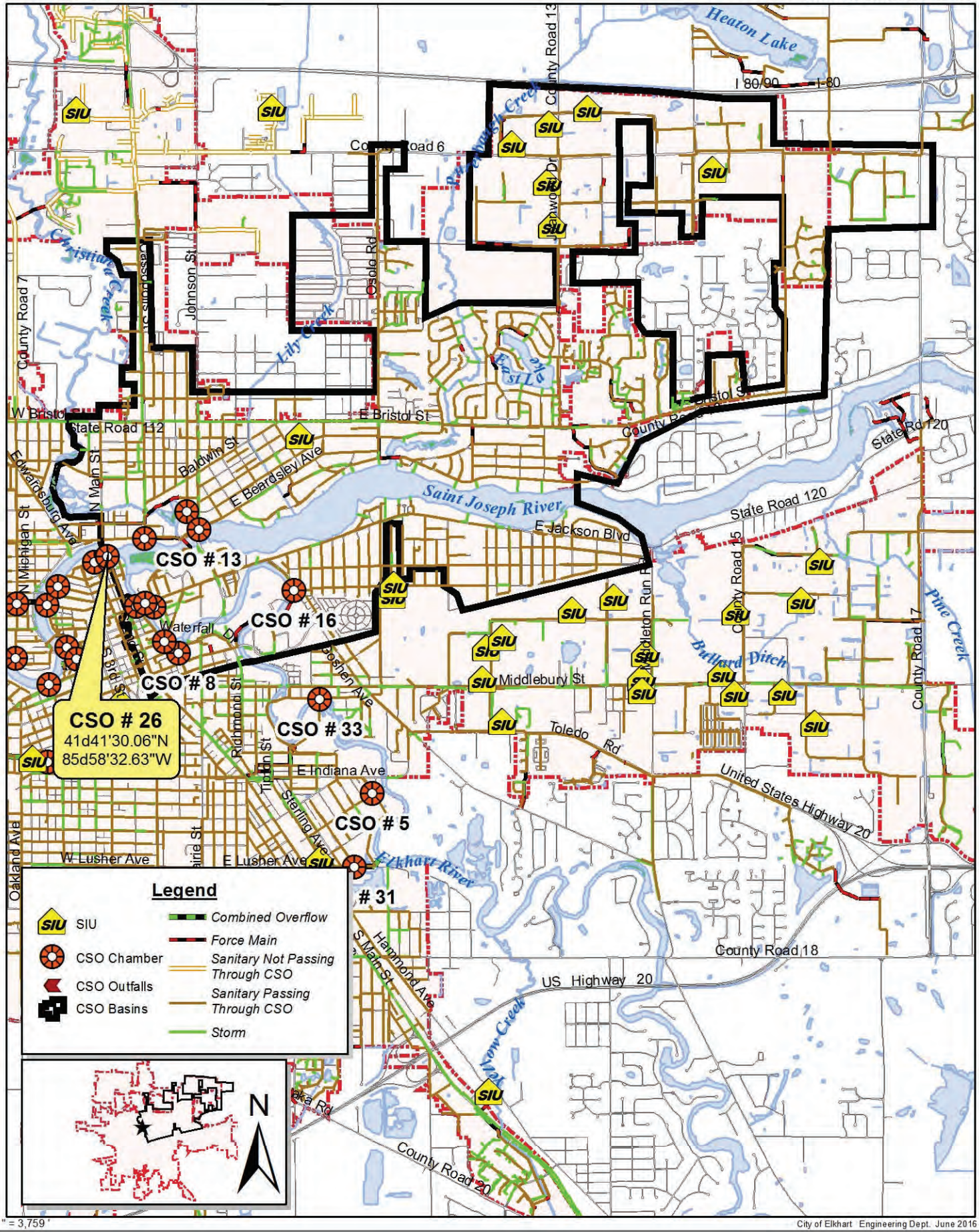
CSO 25

not to scale

City of Elkhart
Public Works & Utilities

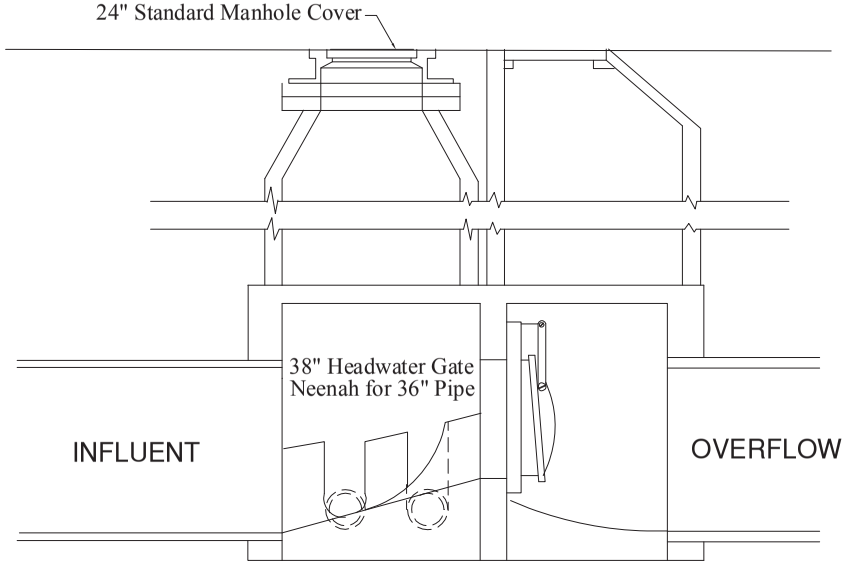
CSO 26

Intercepting Chamber at
Pottawatomi and Main



1 " = 3,759 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A

City of Elkhart
CSO 23 - notta&ato8 i e Mais Struut
Situ MuamGru8 ustm

RECEIVINA W. TER StJpomuvh RiDur
L. TITU4 E 1d01d'25J6" zN
LONA ITU4 Ew" 0" w91J69zW

IsflGust LisumSiBum1wz

EfflGust Lisu SiBumdwz e dwz

ODurflo& Lisu SiBu 1wz

MuamGru8 ustm

IsflGust Lisu to Ri8 d" J3
IsflGust Lisu to Ri8
IsflGustLisu to Ri8

EfflGust Lisu to Ri8 d" J3
EfflGust Lisu to Ri8

ODurflo& to Ri8 d1J23

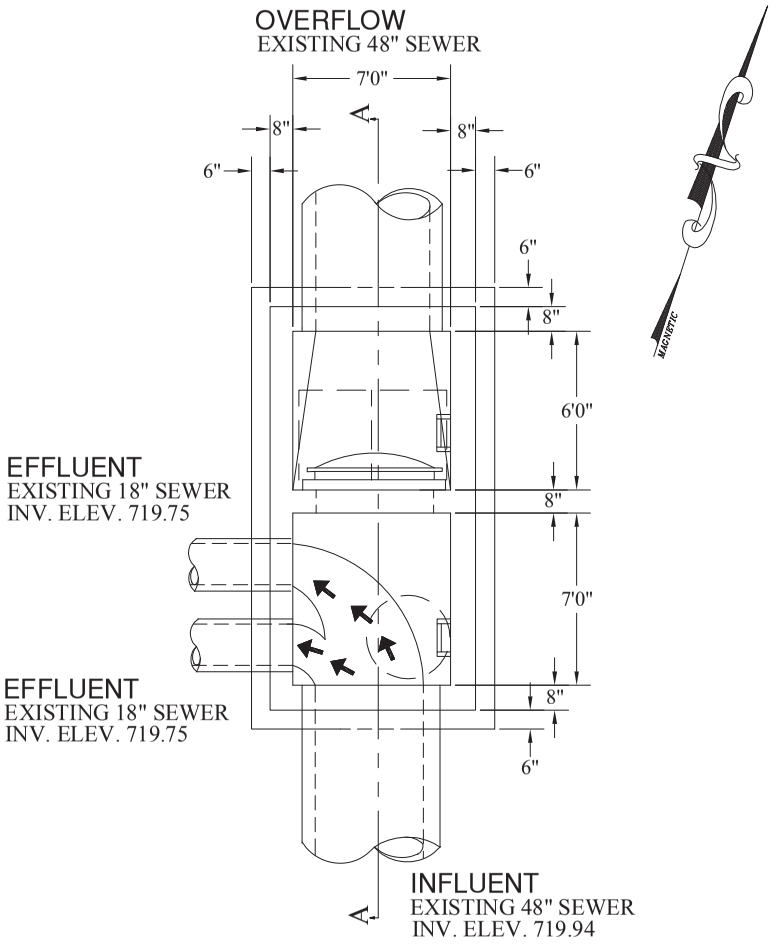
Tov of 4 a8 or Wuir to Ri8 d9Jd

4 a8 4 i8 usmiosm 91J' z

c axk&atur Aatu
SiBu 9wz
Tyvu Nuusah for 93z nivu

Ti0uFlu(Aatu
SiBu
MoGst PWall or nivu Es0)

