

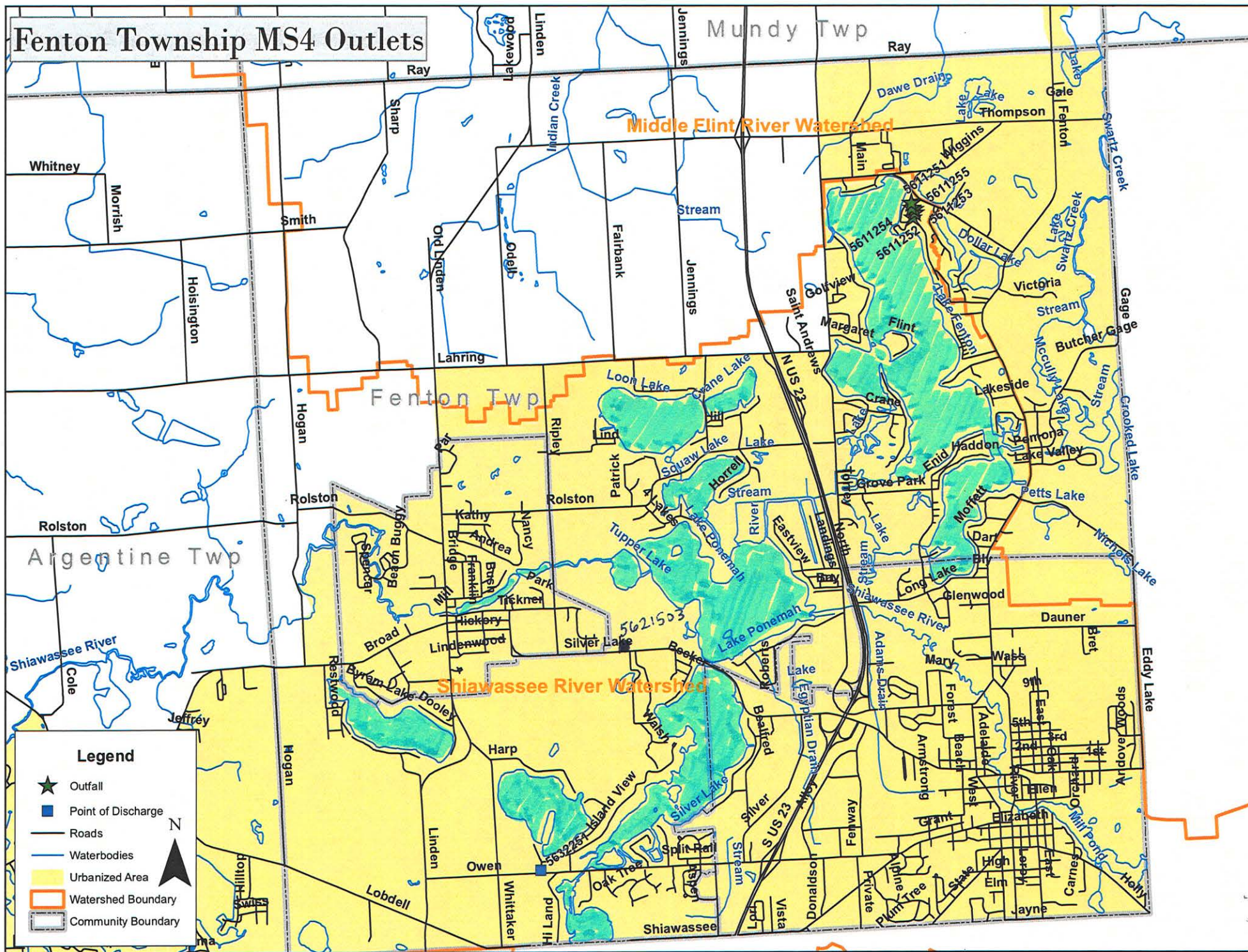
Attachment 1

To MDEQ Stormwater Discharge Permit Application

(Section IV map)

(Section V Table 1)

Fenton Township MS4 Outlets



Outfalls and Points of Discharge Table 1 Fenton Township

ID #	Outfall/POD	Receiving Water	Longitude	Latitude	Priority	Priority Explanation
5611251	Point of Discharge	Lake Fenton	-83.7167	42.85594	#Low	Sampled DS as 5611256, roof drains only
5611252	Outfall	Lake Fenton	-83.7166	42.8545	Medium	Commercial
5611253	Outfall	Lake Fenton	-83.7163	42.85496	Medium	Commercial
5611254	Outfall	Lake Fenton	-83.7163	42.85535	Medium	Commercial
5611255	Outfall	Lake Fenton	-83.7167	42.85545	Medium	Commercial
5621503	Point of Discharge	Ponemah Lake	-83.75735	42.81151	#Low	Sampled DS as 5621751
5632251	Point of Discharge	Egyptian 0867	-83.7703	42.78948	Medium	Residential

Priorities and Priority Explanations were updated March 2023 for new permit cycle.

Attachment 2

To MDEQ Stormwater Discharge Permit Application

(IDEP Plan)

(IDEP Protocol Manual)

(Individual Community Enforcement Authority)

(Illicit Discharge Ordinance/ Regulatory Mechanism)

(IDEP Ordinance Schedule)

ILLICIT DISCHARGE ELIMINATION PLAN (IDEP) 2014 Application

Submitted in partial fulfillment of the State of Michigan National Pollutant Discharge Elimination System Permit Application for Coverage of Storm Water Discharges by:

GENESEE COUNTY PHASE II PARTICIPANTS

Phase II Permittees:

Burton; Clio; Davison; Davison Township; Fenton; Fenton Township; Flint Township; Flushing; Genesee Township; Grand Blanc; Linden; Mount Morris; Mount Morris Township; Swartz Creek; Vienna Township; Genesee County.

Nested Jurisdictions under Genesee County Permit:

Atherton Community Schools	Fenton Area School	Lake Fenton Schools
Beecher Community Schools	Flint Board of Educations	Linden Community School
Bendle Public Schools	Flushing Community Schools	Mt. Morris Consolidated Schools
Bentley Community Schools	Genesee Schools District	Swartz Creek Community Schools
Carman Ainsworth Community Schools	Genesee Intermediate School District	Westwood Heights Schools
Clio Area Schools	Grand Blanc Community Schools	
Davison Community Schools	Kearsley Community Schools	Bishop Airport*

The Bishop Airport property is nested under Genesee County's permit for their storm water runoff only. They also have an industrial discharge permit for their other activities.

The Municipal Separate Storm Water Discharge Permit requires that all MS4s develop an illicit discharge elimination plan (IDEP). The above communities have entered into a 342 agreement with the Genesee County Drain Commissioner's office (GCDC) to assist them with their stormwater needs. As part of the contracted agreement the GCDC will be conducting the IDEP activities required by the permit on behalf of the communities and nested jurisdictions. This plan is submitted on behalf of all of the above communities and nested jurisdictions. It outlines the approach to be used to meet their IDEP obligations. The major components of the Genesee County IDEP plan include field verification of outfall locations, reviewing and eliminating illicit discharges, reviewing the legal authority, minimizing seepage from septic systems and sanitary sewers, and the coordination of activities.

