



Village of Round Lake, Illinois

NPDES Phase II Stormwater Program
Illicit Discharge Detection and
Elimination Procedures

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8678 Ridgefield Road

Crystal Lake, IL 60012

815.459.1260

Fax 815.455.0450

info@baxterwoodman.com

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1. INTRODUCTION

Illicit Discharge Detection and Elimination is one of six minimum control measures that must be included in the Village's Stormwater Program. To meet the requirements of General NPDES Permit No. ILR40 for this minimum control measure, the Village's Stormwater Program must include each of the components outlined below.

According to General NPDES Permit No. ILR40, the Village must:

- a. develop, implement and enforce a program to detect and eliminate illicit discharges into your small municipal separate storm sewer system (MS4);
- b. develop, if not already completed, a storm sewer system map, showing the location of all outfalls and the names and location of all waters that receive discharges from those outfalls;
- c. to the extent allowable under state or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-stormwater discharges into your storm sewer system and implement appropriate enforcement procedures and actions;
- d. develop, implement and adequately fund a plan to detect and address non-stormwater discharges, including illegal dumping, to your system;
- e. inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste; and
- f. address non-stormwater discharges into your small MS4 identified as a significant contributor of pollutants to your small MS4 (discharges or flows from the fire fighting activities are excluded from the effective prohibition against non-stormwater and need only be addressed where they are identified as significant sources of pollutants to waters of the United States).

This document establishes the Village's plan to detect and address non-stormwater discharges, including illegal dumping, into its stormwater drainage system. It represents component d. of the Village's Illicit Discharge Detection and Elimination Program (see above).

This document outlines the procedures by which the Village will prevent, detect and eliminate illicit discharges, including illegal dumping, into its stormwater drainage system. These procedures are described in detail in the document titled: *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, which was published by the Center for Watershed Protection in October 2004 (www.cwp.org).

The Village's Illicit Discharge and Connection Ordinance provides the regulatory framework for this plan and for the Village's entire Illicit Discharge Detection and Elimination Program. The Ordinance regulates non-stormwater discharges to the Village's stormwater drainage system to the maximum extent practicable under state and local law. It defines the term "illicit discharge" and establishes the Village's legal authority to carry out all inspection, surveillance and monitoring procedures necessary to control non-stormwater discharges to the stormwater drainage system.

1.1 Illicit Discharges

An illicit discharge is any direct or indirect non-stormwater discharge to the storm drain system, except as exempted by the Village's Illicit Discharge and Connection Ordinance. Common illicit discharges include:

- Sewage flows (from sanitary sewers connected to the storm sewer system);
- Septage flows (from septic systems);
- Washwater flows (laundry water, commercial carwash water, fleet washwater, commercial laundry water, floor washing to shop drains); and
- Liquid wastes (oil, paint, process water, etc. from radiator flushing, plating baths, etc.).

Consistent with General NPDES Permit No. ILR40 and the Village's Illicit Discharge and Connection Ordinance, non-stormwater discharges that are exempted include:

- Water line and fire hydrant flushing,
- Landscape irrigation water,
- Groundwater infiltration or uncontaminated pumped groundwater,
- Discharges from potable water sources,
- Footing or foundation drain water,
- Air conditioning condensate,
- Irrigation water (except for wastewater irrigation),
- Springs,
- Water from crawl space pumps,
- Storm sewer cleaning water,
- Water from individual residential car washing,
- Routine external building washdown which does not use detergents,
- Flows from riparian habitats and wetlands,
- Dechlorinated, pH neutral swimming pool discharges,
- Residual street wash water,
- Discharges or flows from fire fighting activities,
- Dechlorinated reservoir discharges, and
- Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).

The above listed exempted non-stormwater discharges may be discharged to the Village's storm drain system provided that they do not contribute substantial pollution to the storm drain system.

2. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROCEDURES

The Village's plan to detect and address non-stormwater discharges, including illegal dumping, into its stormwater drainage system includes four components. These components are:

1. Education
2. Detect and Identify Illicit Discharges
3. Remove/Eliminate Illicit Discharges
4. Program Evaluation and Recordkeeping

2.1 Education

Prevention is more effective and less expensive than detecting, tracing and eliminating discharges. Educating Village residents and businesses about proper waste disposal practices will help minimize unintentional discharges of pollutants into the Village's storm sewers, ponds, streams and rivers. As a part of the Village's Stormwater Program, the Village conducts regular public education and outreach. Information about illicit discharges should be presented in the Village's public education and outreach publications on a regular basis.