Co8 8 ustm



PLAN

CosxuvtGal 4 ra&isg

City of Elkhart

Intercepting Chamber at Pottawatomi and Main

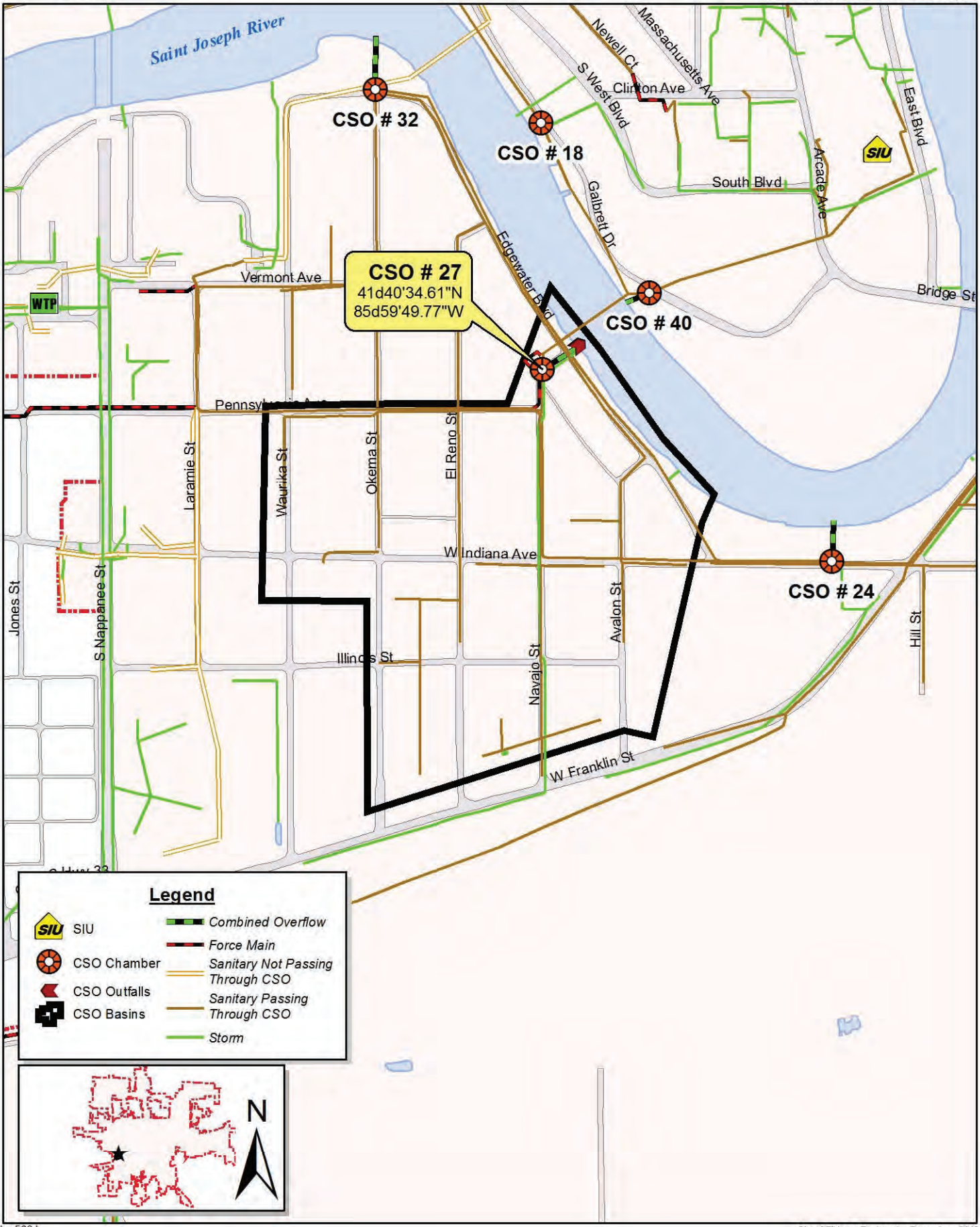
CSO 26

not to scale

City of Elkhart
Public Works & Utilities

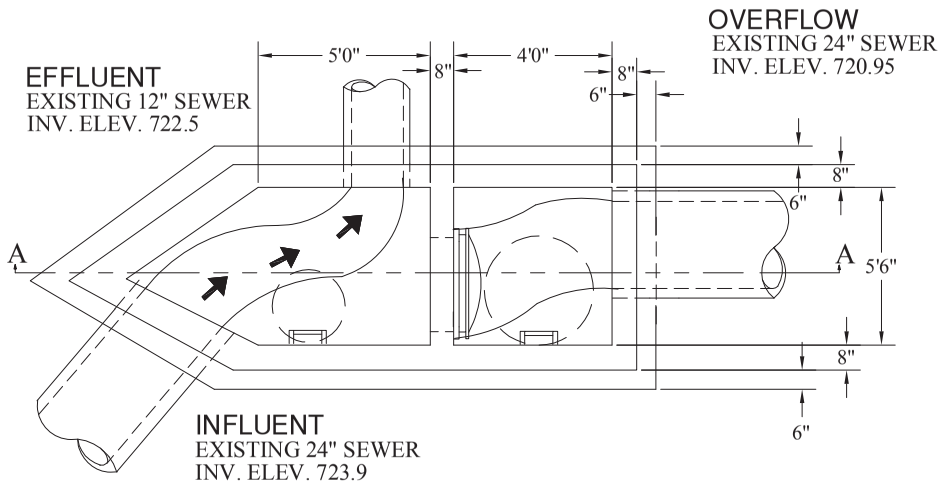
CSO 27

Intercepting Chamber at
Edgewater and Navajo



1 " = 500 '

City of Elkhart Engineering Dept. June 2016



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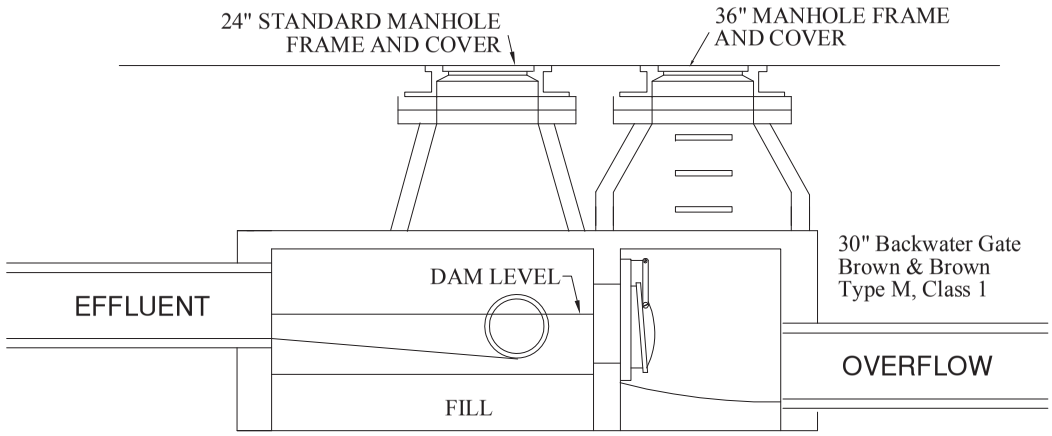


SECTION A-A

City of Elkhart
CSO 27 - Edgewater & Navajo
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'33.25"N
LONGITUDE85d59'50.07"W

Influent Lines Sizes 30"

Effluent Line Sizes 12"

Overflow Line Size 30"

Measurements

Influent Line to Rim 9.27
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 9.27
Effluent Line to Rim

Overflow to Rim 9.05

Top of Dam or Weir to Rim 8.65

Dam Dimensions

Backwater Gate
Size 30"
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Edgewater and Navajo

CSO 27

Scale: N.T.S

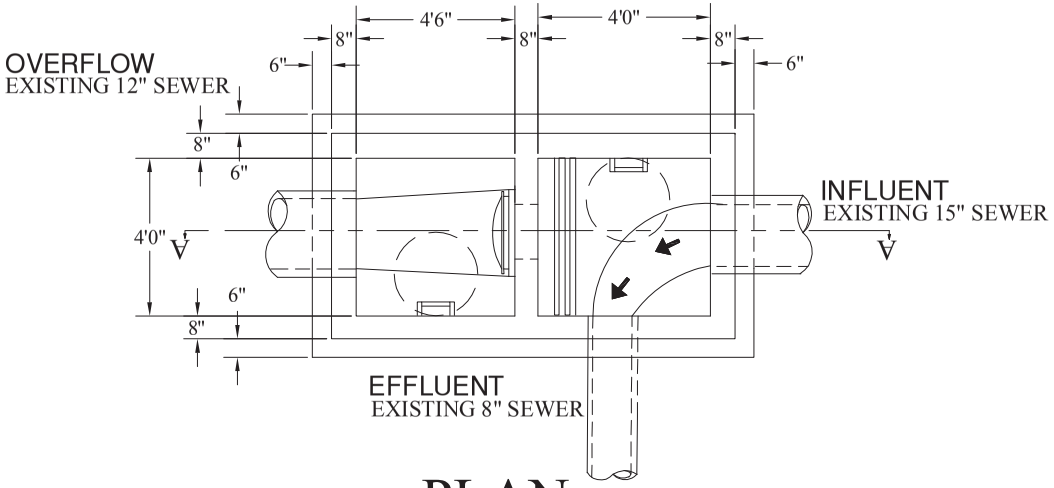
City of Elkhart
Public Works & Utilities

CSO 28

Intercepting Chamber at
Washington and St Joseph River

1 " = 417 '

City of Elkhart Engineering Dept. June 2016



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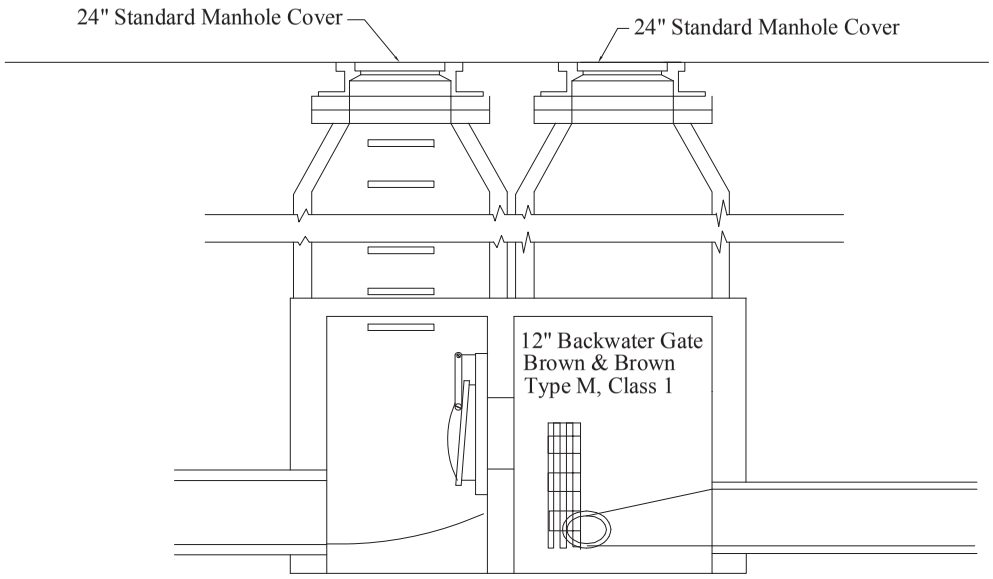


SECTION A-A

City of Elkhart
CSO 28 - Washington at River
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'19.80"N
LONGITUDE85d58'52.80"W

Influent Lines Sizes 12"

Effluent Line Sizes 8"

Overflow Line Size 12"

Measurements

Influent Line to Rim 7.95
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim8.09
Effluent Line to Rim

Overflow to Rim 7.98

Top of Dam or Weir to Rim 5

Dam Dimensions 4.0'

Backwater Gate
Size 12"
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Washington and River

