Illicit Discharge Detection and Elimination (IDDE) Plan

Acronyms

BMP – Best Management Practice

CWA – Clean Water Act

EPA – Environmental Protection Agency

GIS – Geographic Information System

GPS – Global Positioning System

IDDE – Illicit Discharge Detection and Elimination

JRBP – James River Basin Partnership

MCM – Minimum Control Measure

MEP – Maximum Extent Practicable

MS4 – Municipal Separate Storm Sewer System

NPDES – National Pollutant Discharge Elimination System

NOV – Notice of Violation

SIC – Standard Industrial Classification

SWMP – Stormwater Management Plan

SWPPP – Stormwater Pollution Prevention Plan

The City – City of Nixa, Missouri

TMDL – Total Maximum Daily Load

CHAPTER 1: INTRODUCTION

The Federal Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. Though the CWA does not deal directly with groundwater or with water quantity issues, the statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters so that they can support the protection of watersheds. To further reduce the adverse effects of stormwater runoff, the U.S. Environmental Protection Agency (EPA) instituted its Stormwater Phase II Final Rule on December 8, 1999.

Phase II Stormwater Program Administration: As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) Permit Program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The Phase II Stormwater Program is part of the EPA's NPDES program, which in Missouri is delegated to the Missouri Department of Natural Recourses (MDNR) to administer. Under this authority, MDNR has issued Phase 1 and Phase II NPDES permits regulating the discharge of stormwater. The City is under the regulations of the MS4 NPDES Phase II Municipal Stormwater Permit issued on Janurarary 15, 2017 which will remain in effect until September 30, 2021.

Phase II Stormwater Program Regulations: The City of Nixa's Municipal Separate Storm Sewer System (MS4) is a system that discharges stormwater runoff to surface water, or waters of the State or United States. Phase II regulates discharges from small MS4s located in "urbanized areas" (as delineated by the Census Bureau in the most recent census). Phase II also regulates construction activities that disturb one (1) or more acres of land.

The Role of Illicit Discharges Detection and Elimination (IDDE) in Phase II Stormwater: To comply with the regulation of the NPDES Phase II permit, the City must, within their StormWater Management Plan (SWMP) develop, implement, and enforce an IDDE program that is designed to reduce the discharge of pollutants to the maximum extent practicable;

To protect water quality, and satisfy the applicable water quality requirements of the NPDES/MS4 General Operating Permit.

The EPA's Stormwater Phase II Final Rule states that this SWMP must include the following six Minimum Control Measures (MCMs):

- Public education and outreach on stormwater impacts,
- Public involvement and participation,
- **Illicit Discharge Detection and Elimination (IDDE),**
- Construction site stormwater runoff control,
- Post-construction stormwater management in new development and redevelopment, and
- Pollution prevention and good housekeeping for municipal operations.

Phase II Stormwater Education: As reflected above, the City, through the successful implementation of the six minimum control measures, has and will continue to provide stormwater education, including IDDE, to City employees, residents, civic groups, owner/operator of Commercial/Industrial facilities as well as the general public.

CHAPTER 2: IDDE PROGRAM OUTLINE

2.1 IMPORTANT TERMINOLOGY

Storm Drain:

A "Storm Drain" System or storm sewer system is designed to drain excess rain and ground water from impervious surfaces such as paved streets, parking lots, driveways and roofs. Normally consists of pipes, junction boxes, inlet boxes, basins, ditches, and open channels used to transport stormwater. The terminology "Storm Sewer" which has been in general use for many years, appears to gradually be changing to "Storm Drain" to help differentiate between sanitary sewers and storm sewers. Throughout the rest of this document the term "Storm Drain" will be utilized in place of "Storm Sewer". From a regulatory standpoint, "Major" storm drains are defined as enclosed storm drain pipes with a diameter of 36 inches, or greater or open channels that drain more than 50 acres. For industrial land uses, major drains are defined as enclosed storm drain pipes 12 inches or greater in diameter and open channels that drain more than two acres. "Minor" storm drains are smaller than these thresholds. Both major and minor storm drains can be a source of illicit discharges, and both merit investigation.

Stormwater:

"Stormwater" is water that originates during precipitation events and snow/ice melt. Stormwater can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up (un-treated) in nearby streams, rivers, or other water bodies.

Surface Water:

"Surface water" is water that collects on the surface of the ground, the top layer of a body of water.

Watershed:

A "Watershed" is an area or ridge of land that separates waters flowing to different rivers, basins, or other body of water.

Waters of the State:

"Waters of the State" refers to all rivers, streams, lakes, and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased, or otherwise controlled by a single person or by two or more persons jointly or as tenants in common and includes waters of the United States lying within the state. (Section 644.016) http://www.moga.missouri.gov/statutes/C600-699/6440000016.HTM

Waters of the United States:

The definition of "waters of the United States" currently in effect is the definition promulgated in 1986/1988, implemented consistent with subsequent Supreme Court decisions and guidance documents. The 2015 revised regulatory definition of "waters of the United States" has been stayed by the U.S. Court of Appeals for the Sixth Circuit. In response to this stay, EPA, Department of Army, and the Army Corps of Engineers resumed nationwide use of the agencies' prior regulations defining the term "waters of the United States." On February 28, 2017, the President of the United States issued an Executive Order directing EPA and Department of the Army to review and rescind or revise the 2015 Rule.

Illicit Discharge:

1. The term "illicit discharge" is defined in the MDNR Phase II Stormwater regulations as "any discharge to a municipal separate storm sewer system (MS4) that is not composed entirely of stormwater, except discharges resulting from fire-fighting activities."

2. Each illicit discharge has a unique frequency, composition and mode of entry in the storm drain system.

3. Illicit discharges are frequently caused when the sanitary sewage system interacts with the storm drain system. A variety of monitoring techniques may be used to locate and eliminate illegal sewage connections. These techniques are intended to trace sewage flows from the stream or outfall, back up the pipes or conveyances to reach the problem connection, discharge or dumping.

4. Illicit discharges of other pollutants are produced from specific source areas and operations known as "generating sites." Knowledge about these generating sites can be helpful to locate and prevent non-sewage illicit discharges.

Depending on the regulatory status of specific generating sites, education, enforcement and other pollution prevention techniques can be used to manage this class of illicit discharges.

Discharge Flow Types:

Dry weather discharges are composed of one or more possible flow types.

1. *Sewage and septic flows* are produced from sewer pipes and septic systems.

2. *Washwater* f*lows* are generated from a wide variety of activities and operations. Examples include discharges of gray water (laundry) from homes, commercial carwash wastewater, fleet washing, commercial laundry wastewater, and floor washing to shop drains.

3. *Liquid wastes* refers to a wide variety of flows, such as oil, paint, and process water (radiator flushing water, plating bath wastewater, etc.) that enter the storm drain system.

4. *Tap water flows* are derived from leaks and losses that occur during the distribution of drinking water in the water supply system.

5. *Landscape irrigation flows* occur when excess potable water used for residential or commercial irrigation ends up in the storm drain system.

6. *Groundwater and spring water flows* occur when the local water table rises above the bottom elevation of the storm drain (known as the invert) and enters the storm drain either through cracks and joints, or where open channels or pipes associated with the MS4 may intercept seeps and springs.

Discharge Categories:

Illicit Discharges can be separated into three (3) categories based on frequency of discharge:

1. *Transitory Illicit Discharge:* These are typically a one-time event. They can result from spills, dumping, and line breaks. These types of discharges are often the most difficult to investigate and trace back to the source. Methods for reducing this type of discharge are to educate the public on stormwater regulations and illicit discharges; establishment of a "hotline" telephone number for the public to call if any discharges are observed; and education of the community's investigative responses to sources of illicit discharge.

2. *Intermittent Illicit Discharge:* These are typically discharges that occur occasionally. They can occur several hours per day, week or over the course of a year. They can happen as the result of line breaks or cross connections.

3. *Continuous Illicit Discharge:* These direct connections into the MS4 can be from sanitary sewers, cross connections, infrastructure problems with a sanitary sewer system, or malfunctioning household sewage treatment systems. This type of discharge is the easiest to find, investigate, trace and eliminate from the MS4. These types of discharges also tend to have the greatest impact because of the constant pollutant loading into a water body.

Mode of Entry:

Illicit discharges can be further classified based on how they enter the storm drain system. The mode of entry can either be direct or indirect.

1. "*Direct entry*" means that the discharge is directly connected to the storm drain pipe through a sewage pipe, shop drain, or other kind of pipe. Direct entry usually produces discharges that are continuous or intermittent. Direct entry usually occurs when two different kinds of "plumbing" are improperly connected.

   a. Sewage cross-connections: A sewer pipe that is improperly connected to the storm drain system produces a continuous discharge of raw sewage to the storm drain pipe. Sewage cross-connections can occur in catchments where combined sewers or septic systems are converted to a separate sewer system, and a few pipes get "crossed."

   b. Straight pipe: This term refers to relatively small diameter pipes that intentionally bypass the sanitary connection or septic drain fields, producing a direct discharge into open channels or streams.

   c. Industrial and commercial cross-connections: These occur when a drain pipe is improperly connected to the storm drain system producing a discharge of wash water, process water or other inappropriate flows into the storm drain pipe, i.e. a floor shop drain that is illicitly connected to the storm drain system. Older industrial areas tend to have a high potential for illicit cross-connections.

2. "Indirect entry" means that flows generated outside the storm drain system enter through storm drain inlets or by infiltrating through the joints of the pipe. Generally, indirect modes of entry produce intermittent or transitory discharges, with the exception of groundwater seepage.

The five main modes of indirect entry for discharges include:

a. Groundwater seepage into the storm drain pipe: Seepage frequently occurs in storm drains after long periods of above average rainfall. Seepage discharges can be either continuous or intermittent, depending on the depth of the water table and the season. Groundwater seepage usually consists of relatively clean water that is not an illicit discharge by itself, but can mask other illicit discharges. If storm drains are located close to sanitary sewers, groundwater seepage may intermingle with diluted sewage.

b. Spills that enter the storm drain system at an inlet: These transitory discharges occur when a spill travels across an impervious surface and enters a storm drain inlet. Spills can occur at many industrial, commercial and transport-related sites. A very common example is an oil or gas spill from an accident that then travels across the road into the storm drain system.

c. Dumping a liquid into a storm drain inlet: This type of transitory discharge is created when liquid wastes such as oil, grease, paint, solvents, and various automotive fluids are dumped into the storm drain. Liquid dumping occurs intermittently at sites that improperly dispose of rinse water and wash water during maintenance and cleanup operations. A common example is cleaning deep fryers in the parking lot of fast food operations.

d. Outdoor washing activities that create flow to a storm drain inlet: Outdoor washing may or may not be an illicit discharge, depending on the nature of the generating site that that produces the wash water. For example, hosing off individual sidewalks and driveways may not generate significant flows or pollutant loads. On the other hand, routine washing of fueling areas, outdoor storage areas, and parking lots (power washing), and construction equipment cleanouts may result in unacceptable pollutant loads.

e. Non-target irrigation from landscaping or lawns that reaches the storm drain system: Irrigation can produce intermittent discharges from over-watering or misdirected sprinklers that send tap water over impervious areas.

In some instances, non-target irrigation can produce unacceptable loads of nutrients, organic matter or pesticides. The most common example is a discharge from commercial landscaping areas adjacent to parking lots connected to the storm drain system.

2.2 LAND USE AND POTENTIAL GENERATING SITES (Table 2.2)

Land use can predict the potential for indirect discharges, which are often intermittent or transitory. Many indirect discharges can be identified and prevented using the concept of "generating sites," which are sites where common operations can generate indirect discharges in a community. Both research and program experience indicate that a small subset of generating sites within a broader land use category can produce most of the indirect discharges. Consequently, the density of potential generating sites within a sub-watershed may be a good indicator of the severity of local illicit discharge problems. Some common generating sites within major land use categories are listed in Table 2.2, and described below.

1. Residential Generating Sites: Failing septic systems have historically been the most common residential discharge reported. In addition, residential discharges frequently contained oil, irrigation overflows, swimming pool discharges, and car washing. Many indirect discharges are caused by common residential behaviors and may not be classified as "illicit" even though they can contribute to water quality problems.

2. Commercial Generating Sites: Illicit discharges from commercial sites typical include operations such as outdoor washing; disposal of food wastes; car fueling, repair, and washing; parking lot power washing; and poor dumpster management. It is important to note that not all businesses within a generating category actually produce illicit discharges; generally, only a relatively small fraction do.

Consequently, on-site inspections of individual businesses are needed to confirm whether a property is actually a generating site.

3. Industrial Generating Sites: Industrial sites produce a wide range of flows that can cause illicit discharges. The most common continuous discharges are operations involving the disposal of rinse water, process water, wash water and contaminated, noncontact cooling water. Spills and leaks, ruptured pipes, and leaking underground storage tanks are also a source of indirect discharges.

Industries are classified according to hundreds of different Standard Industrial Classification (SIC) codes. The SIC coding system also includes commercial, institutional and municipal operations. Many industries are required to have storm water pollution prevention and spill response plans under EPA's Industrial Storm Water NPDES Permit Program. *See Figures 2.2 and 2.2.1 copy of list of the industries covered by the NPDES MS4 Stromwater Permit Program within the City.*

4. Institutional Generating Sites: Institutions such as hospitals, corporate campuses, colleges, churches, and cemeteries can be generating sites if routine maintenance practices/operations create discharges from parking lots and other areas. Many large institutional sites have their own areas for fleet maintenance, fueling, outdoor storage, and loading/unloading that can produce indirect discharges.

5. Municipal Generating Sites: Municipal generating sites include operations that handle solid waste, water, wastewater, street and storm drain maintenance, fleet washing, and yard waste disposal. Transport-related areas such as streets and highways, and parking lots can also generate indirect discharges from spills, accidents and dumping.

Table 2.2: Land Uses, Generating Sites Activities That Produce Indirect Discharges		
Land Uses	**Generating Sites**	**Activity That Produces Discharge**
Residential	• Apartments • Multi-Family • Single Family Dwelling	• Car Washing • Driveway Cleaning • Dumps/Spills Equipment Washing (Lawn mowers) • Lawn/landscaping Watering • Septic System Maintenance • Swimming Pool Discharges • Improper Plumbing - Prohibited Discharge
Commercial	• Camp Grounds/RV Parks • Car Dealerships • Car Washes • Commercial Laundrt/Dry Cleaning • Gas Stations/Auto Repair Shops • Home Improvement Stores • Restaurants • Public Swimming Pools	• Building/Parking Lot Maintenance (Power Washing) • Dumps/Spills (automotive fluids) • Landscapeing/Grounds Care • Outdoor Storage of Liquids (use fry oil) • Vehicle Fueling • Vehicle Maintenance/Repair • Vehicle Washing • Pressure Washing of Greasy Equipment and Grease Traps
Industrial	• Auto/Metal re-cyclers • Construction vehicle washing • Distribution centers • Food processing • Trash dumpsters • Marinas (boat and motor repair) • Metal plating operations • Paper and wood products • Petroleum and LPG storage • Printing • Food grade additives (Vinegar)	• All outdoor activities • Processing or rinse water • Loading and unloading area wash downs • Outdoor material storage (liquids/chemicals)
Institutional	• Cemeteries • Churches • Corporate Campus • Major medical facilities • School	• Building Maintenance (pressure washing) • Dumping/Spills • Landscaping/Grounds Care • Parking Lot Maintenance (pressure washing) • Vehicle Washing
Municipal	• Office Facilities (City Hall, Utility Billing, • Parks Department and Police Department. • Public Works Campuses, Infrastructure maintenance: • Water Department - Well sites and distribution system. • Waste Water - Sanitary sewer collection system including lift station sites. • Electric Department - transmission and distribution system including sub-station sites. • Streets: • Stormwater:	• Building Maintenance (pressure washing) • Dumping/Spills • Landscaping/Grounds Care • Outdoor Liquid Storage • Parking Lot Maintenance (pressure washing) • Road Maintenance • Vehicle Fueling • Vehicle Maintenance /Repair • Vehicle Washing • Outdoor Liquid Storage • Outdoor storage of electrical system components (transformers).

SOURCE: Modified from NPDES Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection.