2.2 Detect and Identify Illicit Discharges

There are multiple strategies for detecting and identifying illicit discharges. The detection and identification strategy presented in this plan includes four components: desktop analysis, visual dry weather screening, water quality sampling and illicit discharge tracing.

2.2.1 Desktop Analysis - A desktop analysis can be used to identify areas within the Village that may be prone to frequent or recurring illicit discharges. The analysis can be used to identify the outfalls and receiving streams that need to be screened on a more regular

basis and the outfalls that can be screened less frequently. It can also be used to identify any areas of the Village that experience a high number of illicit discharges, which need to be screened more frequently. The following data can be used to complete the desktop analysis:

- ***Past Discharge Complaints and Reports*** - Review any records of suspected or identified illicit discharges reported by the public or found by the Village (do not include discharges that occurred soon after a rain event, unless they contained an obvious illicit discharge). Inquire with Village field staff as to where they have seen suspected illicit discharges or think they might be occurring.
- ***Poor Dry Weather Water Quality*** - Review any water quality data that already exists from outfalls or streams/ditches. Streams that have poor water quality may be the result of polluted stormwater runoff caused by an illicit discharge.
- ***Density of Industrial/Commercial Development*** - Higher densities of industrial and commercial development can signify a higher likelihood of illicit discharges, especially in older industrial areas.
- ***Age of Developed Areas*** - The older an area of the Village is, the greater the probability that illicit discharges will occur. A change in construction materials and methods, building codes and inspections means newer developments are less likely to have illicit connections.
- ***Aging or Failing Sewer Infrastructure*** - Older and aging sewer infrastructure experiences more leaks, cross-connections and broken pipes that can contribute sewage to storm drain systems. A higher probability of illicit discharges occurs when the sewer age exceeds the design life of the construction materials or when clusters of pipe breaks, spills, overflows or infiltration and inflow (I/I) are observed.
- ***Sewer Conversion*** - Areas once served by septic systems but connected to sanitary sewers and former combined sewer systems can be susceptible to illicit discharges.
- ***Density and Age of Septic Systems*** - Areas that have a high density of septic systems have a higher probability of illicit discharges. Septic systems greater than 30 years old are more prone to failure, which can cause septage to enter the stormwater drainage system.

2.2.2 Visual Dry Weather Screening - Visual dry weather screening is the simplest method that can be used to detect and identify illicit discharges and it can be extremely effective in detecting obvious illicit discharges. Illicit discharges often, but not always, have visible characteristics that can help indicate when stormwater is polluted. These characteristics include:

- Odor,
- Color,
- High turbidity,
- Suds/Foam,
- Synthetic oil sheen,
- Bacteria or algae growth at the outfall or downstream that are present when there are high nutrients in a discharge,
- Excessive vegetation at or just downstream of the outfall (indicating excess nutrients in discharge),
- Staining in pipe or at outfall (may indicate an intermittent illicit discharge),
- Poor downstream water quality,
- Toilet paper at outfall,
- In cold weather:
 - ◆ An outfall with multiple pipes, with one pipe frozen with ice and the other not frozen (may have had recent illicit discharges).
 - ◆ Discolored ice around the outfall.
 - ◆ An unfrozen area in a ditch or stream with moving water in an otherwise frozen area (indicates submerged outfall).

During visual dry weather screening, any signs of an illicit discharge, including those described above, should be recorded. If an outfall with flowing water is encountered, an attempt should be made to identify the composition of the water flowing from the outfall and the potential source of the water. If the water flowing from an outfall is an obvious illicit discharge, the screening process should immediately be stopped and the illicit discharge traced to its source.

To conduct visual dry weather field screening for illicit discharges, an Outfall Reconnaissance Inventory should be conducted. The following narrative describes the procedure for conducting the Outfall Reconnaissance Inventory.