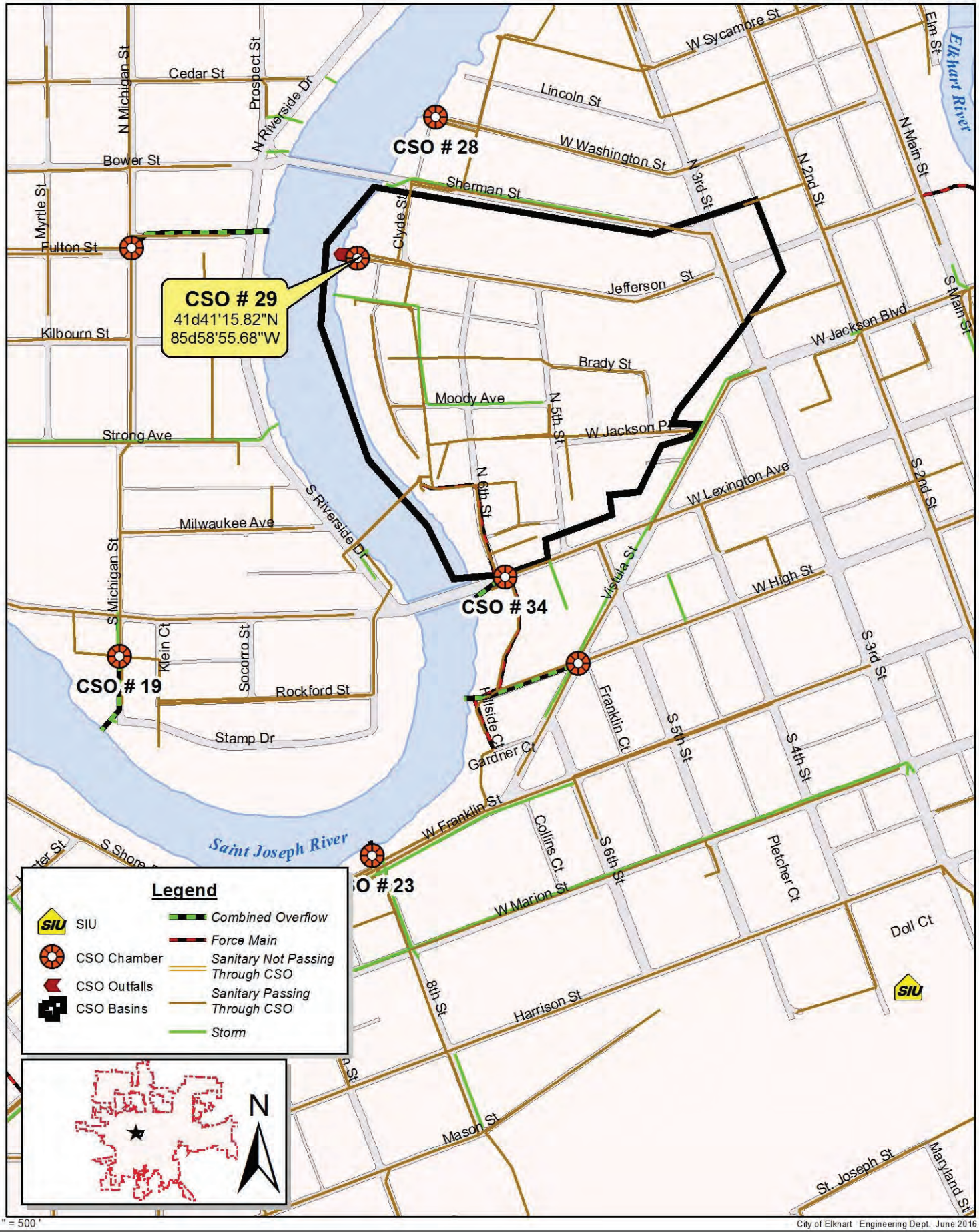
CSO 28

not to scale

City of Elkhart
Public Works & Utilities

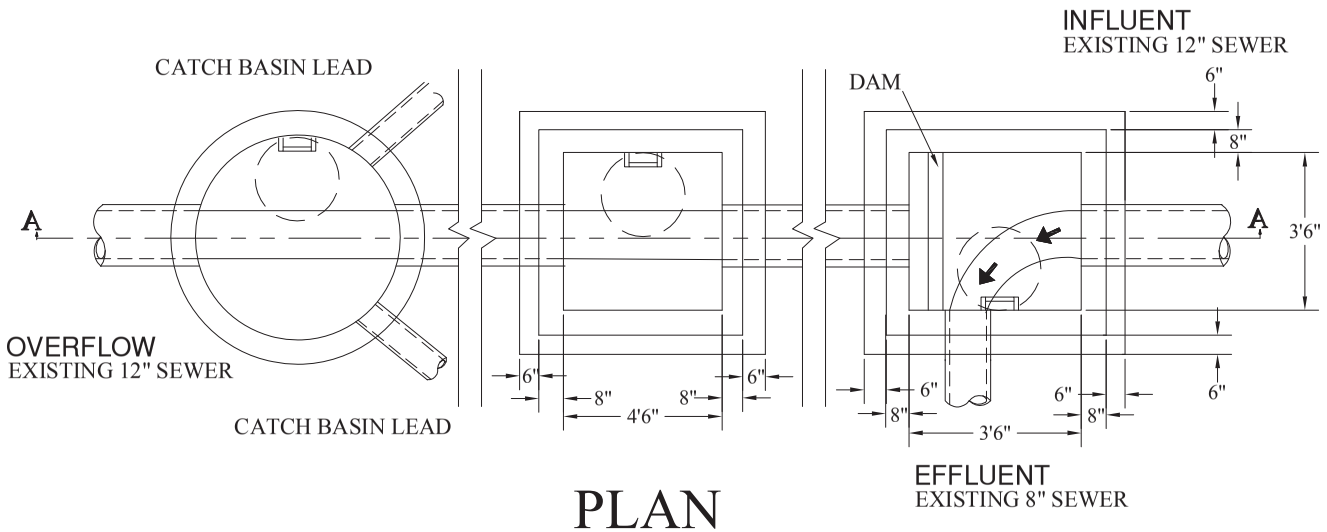
CSO 29

Intercepting Chamber at
Jefferson and St Joseph River

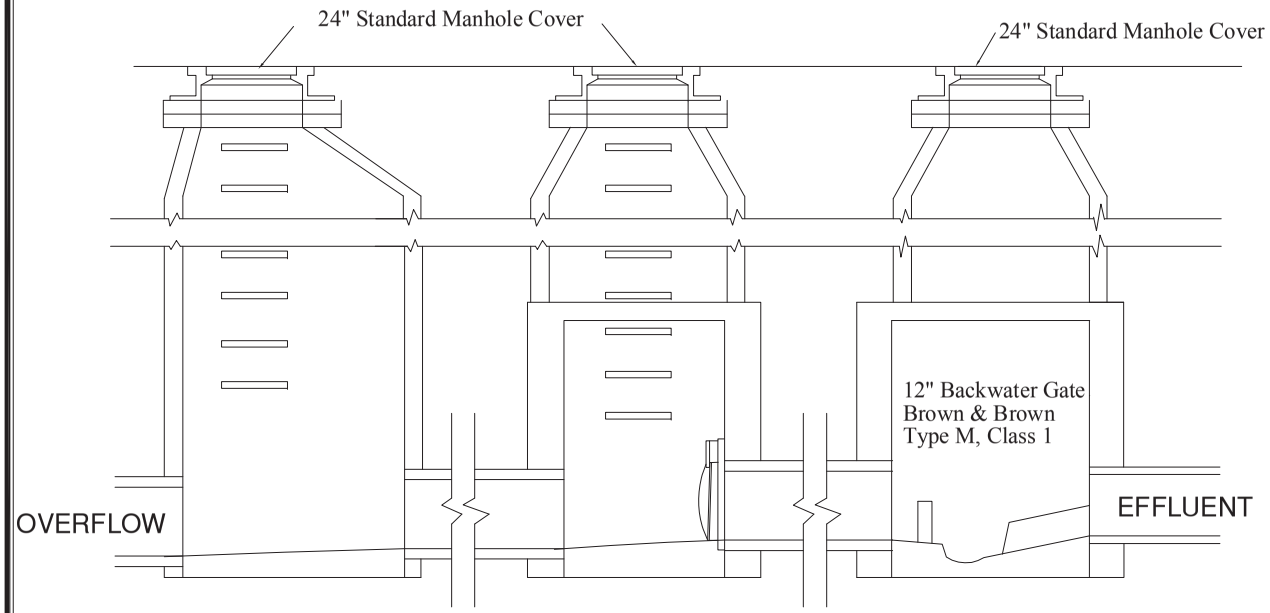


1 " = 500 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 29 - Jefferson at River
Site Measurements

RECEIVING WATER	St. Joseph River
LATITUDE	41d41'14.63"N
LONGITUDE	85d58'56.8"W
Influent Lines Sizes	12"
Effluent Line Sizes	8"
Overflow Line Size	12"
Measurements	
Influent Line to Rim	5.98
Influent Line to Rim	
InfluentLine to Rim	
Effluent Line to Rim	6.25
Effluent Line to Rim	
Overflow to Rim	4.88
Top of Dam or Weir to Rim	
Dam Dimensions	
Backwater Gate	
Size	12"
Type	
TideFlex Gate	
Size	
Mount (Wall or Pipe End)	
Comments	