Figure 2.2

Facility Name	Facility ID	Date Issue	Date Expire	REG	REC Stream	M P 92	TRMT	City Name	County Name	FLOW	FAC CODE
ALL STORE MINI STORAGE	MOR109L95	9/23/2005	3/7/2007	SWR	TR FINLEY R		STO R	Nixa	Christian		SIAND
ALLIED BUS SALES INC	MOR80C334	11/1/2002	10/03/2007	SWR	TRIB JAMES R		STO R	Nixa	Christian		PASS
BASS PRO SHOPS FAB DEPT	MOR203161	5/13/2004	3/4/2009	SWR	TRIB JAMES R		STO R	Nixa	Christian		METAL
BENTWATER COMMERCIAL	MOR109R12	4/19/2006	3/7/2007	SWR	SINKHOLE		STO R	Nixa	Christian		SIAND
BENTWATER SUBDIVISION	MOR109263	04/19/2002	03/07/2007	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
BLUEBIRD HILLS PHASE 1	MOR109Y41	04/06/2007	03/07/2012	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
CARNAHAN CORNERS	MOR109R63	05/22/2006	03/07/2007	SWR	AVIN SINK		STO R	Nixa	Christian		SIAND
CARRIAGE CROSSING SUB PH2	MOR105541	6/30/2003	02/07/2007	SWR	TR SPROUT SPR		STO R	Nixa	Christian		SIAND
CASEY GENERAL STORE #2619	MOR109M19	9/26/2005	03/07/2007	SWR	UN TR JAMES R		STO R	Nixa	Christian		SIAND
CASEY'S GENERAL STORE	MOR109M76	10/28/2005	03/07/2007	SWR	UN TR JAMES R		STO R	Nixa	Christian		SIAND
CC -- BUSINESS PARK	MOR109J60	8/5/2006	3/7/2007	SWR	UN TR JAMES R		STO R	Nixa	Christian		SIAND
CC BUSINESS PARK	MOR109A79	07/03/2007	03/07/2012	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
CEDAR HEIGHTS SUBDIVISION	MOR109319	03/30/2007	03/07/2012	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
CHANDLER PLACE	MOR109B79	02/09/2004	03/07/2007	SWR	TRIB SPOUT SPR		STO R	Nixa	Christian		SIAND
CITY OF NIXA - CITY HALL	**MOR109R74**	**05/22/2006**	**3/7/2007**	**SWR**	**SINKHOLE**		**STO R**	**Nixa**	**Christian**		**SLAND**
COPPER LEAF	MOR109H67	02/03/2004	03/07/2007	SWR	TRIB SPOUT SPR		STO R	Nixa	Christian		SIAND
COPPERLEAF APARTMENTS	MOR109109	03/28/2005	03/07/2007	SWR	TRIB SINKHOLE		STO R	Nixa	Christian		SIAND
DAISY FALLS	MOR109B49	01/14/2004	03/07/2007	SWR	TRIB SPRING BR		STO R	Nixa	Christian		SIAND
DAISY FALLS PHASE TWO	MOR109U32	9/1/2006	03/07/2007	SWR	SPOUT SPRING H		STO R	Nixa	Christian		SIAND
DALLAS TRAILS	MOR109191	03/27/2007	3/7/2012	SWR	TRIB SPOUT SPR		STO R	Nixa	Christian		SIAND
DIVERSIFIED PLASTICS CORP	MOR2310017	10/12/2005	09/22/2010	SWR	SPOUT CR FINLE		STO R	Nixa	Christian		SIAND
DOGWOOD ESTATES	MOR109N34	12/02/2005	03/07/2007	SWR	UN TRIB JAMES		STO R	Nixa	Christian		SIAND
EAGLEWOOD APARTMENTS	MOR103270	5/3/2002	02/07/2007	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
ELITE STORAGE	MOR109V93	4/26/2007	03/07/2012	SWR	SINKHOLE		STO R	Nixa	Christian		SIAND
FAIR HAVEN ESTATES SUBDIV	MOR103587	04/19/2002	02/07/2007	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
FAIR HAVEN ESTATES/IV	MOR109M61	10/27/2005	03/07/2007	SWR	UN TR JAMES R		STO R	Nixa	Christian		SIAND
FLEISCHMANN'S VINEGAR CO	MO041483	10/19/2006	10/18/2011	SWR	TRIB FINLEY CR		COL W	Nixa	Christian	0.394	INDUS.
GARDEN ADVENTURES NURSERY	MOR109V45	11/09/2006	03/07/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
GLEN OAKS ESTATES	MOR103189	4/19/2002	02/07/2007	SWR	JAMES RV		STO R	Nixa	Christian		SIAND
GREAT SOUTHERN SUBD	MOR109353	02/19/2003	03/07/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
HIGHWAY CC BUSINESS PARK	MOR109T85	8/22/2006	03/07/2007	SWR	SINKHOLE		STO R	Nixa	Christian		SIAND
HMI FIREPLACE SHOPS	MOR109T19	07/31/2006	03/07/2007	SWR	AVEN SINK HOLE		STO R	Nixa	Christian		SIAND
JACK'S PLACE	MOR109D21	07/01/2004	03/07/2007	SWR	TRIB FINLEY CR		STO R	Nixa	Christian		SIAND
JACK'S PLACE 1ST ADDITION	MOR109E96	9/20/2004	03/07/2007	SWR	TRIB FINLEY CR			Nixa	Christian		SIAND
KEDGPETH ESTATES 4TH ADDI	MOR109924	04/21/2003	03/07/2007	SWR	TRIB FINLEY CR		STO R	Nixa	Christian		SIAND
KIDS INVESTMENST, LLC	MOR109T96	08/22/2006	03/07/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
LOT 2 CASEY'S ADDITION	MOR109V27	10/02/2006	3/7/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
MAPLEWOOD HILLS	MOR109598	12/13/2002	03/07/2007	SWR	TRIB FINLEY RI		STO R	Nixa	Christian		SIAND
NEW OFFICE BUILDING WAREH	MOR109P57	02/15/2006	03/07/2007	SWR	JAMES RIVER		STO R	Nixa	Christian		SIAND
NIXA INDUSTRIAL PK-4TH AD	MOR109235	08/23/2002	03/07/2007	SWR	TRIB JAMES R		STO R	Nixa	Christian		SIAND
NIXA K-4 ELEMENTARY SCHOO	MOR109R92	03/30/2007	03/07/2012	SWR	UN TRIB JAMES		STO R	Nixa	Christian		SIAND
NIXA NW GRAVITY SEWER	MOR109W03	09/29/2006	03/07/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
NIXA WWTF	**MO0028037**	**06/25/2004**	**6/24/2009**	**SWR**	**FINLEY CR**	**YY $**	**SET B**	**Nixa**	**Christian**	**1.846**	**POTW**
NIXA, CITY OF SMALL MS4	**MOR040067**	**5/18/2007**	**3/9/2008**	**SWR**	**TRIB JAMES RIV**		**STO R**	**Nixa**	**Christian**		**MS4**
OFFICE / WAREHOUSE	MOR109V46	11/9/2006	3/7/2007	SWR	TRIB JAMES RIV		STO R	Nixa	Christian		SIAND
OZARK SUPPLY LINE -NATURA	MOR109T41	03/30/2007	03/07/2012	SWR	UN TR JAMES R		STO R	Nixa	Christian		SIAND

Figure 2.2.1

PARK HILL PLACE	MOR109A83	10/27/2003	03/07/2007	SWR	TRIB FINLEY CR		STOR	Nixa	Christian			SLAND
PARKMORE HEIGHTS #4	MOR103729	12/30/1999	01/02/2002	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			CONST.
PEOPLE'S BANK	MOR109930	4/25/2003	3/7/2007	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			SLAND
PROGRESSIVE PROPERTIES	MOR109W12	11/27/2006	03/07/2007	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			SLAND
RADER SUBDIVISION	MOR109349	03/27/2007	3/7/2012	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian		VARIES	SLAND
RETAIL CENTER SHELL	MOR109T81	08/16/2006	03/07/2007	SWR	UN R AVIN SINK		STOR	Nixa	Christian			SLAND
RICHMOND PHASE I & II	MOR109S02	04/09/2007	3/7/2012	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian			SLAND
ROLLING HILLS SUBDIVISION	MOR104636	03/22/2002	02/07/2007	SWR	TRIB TO JAMES		STOR	Nixa	Christian			SLAND
SACKETT PARK SUBDIVISION	MOR109C97	06/22/2004	03/07/2007	SWR	TRIB AVIN SINK		STOR	Nixa	Christian			SLAND
SOUTH HAVEN EST 2ND ADDIT	MOR109882	03/18/2003	3/7/2007	SWR	TR MCCAFFERTY		STOR	Nixa	Christian			SLAND
SOUTHERNWOOD APARTMENTS	MOR109F31	10/08/2004	03/07/2007	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			APART
SPRING MANOR - PHASE 5	MOR109G13	11/17/2004	03/07/2007	SWR	TRIB FINLEY CR		STOR	Nixa	Christian			SLAND
SPRINGFIELD ALUMINUM CO.	MOR203228	5/13/2004	3/4/2009	SWR	UNNAMED TRIB		STOR	Nixa	Christian			METAL
SPRINGFIELD SUPPLY	MOR109P25	02/02/2006	3/7/2007	SWR	FINLEY CR		STOR	Nixa	Christian			SLAND
SPRINGS SUBDIVISION	MOR109772	09/20/2002	03/07/2007	SWR	TRIB FINLEY CR		STOR	Nixa	Christian			SLAND
ST. JOHN'S - NIXA CLINIC	MOR109A79	10/10/2003	03/07/2007	SWR	TRIB TO UNNAME		STOR	Nixa	Christian			SLAND
STINEROCK HILL PHASE 1	MOR109AP0	07/26/2007	03/07/2012	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian			SLAND
STINEROCK HILL REGIONAL W	MOR109U11	08/23/2006	03/07/2007	SWR	SPROUT SPRNG		STOR	Nixa	Christian			SLAND
SUNRISE CANYON	MOR109Y38	04/12/2007	3/7/2012	SWR	TRIB FINELY RI		STOR	Nixa	Christian			SLAND
THE COLUMNS AT CENTURY PA	MOR109G89	3/11/2005	03/07/2007	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian			SLAND
THE COLUMNS AT CENTURY PA	MOR109S15	06/14/2006	03/07/2007	SWR	UN TRIB FINALE		STOR	Nixa	Christian			SLAND
THE PINES	MOR109U08	05/14/2007	03/07/2012	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian			SLAND
THE TERRACES AT COPPER LE	MOR109U69	5/31/2007	03/07/2012	SWR	UN TR JAMES R		STOR	Nixa	Christian			SLAND
TIFFANY HIGHLANDS	MOR109102	03/27/2007	3/7/2012	SWR	TRIB SPOUT SPR		STOR	Nixa	Christian			SLAND
TIM WILSON WAREHOUSE	MOR109U04	08/30/2006	02/07/2007	SWR	UN TR AVIN SIN		STOR	Nixa	Christian			SLAND
VILLAGE AT WICKLOW	MOR109B09	11/13/2003	3/7/2007	SWR	TRIB TO JAMES		STOR	Nixa	Christian			SLAND
WALNUT CREEK MANOR	MOR109Y73	4/26/2007	03/07/2012	SWR	TRIB FINLEY CK		STOR	Nixa	Christian			SLAND
WASSON PLACE	MOR109101	03/21/2007	3/7/2012	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			SLAND
WELLINGTON PARK	MOR103732	09/06/2002	02/07/2007	SWR	TRIB JAMES RIV		STOR	Nixa	Christian			SLAND
WOODFIELD SUBDIVISION	MOR109A04	08/22/2003	03/07/2007	SWR	TRIB FINLEY CR		STOR	Nixa	Christian			SLAND
14 PARK PLACE PH III	MOR109K04	07/05/2005	03/07/2007	SWR	UN TR FINLEY C		STOR	Nixa	Christian			SLAND
14 PARK PLACE PHASE IV	MOR109Q17	03/03/2006	3/7/2007	SWR	UN TRIB FINLEY		STOR	Nixa	Christian			SLAND

2.3 FINDING, FIXING, AND PREVENTING ILLICIT DISCHARGES.

The purpose of an IDDE program is to find, fix and prevent illicit discharges, and a series of techniques exist to meet these objectives. The remainder of the manual describes the major tools used to build a local IDDE program, but they are briefly introduced below:

1. Locate Problem Areas: Priority areas need to be identified for detailed screening of the system based on the likelihood of illicit connections (e.g., areas with older sanitary sewer lines). Methods that can locate problem areas include: visual screening; water sampling from manholes and outfalls during dry weather; the use of infrared and thermal photography, cross-training field staff to detect illicit discharges, and public complaints.

Monitoring can sometimes pick up other types of illicit discharge that occur on a continuous or intermittent basis (e.g., wash water and liquid wastes). Monitoring techniques are classified into three major groups:

- Outfall Reconnaissance / Inventory
- Indicator Monitoring at Storm Water Outfalls and In-stream
- Tracking Discharges to their Source

2. Find the Source: Once a problem area or discharge is found, additional efforts usually are necessary to determine the source of the problem. Methods that can find the source of the illicit discharge include: dye-testing buildings in problem areas; dye- or smoke-testing buildings; tracing the discharge upstream in the storm sewer; employing a certification program that shows that buildings have been checked for illicit connections; implementing an inspection program of existing septic systems; and using video to inspect the storm sewers.

3. *Remove/Correct Illicit Connections*: Once the source is the offending discharger is identified, that party will be notified and directed to correct the problem. Attempts to educated the offender and work with them to resolve the problem a thorough and timely manner will be the first step, before taking legal action.

Once all amicable avenues have been exhausted and the situation has still not been resolved, then the next step would be to take legal action i.e. citation for ordinance violation.

4. Preventing Illicit Discharges: The old adage "an ounce of prevention is worth a pound of cure" certainly applies to illicit discharges. Transitory discharges from generating sites can be minimized through pollution prevention practices and well-executed spill management and response plans. *See addendum MCM #6-3 copy of the City's Spill Prevention and General Response program.*

5. Document Actions Taken: All actions taken under the plan should be documented. This illustrates that progress is being made to eliminate illicit connections and discharges. Documented actions will be included in annual reports and include information such as: the number of outfalls screened; any complaints received and corrected; the number of discharges and quantities of flow eliminated; and the number of dye or smoke tests conducted.

2.4 NON-STORMWATER DISCHARGES:

According to the MDNR Phase II Stormwater regulations, an IDDE program needs only address the following categories of non-stormwater discharges **if** the operator of a small MS4 (i.e., City of Nixa) identifies them as significant contributors of pollutants to the MS4 (**which the City of Nixa does not**):

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising groundwater
- Uncontaminated groundwater Infiltration
- Street sweeper wash water
- Foundation drains
- Flows from riparian habitats and wetlands
- Air conditioning condensation
- Irrigation return flow
- Springs
- Water from sump pumps (crawl space)
- Footing drains
- Dechlorinated swimming pool discharges
- Individual residential car washing
- Lawn watering
- Uncontaminated pumped groundwater

CHAPTER 3: MUNICIPAL STORM DRAIN SYSTEM MAPPING

3.1 CURRENT PROGRAM

The City currently has the following stormwater-related information in the GIS database:

* Storm Drain System
* Catch basins and manholes
* Ditches/Trickle Channels
* Streams (watercourses)
* Outfalls
* Inlet/Outlet pipes

In 2012, the City of Nixa's Public Works Inspector, along with City's GIS Technician, began the development of a stormwater GIS System to address the MS4 Phase II mapping requirements. This GPS/GIS system is maintained and updated by the GIS Technician. The City has work diligently over the past 5 years to create the data base and map. The City will continue to update this data base and map as new features are expanded, added and constructed.

3.2 MAPPING

Field Data Collection

1. A map of all structural BMPs owned, operated, or maintained by the City. Global Positioning System (GPS) is used to obtain the coordinates (longitude and latitude) and other specific individual identifying information for every aspect of the storm drain system including; inlet/outlet pipes (size and material) basins (area), trickle channels (length and width, material), inlet boxes (curb, area and grated), etc., to compile and update this map. *See addendum MCM #3-8 A copy of the City's Entire MS4 Storm Drain System map, also denoting outfalls, sinkholes and receiving waters; Figure 3.2 copy of the same map.*

2. For pipe outfalls 24-inch-diameter pipes and watercourse outfalls, a map with the following attributes for each outfall, tributary conveyances (type, material, and size where known), associated drainage areas and land use.

Although most of the watercourses and pipes have a cross-sectional area less than a 24-inch-diameter pipe, the City has elected to map the entire storm drain system and all known features.

As-Built Data Collection

1. As-built drawings provide location as well as feature information in a concise manner. Currently, the City of Nixa requires that as-builts be submitted for all new developments, including drainage infrastructure. Electronic information is submitted to the City's GIS Department, which is used to update the storm drain GIS System. This allows the City to maintain a mapping system that contains an accurate, current, and reliable source of information for the entire storm drain system, even underground features.

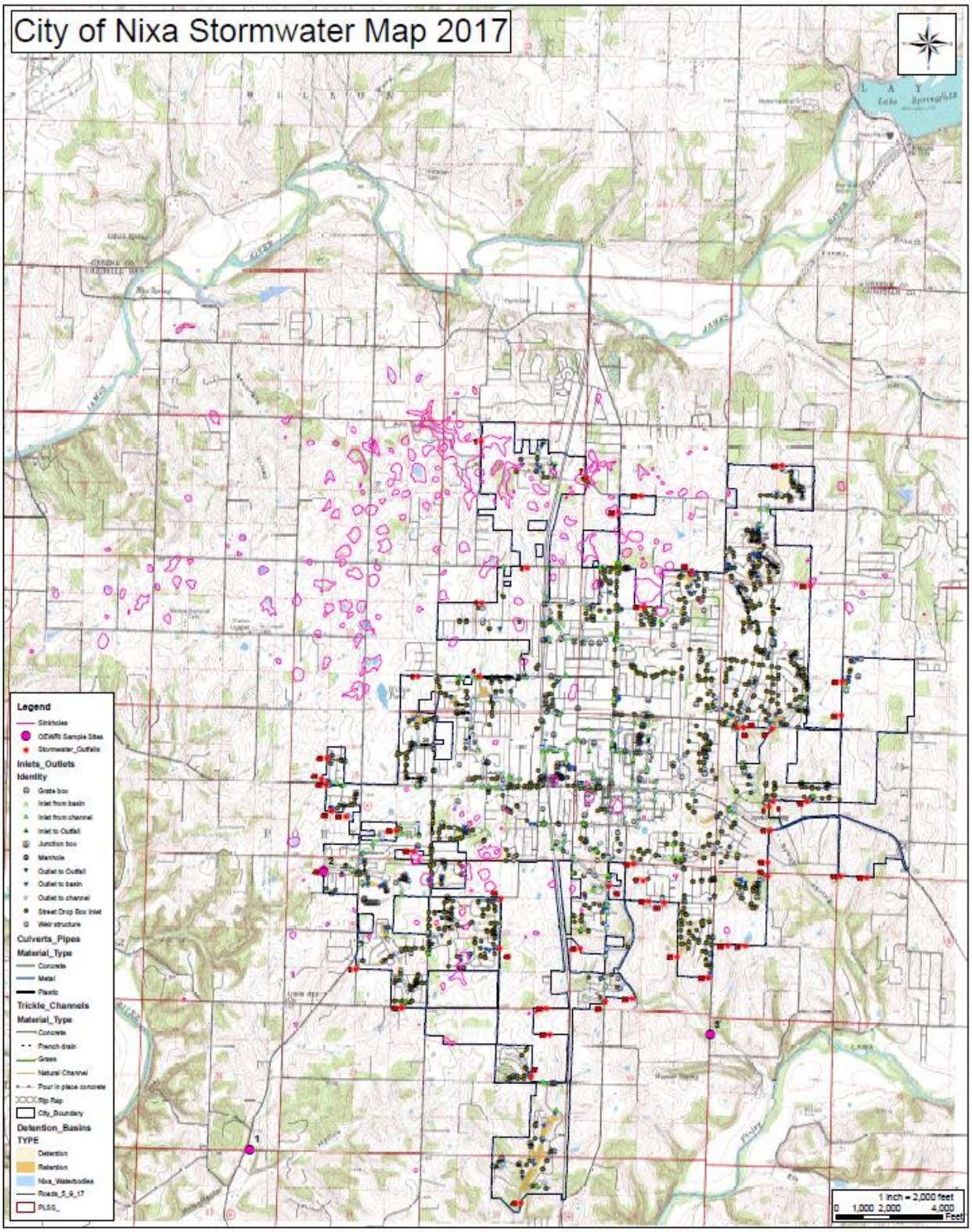
3.3 OUTFALL(s)

The paragraph below is an excerpt from EPA's Stormwater Phase II Final Rule (USEPA, 1999): The term *"outfall"* is defined in 40 CFR 122.26(b)(9) as *"a point source at the point where a municipal separate storm sewer discharges to waters of the United States."* The City of Nixa has taken this definition one step further to include all points where the stormwater leaves our MS4 jurisdiction and is deposited on to another MS4 jurisdiction be it a pipe, concrete ditch, detention/retention basin or open natural ditch line.