Reviewing the Legal Authority

Legal authority for the management & elimination of illicit connections and discharges stems from two state authorities. The first is the Michigan National Pollutant Discharge Elimination System (NPDES) permit (MIG60000) which enables local communities to grant themselves the authority to regulate, prohibit, investigate, monitor and enforce illicit connects and discharges. The 342 permitted communities have been provided with an ordinance template that addresses each of these requirements that they can tailor to their own situation and then adopt it into their local code. Individual permittee legal authority is under a **separate document**.

The second legal authority stems from the Michigan Drain Code of 1956, Section 280.423, which grants the Genesee County Drain Commissioner (GCDC) the authority to prohibit illicit discharges. This authority applies to all legally established county drains. The relevant section from the Michigan Drain Code is attached.

The third legal authority is the Genesee County Health Department (GCHD), which governs septic systems only.

The fourth legal authority stems from PA 283 of 1909, section 19b. which requires a person, partnership, association, corporation or governmental entity to acquire a Permit for work within a county road from its Road Commission. Work would include connecting storm water outlets within the Road ROW. The relevant section is attached.

The GCDC together with local community representatives has reviewed the current legal authority and enforcement procedures. The County storm water ordinance template will provide local municipalities with the authority (once adopted) to prohibit illicit discharges and manage outfalls for all municipal drainage systems. Attachment "C" is the section out of the template ordinance that covers legal authority to prohibit illicit discharges.

The BMP subcommittee has been working on developing the Stormwater Ordinance, which includes the authority to detect and eliminate illicit connections and discharges to the permittee's MS4. Pursuant the COCs, the Stormwater Ordinance Template was submitted to the MDEQ for review under the revoked 2008 permit. The following schedule will be followed for adoption of the ordinance:

Aug 11, 2010: Meet with MDEQ, to go over comments and concerns.

October 11, 2010: make necessary changes and submit copy to MDEQ.

March 8, 2011: MDEQ withdrew 2008 permit

2014* required communities to adopt ordinance.

Field Verification of Outfall Locations

The outfall map section of this plan is based on field investigation conducted in the previous permit cycle together with permittee records. Although a majority of the collection systems was surveyed in the first permit cycle not all outfalls have been field verified. The IDEP plan approved under the previous permit used a different approach to locate and field verify outfalls. The IDEP crews walked the waters of the state within Genesee County and located all outfalls whether they were MS4's or private. With the 2008-2013 permit cycle, only MS4's are being identified. The outfalls that are being identified and screened are all MS4s where they are going from permittee jurisdiction into the waters of the state and discharge points between two permittee MS4 jurisdictions. **Note: Genesee County's permit covers several agencies and nested jurisdictions. A single outfall identified under the County's permit may contain**

multiple discharge points between agencies or nested jurisdictions covered under the same permit. An important part of this cycles IDEP work will be to continue to field verify the location of mapped outfalls. Additionally, ownership (municipal MS4 or private) will be determined for each outfall. Maps are being continually updated, but are available in a shapefile version (GIS). Electronic copies are available and were provided to the MDEQ upon request in 2010 and an updated version November 2011. Yearly outfall updates are prepared and submitted within the progress report.

All known outfalls and discharge points for each community (except Burton and Genesee County) have been identified. Genesee County's agencies and nested jurisdictions combined have more than 1,500 categorical discharges that are being identified. City of Burton took over the roads from the Genesee County Road Commission in the last 10-years. This has provided a significant larger number of outfalls under the City of Burton's jurisdiction than originally anticipated. Identification of the outfalls for Burton Roads has been complicated by not all roads having maps.

All outfalls identified as of April 1, 2014 are located in attachment 1. If all outfalls are not identified a plan is included on how they will be identified prior to Oct 1, 2014. A shape file of the outfalls and storm systems are available. As outfalls are added/ removed, specific location(s) for additional outfall(s) will be reported as needed. Changes will be reflected in an updated map to be included in the progress reports.

Prioritizing Areas for Dry Weather Flow

Areas to be dry weather flow tested first are prioritized based on the permit application (page 5) and other criteria listed below. Before Oct 1, 2014 all known outfalls will be evaluated based on the criteria below be ranked as high, medium or low priority and the basis for that ranking. Dry weather testing will be done based on the schedule below and geography to maximize resources and to reduce travel time, proximity of outfalls to one another will be taken into consideration. Copies of the updated outfalls with the priorities will be available to the State upon request.

NOTE: Individual Permittees that opt to follow a alternative procedure for dry weather testing will need to provide to the State their procedure that would supersede this one.

High Priority

- Areas with older infrastructure
- Industrial, commercial, or mixed use areas
- Areas with a history of past illicit discharges
- Areas with a history of illegal dumping
- Areas with onsite sewage disposal systems
- Areas with older sewer lines or with a history of sewer overflows or cross-connections
- Areas with poor dry-weather water quality
- *Areas with water quality impacts, including water bodies identified in a Total Maximum Daily Load
- Verification of Categorical Outfalls (previously unmapped ?& never tested)
- Discharge complaints and reports

Medium priority

- Other potential pollutant generating sites

	Type of commercial activity
	Areas with sewer conversions or historic combined sewer systems
Low priority	Undeveloped area
	Subdivisions less than 30 years old with no know history of illicit discharge
	Confirmed illicit discharge that has been removed
	Upstream Discharge points that are already being sampled at the outfall regardless of jurisdiction unless a suspected illicit discharge is found

*The only TMDL in Genesee County is for e-coli. The outfall would only be considered high priority under this choice if it had the potential of discharging e-coli.

Schedule: outfalls to be dry weather tested

2015	High priority outfalls for Municipalities 60% complete, Genesee Co 10% complete
2016	High priority outfalls for Municipalities 95% complete, Genesee Co 25% complete
2017	High priority outfalls for Municipalities 100% complete, Genesee Co 50% complete Medium priority outfalls for Municipalities 50% complete, Genesee Co. 10% comp
2018	High priority outfalls for Genesee Co 75% complete Medium priority outfalls for Municipalities 100%, Genesee Co. 60%
2019	High priority outfalls for Genesee Co 100% complete Medium priority outfalls for Genesee Co. 100% Low priority outfalls will be done in 2020-2025 permit cycle

Although ok the outfalls will be completed at the end of the 5-year IDEP cycle the year-to-year schedule is subject to adjustments due to weather, financial considerations and staff availability.

*Prior to October 1, 2014 a list showing the priority level of each outfall will be provided to the State.

Performing Dry-weather Screening

As mentioned above, one of the primary actions under the IDEP program is to identify and remove all illicit discharges and connections from the municipal storm sewer system. The outfall maps presented in Attachment 1 of the 2014 application is in ArcView GIS and this information will be updated and added to for guiding the screening of outfalls for dry weather flow.

To achieve IDEP requirements, each outfall that is prioritized High or Medium will be screened for signs of illicit discharges. Where illicit discharges are suspected, systematic investigation upstream of the outfall will be conducted to trace the discharge to the source where practicable.