With a copy of the Village's storm sewer outfall map or a USGS map in hand:

1. Walk receiving waters (e.g. streams, lakes, wetlands, etc.) looking for outfalls. It may also be helpful to identify outfalls to ditches that are tributary to the receiving waters as it is easier to identify illicit discharges at the end of a pipe than it is at the confluence of a ditch with a larger stream. The inspection walk can also be used to check the condition of other infrastructure (e.g. bridges).
2. Survey almost every outfall encountered. Only skip an outfall if it cannot, in any situation, contribute to or convey an illicit discharge. See the table below for guidance.

Outfalls to Record	Outfalls to Skip
<ul style="list-style-type: none"> ▪ Both large and small diameter pipes that appear to be part of the storm drain infrastructure ▪ Outfalls that appear to be piped headwater streams ▪ Field connections to culverts ▪ Submerged or partially submerged outfalls ▪ Outfalls that are blocked with debris or sediment deposits ▪ Pipes that appear to be outfalls from storm water treatment practices ▪ Small diameter ductile iron pipes ▪ Pipes that appear to only drain roof downspouts but that are subsurface, preventing definitive confirmation 	<ul style="list-style-type: none"> ▪ Drop inlets from roads in culverts (unless evidence of illegal dumping, dumpster leaks, etc.) ▪ Cross-drainage culverts in transportation right-of-way (i.e., can see daylight at other end) ▪ Weep holes ▪ Flexible HDPE pipes that are known to serve as slope drains ▪ Pipes that are clearly connected to roof downspouts via above-ground connections

3. Record outfall characteristics, such as pipe size, pipe material and the condition of the outfall.
4. Record the location of any previously unidentified outfalls. Survey any previously unidentified outfalls using the same protocol used to survey previously identified outfalls. Update storm sewer map as appropriate.
5. Record ownership or apparent ownership of the outfall. Is the outfall maintained by the Village or by a private owner? What is the apparent source of the outfall (roof downspout, municipal storm sewer system, foundation drain, etc.)?
6. Look for noticeable characteristics, such as stains, smudges and odors that are unusual for stormwater discharges and may be an indication of an illicit discharge.
7. For any obvious illicit discharges, stop the screening process and attempt to trace the source of the discharge immediately.
8. Take a digital photo of the outfall location. This is not required, but can save time in locating outfalls that may be submerged or obstructed in the future.

Visual dry weather field screening should be conducted during ideal weather conditions. Ideal weather conditions include:

- Low groundwater (e.g., few flowing outfalls) since high groundwater can confound results. Screening should not be done in the early spring when the ground is saturated with snowmelt.
- No runoff-producing rainfall within the previous 48 hours. Stormwater runoff can interfere with screening, both by masking illicit discharges (through dilution from high flows) or by providing false indications of illicit discharges (from pollutants contained in stormwater runoff).
- Leaf off. Dense vegetation does not affect the validity of screening, but makes locating outfalls more difficult. This criterion is recommended, but not required.

In some cases, visual dry weather field screening does not provide enough information to determine whether an illicit discharge exists. When the information provided

by visual dry weather screening is insufficient to determine whether or not an illicit discharge is present, water quality sampling can be conducted.

2.2.3 Water Quality Sampling - Water quality sampling may be necessary to help determine if an illicit discharge is present or to define the composition of an illicit discharge for tracing purposes. If an outfall with flowing water is encountered during the visual dry weather screening process, an attempt should be made to identify the composition of the water flowing from the outfall and the potential source of the water. Unless the water flowing from the outfall is composed strictly of stormwater or one of the exempted non-polluting, non-stormwater discharges listed below, the discharge may be contributing significant amounts of pollution to the receiving stream.

Exempted non-stormwater discharges include:

- Water line and fire hydrant flushing,
- Landscape irrigation water,
- Groundwater infiltration or uncontaminated pumped groundwater,
- Discharges from potable water sources,
- Footing or foundation drain water,
- Air conditioning condensate,
- Irrigation water (except for wastewater irrigation),
- Springs,
- Water from crawl space pumps,
- Storm sewer cleaning water,
- Water from individual residential car washing,
- Routine external building washdown which does not use detergents,
- Flows from riparian habitats and wetlands,
- Dechlorinated, pH neutral swimming pool discharges,
- Residual street wash water,
- Discharges or flows from fire fighting activities,
- Dechlorinated reservoir discharges, and

- Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).

If the discharge cannot be contributed by any of the sources listed above or can be contributed by any of the sources listed above but is suspected of being polluted, then water quality sampling is warranted.