The term "Municipal Separate Storm Sewer" is defined at 40 CFR 122.26(b)(8) as "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains)."

Following the logic of these definitions, a "ditch" may be part of the municipal separate storm sewer system, and at the point where the ditch discharges to waters of the United States (State), it is an outfall. As with any determination about jurisdictional provisions of the CWA, however, final decisions require case-specific evaluations of fact.

Figure 3.2


City of Nixa Stormwater Map 2017
Legend
Sinkholes
OEWRI Sample Sites
Stormwater_Outfalls
Inlets_Outlets
Identity
Grate box
Inlet from basin
Inlet from channel
Inlet to Outfall
Junction box
Manhole
Outlet to Outfall
Outlet to basin
Outlet to channel
Street Drop Box Inlet
Weir structure
Culverts_Pipes
Material_Type
Concrete
Metal
Plastic
Trickle_Channels
Material_Type
Concrete
French drain
Grass
Natural Channel
Pour in place concrete
Rip Rap
City_Boundary
Detention_Basins
TYPE
Detention
Retention
Nixa_Waterbodies
Roads_5_9_17
PLSS_
1 inch = 2,000 feet
0 1,000 2,000 4,000
Feet

CHAPTER 4 – PROHIBITING ILLICIT DISCHARGES

ILLICIT DISCHARGE ORDINANCE

4.1 CURRENT ORDINANCE

Section 121 of the City's Land Disturbance, Illicit Discharge and Erosion Control ordinance prohibits illicit discharges. *See addendum MCM #3-1 copy of the Land Disturbance, Illicit Discharge and Erosion Control ordinance.*

4.2 RECOMMENDATIONs

As the MDNR's guidance specifies, a municipal ordinance or other regulatory mechanism created to comply with Phase II regulations must include a *prohibition* of illicit discharges and an enforcement mechanism. It is essential for the City to establish legal authority to inspect properties suspected of releasing contaminated discharges into the MS4. This authority was established when the stormwater ordinance was adopted in 2009. However, it may be necessary to draft and implement a standalone IDDE ordinance to fully address every aspect of this IDDE manual.

The City of Nixa has taken into account the legal authority granted to it under state law (as a home-rule municipality), the Phase II Permit requirements in the State of Missouri, the enforcement methods the City deems appropriate, and any other locality-specific considerations. Consequently, the City is able to prohibit illicit discharges to our MS4, as well as enforce the elimination and mitigation of any illicit discharges that may occur, through the following legal regulatory mechanism:

Section 121 DISCHARGE PROHIBITIONS of the City's Land Disturbance, Illicit Discharge & Erosion Control ordinance.

Each day a violation of this Chapter continues shall constitute a separate offense. The City's Public Works Inspectors are authorized according to the Stormwater ordinance to inspect and examine any public or private property in the City for the purpose of ascertaining the nature and existence of any stormwater pollutant.

4.3 PROHIBITED MS4 DISCHARGES

The following are considered to be illicit (illegal) discharges to the City of Nixa's MS4 (this list is not considered all inclusive):

Sanitary wastewater sources such as:

- Sanitary wastewater (usually untreated) from improper sewerage connections, exfiltration or leakage;
- Effluent from improperly operating or improperly designed septic tanks; and
- Overflows of sanitary sewer systems (e.g., manholes).

Automobile maintenance and operation sources such as:

- Untreated (e.g., not captured through a well maintained oil/water separator) commercial car wash wastewaters;
- Untreated radiator flushing wastewaters;
- Untreated engine degreasing wastes;
- Improper oil, gasoline, and other automotive fluids disposal;
- Leaky underground storage tanks; and
- Untreated leaking of oils, gasoline and other automotive fluids for automobiles.

Landscape irrigation sources such as:

- Direct spraying of fertilizers, pesticides or herbicides onto impervious surfaces; and
- Over-application of fertilizers, pesticides or herbicides onto landscaping.

Other sources such as:

- Laundry wastes;
- Metal plating baths;
- Dewatering of construction sites;
- Washing of concrete ready-mix trucks;
- Contaminated sump pump discharges;
- Improper disposal of household toxic wastes;
- Spills from roadway and other accidents;
- Chemicals, hazardous materials, garbage, and sanitary sludge landfills and disposal sites;
- Commercial use of soaps and detergents; use in cleaning pavement, vehicles and equipment;
- Sediment from lack of or improper maintenance of erosion and sedimentation controls;
- Latex/oil-based paints & solvents;
- Trash and debris: littering and dumping, household or construction waste; and
- Restaurant grease: Improper disposal or spillage.

CHAPTER 5 – PREVENTING ILLICIT DISCHARGES

5.1 PURPOSE

This program component identifies key behaviors of neighborhoods, generating sites, and municipal operations that produce intermittent and transitory discharges. These key "discharge behaviors" are then targeted for improved pollution prevention practices that can prevent or reduce the risk of discharge. The City may then apply a wide range of education and enforcement tools to promote the desired pollution prevention practices.

The intent is to identify the major behaviors that generate intermittent and transitory discharges, once that occurs, specific discharge behaviors and generating sites will be targeted for education and enforcement efforts.

5.2 DESIRED RESULTS AND OR OUTCOME(S)

The desired outcome is a mix of prevention programs that target the most common intermittent and transitory discharges in the community. The City will develop targeted pollution prevention programs for three sectors of the community:

- *Neighborhood Discharges.* The pollution prevention practices related to discharge prevention in residential neighborhoods include storm drain stenciling, lawn care, septic system maintenance, vehicle fluid changing, car washing, household hazardous waste disposal and swimming pool draining. *See MCM #2 Public Involvement and Participation for additional information.*

- *Generating Sites.* This group of pollution prevention practices can reduce spills and transitory discharges generated during common business operations. Practices include business outreach, spill prevention and response plans, employee training and site inspections.

• *Municipal Housekeeping.* This group of pollution prevention practices is performed during municipal operations, such as sewer and storm drain maintenance, plumbing code revision, and provision of household hazardous waste and used oil collection services. *See MCM #6 Pollution Prevention/Good Housekeeping for Municipal Operations for additional Information.*

5.3 OVERVIEW OF PREVENTING ILLICIT DISCHARGES

Intermittent and transitory discharges are difficult to detect through outfall screening or indicator monitoring. The best way to manage these discharges is likely to promote pollution prevention practices in the community that prevent them from occurring. This discharge prevention message is will be tied to the storm water education programs required under the City's SWMP as:

- Public Education and Outreach
- Public Participation/Involvement
- Municipal Pollution Prevention/Good Housekeeping

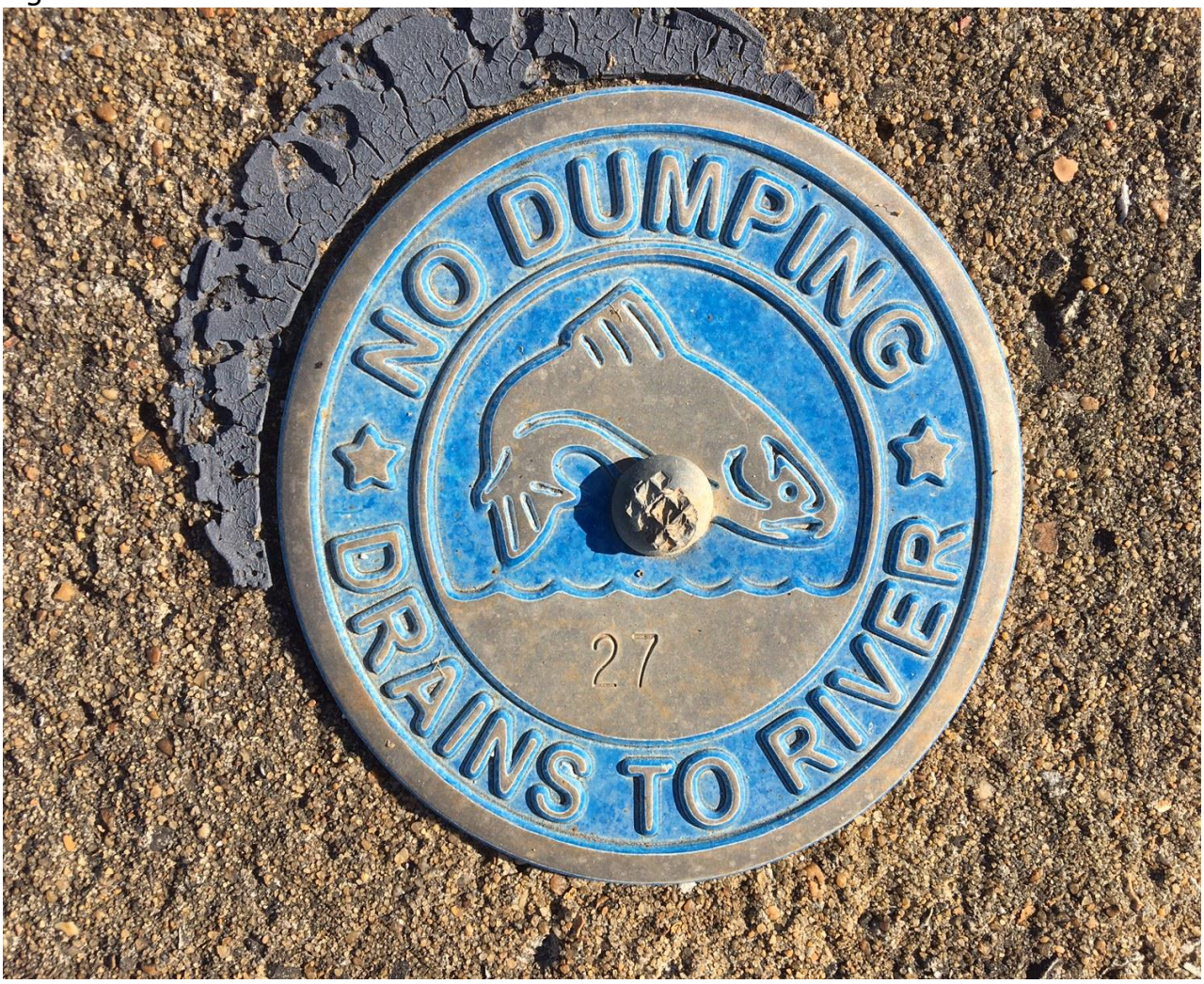
5.4 PREVENTING ILLICIT DISCHARGES FROM NEIGHBORHOODS

Many common neighborhood behaviors can cause transitory discharges that are seldom defined or regulated as illicit discharges by most communities. Individually, these behaviors cause relatively small discharges, but collectively, they can produce significant pollutant loads. The City will use outreach and education to promote pollution prevention practices. Some of the more effective practices to influence these behaviors are described in this section:

- Storm drain stenciling
- Septic system maintenance
- Vehicle fluid changing
- Car washing
- Household hazardous waste storage and disposal
- Swimming pool draining

Storm Drain Stenciling: Storm drain stenciling and/or medallion application sends a clear message to keep trash and debris, leaf litter, and pollutants out of the storm drain system, and may deter illegal dumping and discharges. Stenciling may increase watershed awareness and neighborhood stewardship and can be used in any neighborhood with enclosed storm drains. Stenciling is an excellent way to involve the public, and just a few trained volunteers can systematically stencil all the storm drains within a neighborhood in a short time. Volunteers can be recruited from scouting, community service, and watershed organizations, or from high schools and neighborhood associations. (Figure 5.4.1) *See MCM #2 Public Involvement and Participation for additional information.*

Figure 5.4.1



Septic System Maintenance: Though there are not many septic systems left in the City, it only takes one to fail to have a large impact on our storm drain system. Failing septic systems can be a major source of bacteria, nitrogen, and phosphorus. According to U.S. EPA (2002), more than half of all existing septic systems are more than 30 years old, which is well past their design life. The same study estimates that about 10% of all septic systems are not functioning properly at any given time. Septic systems are a classic case of out of sight and out of mind. Many owners take their septic systems for granted, until they back up or break out on the surface of their lawn. Subsurface failures, which are the most common, go unnoticed. In addition, inspections, pump outs, and repairs can be costly, so many homeowners tend to put off the expense until there is a real problem. (Figure 5.4.2)

Lastly, many septic system owners are not aware of the link between septic systems and water quality. The City can employ a few tools to improve septic system maintenance. These may include:

- Media campaigns and conventional outreach materials to increase awareness about septic system maintenance and water quality (e.g., billboards, radio, newspapers, brochures, bill inserts, and newsletters)
- Mandatory inspections
- Performance certification upon property transfer

Figure 5.4.2

Vehicle Fluid Changing: Dumping of automotive fluids into storm drains can cause major water quality problems, since only a few quarts of oil or a few gallons of antifreeze can severely degrade a small stream. Dumping delivers hydrocarbons, oil and grease, metals, xylene and other pollutants to streams, which can be toxic during dry-weather conditions when existing flow cannot dilute these discharges.

The major culprit has been the backyard mechanic who changes his or her own automotive fluids (Figure 5.4.3). The City will utilize a range of tools to prevent illegal dumping of car fluids, including:

- Outreach materials distributed at auto parts store and service stations
- Community oil recycling centers
- Directories of used oil collection stations
- Free or discounted oil disposal containers
- Pollution hotlines
- Fines and other enforcement actions

Figure 5.4.3

Car Washing: Car washing is a common neighborhood behavior that can produce transitory discharges of sediment, nutrients and other pollutants to the curb, and ultimately the storm drain. (Figure 5.4.4) The City may utilize many innovative outreach tools to promote environmentally safe car washing, including:

- Media campaigns
- Brochures promoting nozzles with shut off valves
- Storm drain plug and wet-vac provisions for charity car wash events
- Utility bill inserts promoting environmentally safe car washing products
- Discounted tickets for use at commercial car washes

Figure 5.4.4

Household Hazardous Waste Storage and Disposal: The average garage contains a lot of products that are classified as hazardous wastes, including paints, stains, solvents, used motor oil, pesticides and cleaning products. While some household hazardous waste (HHW) are on occasion dumped into storm drains, most enters the storm drain system as a result of outdoor rinsing and cleanup. Improper disposal of HHW can result in acute toxicity to downstream aquatic life. The desired neighborhood behavior is to participate in HHW collection days, and to use appropriate pollution prevention techniques when conducting rinsing, cleaning and fueling operations. *See addendum MCM #2-6 a copy of brochure on where and how to dispose of HHW.*

Convenience and awareness appear to be the critical factors in getting residents to participate in household hazardous waste collection programs. The City may utilize a variety of techniques to promote and expand HHW collection, including:

- Mass media campaigns to educate residents about proper outdoor cleaning/rinsing techniques
- Conventional outreach materials notifying residents about HHW and collection days
- More frequent HHW collection days
- Providing curbside disposal options for some HHW
- Establishing permanent collection facilities at solid waste facilities
- Providing mobile HHW pickup
- Waiving disposal fees at landfills

Swimming Pool Draining: Routine and end-of-season maintenance tasks for aboveground or in-ground pools can cause the discharge of chlorinated water or filter back flush water into the storm drain system or the stream. The ideal practice is to discharge chlorinated pool water into the sanitary sewer system, or hold it until chlorine and temperature levels are acceptable to permit spreading it over a suitable pervious surface.

Most pool owners understand that regular maintenance is essential to keep pools safe and clean, and they may be more receptive to changing discharge behaviors with proper education. Effective outreach methods that the City may use includes:

- Conventional outreach techniques on proper discharge (pamphlets, utility bill inserts, posters)

- Educational information at the retail outlets selling pool chemicals

- Changes in local plumbing codes to require discharge to sanitary sewer systems

5.5 PREVENTING ILLICIT DISCHARGES FROM GENERATING SITES

Many indirect discharges can be identified and prevented using the concept of generating sites, which are a small subset of commercial, industrial, institutional, municipal and transport-related operations that have the greatest risk of generating indirect discharges. The City has become intimately familiar with these types of generating sites, particularly those regulated by industrial NPDES storm water permits.