*Genesee County outfalls include all County agency and nested jurisdiction outfalls. A single outfall identified under the County's permit may contain multiple discharge points between agencies or nested jurisdictions covered under the same permit. Only the County agency/nested jurisdiction at the point of outlet will be indicated on the outfall table. The PA 342 Contract acts as a interagency agreement.

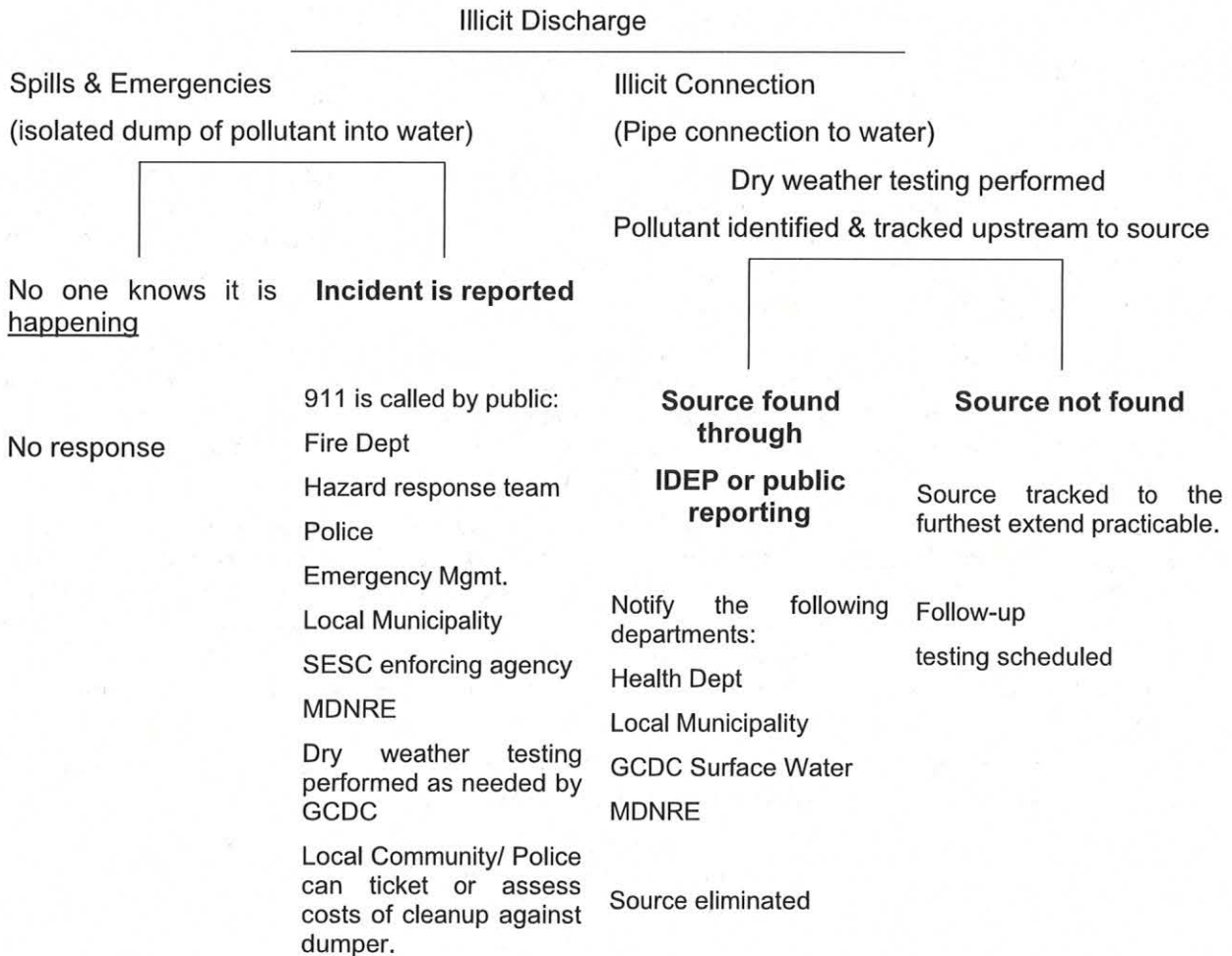
The process of locating and removing illicit connections is illustrated in an attached Work Plan Flow Chart. The flow chart is discussed in detail below. Forms for recording field inventory information and observations if dry weather flow is observed are also included at the end of this section. The dry weather screening form could be used multiple times at a single site if a suspected connection or discharge requires follow-up site visits.

The High or Medium outfall will be observed in the field during dry weather conditions, 72 hours with less than 0.10 inches of rainfall, and the sites will be checked for intermittent flows if suspected. If flow is present, it will be visually observed, checked for odors, and tested for representative tracer parameters such as pH, temperature, E. coli, fecal coliform, detergents, ammonia, and total organic carbon. The thresholds for the above parameters that trigger activity to determine the sources of illicit connections are listed below. All of these tests, except for pH and temperature, will be performed by a professional contract laboratory. Test results and observations will be used to identify areas that require follow-up investigations.

Parameter	Threshold
Ammonia (NH ₃)	1 mg/l
Surfactant	.2 mg/l
E.coli.	2000 Col. Per 100 ml
Ph	7 - 9

Decision Making

Depending upon the type of illicit discharge there are various responses that can occur. The following chart outlines the appropriate responses to an illicit discharge based upon whether they are spills and emergencies or illicit connection.



Depending on the type and location of an illicit discharge, the responsible party can change. In a spill or emergency, 911 should be called to initiate the emergency response. As an illicit discharge is identified and information is gathered, the responsible party will be identified from the above bulleted list.

The following are examples of the types of materials that if discharged constitute a spill or an emergency due to the potential introduction of pollutants to local waterways either directly or through stormwater: dredged spoils, solid waste (see below), sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat sources, wrecked or discarded equipment, rock, sand, petroleum products, industrial, municipal, and agricultural

waste. This list is not meant to be exhaustive. The quantity of the spill should also be considered in conjunction with the type of spill that has occurred before reporting it. For example, wastewater from painting activities need not be reported to 911 but one may wish to mention it to the authorities such as public works, or the GCDC to have them contact the offender in order to educate them.

Illegal dumping: permittee will make sure 911 has been contacted, who will contact fire dept, police, emergency management and the hazardous response team. Local responder will depend on the nature of the discharge (see above) and if a responsible party is identified. If a responsible party is identified, a private cleanup company may be involved. MS4 owner is enforcement agency for follow up. (local municipality, County, MDNRE).

Illicit sanitary connection: once identified, GCDC will contact the Health Dept, local community, MS4 owner and MDNRE by letter. Enforcement agency for follow up is Health Dept, coordinated with GCDC.

Failing soil erosion measures: MS4 owners are the enforcement agency once construction is complete and the soil erosion permit has been released. If the site is a current construction site, the permittee will make sure the presiding SESC agency has been notified pursuant section 9107 of Part 91 and fill out a spill form. If there is an active SESC permit then the presiding SESC agency is the enforcement agency.