Water quality sampling can be costly. Therefore, prior to conducting any water quality sampling, it is important to determine what parameters to sample for. A table of common indicator parameters that can be used to detect illicit discharges is presented below.

**Indicator Parameters Used to Detect Illicit Discharges
Discharge Types It Can Detect**

Parameter	Sewage	Washwater	Tap Water	Industrial/Commercial Liquid Wastes
Ammonia	●	*	—	*
Boron	*	*	—	N/A
Chlorine	—	—	—	*
Color	*	*	—	*
Conductivity	*	*	—	*
Detergents- Surfactants	●	●	—	*
E. coli				
Enterococci				
Total Coliform	*	—	—	—
Fluoride	—	—	●	*
Hardness	*	*	*	*
pH	—	*	—	*
Potassium	*	—	—	●
Turbidity	*	*	—	*

TABLE KEY

- Can almost always (>80% of samples) distinguish this discharge from clean flow types (e.g., tap water or natural water). For tap water, can distinguish from natural water.
- * Can sometimes (>50% of samples) distinguish this discharge from clean flow types depending upon regional characteristics, or can be helpful in combination with another parameter.
- Poor indicator. Cannot reliably detect illicit discharges, or cannot detect tap water.

Source: *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection, 2004.

If sampling reveals that the discharge does not contain any pollutants or that the source of the non-stormwater discharge is uncontaminated groundwater, then future water quality sampling at the same outfall may not be necessary, unless specific evidence of an illicit discharge is observed during a future Outfall Reconnaissance Inventory.

2.2.4 Illicit Discharge Tracing - A combination of methods can be used to isolate the specific source of an obvious illicit discharge. These are summarized below and are presented in detail in *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*.

1. **Trunk Investigations** - Three techniques can be used to narrow the source of a discharge problem to a single storm sewer segment:
 - Work upstream from the detected discharge, investigating all storm structures along the way. This can be started immediately after the discharge is detected at an outfall.
 - Work downstream to the detected illicit discharge from the pipes and storm structures located upstream of the outfall. This technique requires a characterization of the discharge composition and some desktop analysis to help determine the location of the source of the illicit discharge. This technique requires a complete stormwater atlas.
 - Break the trunk sewer into segments and perform visual inspection or water quality sampling at manholes at strategic points within the storm sewer system. This technique requires some desktop analysis to help decide what manholes should be inspected or sampled. This technique requires a complete stormwater atlas.
2. **On-Site Investigations** - These techniques can be used when the illicit discharge has been narrowed to a single location or pipe segment:
 - Dye testing,
 - Smoke testing,
 - Video surveillance,
 - Visual inspection at manholes,
 - Sandbagging or damming the sewer.

3. ***Intermittent or Transitory Discharge Monitoring*** - These techniques can be used to trace suspected illicit discharges from outfalls that exhibited abnormal characteristics (e.g. stains, smudges, odors) during the Outfall Reconnaissance Inventory. They can also be used to trace suspected illicit discharges that may be causing poor in-stream dry weather water quality or to monitor particular areas of the Village that are prone to frequent or recurring illicit discharges. Example intermittent and transitory discharge monitoring techniques include:
 - Odd hours monitoring,
 - Toxicity monitoring,
 - Optical brightener monitoring traps,
 - Caulk dams,
 - Pool sampling.

4. ***In-Stream Water Quality Monitoring*** - In-stream water quality monitoring can be used to help identify problem reaches or watersheds within the Village. Monitoring can be performed on a regular basis (e.g. monthly, weekly) to track changes and build a database. When performing in-stream water quality monitoring, the Village should sample for the parameters that are being targeted within the particular stream or watershed that is being monitored. In-stream monitoring should be done in conjunction with regular Outfall Reconnaissance Inventories, because the two techniques are complementary to one another and can help confirm results.

2.3 Remove/Eliminate Illicit Discharges

The Village's Illicit Discharge and Connection Ordinance establishes the Village's legal authority to carry out all inspection, surveillance and monitoring procedures necessary to control non-stormwater discharges to the stormwater drainage system. It also establishes the process for removing and eliminating any identified illicit discharges to the storm drain system. If an illicit discharge can be traced to its source, the first step toward eliminating it is to determine who is responsible for the discharge and who will need to pay to remove the discharge. The following table illustrates some common types of illicit discharges, the typical sources of these discharges, where responsibility lies and what actions can typically be taken.