Some of the more common operations that generate spills and transitory discharges are profiled in Table 5.5. The City considers all non-stormwater discharges from generating sites to be illicit, and will take a more regulatory approach. Consequently, pollution prevention practices are more prescriptive, and are frequently incorporated into a pollution prevention plan for a facility or operation. The City may utilize a broad array of tools to promote effective pollution prevention practices at generating sites including:

- Business outreach and education

- Spill prevention and response planning

- Employee training

- Site inspections

Spill Prevention and Response: A spill prevention and response plan is useful for any potential generating site, and is mandatory for any operation that uses, generates, produces, or transports hazardous materials, petroleum products or fertilizers. In addition, all industrial sites regulated by individual or group NPDES stormwater permits must have an updated spill prevention and response plan on its premises. *See addendum MCM #6-3 a "DRAFT" copy of the City's Spill Prevention and General Response Plan.*

Spill prevention and response plans describe the operational procedures to reduce the risks of spills and accidental discharge and ensure that proper controls are in place in the event they do occur. Spill prevention plans standardize everyday procedures and rely on employee training to reduce potential liability, fines and costs associated with clean up. Planning begins with an analysis of how pollutants are handled at the site and how they interact with storm water. The City will incorporate, within the annual site inspection criteria, requirements of a spill prevention plan at all facilities (commercial/industrial) within the City limits having an active NDPES MS4 Stormwater permit. Spill prevention and response plans have five major components:

1. A site map and evaluation of past spills and leaks
2. An inventory of materials at the site
3. Identification of potential spill areas
4. A list of required spill response equipment
5. Employee training

These spill prevention and response plans should clearly contain the following aspects:

- Identify potential spill sites and their drainage points
- Specify material handling procedures
- Describe spill response procedures
- Ensure that adequate spill clean-up equipment is available

Employee Training: Effective and repeated employee training on the pollution prevention plan is essential to maintain pollution prevention practices at generating sites, particularly at generating sites where the work force turns over frequently. The City will explore the idea of providing basic Stormwater pollution prevention training on site to help fray the cost of this training to the business'. This training may be offered for employees or supervisors that are scheduled for down times of the year, or coincide with regular employee safety meetings. *See MCM #6, BMP #2 City of Nixa Employee Stormwwater Operation & Maintenance (O & M) Plan Committee for additional information.*

Site Inspections: Regular inspections of generating sites are a key tool to foster pollution prevention and reduce the risk of illicit discharges. The City possess authority to, and conducts inspections of non-regulated sites that connect to the municipal storm drain system. *See MCM #3, BMP #5 IDDE Onsite Annual Inspections of: Commercial and Industrial Properties, City Owned Public Facilities and Stormwater Outfalls for additional information.*

These are used to assess the site and educate owners/operators about recommended pollution prevention practices. Site inspections are staff intensive and therefore as stated in the SWMP 50 % are completed each year of the permit cycle. An industrial NPDES stormwater permit is an extremely important compliance tool at many generating sites. NPDES permits require operators to prepare a pollution prevention plan for the site and implement the practices specified in the plan.

Inspections are an important tool to improve compliance at generating sites subject to industrial NPDES permits. Inspectors should frequently observe site operations to ensure that the right mix of pollution prevention practices is routinely employed. The City will continue to inspect all 740+ commercial/industrial sites within the City limits that discharge to our storm drain system, and refer any violations for subsequent local, state or federal enforcement as appropriate.

Table 5.5: Common Discharges Produced at Generating Sites	
Generating Site	**Activity Generating the Discharge**
Vehicle Operations (Maintenance, Repair, Fueling, Washing, Storage)	* Improper disposal of fluids down shop and storm drains * Spilled fuel, leaks and drips from older/wrecked vehicles * Hosing of outdoor work areas * Wash water from cleaning * Spills
Outdoor Materials (Loading/unloading, Outdoor storage)	* Liquid spills at loading areas * Hosing/washing of loading areas into shop or storm drains * Leaks and spills of liquids stored outdoors
Waste Management (Spill prevention and response, Dumpster management)	* Spills and leaks of liquids * Dumping into storm drain * Leaking dumpsters
Facility Maintenance (Building repairs, Remodeling and maintenance, Parking lot maintenance)	* Discharges from power washing and steam cleaning * Rinse water and wash water water discharges during cleanup * Runoff from degreasing and re-surfacing
Lawn and Landscaping (Turf management, landscaping/Grounds care)	* Non-target irrigation * Improper rinsing of feertilizer/pesticide applications
Unique Hotspot Operations (Pools, Golf courses, Marinas, Construction, Restaurants, Hobby farms)	* Discharges of chlorine water from pools * Dumping of seweage and grease

5.6 PREVENTING ILLICIT DISCHARGES FROM MUNICIPAL OPERATIONS

Many municipal operations and services have the potential to create or reduce illicit discharges. The City will review all municipal operations and services to make sure good housekeeping is practiced. *See addendum MCM #6-1 a "DRAFT" copy of the City's Municipal Operation and Maintenance Plan.*

Routine Sanitary Sewer and Storm Drain Maintenance: Failure to regularly inspect and maintain local sewer and storm drain infrastructure can cause illicit discharges to receiving waters. Within the storm drain system, maintenance should focus on frequent cleaning to keep trash, debris and illegally dumped material from entering the storm drain system. In the sanitary sewer network, maintenance should focus on finding damaged infrastructure that allows sewage discharges from the sanitary sewer. In-stream monitoring, historical data reviews of past complaints, or aging sewer infrastructure can often be used to identify likely problem areas.

Plumbing Code Revisions: The City has established the legal authority to prohibit illicit connections to the storm drain system. If the City moves forward with the adoption and implementation of a standalone illicit discharge ordinance, thorough review all of the plumbing codes, will be necessary to prevent any mis-interpretation that might create cross connections to the storm drain system.

Household Hazardous Waste Collection Services: Households generate a lot of hazardous wastes, and communities need to educate residents about proper household hazardous waste (HHW) handling and disposal, and provide convenient options for pick up and disposal. The City will research the feasibility of developing innovative ways to deal with HHW including:

- A permanent facility that accepts HHW year-round and can serve as a central location for HHW exchange and recycling

- Mobile collection at temporary facilities. On designated special collection days, mobile units can move through communities accepting HHW and take the form of curbside pickup or central collection locations. *See addendum MCM #2-6 a copy of brochure on where and how to dispose of HHW.*

• Some local businesses may act as drop off centers for certain products. Some local garages, for example, may accept used motor oil for recycling Overall, the costs for implementing HHW collection programs can be high. Factors such as frequency of the collection, size of community, environmental awareness, level of staff training, and level of outreach all contribute to the overall cost.

Used Motor Oil Collection Services: Used motor oil collection has been a common municipal service for many years, and this is another option for the City to encourage cleaner stormwater by seeking increased participation. Typical outreach approaches may include:

• Conventional outreach materials provided at points of sale (e.g., auto parts store, service stations)

• Multilingual outreach materials

• Directories of used oil collection stations

• Free or discounted oil disposal containers

5.7 BUDGETING AND SCOPING POLLUTION PREVENTION

Budget and/or Staff Resources Required: The budget and staff resources needed for prevention programs can be considerable, and should be coordinated with other storm water education, public involvement and municipal housekeeping initiatives required under NPDES Phase II MS4 permits. Special emphasis should be placed on cross-training staff, partnering with local watershed groups, and pooling educational resources with other communities.

CHAPTER 6: DETECTION AND ELIMINATION OF ILLICIT DISCHARGES

6.1 CURRENT RESOURCES

The City currently has two staff members that are assigned to enforce MS4 regulations as part of their daily duties. However, this is only one of the many duties assigned to them and they are not able to work on MS4 regulations full time. A large portion of this IDDE Program will focused on the training of other City staff to assist with identifying and eliminating illicit discharges.

Though the City does not currently have a "HOTLINE" number per say, however, the public is able to find emergency numbers on the City's website at www.nixa.com.

The Public Works Inspector or Asst. Public Works Inspector will respond to all reports regarding spills and illicit discharges. Any call received that is a report of major spill or associated with a hazardous chemical, the Nixa Fire Protection District will then be notified.

The Public Works Inspectors inspect all new storm drain system construction to ensure that no cross-connections or illegal connections are installed during that phase of development.

The City's Street Department staff maintains and repairs all storm drain facilities that the City is responsible for, as needed. By making timely repairs to the existing storm drain system, the likelihood of contaminants entering it from the surrounding ground or nearby sanitary sewer pipes is greatly reduced. *See addendum MCM #6-1 a copy of the City's Municipal Operations and Maintenance Plan.*

6.2 PROACTIVE INVESTIGATION

6.2.1 Prioritization Procedures:

The City is required to proactively conduct field assessments to check for illicit discharges and illegal connections to the City's storm drain system and receiving waterbodies.

The first step of this proactive work is to prioritize those areas most likely to contain illicit discharges ("hot spots") based on an analysis of Land Use and other specific information (see Figure 6.2.1 City zoning map, and Figure 6.2.1.1 City's Storm drain priority map). Based on previous work, the following types of areas are more likely to generate polluted discharges than others (Center for Watershed Protection & Pitt, 2004):

1. Locations where there have been repeated problems in the past. This could include areas with water quality data or where repeated complaints have been filed.

2. Older areas of a community typically have a higher percentage of illegal connections. Also, deteriorating sewer pipes can allow wastewater exfiltration out of the sanitary lines and into the surrounding environment.

3. Commercial and industrial areas tend to have a higher percentage of illicit discharges.

4. Areas with large and/or many storage vessels of hazardous solids or liquids. (see land use table below table 6.2.1)

Another consideration for the City of Nixa is the proximity of the higher risk land uses (commercial/industrial) to receiving waters. These areas will have a short flow path and greater chance of adversely affecting a larger aquatic system in the event of an illicit discharge or spill.

Figure 6.2.1: City of Nixa Zoning Map

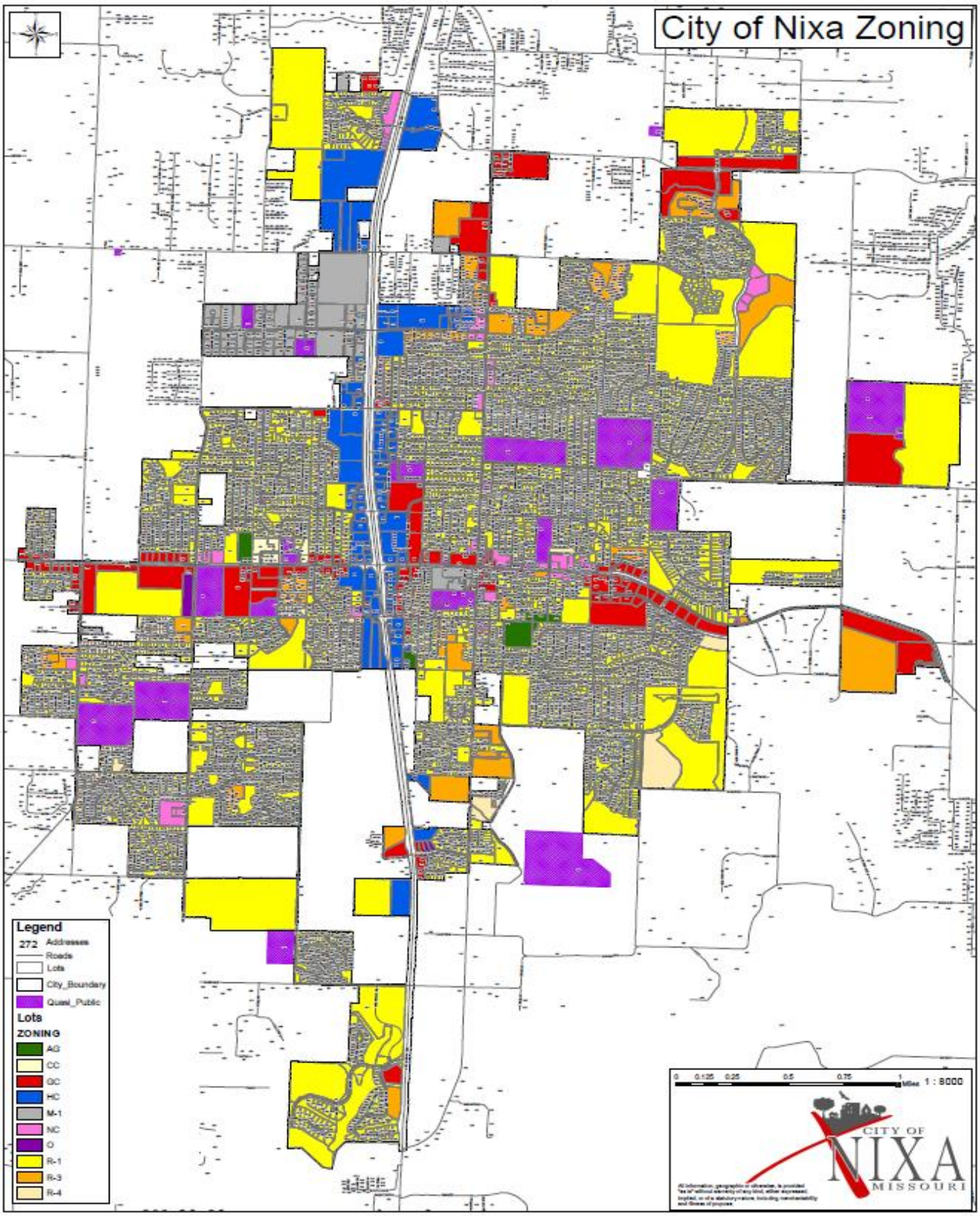


Table 6.2.1: Land Uses, Generating Sites Activities That Produce Indirect Discharges		
Land Uses	**Generating Sites**	**Activity That Produces Discharge**
Residential	• Apartments • Multi-Family • Single Family Dwelling	• Car Washing • Driveway Cleaning • Dumps/Spills Equipment Washing (Lawn mowers) • Lawn/landscaping Watering • Septic System Maintenance • Swimming Pool Discharges • Improper Plumbing - Prohibited Discharge
Commercial	• Camp Grounds/RV Parks • Car Dealerships • Car Washes • Commercial Laundrt/Dry Cleaning • Gas Stations/Auto Repair Shops • Home Improvement Stores • Restaurants • Public Swimming Pools	• Building/Parking Lot Maintenance (Power Washing) • Dumps/Spills (automotive fluids) • Landscapeing/Grounds Care • Outdoor Storage of Liquids (use fry oil) • Vehicle Fueling • Vehicle Maintenance/Repair • Vehicle Washing • Pressure Washing of Greasy Equipment and Grease Traps
Industrial	• Auto/Metal re-cyclers • Construction vehicle washing • Distribution centers • Food processing • Trash dumpsters • Marinas (boat and motor repair) • Metal plating operations • Paper and wood products • Petroleum and LPG storage • Printing • Food grade additives (Vinegar)	• All outdoor activities • Processing or rinse water • Loading and unloading area wash downs • Outdoor material storage (liquids/chemicals)
Institutional	• Cemeteries • Churches • Corporate Campus • Major medical facilities • School	• Building Maintenance (pressure washing) • Dumping/Spills • Landscaping/Grounds Care • Parking Lot Maintenance (pressure washing) • Vehicle Washing
Municipal	• Office Facilities (City Hall, Utility Billing, • Parks Department and Police Department. • Public Works Campuses, Infrastructure maintenance: • Water Department - Well sites and distribution system. • Waste Water - Sanitary sewer collection system including lift station sites. • Electric Department - transmission and distribution system including sub-station sites. • Streets: • Stormwater:	• Building Maintenance (pressure washing) • Dumping/Spills • Landscaping/Grounds Care • Outdoor Liquid Storage • Parking Lot Maintenance (pressure washing) • Road Maintenance • Vehicle Fueling • Vehicle Maintenance /Repair • Vehicle Washing • Outdoor Liquid Storage • Outdoor storage of electrical system components (transformers).

SOURCE: Modified from NPDES Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection.

6.2.1.1 City of Nixa Priority Areas Identified:

Using the guidelines provided above, the City of Nixa staff identified the following priority areas within the City's Phase II Permit boundaries:

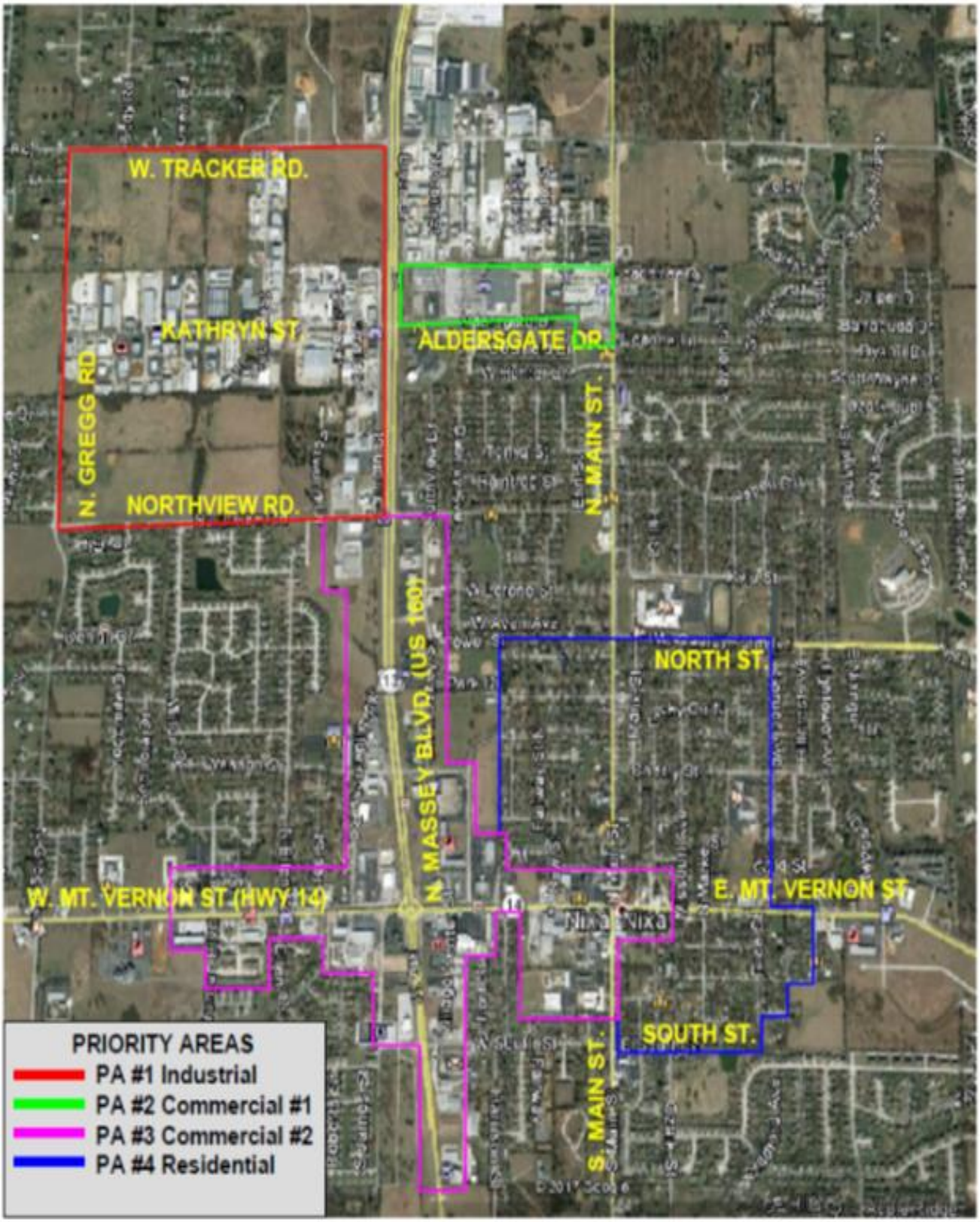
• **Priority Area #1:** Industrial-Manufacturing priority area generally lies between Tracker Rd. and North View Rd.; between N. Gregg Rd. and N. Massey Blvd. (US Hwy 160).