Large quantity spill: permittee will make sure 911 has been contacted, who will contact fire dept, police, emergency management and the hazardous response team. Local responder will depend on the nature of the discharge and if a responsible party is identified. If a responsible party is identified, a private cleanup company may be involved. MS4 owner is enforcement agency for follow up. (local municipality, County, MDNRE).

In all the above instances, if a responsible party is not identified, and if the spill is significant enough to warrant clean-up, measures will be taken to address the problem by local authorities to levels that at a minimum ensure public safety. The decision to commence with a clean-up will be made by whoever has jurisdiction over the spill site. In some cases there maybe multiple jurisdictions in which case all parties will be consulted on the course of action to occur. For all significant spills, the MDEQ will receive verbal notification of the event within twenty-four (24) hours.

Within Individual communities, if an emergency spill is received, this person will make sure that the call gets resolved or forwarded to the responsible agency.

Davison Township	DPW Director
Fenton Township	Ordinance Enforcement Officer
Flint Township	Building Dept Agent
Genesee Township	Code Enforcement Officer
Mt. Morris Township	Code Enforcement Officer
Vienna Township	Building Superintendent
City of Burton	DPW Director
City of Clio	City Administrator
City of Davison	Clerk/DPW
City of Fenton	DPW Director
City of Flushing	DPW Supervisor
City of Grand Blanc	Public Works Director
City of Linden	DPW Director
City of Mt. Morris	DPW Superintendent
City of Swartz Creek	DPW Director

Illicit Source Identification

GCDC-SWM has been contracted to coordinate the dry weather testing and perform any follow up on behalf of the Contracted Phase II communities and nested jurisdictions listed on the first page of this document. When initial testing has identified a potential problem, it will be given to the GCDC office staff to follow up and confirm an illicit connection or not. The land use and type of buildings in the area will be considered to determine the next course of action. Based on the land use and the results of the observations and chemical testing, additional manholes will be investigated. Tracing of the pollutant stream will continue by manhole investigations until the source is isolated within a relatively short reach of sewer. Dye testing of building fixtures will then be used to locate the source.

Dye testing will be scheduled by GCDC staff at individual buildings following notification of the building owner to explain the need for this investigation and how it will be performed. In general, dye testing will be used as the final step to gain positive identification of an illicit connection. Televising the sewer may be used to further isolate the pollutant source or may be used if dye testing does not reveal the source of the problem. This approach is intended to locate illicit connections in the most cost-effective and efficient manner possible. It will focus the use of dye testing in those areas with the highest potential for illicit connections.

Field investigations to identify specific illicit connection locations will be performed by either the GCDC or a consultant contract. If a source is found discharging to a municipal's or nested jurisdiction's MS4 that is not owned by Genesee County, GCDC will also notify owner, elected official (supervisor, mayor or superintendent) or in the case of the airport the facilities manager for assistance to perform the tracking and elimination of the illicit discharge. If a source is found discharging to a Genesee County MS4, GCDC will also notify the appropriate agency(ies) for assistance to perform the tracking and elimination of the illicit discharge.

Illicit discharges to MS4 systems other than the County's, 342 communities and nested jurisdictions that are discovered will result in the generation of a letter to the owner/operator informing them of the problem. If it is a confirmed illicit discharge the MDEQ will be copied on the letter.

Occasionally, hot spots are located that may threaten local water quality. Stormwater hot spots are areas where current or legacy land uses or activities generate contaminated runoff, with concentrations of pollutants exceeding those typically found in stormwater. A typical example is an abandoned underground storage tank associated with a gas station. If a suspected hot spot comes to the attention of GCDC they will develop a plan to monitor the hot spot and the surrounding area, within their capacity, to determine the degree and extent of the problem and the threat (if any) it may pose to local waterways and public health. Appropriate action will then be taken as limited by the availability of funds.

When potential illicit connections are located, the GCDC will be provided with specific details by the consultant/ field investigator. The GCDC will be responsible for coordinating the tracking of an illicit connection upstream to its source and elimination. Once an illicit connection has been confirmed a letter to notify the property owner / responsible party and other involved parties (including the municipality, MS4 owner and the MDEQ) of the violation and require corrective action by the property owner or responsible party. If the illicit connection is time sensitive or beyond the jurisdiction of this program (such as an industrial discharge), an e-mail may be sent

in lieu of a letter. Once the confirmed illicit connection has been eliminated a follow-up letter will be sent to all involved parties.

Eliminating Illicit Discharges and Pursuing Enforcement Action

Prioritization of verifying and removing potential illicit connection is done through a combination of when they are initially detected (chronologically) and by geographical location (trying to maximize resources through scheduling investigation that are close to each other). If the property owner does not respond in the specified time frame, follow-up enforcement action will be taken by GCDC or the appropriate enforcing agency. Each problem is unique and depending upon the circumstance. When the property owner or responsible party has indicated that a connection has been eliminated, GCDC will confirm that all problems have been fixed to their satisfaction for both the County Departments, nested jurisdictions and 342 communities.

GCDC and its partners will work to eliminate all illicit discharges to the maximum extent practicable. This means exhaustive steps will be taken within the limits of financial and technical resources available to address the problem. Occasionally, elimination of the source is not possible either because it cannot be found or the cost to address the problem exceeds the benefits of making the correction. In these cases either a management plan will be implemented and/or the location identified for regular monitoring by the owner/operator.

Updated maps are provided in the progress reports that reflect ownership, status of any illicit connections found, as well as corrections to the original information in the permit.

Public Notification System for Illicit Discharges

Currently the Illicit Discharge system is split between those that are associated with illegal dumping and those releases associated with MS4s. The above flow chart illustrates the various paths and responsible parties involved in managing Illicit Discharges.

The number of possible ways that an illegal dumping can occur compounded by the number of agencies involved make centralization of this function extremely difficult and cost prohibitive under the current economic climate. Furthermore, centralization of the function may in-fact reduce response time and clean up efficiency due to having to educate the public about the who they should call. Current laws do not provide for a single responsible party.

The permit requires the permittee to develop and implement a procedure for the receipt and consideration of complaints or other information submitted by the public regarding construction activities discharging waste to the MS4.

The M&M Subcommittee had already created a form to be used to track illegal dumping as reported by the public, similar in concept to a "chain of custody" form used to track hazardous materials. The form originates with the agency that receives the call from the public and ends with GCDC. This way illegal dumping calls will be responded to as they are received. Calls will continue to be prioritized by the type of suspected release. For example, from the responder's perspective a suspected oil spill will take precedent over a suspected detergent spills. Another benefit to improving the current system is that it allows local communities under current laws to levy fines and collect clean-up costs if the responsible party can be identified.

The illicit dumping form will direct the originating agency to notify GCDC within 24 to 48 hours and inform them of any corrective action taken. This way GCDC can track any open notification

that still may need to be followed up on as well as determine any apparent patterns that may lead to eliminating re-occurrences in the future.

The permit requires the permittee to develop and implement a procedure to provide notice to the part 91 permitting entity and the Department when pollutants are discharged in violation of section 9116 of Part 91 (SESC rules). The requirement of notice of violation has already been required in section 9107 of Part 91. A new procedure is unnecessary.

Note: minor changes to the spill form have been done to include SESC information to notify of SESC complaints.