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Jefferson and River

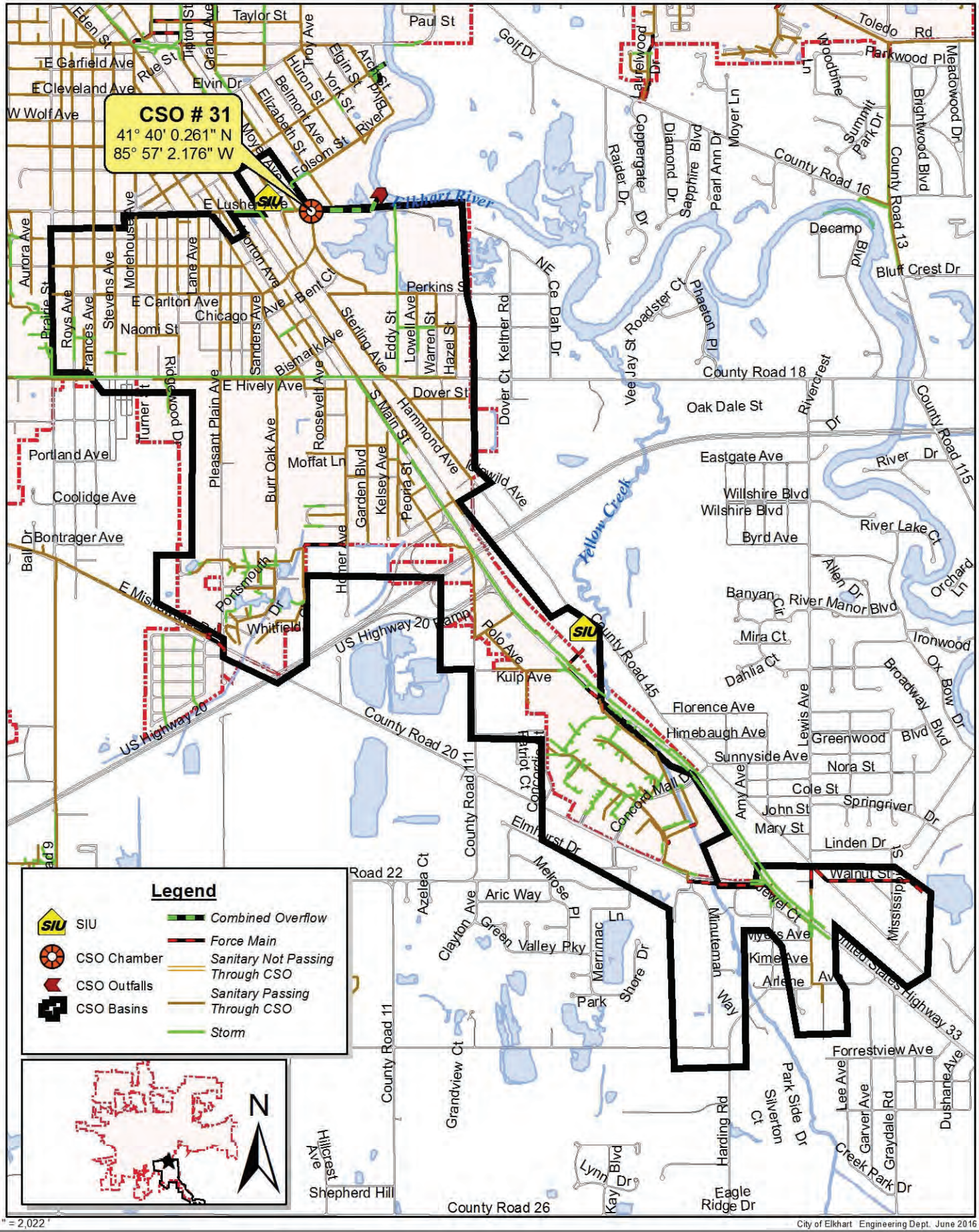
CSO 29

not to scale

City of Elkhart
Public Works & Utilities

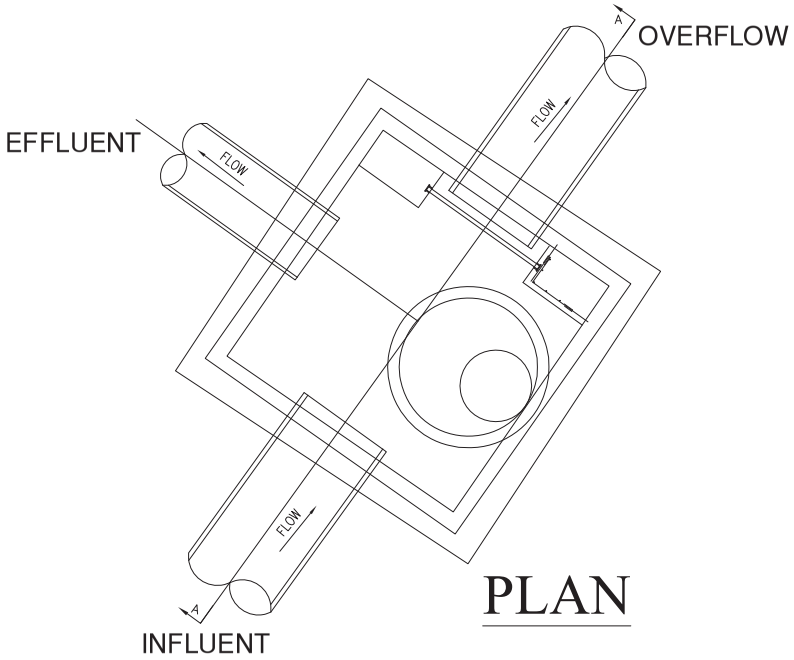
CSO 31

Intercepting Chamber at
Elizabeth and Lusher

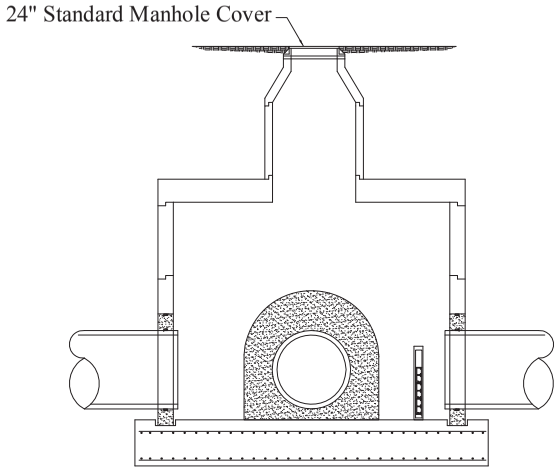


1 " = 2,022 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 31 - Moyer & Lusher
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d39'59.89"N
LONGITUDE 85d56'57.15"W

Influent Lines Sizes 48"

Effluent Line Sizes 36"

Overflow Line Size 48"

Measurements

Influent Line Elevation 736.80

Effluent Line Elevation 736.70

Overflow Line Elevation 736.80

Top of Dam Elevation 738.55

Dam Dimensions 4.42'

Backwater Gate N/A
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments Chamber is 6' x 6"

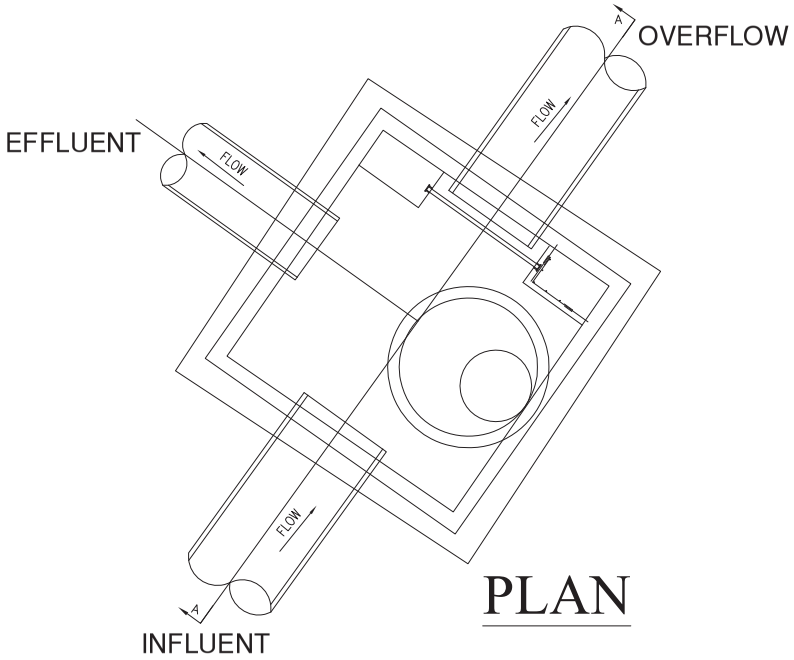
Conceptual Drawing

City of Elkhart

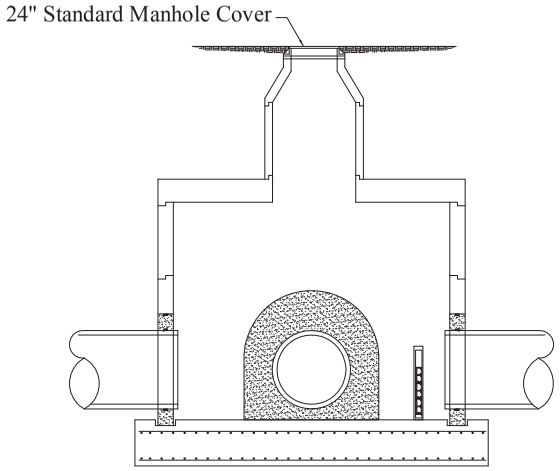
Intercepting Chamber at Moyer and Lusher

CSO 31

not to scale



PLAN



SECTION A-A

City of Elkhart
CSO 31 - Moyer & Lusher
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d39'59.89"N
LONGITUDE 85d56'57.15"W

Influent Lines Sizes 48"

Effluent Line Sizes 36"

Overflow Line Size 48"

Measurements

Influent Line Elevation 736.80

Effluent Line Elevation 736.70

Overflow Line Elevation 736.80

Top of Dam Elevation 738.55

Dam Dimensions 4.42'

Backwater Gate N/A
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments Chamber is 6' x 6"

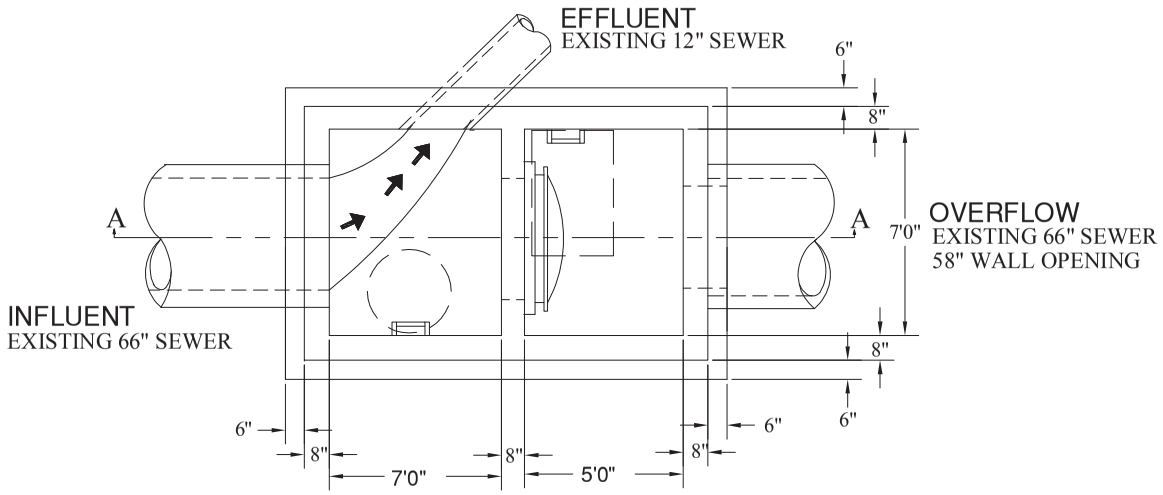
Conceptual Drawing

City of Elkhart

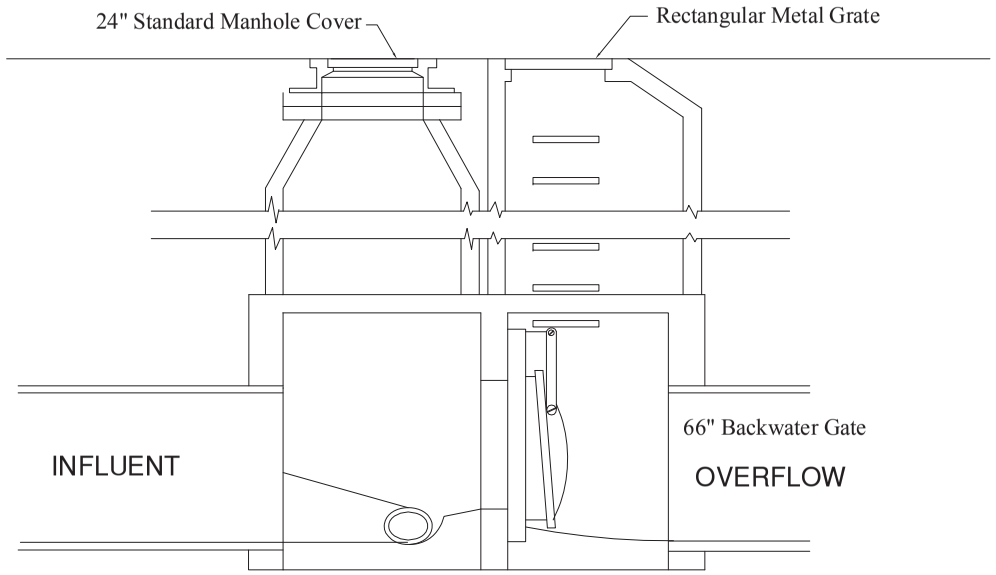
Intercepting Chamber at Moyer and Lusher - Chamber A