• **Priority Area #2:** Commercial priority area #1 is generally lies between Aldersgate Dr., and the North City limits (north of Wal-Mart); between Massey Blvd. (US 160) and N. Main St.

• **Priority Area #3** Commercial priority area #2 generally lies along the west and east sides of Massey Blvd. (US 160) between Wasson Rd. and South St.; and along the north and south sides of Mt. Vernon St. (Hwy 14) between Center Circle and Water St.

• **Priority Area #4** Residential priority area is generally lies between North St. and South St.; and between Fort St. and Spruce St. (see aerial view of priority areas below)

Figure 6.2.1.1.: City of Nixa Storm Drain Priority Map



The City has and will continue to conduct qualitative assessments of City's surface waters by walking the streams to identify additional areas of concern. This activity can also be used to ground-truth (information provided by direct observation) the outfall map, determine the accessibility of the streams for future monitoring, and provide a photographic record of existing conditions.

The City has entered into contractual agreement with OEWRI (Ozarks Environmental and Water Resource Institute) to collect stream samples, monitor and run laboratory analysis on first flush samples from 3 of the City's outfalls. These three outfall sample sites have permanently installed sample collection equipment so samples are collected and annualized year round, no less than once every quarter (see Figure 6.2.1.2 a copy of OEWRI Outfall Sample Sites map).

During each "dry weather" inspection, it is expected that field personnel will collect data on the physical conditions at the outfall as well as water samples for lab analysis, if present.

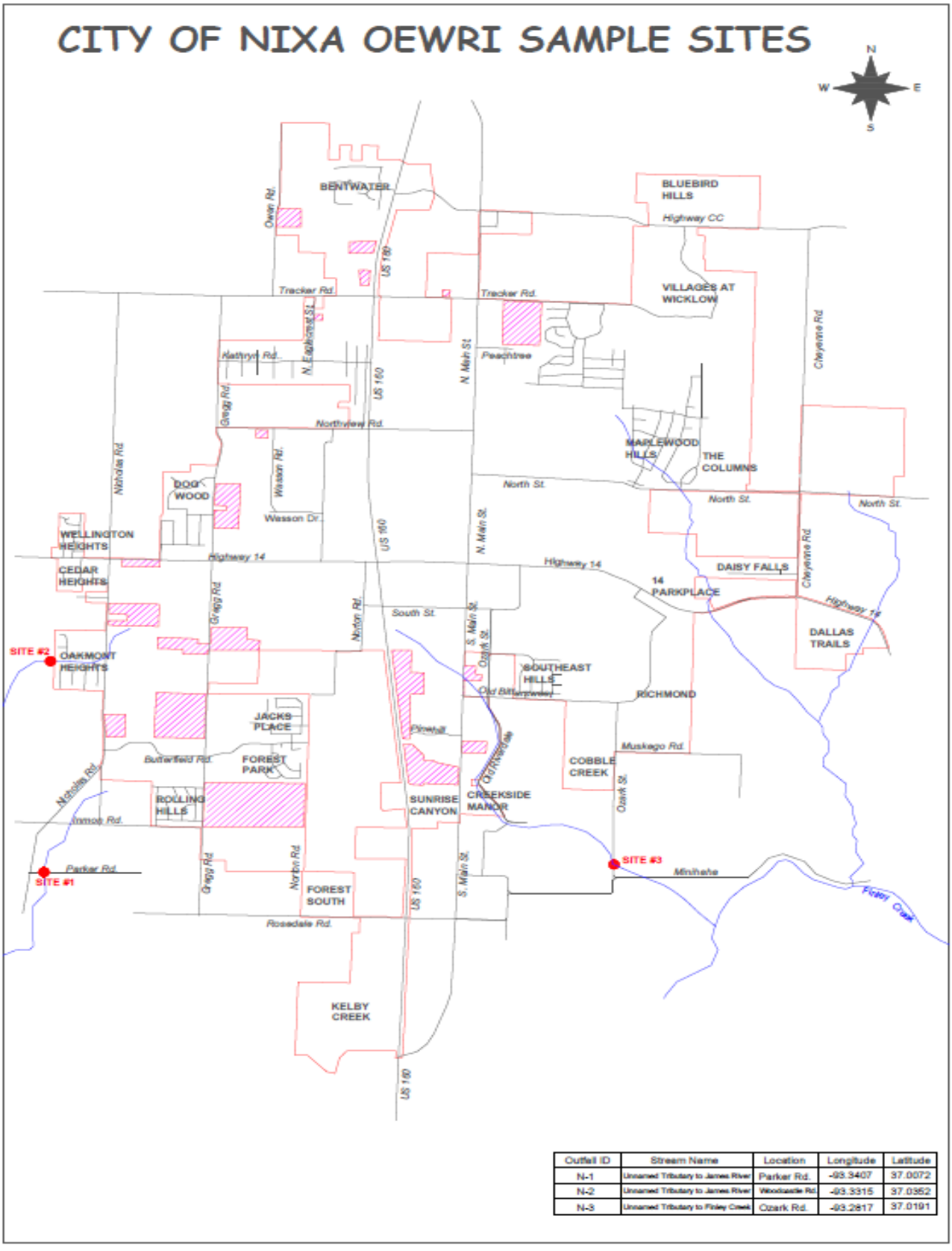
A GIS-based map will be amended to reflect any potential hot spots and prioritized water bodies. It is expected that as a result of internal training of staff and public outreach efforts required by the NPDES permit, the City will develop a better understanding of the causes and locations of illicit discharges.

The GIS data base and map are and will continue to be regularly updated to reflect reports from staff and the public as well as information learned by the on-going field assessment work as the City's IDDE program progresses.

Data sampling goals include conventional parameters, nutrients, biological parameters (bacteria and macroinvertebrates), dissolved metals, herbicides, pesticides, and sediment (metals and hydrocarbons). This information provides useful information, assessing the efficacy of stromwater improvements, and looking for trends and/or localized water quality concerns.

The City plans to continue monitoring these locations for compliance with the NPDES permit. For future monitoring and assessment under this program the City plans to work with OEWRI to ensure the monitoring procedures and documentation meets the requirements of the permit.

Figure 6.2.1.2 OEWRI Sample Sites



6.2.2 General Field Assessment Procedure:

The following general recommendations apply to the dry weather field inspection and water sampling work.

1. Notify the public during field work campaigns. Public notices and informational mailers can improve the success of the program by educating the citizenry.

2. Develop training and protocols to keep workers safe during field work.

3. Make good use of the mapping information that has been developed by the City.

4. Fill out a standard field inspection form (Figure 6.2.2)

Figure 6.2.2

CITY OF NIXA STORMWATER ILLICIT DISCHARGE FIELD INSPECTION REPORT				
GENERAL INFORMATION:				Pg.1
Latitude			Object ID #	
Longitude			Date Of Inspection:	
INSPECTOR'S INFORMATION:				
Inspector's Name:			Inspector's Signature:	
Inspector's Title:				
Inspector's Contact Information:				
Inspector's Qualifications:				
TYPE OF INSPECTION:				
Regular annual, Pre-storm, During storm, Post storm				
WEATHER INFORMATION:				
Date of most recent storm event:			Approximate Duration (Hrs):	
Approximate precipitation amount (Inches):				
Weather at time of inspection: Clear Cloudy Rain Sleet Snow				
Are there any discharges at this time in danger of leaving the site?			YES	NO
If YES, describe:				
Comments, Observations, Actions Taken, Corrective Actions Needed:				

Comments, Observations, Actions Taken, Corrective Actions Needed Pg.2

6.2.3 Physical Parameters:

During dry weather field inspections, a variety of physical parameters will be recorded at each site to assess conditions. At flowing outfalls this includes flow, odor, color, turbidity, and presence or absence of floatables. The information that is obtained from the physical characteristics observed are indicators and cannot be fully relied upon by themselves.

A qualitative observation of flow (none, trickle, moderate, or substantial) should be made. Flow rates can be estimated by one of the following simple methods:

1. Record the time required for the full flow to fill container of a known volume.

2. Multiply cross-sectional flow area by flow velocity. For most instances, flow area is based on an estimate of mean depth and width. Flow velocity is based on the time of travel for an object floating near the surface over a known length.

Odor is described by one of the following terms sewage, rancid/sour, petroleum/gas, sulfide, or other. The severity of the odor should also be recorded in the field.

Color can be a description of color type and intensity. It is also a quantitative measurement expressed in cobalt-platinum units (APHA, 1998). Turbidity can be a qualitative descriptor (clear, slight cloudiness, cloudy, or opaque). Alternatively, it can be measured in the field or in the office with a hand held turbidity-meter. It is recommended that the City use a single make and model of meter to reduce the differences in readings associated solely with equipment readings.

Floatables are the best physical indicator. The most common floatables are sewage, suds, and oil sheens. Floatables do not include trash. The observation of sewage at an outfall location indicates that there is a severe problem with that MS4 and should be looked at as to where the source for the sewage is emanating from. Suds can indicate a variety of things. Some suds are naturally formed by the movement of the water.

If the suds are located at a water drop off and break up quickly, this may only be water turbulence related. If the suds have a fragrant odor, this can indicate the presence of laundry water or wash water in the waterbody. Oil sheens need to be looked at to try and determine the source of the oil sheen. Some oil sheens are common and occur naturally by instream processes. This occurs when an iron bacterium forms a sheet-like film. This can be determined by looking at the sheen and seeing if it cracks when disturbed. Synthetic oil sheens, on the other hand, will swirl when disturbed. If this occurs, then the sheen is from an oil source.

There may be physical indicators of illicit discharges even if no flow is present. These include: outfall damage, deposits/stains, abnormal vegetation, poor quality of pooled water, benthic (occurring at the bottom of a body of water growth) in pipe. During a dry weather inspection, observed flows are considered non-stormwater related.

The flow may or may not be the result of an illicit discharge. Also, the absence of a flow does not indicate the absence of an illicit discharge since these discharges can be intermittent or transitory. It is important to observe carefully during the dry weather inspection to determine if an intermittent or transitory pollution problem has occurred.

6.2.4 Water Quality Sampling and Testing:

During dry weather inspections physical clues indicating a pollution problem often are not observable. Therefore, water quality sampling and testing will be an essential part of the City's IDDE program. Some parameters can be directly measured in the field whereas others require laboratory analysis. The following table lists the parameters to be sampled as well as optional parameters to be sampled to isolate an illicit discharge.

The table also provides the analytical method and benchmark concentration that typically indicate when there is a problem. Note that these benchmark concentrations are based on samples collected from storm drains nationally. Therefore, benchmark concentrations would be lower for samples drawn from watercourses since the natural base flows would likely dilute any pollutants in water discharged from a contributing storm drainage system.

Table 6.2.4 Water Quality Test Parameters and Uses

Water Quality Test Parameters and Uses		
Water Quality Test	**Use of Water Quality Test**	**Comments**
Conductivity	Used as an indicator of dissolved solids	-Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter- Typically measured in the field with a probe
Bacteria (fecal coliform, E. coli and/or enterococci)	Used to indicate the presence of sanitary wasterwater	Minnesota Pollution Control Agency
Ammonia	High levels can be an indicator of the presence of sanitary wastewater	-Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter
Surfactants	Can indicate the presence of detergent (laundry, car wash)	-Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter
pH	Extreme pH values (low or high) may indicate commercial or industrial flows; not useful in determining the presences of sanitary wastewater (which, like uncontaminated base flow, tends to have a neutral pH, close to 7)	-Pitt et al. 1993 suggested parameter; -Measured in the field with a thermometer or probe
Temperature	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperature. This measurement is most useful during cold weather	-Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter- Typically measured in the field or lab with a probe
Hardness	Used to distinguish between neutral and treated waters	
Total Chlorine	Used to indicate inflow from potable water sources; not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long	-Pitt et al. 1993 suggested parameter;
Flouride	Used to indicate potable water sources; in areas where water supplies are fluoridated.	-Pitt et al. 1993 suggested parameter;
Potassium	High levels may indicate the presence of sanitary wastewater	-Pitt et al. 1993 suggested parameter;
Optical Brighteners (Florescence)	Used to indicate presence of laundry detergents, which often contain fabric whiteners, which cause substantial fluorescence	-Pitt et al. 1993 suggested parameter;
Dissolved Oxygen	Low DO can indicate high levels of Phosphorus which in turn can indicate sewage wastewater	Minnesota Pollution Control Agency
Phosphorus	High phosphorus can indicate sewage and/or possible illegal gray water connections	Minnesota Pollution Control Agency

Source: Table Modified from Illicit Discharge Detection and Elimination Manual: A Handbook for Municipalities, New England Interstate Water Pollution Control Commission

6.2.5 Immediate Response Procedures:

The field crew should be prepared to take immediate action in the event of encountering one of the following situations:

* Individuals actively in the process of introducing possible illegal substances or materials to the storm drain system

* Very strong chemical odor emanating from storm drain system

*Presence of fumes or smoke emanating from storm drain system

* Visible significant stream of a controlled chemical or petroleum product flowing in storm system or downstream waters

* Large chemical plume in stream or downstream of an outfall

*Any condition that poses or could pose an immediate threat to property, human health or safety, or aquatic life.

The crew should take the following steps if one of the above situations is encountered:

1. Ensure crew safety and the public by instructing people to stay clear of the area.

2. Call 911 to report active illegal dumping or potential fire or significant chemical incident.

3. Call the City's MS4 Coordinator 417-725-2353 to report a possible illegal discharge.

4. The following offices must all be called if an unauthorized discharge of oil or hazardous material spill has occurred:

a. The National Response Center at 1-800-424-8802;

b. Missouri department of natural resources Spill report (573) 634-2436;

c. 911

5. If a spill is encountered the following information should be recorded if possible:

a. Where is the spill?
b. What spilled?
c. How much spilled?
d. How concentrated is the spilled material?
e. Who spilled the material?
f. Is anyone cleaning up the spill?
g. Are there resource damages (e.g. dead fish or oiled birds)?
h. Who is reporting the spill?
i. Your contact information!

6. If possible isolate or contain visible chemical pollution in the effected waterbody with any materials that are accessible. For small discharges earth dams, absorbent pads, and containers may be useful to contain part of the illicit discharge.

7. Take detailed notes and photos/video for subsequent investigation by City or other agencies.

At a minimum, follow-up work includes contacting the Missouri Department of Natural Resources to determine if any additional reporting or investigative actions are necessary. (573) 634-2436)

For incidents not determined to be emergencies, the City will investigate or refer to the appropriate agency any complaints, reports, or monitoring information that indicates a potential illicit discharge, spill, or illegal dumping.

6.2.6 Isolating Illicit Discharges (Source Tracing):

In situations where outfall screening identifies an illicit discharge several methods can be used to trace to the source of the illicit discharge.

Tracing techniques include visual inspections of drainage structures and lines, dye testing, damming lines to isolate areas, video inspection, indicator monitoring, smoke testing, and optical brightener monitoring traps. Other more elaborate approaches include using remote sensing tools to identify soil moisture, water temperature, and vegetation anomalies associated with failing septic systems and tracking illegal dumping activities. The most common approach for the City will likely rely upon visual inspections of the catch basins, outfalls and the storm drain system as a whole.

Several resources exist to assist in evaluating the likely source of an illicit discharge. Generally, the sources are wash water, sanitary sewer or septage, potable water leak, animal contamination, illegal dumping, or industrial discharge.

6.3 INVESTIGATION and RESPONSE PROCEDURES

Once an illicit discharge or illegal connection has been located, details about the discharge connection should be documented. Photographs and video will be helpful to record the location and nature of an illicit connection. City staff should determine the name and contact information of property owner.

The response by the City will vary greatly depending on the type, location, frequency, severity, and source of illicit discharge. In general, the City will have several options available to address a specific discharge. In most cases where the violator is identified it is expected that they will voluntarily comply with any action required by the City to eliminate the potential for further illicit discharges.

When the violation is the result on an illegal connection from a building, the property owner should respond once they are made aware of the connection, the environmental consequences, the applicable regulations, and the recommended remedy.

The City will prepare a letter to be sent to the property owner for any illicit discharge or illegal connection. Depending on the circumstances the letter will describe the findings of the investigation, the required remedy, the required deadline for compliance, technical resources, and the enforcement actions, fines, and legal actions that could ensue for non-compliance. The letter should also describe the relevant ordinances, codes and laws. The letter should specify who the property owner should contact for additional information and to notify the City when the required remedy has been completed.