Minimizing Seepage from Septic Systems and Sanitary Sewers

A map of the sanitary sewer service areas was prepared in 2006 for the watershed plan to define areas where sanitary service is available and septic tanks can be prohibited. Those areas with possible septic tanks are included in the watershed management plans. As part of the actions in the Watershed Management Plan, Genesee County will explore the possibility for a time of sale septic tank inspection ordinance and coordinate such activities with the County Public Health Department.

GCDC Water and Waste Services (WWS) has a PA 342 Water and Sewer Advisory Board (WSAB) with their water and sewer community customers. The WSAB have a sanitary sewer infiltration and inflow removal program (I&I Program). This program is being enforced by both GCDC-WWS and the local communities that use the WWS treatment plants. Since 2001 there has been a significant effort to reduce I&I through monitoring flows between communities, lining sanitary lines, locking sanitary lids, waterproofing structures, footing drain removal and other efforts by all parties. This has resulted in a wet weather reduction to the treatment plants. There has also been a reduction on sanitary sewer overflows due to wet weather. WWS has also focused on efforts to the infrastructure and treatment plants to build in non-wet weather capacity.

Training

At the start of every IDEP field season training is conducted for new Tetra Tech employees, summer interns, GCDC personnel and individuals from various other firms and municipalities. The training is typically for an entire day and provides procedural information for individuals that have not previously been involved in IDEP operations, and it serves as a refresher for the regular IDEP field crews. There is both an in-class module and a field demonstration. Through the use of Power Point presentations, IDEP protocol manuals, and hands on training in the field, individuals are given the tools to collect and record the required data under the Phase II Storm Water permit.

At a minimum the following topics are covered:

The definition of illicit discharges and connections

Techniques for finding illicit discharges, including field screening, source identification, and recognizing illicit discharges and connections

Methods for eliminating illicit discharges and the proper enforcement response

A training schedule and requirement for training during the term of the permit

Additional topics usually include:

The methodology that will be utilized by the municipality to find, prioritize and eliminate illicit discharges and connections to the municipal separate storm sewer system (MS4)

The IDEP investigation history for the municipality

Desktop assessment of illicit discharge potential within the municipality, including assessment of the highest priority investigation areas based on the prioritization criteria listed in Table 1 of the permits

Investigation planning and preparation for field work

Field techniques that can be used to detect and identify the sources of illicit discharges/connections.

Training for staff that have field jobs

For staff that do not actually perform Dry weather flow, but do work in field jobs that would have the potential for them to witness illicit discharges and connections, a information sheet is being developed. See Attachment C. This will be provided to appropriate staff per IDEP training and evaluation (#18) requirements in the 2014 application and can be used to train staff.

An information sheet on signs of an illicit discharge, see attachment – will be provided to staff per IDEP training and evaluation (#18) requirements in application. We will provide the training/literature on the following schedule:

Staff training will be provided utilizing the illicit discharge brochure (Attachment C) and the Spill Notification Complaint Reporting form.

Employees to be trained: Ordinance Enforcement Officer, Building Inspector, Assessor and reception staff

Training frequency: Annual

Training for new staff: Within 6 months of hire date

Effectiveness of IDEP program

The current permit requires that the permittee determine the effectiveness of their illicit discharge elimination activities. These evaluation activities are in addition to inspecting each high and medium storm water point source every five years. GCDC will use three evaluation methods, all of which are approved methods in the MDEQ IDEP guidance. The current GCDC IDEP program will continue to compare the number of illicit discharges/connections eliminated versus the number found and report these in the annual report. The second evaluation method is to use the illicit discharge tracking form for public generated complaints. Information collected will be reported in the progress reports. The last evaluation method to be used is the ambient water quality monitoring results generated yearly from the existing program. Project Green, FRWC's Benthic Monitoring, monitoring conducted for IDEP investigation and any additional hot spot monitoring are updated and analyzed annual.

Progress Report

GCDC together with its member permittees will provide documentation of the actions taken to eliminate illicit discharges. For identified illicit discharges, the permittees shall summarize the total estimated volume and pollutant load eliminated for the main pollutants of concern, and the locations of the discharges into both the permittees MS4 and the receiving water.

Coordination of Activities

The Genesee County Drain Commissioner will be coordinating with all municipalities, county agencies and nested jurisdictions to address illicit connections/discharges, local ordinances, and seepage from septic systems and sanitary sewers. This work is proposed to be performed under a PA 342 contract with Genesee County. All work is proposed to be directed by the Drain Commissioner and coordinated with the Road Commission, Health Department, Emergency Management Services, and local officials, as appropriate. Annual discussions on IDEP matters will be placed on 342 committee of the whole meetings.

Record Keeping

Permittees shall make records associated with IDEP activities to address illicit discharges and connections available to the MNRE upon request.

DRAINAGE SYSTEM INVENTORY

GENERAL

ID

Date _____ Time _____

Crew Initials _____ Chk By: _____

Photographs: Roll # _____ Picture #'s _____

DISCHARGE STRUCTURE TYPE

- ☐ PSD
- ☐ Manhole
- ☐ Catch Basin
- ☐ Culvert Outlet
- ☐ Point in Open Channel
- ☐ Abandoned
- ☐ Unknown

PSD Status

- ☐ PSD
- ☐ Not a PSD
- ☐ PSD Not in Permit (New)
- ☐ PSD Not Permittable
- ☐ Structure within Drainage Network

LOCATION (see back side for location sketch)

Latitude

Longitude

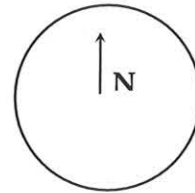
Invert Elevation

Offset Description:

Receiving Water Body:

DISCHARGE SRUCTURE INFORMATION

Pipe ID						
Direction from MH						
Shape						
Diameter (in)						
Width (in) (Open Channel)						
Depth (in)						
Measure Down (ft) (Manhole)						
Invert Elevation (ft) (Pipes)						
Conduit Material						
US/DS End						



Comments

LOCATION SKETCH

LOCATION SKETCH CHECK LIST

Label Street Names

Indicate North

Locate manholes by dimensions from property lines, back of curb, or edge of pavement

Sketch catch basins and connections (no measurements necessary).