CSO 31

not to scale



PLAN



SECTION A-A

City of Elkhart
CSO 31 - Elizabeth & Lusher
Site Measurements

RECEIVING WATER	Elkhart River
LATITUDE	41d39'59.89"N
LONGITUDE	85d56'57.15"W
Influent Lines Sizes	66"
Effluent Line Sizes	12"
Overflow Line Size	66"
Measurements	
Influent Line to Rim	15.72
Influent Line to Rim	
InfluentLine to Rim	
Effluent Line to Rim	15.75
Effluent Line to Rim	
Overflow to Rim	13.55
Top of Dam or Weir to Rim	N/A
Dam Dimensions	4.42'
Backwater Gate	
Size	66"
Type	
TideFlex Gate	N/A
Size	
Mount (Wall or Pipe End)	

Comments Chamber is 4.92' x 7.25'

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Elizabeth and Lusher - Chamber B

CSO 31

not to scale

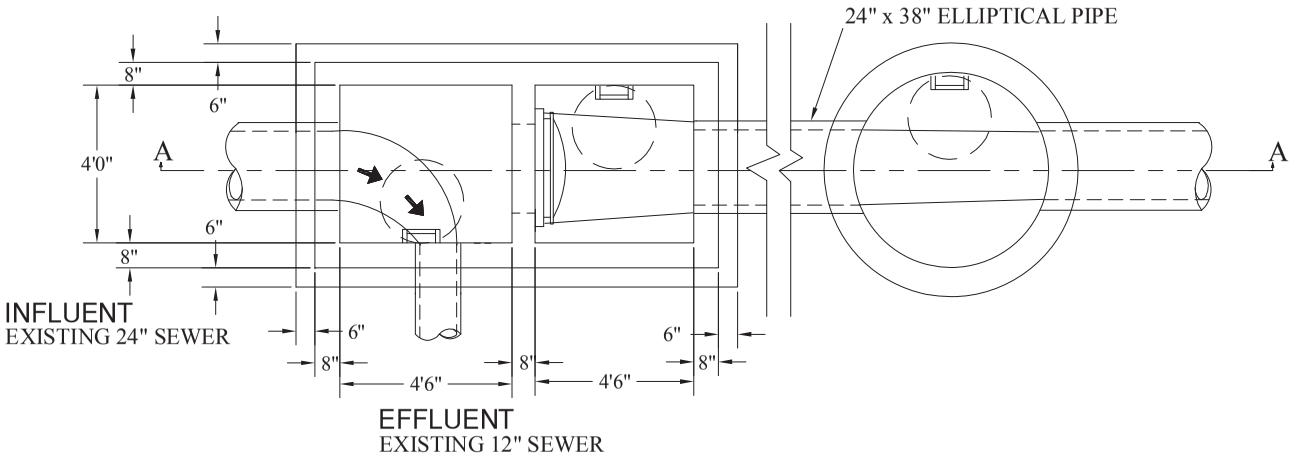
City of Elkhart
Public Works & Utilities

CSO 32

Intercepting Chamber at
Edgewater & Okema

1 " = 417 '

City of Elkhart Engineering Dept. June 2016



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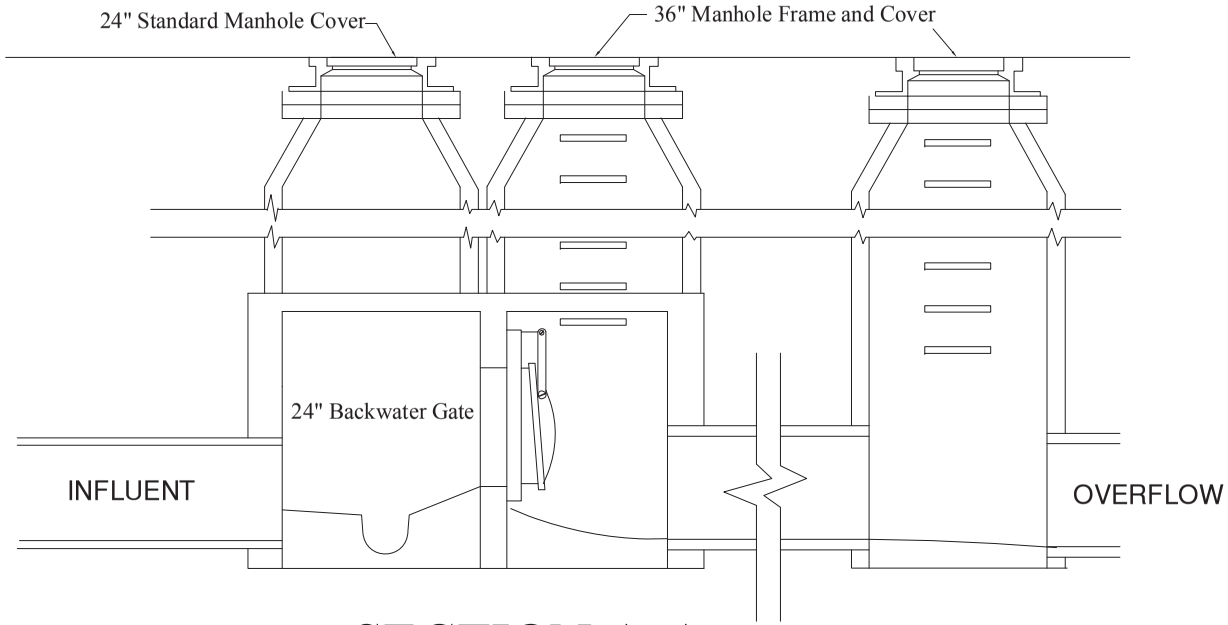


SECTION A-A

City of Elkhart
CSO 32 - Edgewater & Okema
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'44.08"N
LONGITUDE85d59'58.52"W

Influent Lines Sizes 24"

Effluent Line Sizes 12"

Overflow Line Size 24"

Measurements

Influent Line to Rim 6.1
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim6.12
Effluent Line to Rim

Overflow to Rim 5.15

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate
Size 24"
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Edgewater and Okema