Type of Discharge	Source	Removal Action(s)
Sewage	Break in right-of-way	Repair by municipality
	Commercial or industrial direct connection	Enforcement
	Residential direct connection	Enforcement; Incentive or aid
	Infrequent discharge (e.g., RV dumping)	Enforcement; Spill response
	Straight pipes/septic	Enforcement; Incentive or aid
Wash water	Commercial or industrial direct connection	Enforcement; Incentive or aid
	Residential direct connection	Enforcement; Incentive or aid
	Power wash/car wash (commercial)	Enforcement
	Commercial wash down	Enforcement
	Residential car wash	Education
Liquid wastes	Professional oil change/car maintenance	Enforcement; Spill response
	Heating oil/solvent dumping	Enforcement; Spill response
	Homeowner oil change	Warning; Education; Fines
	Spill (trucking)	Spill response
	Other industrial wastes	Enforcement; Spill response

Once the entity responsible for the illicit discharge has been identified, the next step is to remove or eliminate the discharge. There is some planning required to establish the illicit discharge process for each illicit discharge. The following narrative describes the procedure for setting up the illicit discharge removal process. It is consistent with the procedure outlined in the Village's Illicit Discharge and Connection Ordinance.

1. Determine the methods to be used to fix the problem. Solutions may include repair or replacement of infrastructure, removal of cross connections, infrastructure cleaning, or in situ rehabilitation. The preferred rehabilitation or repair method will depend upon the type and nature of the problem, the accessibility of the site and depth of underground infrastructure.
2. Establish the schedule for compliance. If an entity other than the Village is responsible for the repair or rehabilitation work, the Village should negotiate a specific date by which the work must be done.
3. Confirm that the illicit discharge has been removed and eliminated by the completion date specified in the schedule for compliance. The outfall or manhole where the discharge was first noted should be revisited to confirm that the illicit discharge has been removed or eliminated.

For discharges from internal plumbing and lateral connections, dye testing can be used to confirm that the connection has been removed. Sandbagging of the

first manhole located downstream of the correction site should be performed to confirm that the connection that was removed was the only illicit connection present at the correction site.

For illicit discharges resulting from infrastructure failures, dye testing or televising should be used to confirm that the illicit discharge was removed. Sandbagging and sampling at a downstream manhole can also be performed to confirm that the illicit discharge was removed.

2.4 Program Evaluation and Recordkeeping

The Village should conduct an annual review of its Illicit Discharge Detection and Elimination Program. The purpose of the annual evaluation is to determine if the program is successfully identifying and eliminating illicit discharges within the Village. It can also be used to determine what modifications can be made to improve the program.

One method that can be used to facilitate regular program evaluation is to establish a program tracking system. The tracking system should collect all of the information regarding the Village's illicit discharge detection and elimination efforts in a single location. The form of the tracking system will depend largely on existing resources available to the Village. The program tracking system can be as simple as a paper file containing the information collected during the Outfall Reconnaissance Inventories, or as complex as a computer database or GIS system.

The information to be entered into the Village's tracking system includes information about all of the outfalls within the Village's stormwater drainage system and supporting information about the contributing drainage area. Specifically, information that could be recorded in the Village's tracking system includes:

- Location of each outfall,
- Watershed and subwatershed information,
- Information about contributing land uses,

- Physical characteristics (e.g. size, material, condition) of each outfall,
- Outfall Reconnaissance Inventory data,
- Any accompanying digital photos,
- Any tracing or follow-up monitoring at outfalls or farther up the pipe,
- Any resident complaints about illicit discharges at outfalls or other storm structures, along with the Village's response to the complaints,
- Number of illicit discharges detected, identified and corrected,
- Status and disposition of any enforcement actions,
- Any in-stream water quality monitoring data,
- Any outfall water quality sampling data,
- Costs and budgetary information associated with each Illicit Discharge Detection and Elimination Program component (visual screening, sampling, tracing, etc.).

Annual analysis of the tracking system sheds light on program strengths and weaknesses and improves allocation of program resources.

Ultimately, the result of a successful Illicit Discharge Detection and Elimination Program will be improved water quality within the Village's streams, rivers, lakes and ponds.

References

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