Indicate (if possible) distance to upstream and downstream manholes

Landmarks/nearest address, if any

Flow direction

Sample point

Special access/traffic control notes

Between mile markers _____ & _____ or _____ tenths past mile marker _____

Velocity/depth measure location

DRAINAGE SYSTEM SCREENING

GENERAL

ID

Date

Time

Air Temp

Rain ☐ Yes ☐ No

☐ Clear/Sunny

Crew Initials

Chk By:

☐ Partly Cloudy

Photographs: Roll # Picture #

☐ Overcast

DRY WEATHER FLOW PRESENT

☐ Yes, Dry Weather Flow Present

☐ Trace, Insufficient

☐ No Dry Weather Flow Present

☐ Standing Water

☐ Submerge

☐ Inundated

☐ N/A

FLOW MEASUREMENTS

Pipe Sampled: Size (in) Direction

Method ☐ Tt Method

General Data

Travel

:

☐ Area * Velocity

Depth, (in)

Time
Trials

☐ Bucket

Distance
Traveled, (ft)

#1 (sec)

☐ Manning's

Bucket Vol, (l)

#2 (sec)

Channel Slope
(%)

#3 (sec)

Channel
Material

Avg (sec)

Flow:

Channel, n

Vel (fps)

Intermittent ☐ Not Checked

Flow Check ☐ Left Sand Bag in Channel

☐ Removed Sand Bag, intermittent DWF present ☐ Yes ☐ No

if possible describe frequency, duration, time of day of flow slugs – put in comments section

DISCHARGE OBSERVATIONS (if “other” checked fill in description at bottom of page)

Odor ☐ None ☐ Musty ☐ Sewage ☐ Rotten Egg ☐ Gas ☐ Oil ☐ Other

Floatables ☐ None ☐ Trash ☐ Sewage ☐ Bacterial Sheen ☐ Oil Sheen ☐ Suds ☐ Other

Deposits/
Stains ☐ None ☐ Mineral ☐ Sediment ☐ Oily ☐ Grease ☐ Suds ☐ Other

Vegetation ☐ None ☐ Normal ☐ Excessive ☐ Algae ☐ Slime ☐ Other

Structural ☐ Normal ☐ Cracking ☐ Spalling ☐ Corrosion ☐ Settlement ☐ Staining ☐ Other

Color _____ Enter #

Turbidity _____ Enter #

Description:

RECEIVING WATER OBSERVATIONS (if "other" checked fill in description at bottom of page)

Odor	<input type="checkbox"/> None	<input type="checkbox"/> Musty	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rotten Egg	<input type="checkbox"/> Gas	<input type="checkbox"/> Oil	<input type="checkbox"/> Other
Floatables	<input type="checkbox"/> None	<input type="checkbox"/> Trash	<input type="checkbox"/> Sewage	<input type="checkbox"/> Bacterial Sheen	<input type="checkbox"/> Oil Sheen	<input type="checkbox"/> Suds	<input type="checkbox"/> Other
Deposits/ Stains	<input type="checkbox"/> None	<input type="checkbox"/> Mineral	<input type="checkbox"/> Sediment	<input type="checkbox"/> Oily	<input type="checkbox"/> Grease	<input type="checkbox"/> Suds	<input type="checkbox"/> Other
Vegetation	<input type="checkbox"/> None	<input type="checkbox"/> Normal	<input type="checkbox"/> Excessive	<input type="checkbox"/> Algae	<input type="checkbox"/> Slime		<input type="checkbox"/> Other
Bank	<input type="checkbox"/> Excessive Vegetation	<input type="checkbox"/> Staining of Banks	<input type="checkbox"/> Erosion	<input type="checkbox"/> Trash			<input type="checkbox"/> Other
Color	_____	Enter #					
Turbidity	_____	Enter #					

Description:

DRAINAGE SYSTEM SCREENING (Continued)

ID

CHEMICAL ANALYSIS

FIELD ANALYSIS LAB SAMPLE COLLECTED ID _____

Surfactants	_____ mg/L	Temperature	_____
Ammonia	_____ mg/L	pH	_____
Boron	_____ mg/L	Specific Cond.	_____
Potassium	_____ mg/L		_____

E. Coli

_____ per 100ml

RESULTS

- ☐ Illicit Connection Ruled Out
- ☐ Illicit Connection (undocumented connection)
- ☐ Pending
- ☐ Notify City
- ☐ Not a PSD

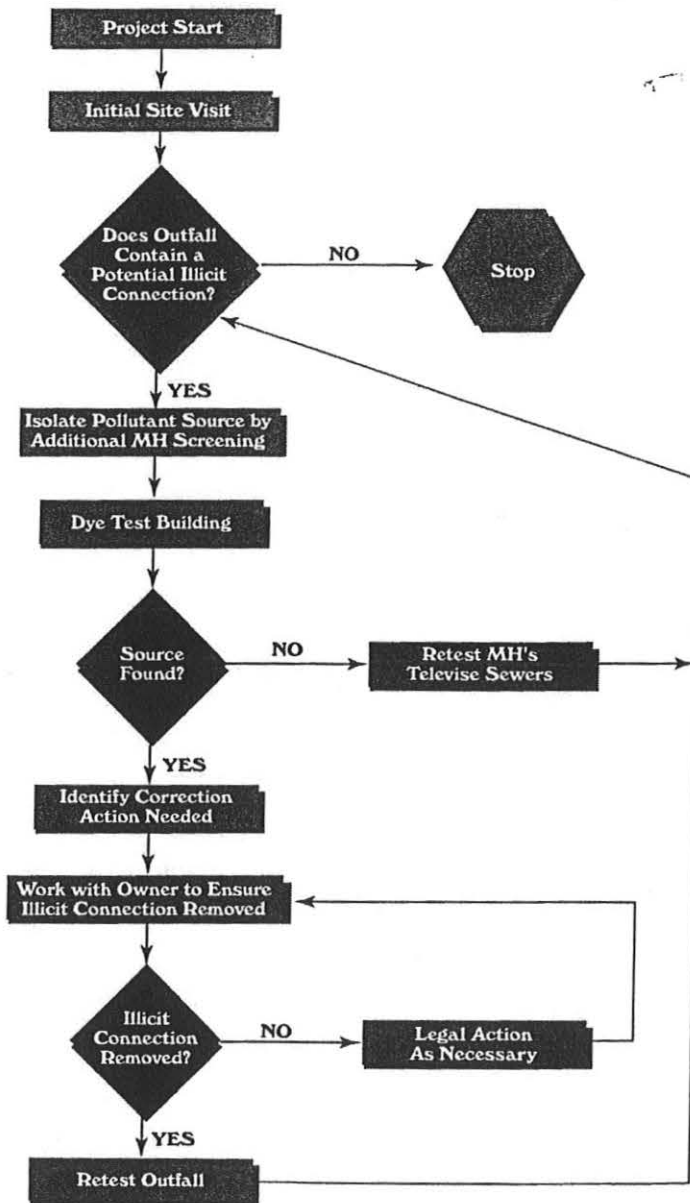
ACTION

- ☐ None Required
- ☐ Illicit Removed
- ☐ Waiting on Lab Results
- ☐ Dye Test
- ☐ Televise
- ☐ Investigate Further
- ☐ Illicit Connection

Comments



Illicit Discharge Elimination Program Work Plan Flow Chart



Michigan Drain Cod5 eff. 1956

Attachment "A"	Drain Code excerpt
Attachment "B"	PA283 of 1909 excerpt
Attachment "C"	*How to spot Illicit Discharge Brochure
Attachment "D"	(Left Blank)
Attachment "E"	Spill Notification

Attachment "A"
DRAIN CODE

280.423 Discharge of certain sewage or waste matter into drains prohibited; construction to purify flow; petitions; order of determination; findings; construction of drain; plans and specifications; contracts; costs; review; acquisition of land; application and fee for sewer connections; connections; powers of drain commissioner or drain board; failure to comply with section; violation as misdemeanor; fine; "person" defined.