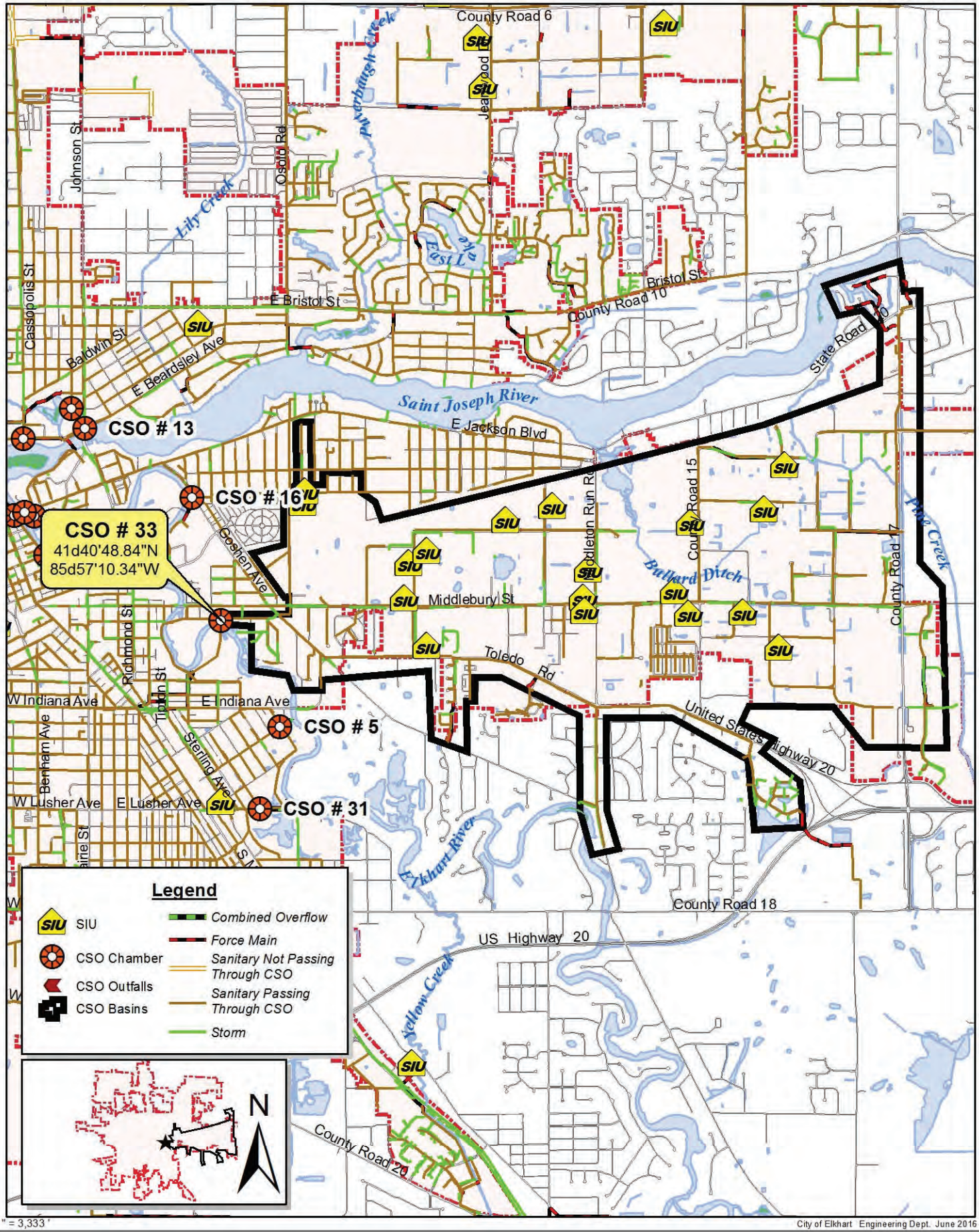
CSO 32

not to scale

City of Elkhart
Public Works & Utilities

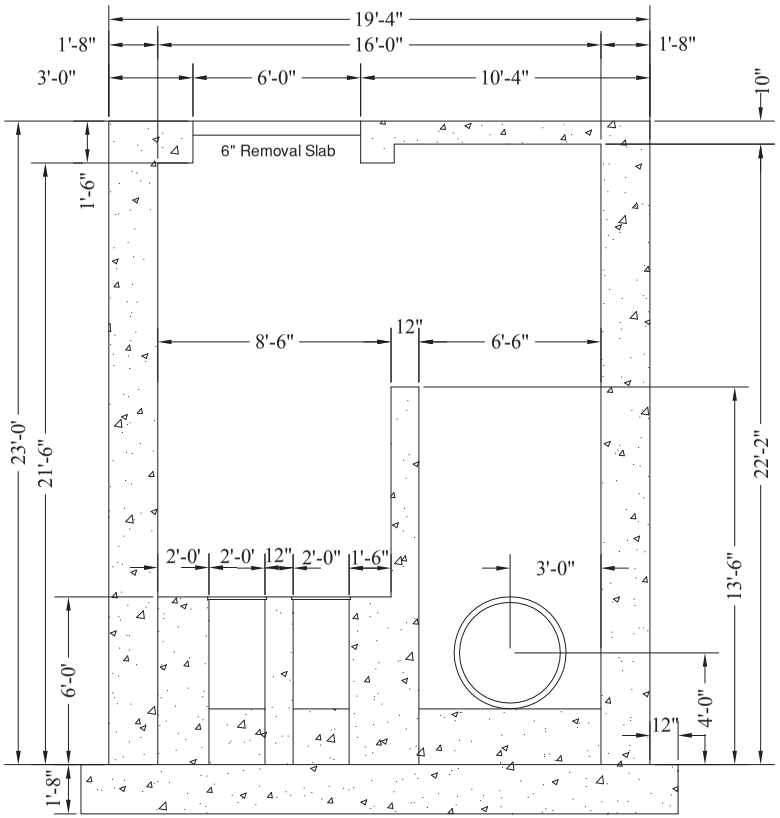
CSO 33

Intercepting Chamber at Evans and Grace

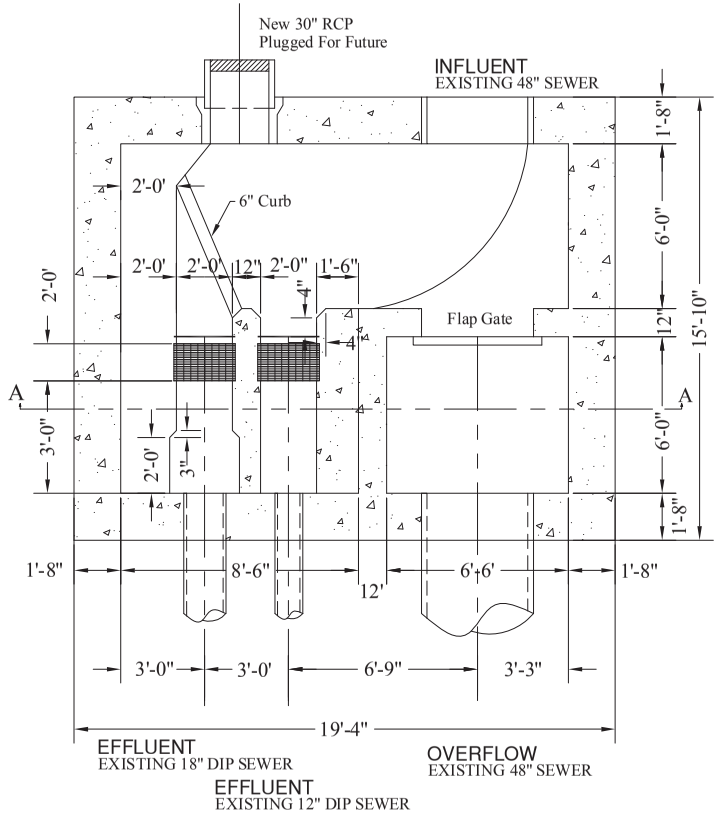


1 " = 3,333 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 33 - Evans & Grace
Site Measurements

RECEIVING WATER Elkhart River
LATITUDE 41d40'48.41"N
LONGITUDE85d57'09.78"W

Influent Lines Sizes 48"

Effluent Line Sizes 12" & 18"

Overflow Line Size 48"

Measurements

Influent Line to Rim 20.85
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim 21.6
Effluent Line to Rim 21.6

Overflow to Rim 21.04

Top of Dam or Weir to Rim 19.38

Dam Dimensions

Backwater Gate
Size 48"
Type Neenah Foundry

TideFlex Gate
Size 36"
Mount (Wall or Pipe End)

Comments Top of wall across 18" is 21.02 Top to rim

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Evans and Grace

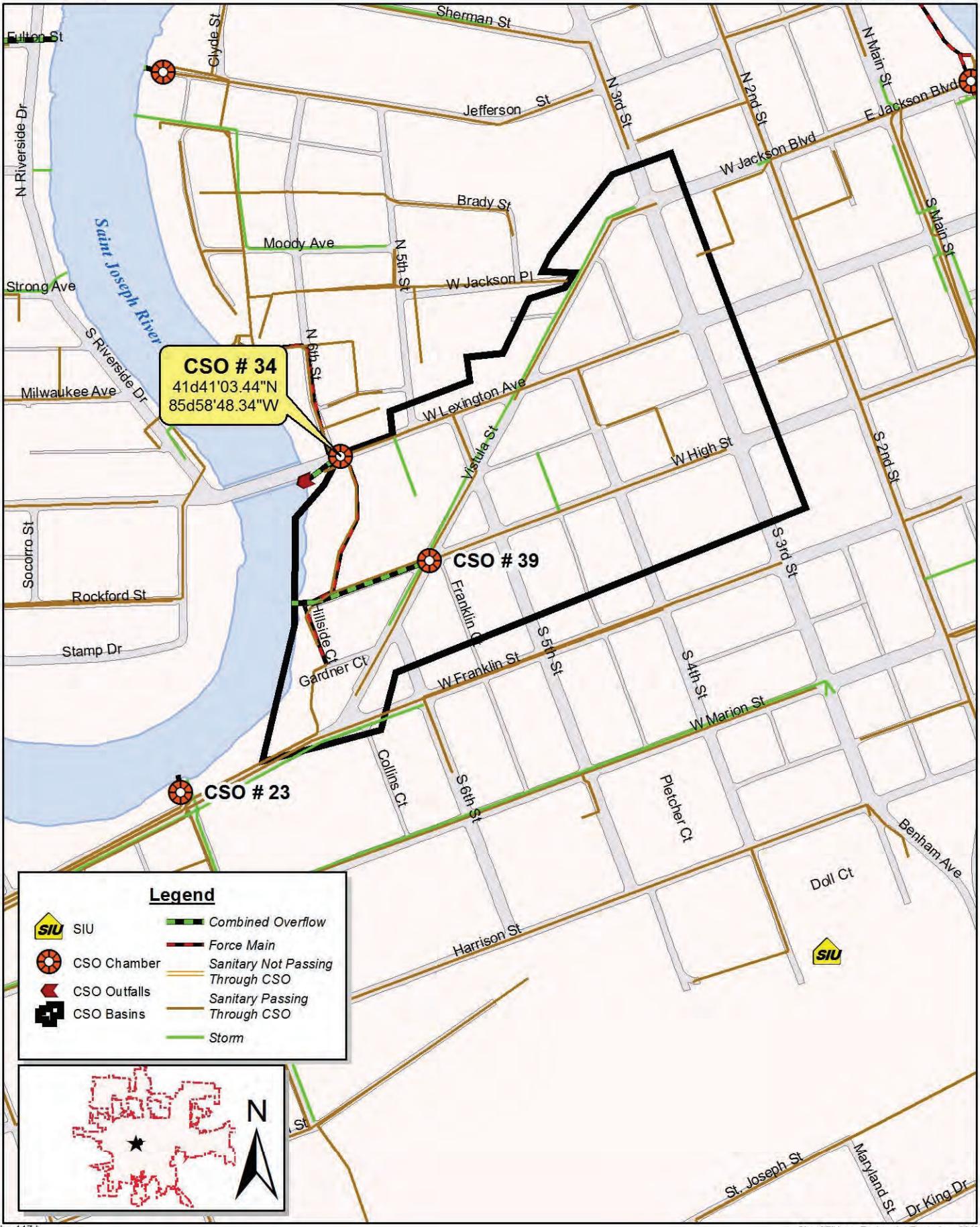
CSO 33

not to scale

City of Elkhart
Public Works & Utilities

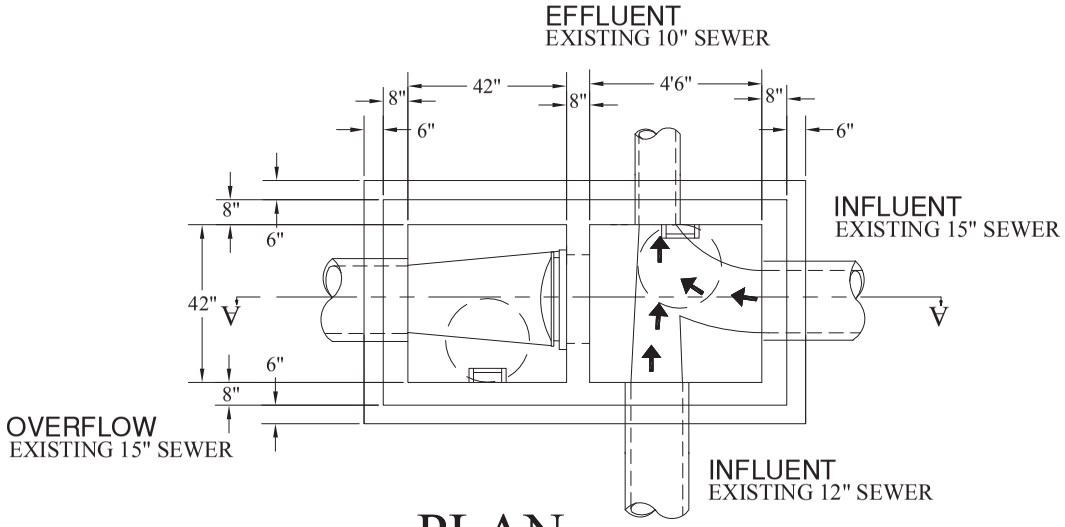
CSO 34

Intercepting Chamber at
Lexington and 6th

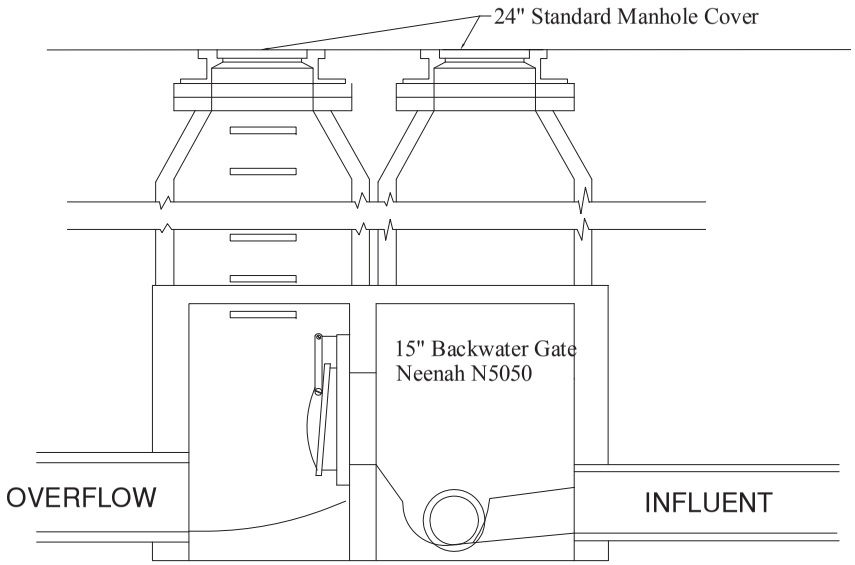


1 " = 417 '