The City will conduct a follow-up inspection following notification that the required remedy has been completed. Should the owner not remedy the discharge, the City may proceed to abate the violation as a public nuisance as well as to seek equitable payment to make this remedy.

See addendum IDDE 6.3 a copy of the City's Nuisance Ordinance and Abatement procedures.

Chapter 7: PUBLIC EDUCATION

7.1 PUBLIC INFORMATION

As part of the City's public outreach program, outreach material in digital and print forms will be made available to citizens. The education campaign will also rely upon the City's website (http://www.nixa.com), brochures, print ads, and/or fact sheets to make citizens aware of stormwater, water pollution, and inform them of the City's hotline for reporting on possible illegal dumping, connections, or discharges. *See MCM #1 for additional information.*

Chapter 8: REPORTING and RECORDKEEPING

8.1 REPORTING *(Spills, Inspections, and Public Comment/Feedback)*

Tracking and documentation is backbone of the IDDE program. Spills reported to the complaint hotline will be recorded on an "Illicit Discharge Hotline Incident Tracking Sheet" (Figure 8.1). Field personnel who discover or are involved in a spill will contact the complaint hotline to ensure that proper documentation of the incident is maintained.

8.2 RECORDKEEPING

The information generated from the water quality monitoring activities will be provided as data documents and records. These documents and records will consist of:

- All water quality lab analysis results shall be stored as a PDF document accessible to all appropriate staff.

- Computer database for all water quality chemical sampling results;

- Field Log books for equipment to be stored in the Public Works Inspector's office accessible to all staff.

The MS4 program coordinator will be responsible for assessing the completed forms filled out by the field staff once the work is completed to ensure that the documents accurately reflect the completed work. All paper documents will be kept in appropriate files in the Public Works Inspector's office. Staff will have access to these files at all times. When appropriate the information from these forms will be entered into the Stormwater Management Plan database. The water quality results on these forms will be published annually in a stormwater quality program summary for the work performed that calendar year.

The City's goal is to utilize a Stormwater Management Program Software package that has the ability to generate reports and to provide all pertinent information on a given monitoring location (lab analysis results, location, GPS coordinates, photos, maps, investigation information, correspondence information, city, and watershed). Once this software is implemented, all staff that will be utilizing this program will be appropriately trained. The MS4 program coordinator and the Public Works Director will have administration access to making changes to the database. This will allow for the integrity of the information to remain viable. *See SWMP Chapter 9 Record Keeping.*

CHAPTER 9: STAFF TRAINING

9.1 TRAINING LEAD

Training will start with those staff that will be directly involved with the implementation of this IDDE program. This training, at least initially will be done by the Public Works Inspector/MS4 Coordinator. He will manage and assign training as described below and shown in the Training Summary Table below.

9.2 DETAILED TRAINING

Detailed training will be assigned to those individuals specifically involved in the immediate response procedures, source tracking of potential illicit discharges and sampling.

9.3 GENERAL TRAINING

General training will consist of printed material distributed to staff through their supervisors and as provided in the yearly training sessions. DVD, print or webcast material may be distributed if the need arises as the program develops. Preliminary training activities and identification of those to receive training are listed in the following table. IDDE Program training will occur once annually during years 2 -5 (2018-2021) of the current permit cycle. *See MCM #6 for additional information on staff IDDE training.*

CHAPTER 10: REFERENCES

The following references were used to prepare this plan and contain supplemental information that has been helpful to City staff in the development of this IDDE program.

10.1 IDDE PROGRAM INFORMATION

The Center for Watershed Protection and Robert Pitt. Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments. October 2004. U.S Environmental Protection Agency. Washington, D.C.

Website for download:
http://www.cwp.org/Resource_Library/Controlling_Runoff_and_Discharges/idde.htm

Cuyahoga County Board of Health. Illicit Discharge Detection and Elimination Manual: A Guidance Manual for Municipalities in the State of Ohio. July 2006. Parma, Ohio.

Website for download:
http://www.ccbh.net/ccbh/export/sites/default/CCBH/pdf/stormwater/IDDE_Manual_July_2006_2.pdf

New England Interstate Water Pollution Control Commission. Illicit Discharge Detection and Elimination: A Handbook for Municipalities. January 2003. Lowell, Massachusetts

Website for download: www.neiwpcc.org

San Diego Stormwater Committees Jurisdictional Urban Runoff Management Program (URMP). Illicit Connection / Illicit Discharge (IC/ID) Detection and Elimination Model Program Guidance. November 13, 2001.

Website for download (sponsored by Project Clean Water):
http://www.projectcleanwater.org/pdf/Model%20Program%20ICID.pdf

10.2 WEBSITES FOR DOWNLOADING OUTREACH MATERIALS:

North Central Texas Council of Governments:
http://www.nctcog.org/envir/SEEclean/stormwater/pubs/brochures.asp

U.S. Environmental Protection Agency's Office of Water:
http://www.epa.gov/owow/nps/toolbox/

CHAPTER 11: APPENDICIES

Appendix A: Dry Weather Monitoring Sampling

11.1 Dry Weather Monitoring Field Equipment Checklist

The field equipment listed below are key to conduct dry weather monitoring.

· Clipboard, pens, pencils, Sharpie or other waterproof pens
· MS4 maps
· Digital camera/IPhone
· Field notebook
· Latex gloves
· Protective eyeglasses or goggles
· Rubber boots
· Cooler and ice
· Paper towels
· Tape for securing cooler
· Sample bottles with preservatives
· Polypropylene bucket with rope, or sampling rod to collect samples from larger bodies of water
· Portable field test kits, colorimeters, or spectrophotometer and all reagents for these meters.
· Multi-parameter or individual probes to measure temperature, electrical conductivity, and pH
· Extra batteries for all meters
· Flow measurement equipment (required equipment will depend on method used)
    - Measuring tape for measuring stream width
    - Folding scale for measuring stream depth
    - Current meter or wristwatch
· De-ionized or ultra-pure water in squeeze bottles for rinsing, dilutions, etc. (depending on methods used)
· Thermometer for measuring air temperature (optional)
· Waste disposal bottles

11.2. Sampling Procedures and Submission

Dry weather monitoring typically involves the collection of grab samples only. The following procedures apply:

1. Use appropriate containers. See 40 CFR Part 136 for container types. Laboratories routinely provide pre-cleaned sample bottles with preservatives already added.

    a. Rinse the container with the sample at least twice. Do not rinse pre-cleaned, preserved containers, as the preservative will be lost.

    b. Use the proper preservatives. Use only analytical or higher grade reagents for preserving samples. Store samples in an ice chest at 40˚ F until custody is transferred to the analytical laboratory directly or via staff courier.

    c. Avoid contaminating the sample. Wear latex gloves.

2. If practical, collect the sample at about 60% of the stream depth (from the surface) in an area of maximum turbulence (except when sampling for volatile organics). Avoid stagnant pools near the edge of flowing streams unless sampling stagnant pools. Enter the channel downstream of the sampling location and move upstream, disturbing as little of the bottom material as possible.

3. Record all qualitative observations and field testing results on the field data sheet. Estimate the flow rate as described on the back of the field data sheet. Also note any changes to standard procedures (for whatever reason), and describe any unusual or noteworthy conditions or results in detail.

4. Dispose of all spent reagents, reacted samples, and rinse solutions in the appropriate waste containers. Upon returning to the office or laboratory, decant these wastes into the sanitary sewer system of the office or laboratory unless otherwise instructed by the Wastewater Superintendent.

Be sure to clean all equipment (recheck calibration if any results were questionable), and restock reagents (if necessary).

5. If filtering samples in the field for dissolved trace metals analysis, do not preserve with HNO3 until after the sample is filtered. If field personnel are submitting unfiltered samples for dissolved trace metals analysis those samples should not be preserved with HNO3.

6. Samples collected for laboratory analysis should be submitted to the laboratory as soon as possible after collection. Complete the following tasks:

a. Fill out the chain-of custody form making sure that all sample bottles are correctly labeled

b. Carefully pack the sample bottles in the cooler

c. Transport the samples to the laboratory

d. Complete the chain-of-custody form Automatic sampling methods may be useful during some source identification or enforcement investigations. Investigators should refer to the manufacturer's instructions for operating automatic sampling equipment.

11.3. Equipment Maintenance

In order to ensure the quality of field results, maintenance of equipment must be given a high priority. All equipment must be cleaned and serviced at the end of a field shift.

1. All water quality meters must be calibrated in the laboratory or office before field use. Calibration solutions should remain uncontaminated and not be used after their expiration dates.

2. Field meters and cameras must be in proper working order. Make sure that batteries have sufficient voltage to power the equipment for the entire field trip. Recharge or replace them as necessary.

Keep extra batteries in the instrument case. Probes should be inspected, cleaned and reconditioned regularly.

3. Clean and rinse all other sampling equipment after returning from the field. Store clean equipment in original manufactures storage bags or cases.

4. Glassware used in the field (e.g. graduated cylinders for sample dilutions, test kit flasks and/ or beakers) should be cleaned immediately after usage. Use laboratory detergent, a brush, and hot tap water or 10% Analytical Grade HCl. Rinse three to four times with deionized water and wipe the outside of the glassware dry with a white paper towel. Dry in an inverted position. Store the dry glassware in the cabinets with stoppers intact (volumetric flasks) or in an inverted position (beakers).

11.4. Quality Control/ Quality Assurance

QA samples can be in the form of replicates, spikes, field blanks, method blanks, or synthetic samples. Dry weather monitoring programs can use these various types of QA/ QC samples to assess the accuracy and precision of the field and laboratory analyses performed for their dry weather monitoring programs.

1. Replicate samples can be collected periodically and submitted to the analytical laboratory to assess the accuracy of the field analyses for nitrate, ammonia, phosphate, electrical conductivity, pH, and turbidity.

2. Replicate samples are used to assess laboratory or field precision. They should be collected in the field in one container and split into two samples for analysis.

3. Spiked samples can be prepared in the field or the permittee's contract laboratory/ office. A field sample is spiked with known amounts of analytes (a substance or chemical constituent that is undergoing analysis) and the total volume of this fraction is adjusted to a specific volume (usually 1 liter) using a portion of the original sample as makeup water. *Make sure that the volume of the added spike is small compared to the volume of the sample to which it is added.*

4. Blank samples must be prepared with deionized or ultrapure water (resistivity greater than 17 mega ohms). A trip blank is prepared by filling a sample container in the laboratory/ office and transporting it on a routine monitoring assignment, preserving it in the field (noting the station location), and submitting it with a normal batch of samples. Method or equipment blanks are prepared using the same methods used to collect, process, or contain samples before submittal to the laboratory. An example of an equipment blank would be pouring deionized water into a sample container to test the cleanliness of the container.

5. Synthetic samples can be prepared using aliquots of commercially prepared standards or from EPA quality assurance ampules. Deionized water should be used as makeup water and analytical grade NaCl should be used to adjust the electrical conductivity of the QA sample into the range of the environmental samples.

11.5. Health and Safety

Dry weather water sampling may occur when the sampling environment and discharges create hazardous conditions. Use safety precautions at all times when conducting dry weather monitoring.

Safety Guidelines

· Keep a first aid kit with field equipment.
· Watch out for traffic along the access road when sampling or making observations.
· Do NOT remain in open areas or stand under trees if lightning is occurring in the vicinity.
· Watch your step; the ground may be wet and slippery, steep, or unstable. Do not attempt to climb down unsafe slopes.
· Always wear clean latex rubber gloves when sampling.
· Protect eyes and skin against contact with acids and other preservatives.

· Use common sense when deciding whether to sample during adverse weather conditions. *This program is intended to assess dry weather*

conditions. Do not sample during dangerous conditions such as high winds, lightning storms, or flooding conditions that might be unsafe.
· Do not enter channels during periods of high flow. The general rule of thumb is: If the product of the water depth in feet and the velocity in feet per second is greater than 10, or the level is above your waist, don't go in.
· Do not enter confined spaces for any reason.
· Follow all analytical procedures as prescribed in the equipment manuals. Heed all warnings and precautionary statements.
· Be familiar with Safety Data Sheets for all chemicals used in the field and when calibrating instruments. Know the health hazards and emergency medical treatments, and follow proper disposal instructions.

Safety Equipment

The following safety equipment is recommended for use during dry weather sampling:

· First aid kit
· Safety glasses
· Latex gloves
· Rubber boots
· Safety rope

Appendix B: Table 1 Summery of Laboratory Sampling and Analysis Requirements

Table 1: Summary of laboratory Sampling and Analysis Requirements					
Physical and Inorganic Non-Metals	**Analytical Meathod**	**Container**	**Volume (mL)**	**Preservative (Always @ 40° C)**	**Holding Time**
TDS	SM 2540C	P	100		7 d
TSS	SM 2540D	P	100		7 d
TURBIDITY	SM 2130B	P	100		48 h
ALKALINE AND HARDNESS	SM 2320B	P	100		14 d
pH	EPA 150.1	P	10		FIELD
CONDUCTIVITY	SM 2510B	P	20		28 d
TEMPERATURE		N/A			FIELD
PHOSPHOROUS, total	SM 4500PE	P	100	H_2SO_4	28 d
PHOSPHOROUS, dissolved/reactive	SM 4500PE	P	100	H_2SO_4	48 h
NITRATE	SM 4500 NO3 E	P	100		48 h
NITRATE	SM 4500 NO2 B	P	100		48 h
TKN	EPA 351.1	P	200		28 d
AMMONIA	SM 4500 NH3 D	P	500	H_2SO_4	28 d
BOD	EPA 405.1	P	1000		48 h
COD	EPA 410.4	P	10	H_2SO_4	28 d
CHLORINE, RESIDUAL	SM 4500 C1 G	N/A			FIELD
ORGANICS					
*Petroleum, hydrocarbons, total (d+g)	EPA 8015	G+2V	250+40 (2)	HCl	14 d
Oil and Grease	EPA 413.1	G	500	HCl	14 d
Diazinon	EPA 8140	G	1000		7 d
Chlorpyrifos	EPA 8140	G	1000		7 d
Methylene Blue Substance (MBAS)	SM 5540 C	P	250		48 h
Organochlorine Pesticides & PCBs	EPA 8081, 8082	G	1000		7 d
*Volatile Organic Compounds	EPA 8260	2V	40 (2)	HCl	14 d
Semi-Volatile Organic Compounds	EPA 8270	G	1000		7 d
Metals / Toxics					
Antimony	EPA 6010	P			
Arsenic	EPA 6020	P			
Cadmium	EPA 6010	P			
Chromium	EPA 6010	P			
Copper	EPA 6010	P			
Lead	EPA 6010	P	500	HNO_3	6 m
Nickel	EPA 6010	P			
Zink	EPA 6010	P			
Thallium	EPA 7470	P			
Silver	EPA 6020	P			
Mercury	EPA 6010	P			28 d
Cyanide	SM 4500 CN C	P	500	NaOH	14 d
Phenols (from SVOCs)	EPA 8270	G	1000		7 d
Bacteriological (including dilutions)					
Coliform, total	SM 9221	P (sterile)	125	$Na_2S_2O_3$	6 h
Coliform, fecal	SM 9221	P (sterile)	125	$Na_2S_2O_3$	6 h
Coliform, E Coli		P (sterile)	125	$Na_2S_2O_3$	6 h
Enterococcus	SM 9230	P (sterile)	125	$Na_2S_2O_3$	6 h
Streptococcus	SM 9230	P (sterile)	125	$Na_2S_2O_3$	6 h

* ZHS (Zero Head Space required) V=VOA / G=Amber / P=Plastic

Appendix C: Outfall Reconnaissance Inventory/Sample Collection Field Sheet Pg. 1

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Sub-watershed		Outfall ID:	
Today's date:		Time:	
Investigator(s)		Form completed by:	
Temperature (°F)	Rainfall (in): Last 24 hours_____Last 48 hours:_____		
Latitude:	Longitude:	GPS unit:	GPS LMK#:
Camera or Iphone:		Photo #s:	

Land Use in Drainage Area (check all that apply):

☐ Industrial ☐ Open Space

☐ Urban Residential ☐ Institutional

☐ Suburban Residential Other:_____

☐ Commercial known Industries:_____

Notes (e.g., origin of outfall, if known)

Section 2: Outfall Description

Location	Material	Shape		Dimensions (in)	Submerged
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other_____	☐ Circular ☐ Elliptical ☐ Box ☐ Other____	☐ Single ☐ Double ☐ Triple ☐ Other____	Diameter: _____	In Water: ☐ No ☐ Partially ☐ Fully With sediment: ☐ No ☐ Partially ☐ Fully
☐ Open Drainage	☐ Concrete ☐ Earthen ☐ Rip Rap ☐ Other_____	☐ Trapezoid ☐ Parabolic ☐ Other_____		Depth:____ Top Width:____ Bottom Width:____	
☐ In Stream					
Flow Present	☐ Yes ☐ No If No, skip to section 5				
Flow Description (if present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

Field Data for flowing Outfalls				
Parameter		Result	Unit	Equipment
☐ Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐ Flow #2	Flow Depth		In	Tape Measure
	Flow Width	____' ____"	Ft, In	Tape Measure
	Measured Length	____' ____"	Ft, In	Tape Measure
	Time of Travel		Sec	Stop watch
Temperature			°F	Thermometer
pH			pH Units	Test strip/probe
Ammonia			mg/L	Test strip

Appendix C: Outfall Reconnaissance Inventory/Sample Collection Field Sheet Pg. 2

OUTFALL RECONNAISSANCE INVENTORY FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are any physical indicators present in the flow? ☐ Yes ☐ No (if No, skip to Section 5)

INDICATOR	CHECK IF PRESENT	DESCRIPTION				RELATIVE SEVERITY (1-3)		
Odor	☐	☐ Sewage ☐ Sulfide	☐ Rancid/Sour ☐ Other	☐ Petroleum/gas	☐ 1 - Faint	☐ 2 - Easily detected	☐ 3 - Noticeable from a distance	
Color	☐	☐ Clear ☐ Green	☐ Brown ☐ Orange	☐ Gray ☐ Red	☐ Yellow ☐ Other	☐ 1 - Faint colors in sample bottle	☐ 2 - Clearly visible in sample bottle	☐ 3 - Clearly visible in the outfall flow
Turbidity	☐	See Severity				☐ 1 - Slight cloudiness	☐ 2 - Cloudy	☐ 3 - Opaque
Floatables - Does Not Include Trash	☐	☐ Sewage (toilet paper, etc.) ☐ Petroleum (Oil sheen)		☐ Suds ☐ Other		☐ 1 - Few /slight, origin not obvious	☐ 2 - Some indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some origin clear (e.g., obvious oil sheen, suds or floatable sanitary material)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No (if No, skip to Section 6)

INDICATOR	Check IF PRESENT	DESCRIPTION			COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping	☐ Peeling Paint	☐ Corrosion	
Deposits/Stains	☐	☐ Oily	☐ Flow Line	☐ Paint ☐ Other	
Abnormal Vegetation	☐	☐ Excessive	☐ Inhibited		
Poor Pool Quality	☐	☐ Odors ☐ Suds	☐ Colors ☐ Excessive Algae	☐ Floatables ☐ Oil Sheen ☐ Other	
Pipe Benthic Growth	☐	☐ Brown	☐ Orange	☐ Green ☐ Other	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a Severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the Lab?	☐ Yes	☐ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk Dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)? Use separate sheet to explain.