Sec. 423. (1) A person shall not continue to discharge or permit to be discharged into any county drain or intercounty drain of the state any sewage or waste matter capable of producing in the drain detrimental deposits, objectionable odor nuisance, injury to drainage conduits or structures, or capable of producing such pollution of the waters of the state receiving the flow from the drains as to injure livestock, destroy fish life, or be injurious to public health. This section does not prohibit the conveyance of sewage or other waste through drains or sewers that will not produce these injuries and that comply with section 3112 of part 31 (water resources protection) of the natural resources and environmental protection act, Act No. 451 of the Public Acts of 1994, being section 324.3112 of the Michigan Compiled Laws.

(2) Disposal plants, filtration beds, and other mechanical devices to properly purify the flow of any drain may be constructed as a part of any established drain, and the cost of construction shall be paid for in the same manner as provided for in this act for other drainage costs. Plants, beds, or devices may be described in the petition for the location, establishment and construction of drains or in the petition for the cleaning, widening, deepening, straightening, or extending of drains, or in the application for the laying out of a drainage district. Petitions for the construction of plants, beds, and devices for use on any established drain may be filed by the same persons and shall be received and all proceedings on the petitions in the same manner as other petitions for any drainage construction under this act.

(3) If the department of environmental quality determines that sewage or wastes carried by any county or intercounty drain constitutes unlawful discharge as prescribed by section 3109 or 3112 of part 31 of Act No. 451 of the Public Acts of 1994, being sections 324.3109 and 324.3112 of the Michigan Compiled Laws, that 1 or more users of the drain are responsible for the discharge of sewage or other wastes into the drain, and that the cleaning out of the drain or the construction of disposal plants, filtration beds, or other mechanical devices to purify the flow of the drain is necessary, the department of environmental quality may issue to the drain commissioner an order of determination identifying such users and pollutants, under section 3112 of Act No. 451 of the Public Acts of 1994, being section 324.3112 of the Michigan Compiled Laws. The order of determination constitutes a petition calling for the construction of disposal facilities or other appropriate measures by which the unlawful discharge may be abated or purified. The order of determination serving as a petition is in lieu of the determination of necessity by a drainage board pursuant to chapter 20 or 21 or section 122 or 192 or a determination of necessity by a board of determination pursuant to section 72 or 191, whichever is applicable. A copy of the findings of the department shall be attached to the order of determination which shall require no other signature than that of the director of the department of environmental quality. Upon receipt of the order of determination, the drain commissioner or the drainage board shall proceed as provided in this act to locate, establish, and construct a drain. If the responsible users of the drain are determined to be public corporations in the drainage district, the drain commissioner or the drainage board shall proceed as provided in chapters 20 and 21, as may be appropriate, using the order of determination as the final order of determination of the drainage board. If the responsible users are determined to be private Persons, the drain commissioner shall proceed as provided in chapters 8 and 9, using the order of determination as the first order of determination.

(4) Plans and specifications for the construction as part of a drain of any disposal plant, filtration bed, or other mechanical device to properly purify the flow of the drain shall be prepared by the drain commissioner or the drainage board. Contracts for construction shall be let in the manner provided in this act. To meet the cost of any preliminary engineering studies for the construction of abatement or purification facilities, the drain commissioner or the drainage board shall apportion the cost among the several parcels of land, highways, and municipalities benefited thereby in the same manner as provided

in chapter 7 or against the public corporations affected by the order of determination in the same manner as provided in chapters 20 and 21. The costs and charges for maintenance shall be apportioned and assessed each year. If the apportionment is the same as the last recorded apportionment, a day of review or a hearing on apportionments is not necessary, but if the apportionment is changed, notice of a day of review or a hearing on apportionment shall be given to each person whose percentage is raised.

(5) Land may be acquired as a site for the construction of such plants, beds, and devices, and releases of land may be obtained in the same manner as provided in this act for other lands acquired for right of way.

(6) A person shall not connect sewage or other waste to a county or intercounty drain except with the written approval of the appropriate commissioner or the drainage board indorsed upon a written application for such service and the payment of a service fee of not to exceed \$50.00 for each connection to a covered drain. The application shall include information showing that all other local, state, and federal approvals related to the sewage or waste have been obtained.

(7) The fee provided for in subsection (6) shall be set and collected by the drain commissioner, as approved by the county board of commissioners or the drainage board, and deposited with the county treasurer, to be credited to the drain fund set up for the maintenance or construction of the drain. The commissioner or the drainage board shall keep a record of applications made and the action on the applications. The commissioner or the drainage board may reject applications for or require such modification in requested applications for sewer connections to county drains as necessary to attain the objectives set forth in this section.

(8) Subject to the review and approval of the department of environmental quality, the drain commissioner or drainage board may study the requirements of persons for flood control or drainage projects including sewage disposal systems, storm sewers, sanitary sewers, combined sanitary and storm sewers, sewage treatment plants, and all other plants, works, instrumentalities, and properties useful in connection with the collection, treatment, and disposal of sewage and industrial wastes or agricultural wastes or run-off, to abate pollution or decrease the danger of flooding. The objective of such studies shall be that sewers, drains, and sewage disposal facilities are made available to persons situated within the territorial limits of any drainage district or proposed drainage district as necessary for the protection of public health and the promotion of the general welfare.

(9) The drainage board or drain commissioner may cooperate, negotiate, and enter into contracts with other governmental units and agencies or with any public or private corporation including the United States of America, and to take such steps and perform **such** acts and execute such documents as may be necessary to take advantage of any act of the congress of the United States which may make available funds for any of the purposes described in this section.

(10) Failure to comply with any of the provisions of this section subjects the offender to the penalties described in section 602. However, for each offense, a person who violates subsection (6) is guilty of a misdemeanor punishable by a fine of not more than \$25,000.00 or imprisonment for not more than 90 days, or both. In addition, the person may be required to pay the costs of prosecution and the costs of any emergency abatement measures taken to protect public health or the environment. Payment of a fine or costs under this subsection does not relieve a person of liability for damage to natural resources or for response activity costs under the natural resources and environmental protection act, Act No. 451 of the Public Acts of 1994, being sections 324.101 to 324.98106 of the Michigan Compiled Laws.

11) As used in this section, "person" means an individual, partnership, public or private corporation, association, governmental entity, or other legal entity.

History: 1956, Act 40, Imd. Eff. Mar. 28, 1956 ;--Am. 1972, Act 298, Imd. Eff. Dec. 14, 1972;--
b. 1996, Act 60, Imd. Eff. Feb. 26, 1996 ;--Am. 1996, Act 552, Eff. Mar. 31, 1997.

Attach B

PUBLIC HIGHWAYS AND PRIVATE ROADS (EXCERPT)

Act 283 of 1909

{Act 212 of 1960}

224.19b Working within right-of-way of county road; permit required; exceptions; permit requirements and schedule of fees; itemization of costs; annual and emergency permits; security.

Sec. 19b.