City of Elkhart Engineering Dept. June 2016



PLAN



SECTION A-A

City of Elkhart
CSO 34 - Lexington & N. 6th
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d41'02.30"N
LONGITUDE85d58'48.73"W

Influent Lines Sizes East 15" South 12"

Effluent Line Sizes 12"

Overflow Line Size 15"

Measurements

Influent Line to Rim East 15" 8.06
Influent Line to Rim South 12" 8.06
InfluentLine to Rim

Effluent Line to Rim8.21
Effluent Line to Rim

Overflow to Rim 6.56

Top of Dam or Weir to Rim

Dam Dimensions

Backwater Gate
Size 15"
Type Neenah N5050

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at Lexington and N. 6TH

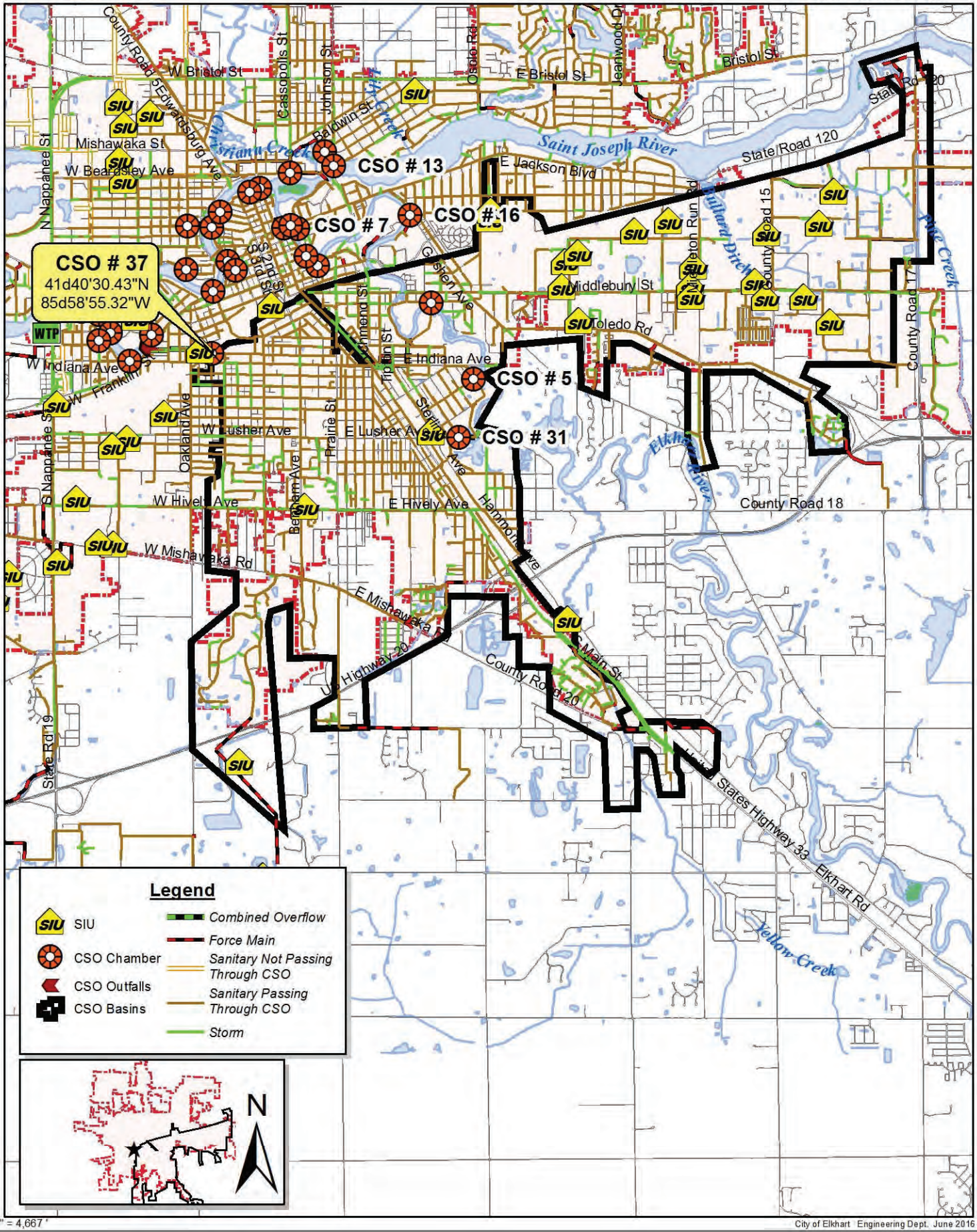
CSO 34

not to scale

City of Elkhart
Public Works & Utilities

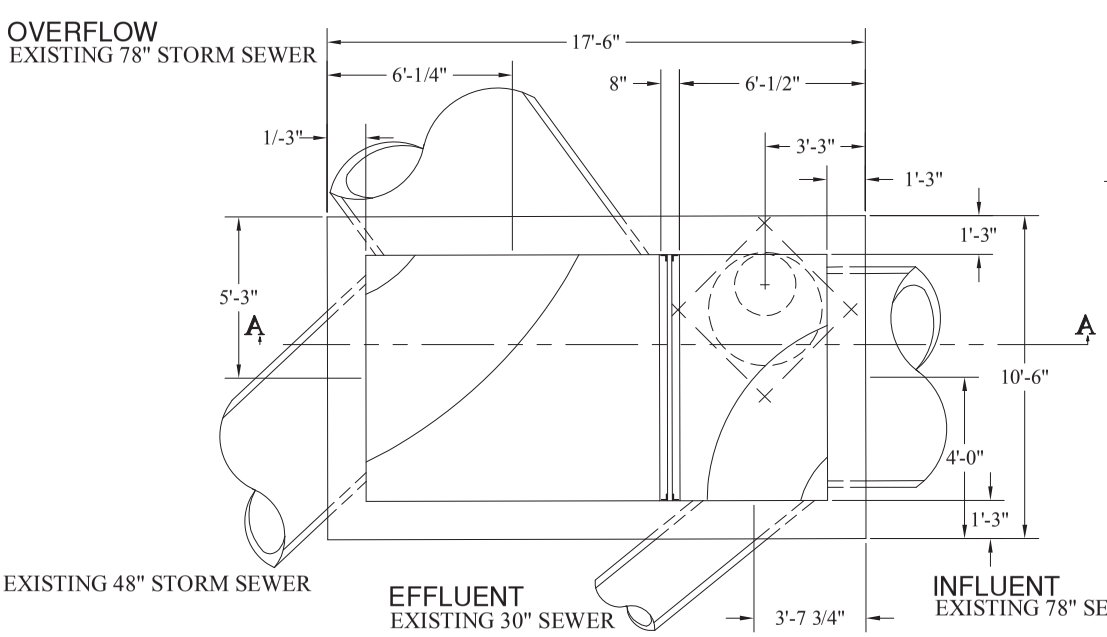
CSO 37

Intercepting Chamber at
Franklin and Krau

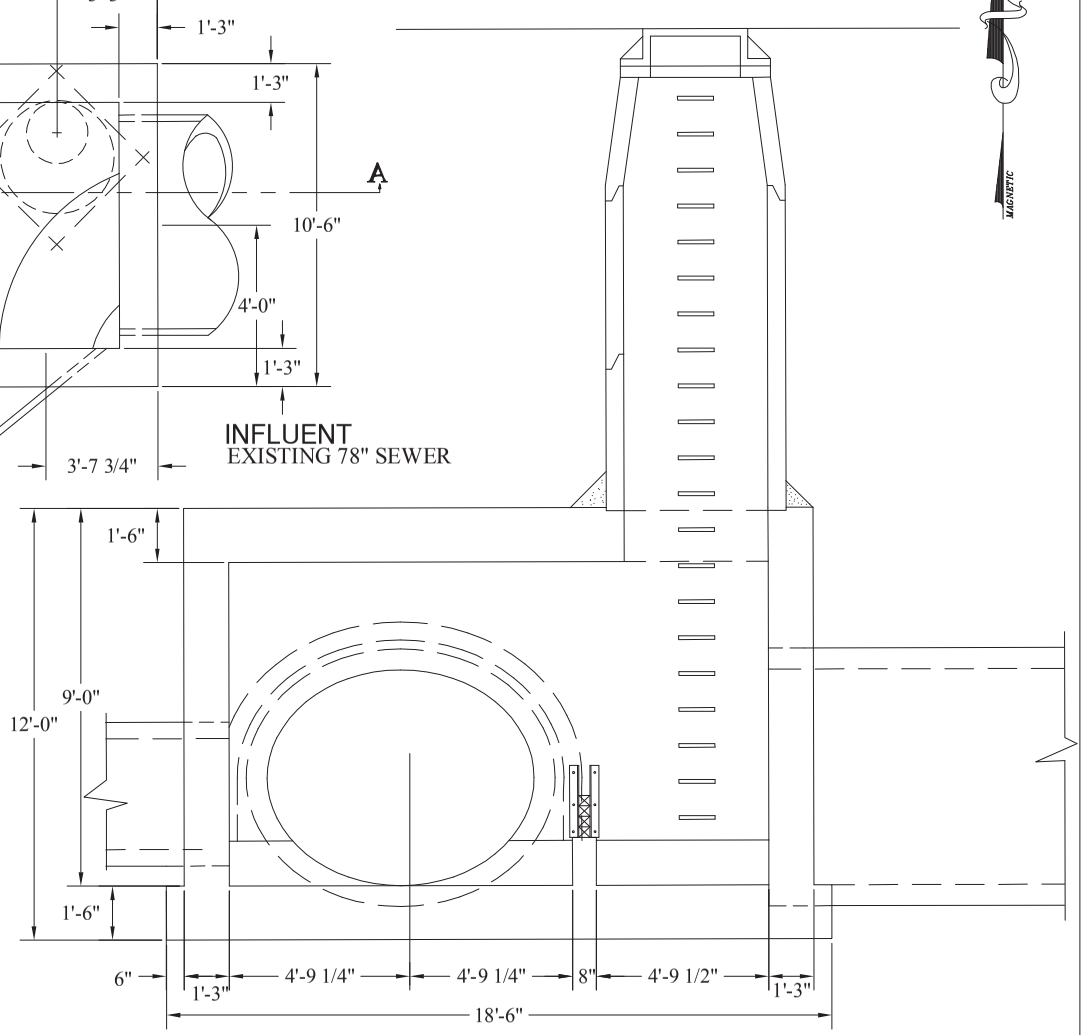


1 " = 4,667 '

City of Elkhart · Engineering Dept. June 2016



PLAN



SECTION A-A

Conceptual Drawing

City of Elkhart
CSO 37 - Franklin & Krau
Site Measurements

RECEIVING WATER St Joseph River
LATITUDE 41d40'29.23"N
LONGITUDE85d58'55.42"W

Influent Lines Sizes 72"

Effluent Line Sizes 30"

Overflow Line Size 72"

Measurements

Influent Line to Rim 24.03
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim24.03
Effluent Line to Rim

Overflow to Rim 24.03

Top of Dam or Weir to Rim 21.46

Dam Dimensions 5.1'