Appendix D: Methods of Flow Measurements

Methods of Flow Measurement

Calculating the Area (a) of the Cross Section of a Circular Pipe Flowing Partially Full

D = Depth of water
d = diameter of the pipe
a = area of water in partially filled pipe
Ta = Tabulated Value
Then a = Ta*d2

D/d	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0013	0.0037	0.0069	0.0105	0.0147	0.0192	0.0242	0.0294	0.0350
0.1	0.0409	0.0470	0.0534	0.0600	0.0668	0.0739	0.0817	0.0885	0.0951	0.1039
0.2	0.1118	0.1199	0.1281	0.1365	0.1440	0.1535	0.1623	0.1711	0.1800	0.1890
0.3	0.1982	0.2074	0.2187	0.2280	0.2355	0.2450	0.2540	0.2642	0.2780	0.2836
0.4	0.2934	0.3032	0.3130	0.3220	0.3328	0.3428	0.3527	0.3627	0.3727	0.3827
0.5	0.3980	0.4030	0.4130	0.4230	0.4330	0.4430	0.4520	0.4620	0.4720	0.4820
0.6	0.4920	0.5020	0.5120	0.5210	0.5310	0.5400	0.5500	0.5590	0.5690	0.5780
0.7	0.5870	0.5960	0.6050	0.6140	0.6230	0.6320	0.6400	0.6490	0.6570	0.6660
0.8	0.6740	0.6810	0.6890	0.6970	0.7040	0.7120	0.7190	0.7250	0.7320	0.7360
0.9	0.7450	0.7500	0.7560	0.7610	0.7660	0.7710	0.7750	0.7790	0.7820	0.7840

AREA x VELOCITY

(CREEK/CHANNEL METHOD)

a. Measure the width, depth, and velocity of the water.

b. Convert each value to a common unit (i.e. all measurements converted to cm, ft, or in.).

c. Multiply the width * depth * velocity to determine flow.

d. Multiply the flow by 0.8 for creek measurements –or– 0.9 for concrete channel measurements to account for channel roughness.

e. The results if measured in

- Ft = Ft^3/sec
- cm = cm^3/sec (mL/sec)
- in = in^3/sec

f. Convert to desired value.

TIME REQUIRED TO FILL A KNOWN VOLUME

(FILL A BOTTLE METHOD)

1. Determine volume/capacity of the sample bottle.
2. Measure time required to fill the bottle.
3. Flow will be determined by initial volume units:
   - mL/s
   - oz/s
4. Convert to desired value.

AREA x VELOCITY

(PARTIALLY FILLED PIPE)

a. All measurement must be converted to a common unit before calculation (ft, in, or cm).

b. Let D = water depth.

c. Let d = *inside* pipe diameter

d. Calculate D/d.

e. Find the tabulated (Ta) value on the partially filled pipe formula chart above using the D/d value. (i.e. if D/d = 0.263 then Ta = .1623).

f. Find the area using the formula $a = Ta*d^2$.

g. Multiply area (a) by the water velocity.

h. Convert to desired value.

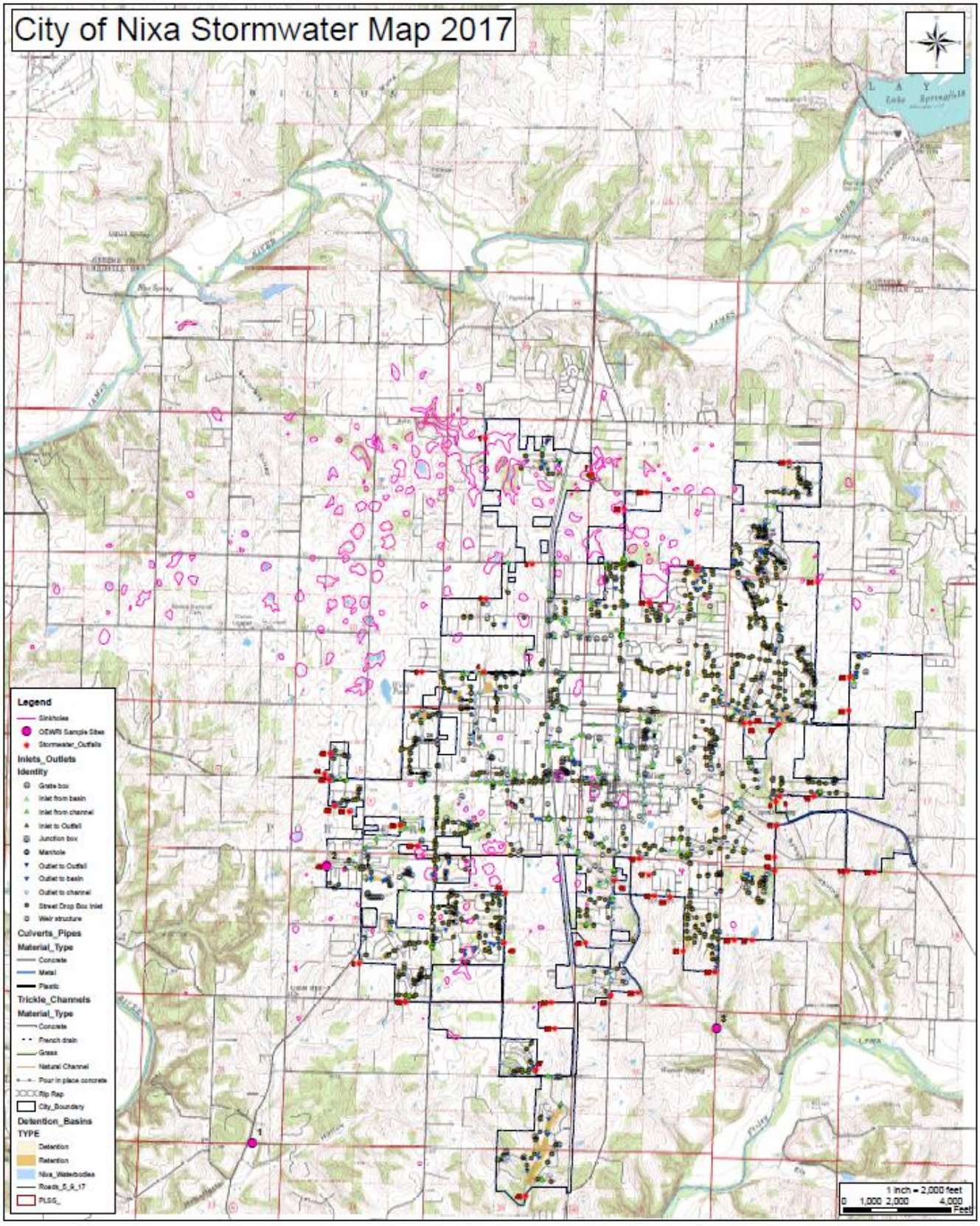
Appendix E: Illicit Discharge Hotline Incident Tracking Sheet Pg. 1

Illicit Discharge Hotline Incident Tracking Sheet				
Incident ID:				
Responder Information *(for hotline incidents only)*				
Call taken by:			Call date:	
Call time:				
Reporter Information				
Incident time:			Incident date:	
			Precipitation (inches) in past 24-48 hrs:	
Caller contact information (*optional*):				
Incident Location *(complete one or more below)*				
Latitude and longitude:				
Stream address or outfall #:				
Closest street address:				
Nearby landmark:				
Primary Location Description	**Secondary Location Description:**			
☐ Stream corridor *(In or adjacent to stream)*	☐ Outfall	☐ In-stream flow	☐ Along banks	
☐ Upland area *(Land not adjacent to stream)*	☐ Near storm drain	☐ Near other water source (storm water pond, wetland, etc.):		
Narrative description of location:				
Upland Problem Indicator Description				
☐ Dumping	☐ Oil/solvents/chemicals	☐ Sewage		
☐ Wash water, suds, etc.	☐ Other: _____			
Stream Corridor Problem Indicator Description				
Odor	☐ None	☐ Sewage	☐ Rancid/Sour	☐ Petroleum (gas)
	☐ Sulfide (rotten eggs); natural gas	☐ Other: Describe in "Narrative" section		
Appearance	☐ "Normal"	☐ Oil sheen	☐ Cloudy	☐ Suds
	☐ Other: Describe in "Narrative" section			
Floatables	☐ None:	☐ Sewage (toilet paper, etc)	☐ Algae	☐ Dead fish
	☐ Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Violator (name, personal or vehicle description, license plate #, etc.):				

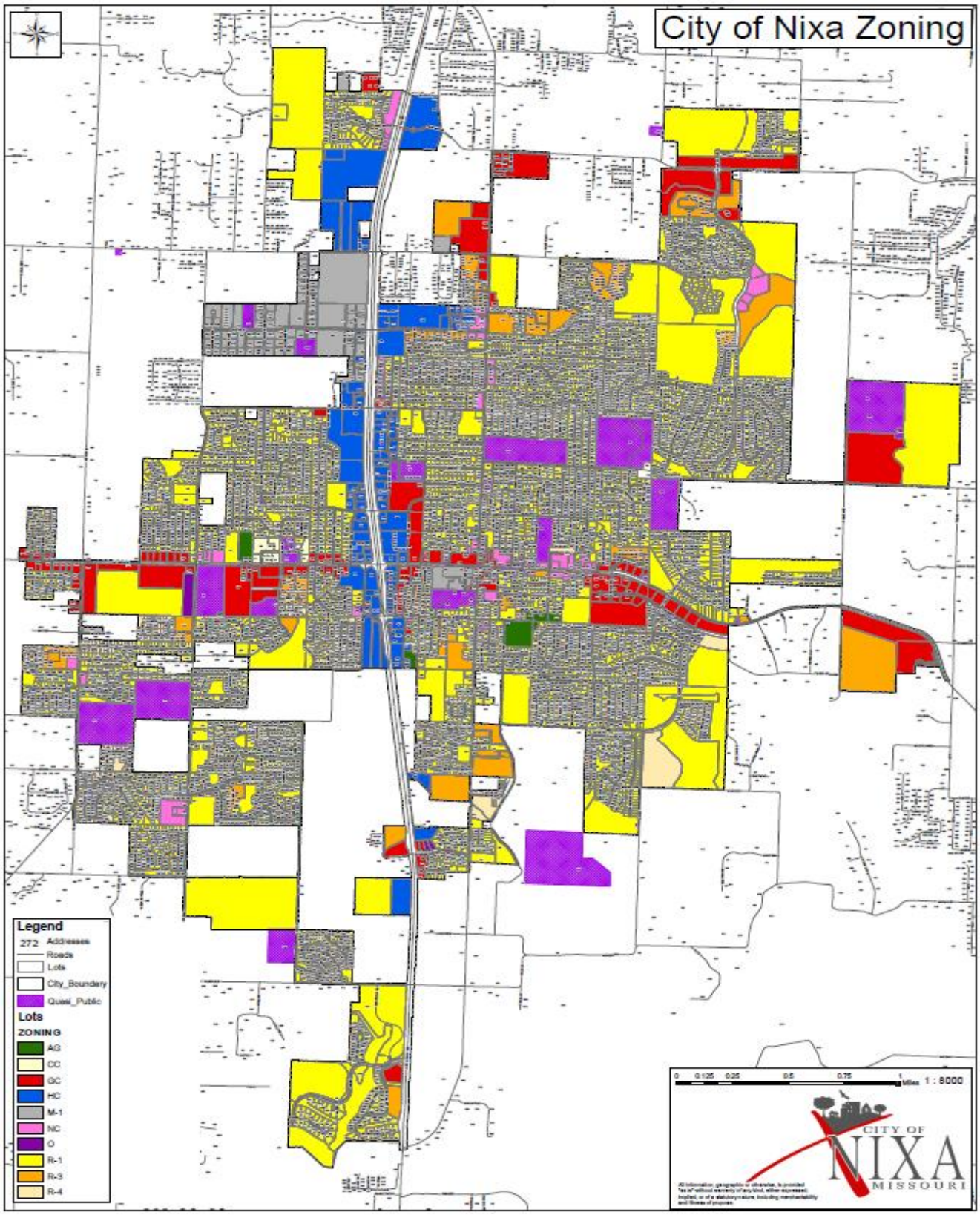
Appendix E: Illicit Discharge Hotline Incident Tracking Sheet Pg. 1

Investigation Notes	
Initial investigation date:	Investigators:
☐ No investigation made	Reason:
☐ Referred to different department/agency:	Department/Agency:
☐ Investigated: No action necessary	
☐ Investigated: Requires action	Description of actions:
Hours between call and investigation:	
Notification and Enforcement Actions (if any):	
Date case closed:	
Notes:	