Backwater Gate N/A
Size
Type

TideFlex Gate N/A
Size
Mount (Wall or Pipe End)

Comments

City of Elkhart

Intercepting Chamber at Franklin and Krau

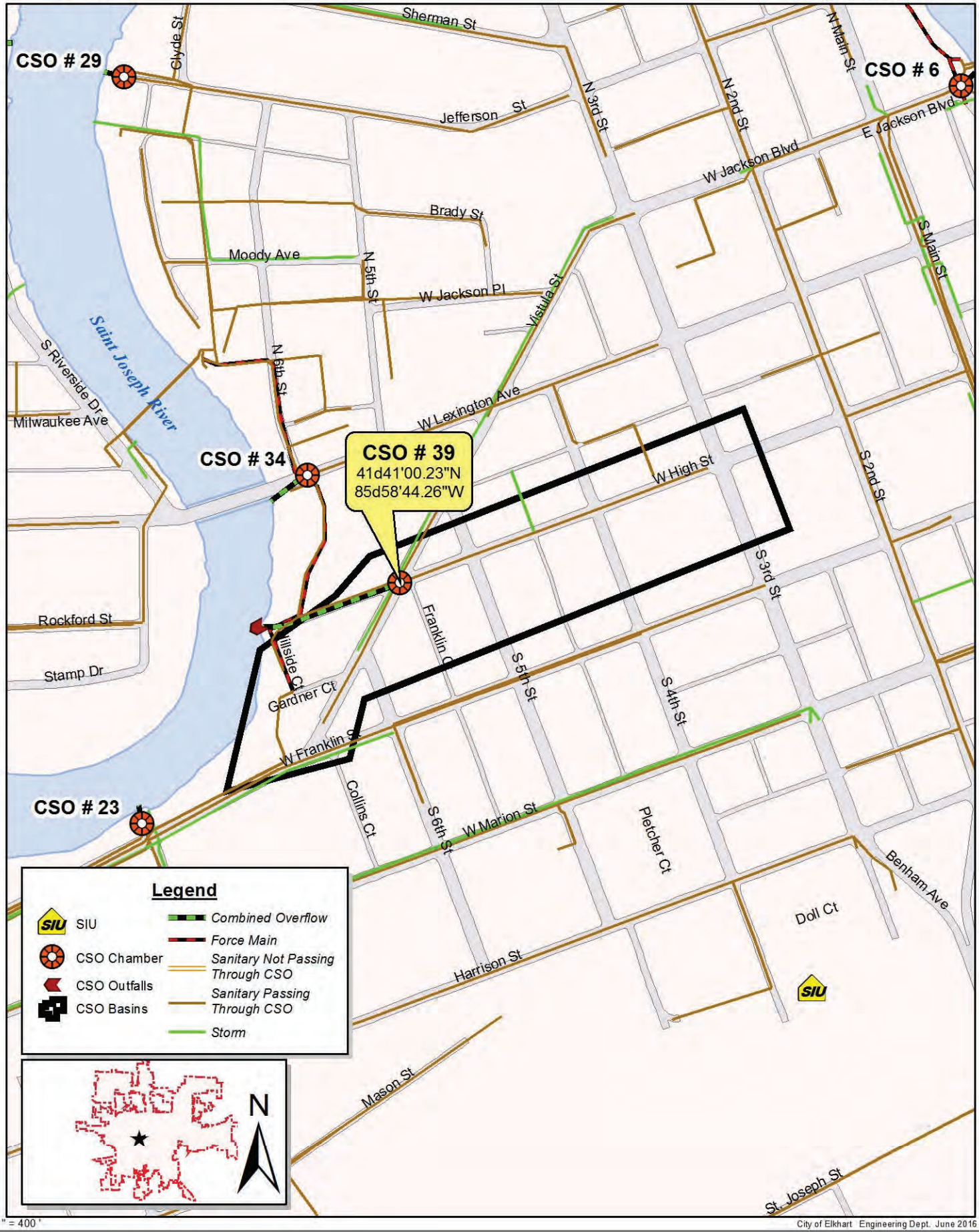
CSO 37

not to scale

City of Elkhart
Public Works & Utilities

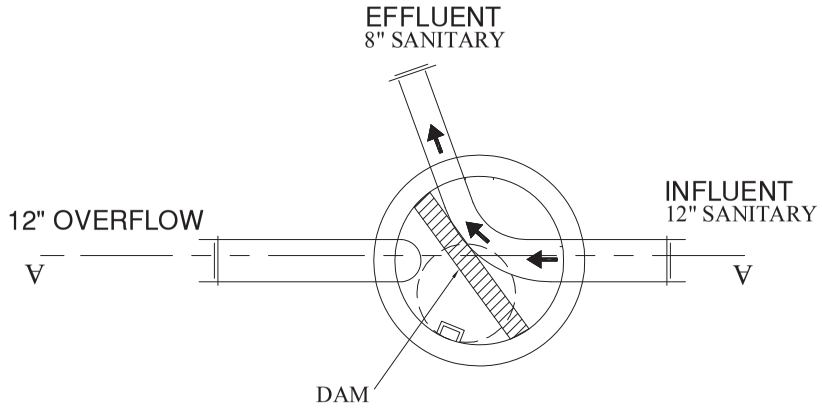
CSO 39

Intercepting Chamber at
High and Vistula



1 " = 400 '

City of Elkhart Engineering Dept. June 2016



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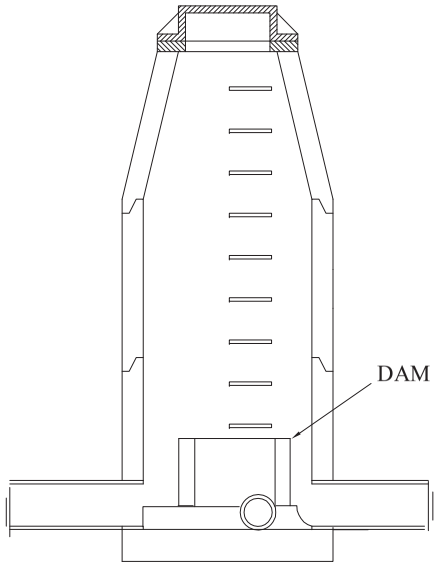


SECTION A-A

City of Elkhart
CSO 39 - West High & River
Site Measurements

RECEIVING WATER St. Joseph River
LATITUDE 41d40'59.07"N
LONGITUDE85d58'44.73"W

Influent Lines Sizes12"

Effluent Line Sizes 8"

Overflow Line Size 12"

Measurements

Influent Line to Rim 9.02
Influent Line to Rim
InfluentLine to Rim

Effluent Line to Rim9.02
Effluent Line to Rim

Overflow to Rim 9.02

Top of Dam or Weir to Rim 6.8

Dam Dimensions 3.42'

Backwater Gate
Size
Type

TideFlex Gate
Size
Mount (Wall or Pipe End)

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at W. High and River

CSO 39

not to scale

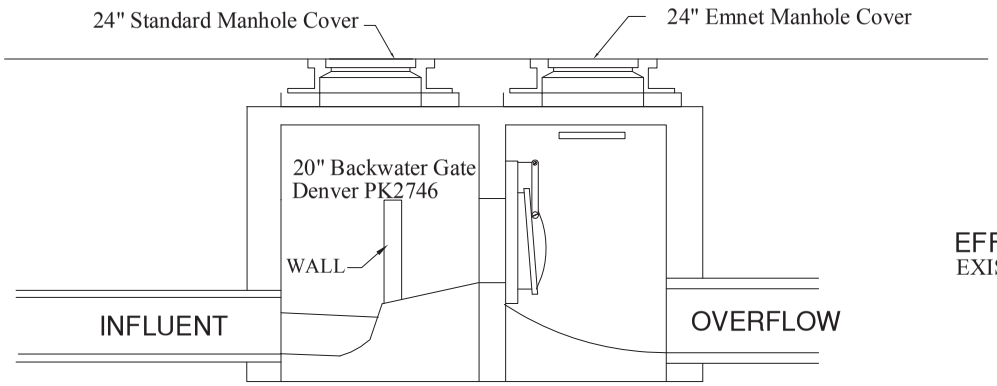
City of Elkhart
Public Works & Utilities

CSO 40

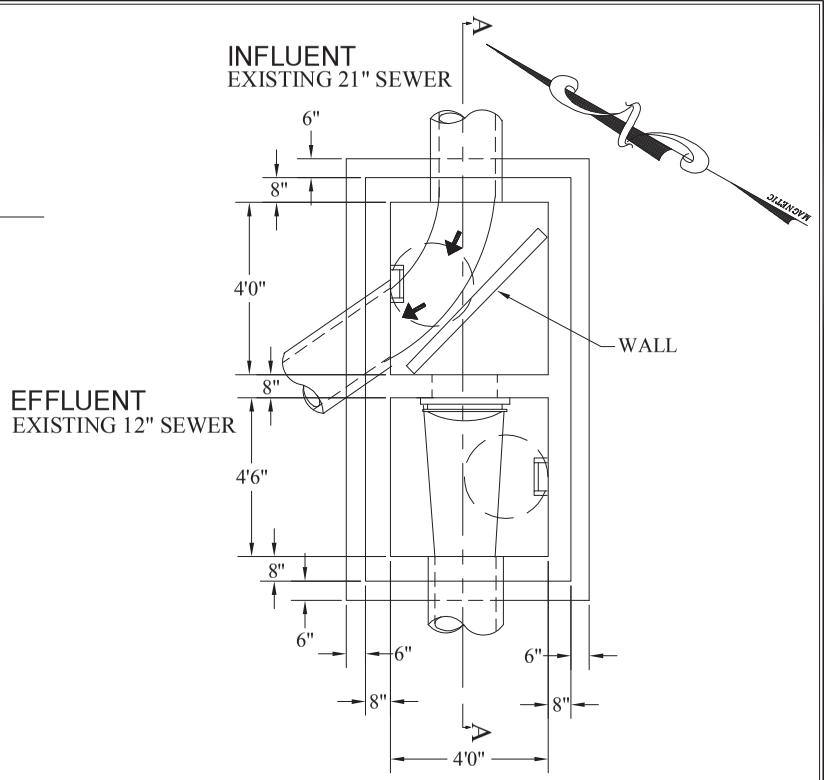
Intercepting Chamber at
McNaughton South

1 " = 417 '

City of Elkhart Engineering Dept. June 2016



SECTION A-A



PLAN

City of Elkhart
CSO 40 - McNaughton South
Site Measurements

RECEIVING WATER St. Joesph River
LATITUDE 41d40'37.01"N
LONGITUDE85d59'44.88"W

Influent Lines Sizes 21"

Effluent Line Sizes 12" (Throttles to 8" or 6")

Overflow Line Size 21"

Elevations
Influent Line 717.20
Effluent Line 717.36
Overflow 717.23

Top of Dam 719.29

Dam Dimensions

Backwater Gate
Size 20"
Type Denver PK2746 20IN 16H

TideFlex Gate N/A

Comments

Conceptual Drawing

City of Elkhart

Intercepting Chamber at McNaughton and South

CSO 40

not to scale