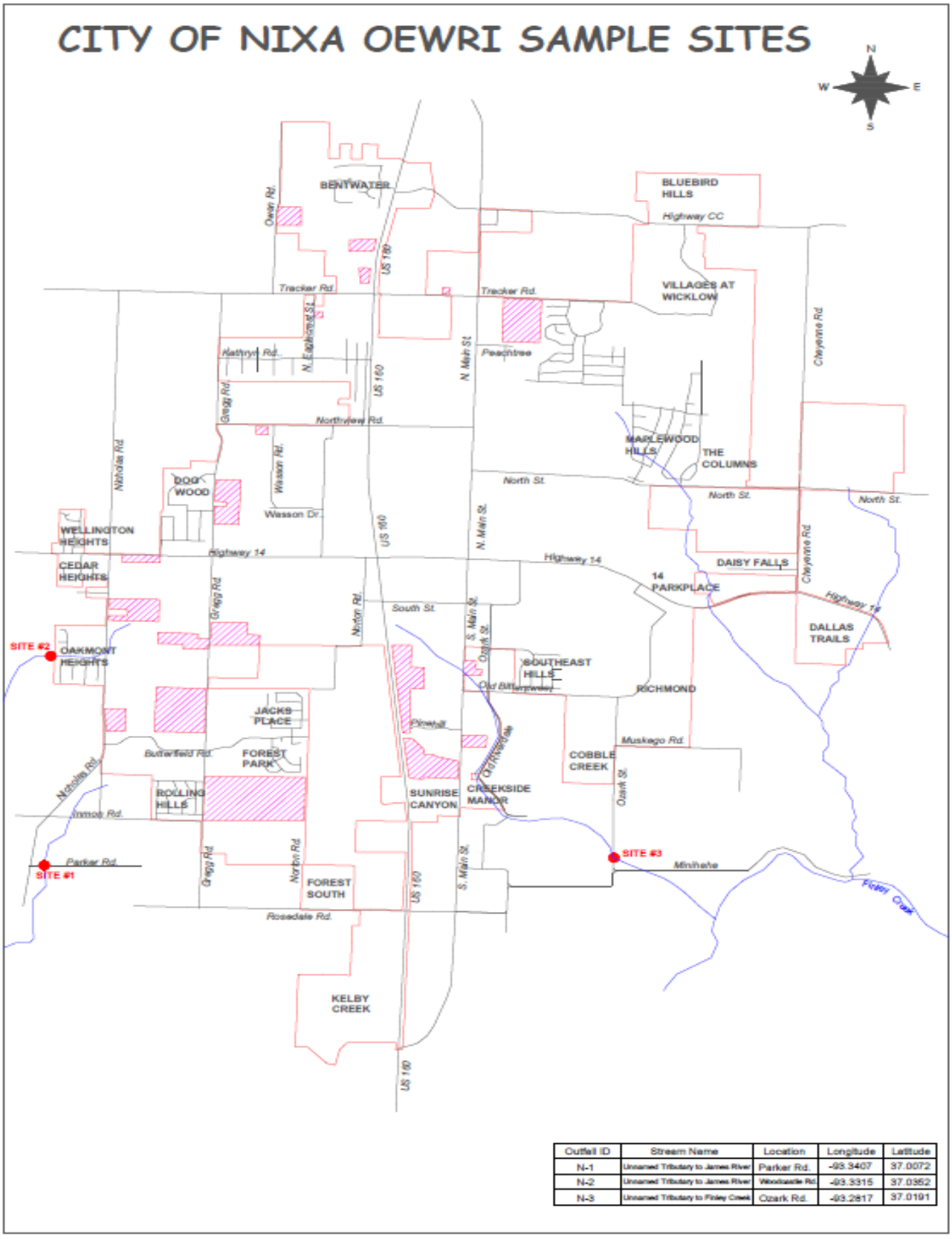
Appendix F: City Stormwater System Map



Appendix G: City Land Use/Zoning Map

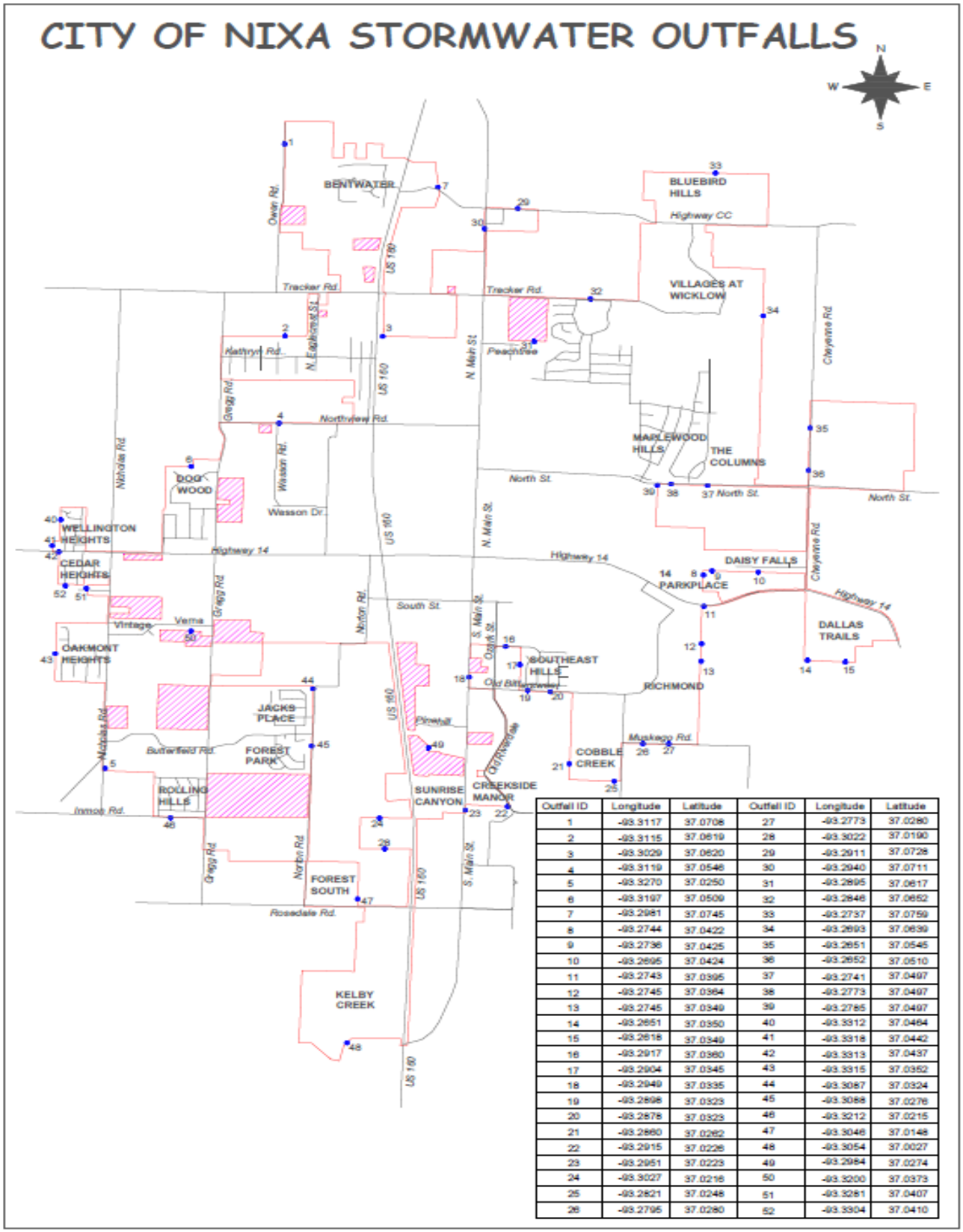


Appendix H: Map of OEWRI Outfall Sample Sites



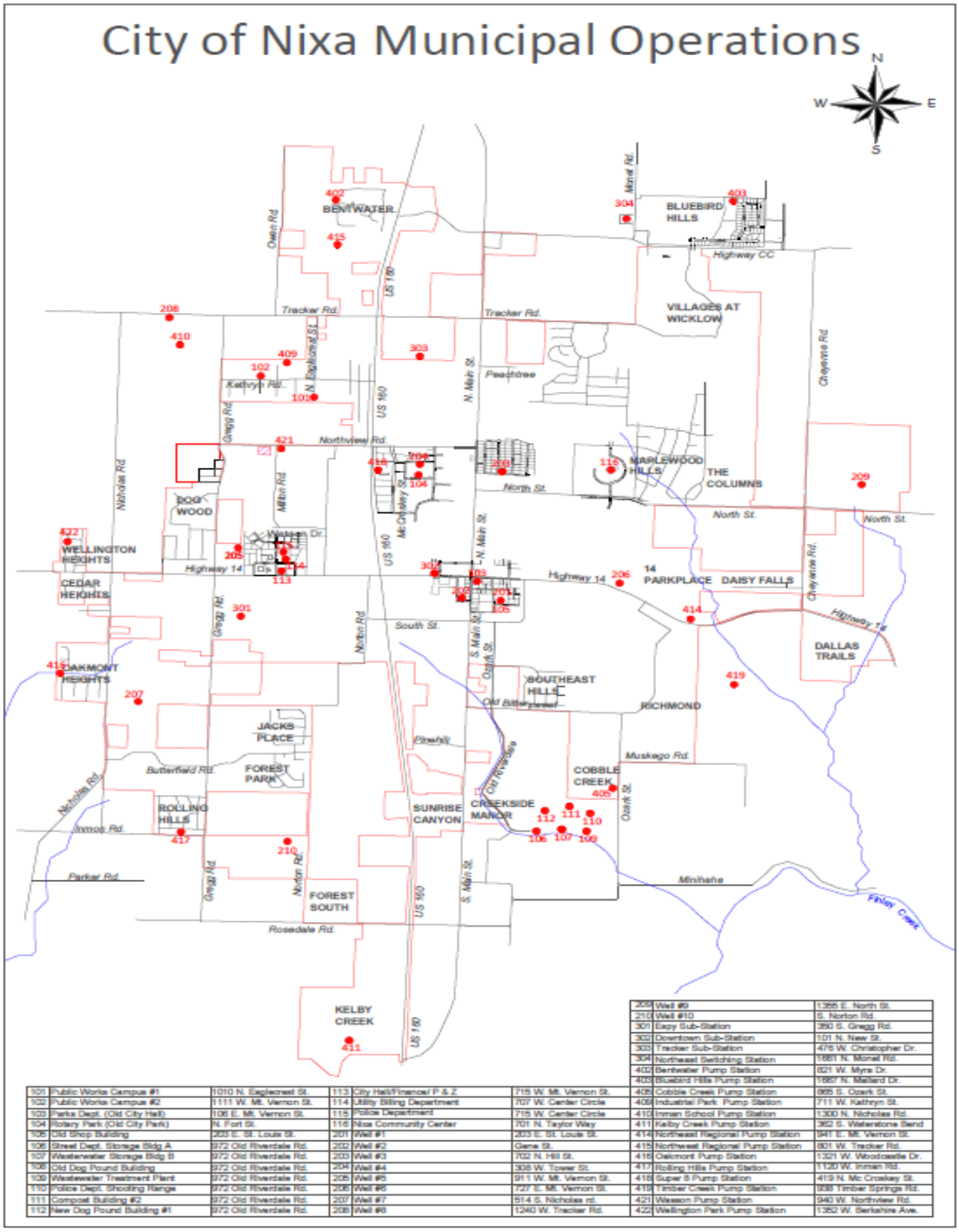
Outfall ID	Stream Name	Location	Longitude	Latitude
N-1	Unnamed Tributary to James River	Parker Rd.	-93.3407	37.0072
N-2	Unnamed Tributary to James River	Woodcastle Rd.	-93.3315	37.0352
N-3	Unnamed Tributary to Finley Creek	Ozark Rd.	-93.2817	37.0191

Appendix I: Map of City of Nixa Outfall Sites



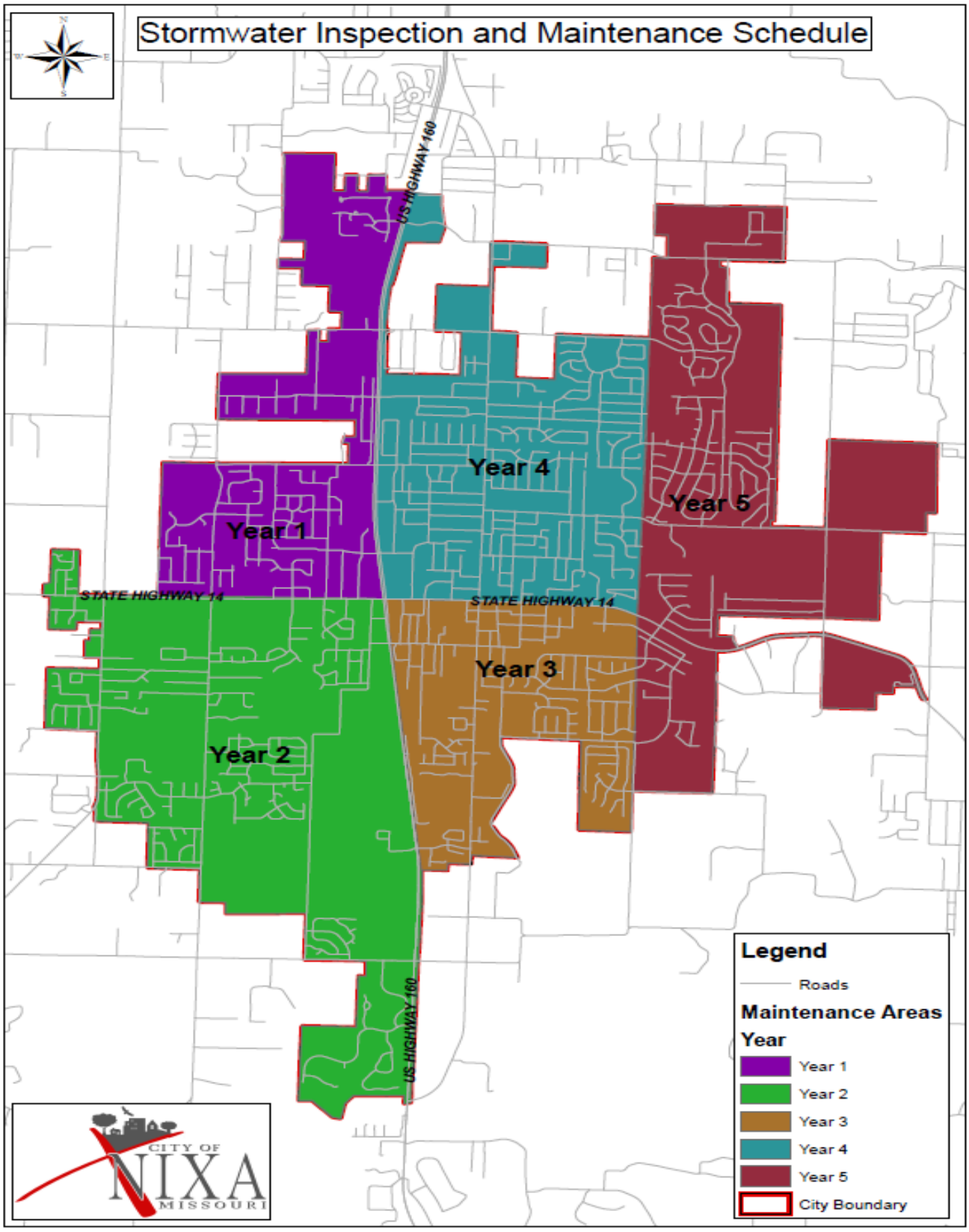
Outfall ID	Longitude	Latitude	Outfall ID	Longitude	Latitude
1	-93.3117	37.0708	27	-93.2773	37.0280
2	-93.3115	37.0619	28	-93.3022	37.0190
3	-93.3029	37.0620	29	-93.2911	37.0728
4	-93.3119	37.0546	30	-93.2940	37.0711
5	-93.3270	37.0250	31	-93.2895	37.0617
6	-93.3197	37.0509	32	-93.2846	37.0652
7	-93.2981	37.0745	33	-93.2737	37.0759
8	-93.2744	37.0422	34	-93.2693	37.0639
9	-93.2736	37.0425	35	-93.2651	37.0545
10	-93.2695	37.0424	36	-93.2652	37.0510
11	-93.2743	37.0395	37	-93.2741	37.0497
12	-93.2745	37.0364	38	-93.2773	37.0497
13	-93.2745	37.0349	39	-93.2785	37.0497
14	-93.2651	37.0350	40	-93.3312	37.0464
15	-93.2618	37.0349	41	-93.3318	37.0442
16	-93.2917	37.0360	42	-93.3313	37.0437
17	-93.2904	37.0345	43	-93.3315	37.0352
18	-93.2949	37.0335	44	-93.3087	37.0324
19	-93.2898	37.0323	45	-93.3088	37.0276
20	-93.2878	37.0323	46	-93.3212	37.0215
21	-93.2860	37.0262	47	-93.3046	37.0148
22	-93.2915	37.0226	48	-93.3054	37.0027
23	-93.2951	37.0223	49	-93.2984	37.0274
24	-93.3027	37.0216	50	-93.3200	37.0373
25	-93.2821	37.0248	51	-93.3281	37.0407
26	-93.2795	37.0280	52	-93.3304	37.0410

Appendix J: Map of City of Nixa Municipal Operations



101	Public Works Campus #1	1010 N. Eaglecrest St.	113	City Hall/Financial P & Z	715 W. Mt. Vernon St.	209	Well #9	1355 E. North St.
102	Public Works Campus #2	1111 W. Mt. Vernon St.	114	Utility Billing Department	707 W. Center Circle	210	Well #10	S. Norton Rd.
103	Parks Dept. (Old City Hall)	106 E. Mt. Vernon St.	115	Police Department	715 W. Center Circle	301	Expy Sub-Station	350 S. Gregg Rd.
104	Rotary Park (Old City Park)	N. Fort St.	116	Nixa Community Center	701 N. Taylor Way	302	Downtown Sub-Station	101 N. Nixa St.
105	Old Shop Building	203 E. St. Louis St.	201	Well #1	203 E. St. Louis St.	303	Tracker Sub-Station	475 W. Christopher Dr.
106	Street Dept. Storage Bldg A	972 Old Riverdale Rd.	202	Well #2	Gene St.	304	Northeast Switching Station	1881 N. Monet Rd.
107	Wastewater Storage Bldg B	972 Old Riverdale Rd.	203	Well #3	702 N. Hill St.	402	Bentwater Pump Station	821 W. Myra Dr.
108	Old Dog Pound Building	972 Old Riverdale Rd.	204	Well #4	306 W. Tower St.	403	Bluebird Hills Pump Station	1887 N. Mallard Dr.
109	Wastewater Treatment Plant	972 Old Riverdale Rd.	205	Well #5	911 W. Mt. Vernon St.	405	Cobble Creek Pump Station	995 S. Ozark St.
110	Police Dept. Shooting Range	972 Old Riverdale Rd.	206	Well #6	727 E. Mt. Vernon St.	406	Industrial Park Pump Station	711 W. Kathryn St.
111	Compost Building #2	972 Old Riverdale Rd.	207	Well #7	514 S. Nicholas rd.	410	Inman School Pump Station	1300 N. Nicholas Rd.
112	New Dog Pound Building #1	972 Old Riverdale Rd.	208	Well #8	1240 W. Tracker Rd.	411	Kelby Creek Pump Station	362 S. Waterstone Bend
						414	Northeast Regional Pump Station	941 E. Mt. Vernon St.
						415	Northwest Regional Pump Station	801 W. Tracker Rd.
						416	Oakmont Pump Station	1321 W. Woodcastle Dr.
						417	Rolling Hills Pump Station	1120 W. Inmon Rd.
						418	Super 8 Pump Station	419 N. Mc Croskey St.
						419	Timber Creek Pump Station	938 Timber Springs Rd.
						421	Wilkeson Pump Station	940 W. Northview Rd.
						422	Wellington Park Pump Station	1352 W. Berkshire Ave.

Appendix K: Map of City of Nixa Stormwater Inspection and Maintenance Schedule



Appendix L: Map of City of Nixa Stormwater Priority Areas

CHAPTER 12: EVALUATION OF THE IDDE PROGRAM

12.1 INTRODUCTION

The MoDNR recommends that the IDDE Manual include procedures for program Evaluation and Assessment. Program evaluation is the time to step back, look at what has been done, determine what worked and what didn't, and make adjustments to planned future actions as appropriate in the City.

12.2 EVALUATION STRATEGY

Evaluation procedures will include documentation of actions taken to locate and eliminate illicit discharges. Such documentation will include numbers of outfalls screened, complaints taken and investigated feet of storm drain system, videotaped (if any), numbers of discharges eliminated, and number of dye or smoke tests conducted (if any). Note that this component of the IDDE Manual fits in with the overall Phase II requirements for identifying measurable goals for each BMP and reporting on progress toward achieving those goals.

Annual and/or bi-annual reports are necessary during the permit cycle to help determine the impact of these actions and an important part of the overall process. Assessment of what worked and what didn't, will provide the information needed to make these adjustments to the City's IDDE Program.

Some steps for assessing the effectiveness of the City's IDDE strategies may include:

- Evaluate the number of possible illicit discharges that were detected using different detection methods, to help determine which detection methods are most effective.

- Evaluate the number of discharges and/or quantity of discharges eliminated using different possible enforcement and compliance measures.

- Program evaluation will also include procedures for considering efficiency and feasibility.

Some questions to answer may include:

- How much staff time and expense did it take to achieve a given result?

- Were practical difficulties encountered with this approach? What were they, and how much of a problem did they present?

These types of questions will greatly help in determining what procedures the City will use for program evaluation and assessment. These procedures will be most helpful in providing the information needed to move forward with the IDDE Program will be decided as the Program further develops.