(1) A person, partnership, association, corporation or governmental entity shall not construct, operate, maintain or remove a facility or perform any other work within the right of way of a county road except sidewalk installation and repair without first obtaining a permit from the county road commission having jurisdiction over the road and from the township, city or village in which the county road is located when a permit is required by ordinance of the township, city or village, pursuant to authority conferred by article VII, section 29 of the Michigan constitution of 1963. The adjacent property owner shall not be required to obtain a permit for work incidental to the maintenance of the right of way lying outside of the shoulder and roadway.

(2) A county road commission and a local unit of government may adopt after a public hearing of which notice has been given by publication at least twice in a newspaper circulated in the county not more than 30 days nor less than 7 days prior to the hearing, reasonable permit requirements and a schedule of fees to be charged sufficient to cover only the necessary and actual costs applied in a reasonable manner for the issuance of the permit and for review of the proposed activity, inspection and related expenses. After the work authorized in the permit has been completed, itemization of all costs shall be supplied upon request of the permit holder.

(3) When a road commission adopts procedures for the issuance of permits or adopts a schedule of fees in accordance with the provisions of this section, separate procedures and fee schedules shall be adopted for the issuance of annual and emergency permits which reflect the minimal administrative burden of issuing an annual permit for frequent but routine and unobtrusive work such as surveying and the extraordinary emergency repairs to municipal or public utilities.

(4) A county road commission may not refuse a permit requested by a government entity for the installation of a facility or utility owned by that entity if security is given by the permittee or its contractor to the county road commission sufficient to insure restoration of the road and appurtenances thereto and adjacent right of way to a condition reasonably equal to or better than that existing prior to such installation nor may a county road commission charge a government entity a permit fee exceeding \$300.00 per permit or \$1,000.00 total for all permits per project.

History: Add. 1980, Act 212, Eff. Mar. 31, 1981

How to spot an Illicit Discharge Brochure:

How to spot an Illicit Discharge Brochure:

This brochure is under development. It is modeled on the alliance of rouge communities IDEP Tip Card, (shown below). It may be used to train staff and can be made available to the public.

- What is an illicit discharge and how to identify
- Hazards associated with illegal discharges
- What to report
- Who to report to

1. Schedule: PEP subcommittee/ Tetra Tech will have brochure complete by July 1, 2014 for distribution.

What are the Signs of an Illicit Discharge?

Sanitary Sewer Discharges

Observations

- Sanitary debris
- Staining on pipe
- Soap suds
- Gray or discolored water
- Odors, sewage, rotten eggs or detergents

Contact

IDEP coordinator and/or DPW

Failed Septic Systems

Observations

- Overgrown or wet patch of grass
- Chester pipe to ditch
- Soap suds
- Gray or discolored water
- Odors, sewage, rotten eggs or detergents

Contact

Health Department and/or IDEP coordinator

Illegal Dumping, Spills or Floor Drain Connections

Observations

- Oil sheen
- Stained sediment, rocks or vegetation
- Odor, petroleum, chemical

Contact

IDEP coordinator or MDEQ

Industrial Discharges

Observations

- Discolored water or vegetation
- Odor, petroleum, chemical

Contact

IDEP coordinator and/or DPW

Agricultural Runoff, Fertilizers, or Sanitary Sewer Waste

Observations

- Algae growth near drain outlet or in a ditch

Contact

IDEP coordinator, DPW and/or Drain Office

Soil Erosion from Construction Sites

Observations

- Bare soils or banks with no soil erosion control fencing
- Muddy discharge from an outlet

Contact

Local soil erosion control agency (either the local community or county)

IDEP = Illicit Discharge Education Program; DPW = Department of public works/services; MDEQ = Michigan Department of Environment and Natural Resources

Important Numbers

EMERGENCIES

- Police/Fire 911
- MDEQ Pollution Alert System (PEAS) 800-292-4706, 24 hrs

NON-EMERGENCIES

Livingston County:

- Health Department 517-546-9658, 8 am - 5 pm
- Drain Office 517-546-0040, 8 am - 5 pm

Macomb County:

- Health Department 586-469-5238, 8 am - 5 pm
- IDEP Hotline 877-678-4337, after 5 pm
- IDEP e-mail IDEP@macombcountymt.gov

Oakland County

248-856-0631; 24 hrs

St. Clair County

877-504-SWIM (7946), 24 hrs

Washtenaw County

734-222-3680; 8 am - 5 pm

Wayne County

888-223-2363; 24 hrs

Local IDEP Coordinator

Local

Soil Erosion Control Agency

How to Spot Illicit Discharges A Tip Card for Municipal Staff

An illicit discharge is any discharge containing polluting material, such as sediment, nutrients, oil and bacteria. These discharges can drain to lakes and streams via storm drains. The communities in Southeast Michigan are required to prevent illicit discharges from entering storm water. You can do your part by notifying the appropriate agency when you spot a potential illicit discharge.

What to Report?

- Spills and contamination to lakes, rivers and streams
- Suspicious dumping to catch basins or waterways
- Unusual discharges from pipes
- Sewage on the ground or draining to surface water
- Large number of dead fish in waterways
- Failing or leaky septic systems
- Polluted runoff from storage piles or dumpsters to catch basins or waterways
- Sewage, detergent, chemical, petroleum or rotten egg odors
- Soil erosion from construction sites

Developed by the Southwest Michigan Regional IDEP Work Group
Available for download at <http://www.idep.org/swmregionalidep/PDFs/HowToSpotIllicitDischarges.pdf>

Attachment "E"
Spill Notification Complaint Reporting Form

Spill Notification Complaint Reporting Form
Illicit Discharge Elimination Program
Genesee County

Municipality: _____
TWP Section where incident occurred: _____

Complaint made by: _____

Phone #: _____

Date: _____ Time: _____

Location of Discharge: _____ Offending Party (if known) _____

Nature of Problem (i.e. paper waste, odor, color, etc.): _____

Is this an Emergency?

Yes ☐ (Then Phone 911) ☐ No

Nature of Emergency: _____

1. Take down co

2. Fill out the Spi

3. Inform the call

4. If the problem:

5. If the problem

6. If the spill/ dis
State the appr
call 24-hour P

7. Please fax cor

Stepha
kamme
Phone

Initial Contact made to:

- 911
- Fire Dept. _____
- Police Dept. _____
- GCDC 732-1590
- GCHD 257-3612
- GCRC 767-4920
- PEAS Hotline (State) 1-800-292-4706
- Other _____

Additional Comments:

Site Investigation

Date of Observation: _____

Investigating Agency: _____

Location of Discharge: _____

☐ Initial Investigation

☐ Follow-up Investigation

Crew Members: _____

Investigation Location: _____

Observations (odor, color, volume, etc): _____

Actions Taken:

Danger to health and/or environment:

☐ Yes ☐ No

Were photos taken: ☐ Yes* ☐ No

Date Corrected: _____

* Please attach copies

If necessary:

Agency Referred to: _____

Agency Contact: _____

Method of Communication:

☐ E-mail ☐ Letter/memo ☐ Phone

Content of Communication:

K:\Stormwater Management\SWPPI\2010\Spill form (landscape) III.doc

GCHD: Fax: (1

GCRC: Fax: (1

GENESEE COUNTY

Illicit Discharge Elimination Program

FIELD PROTOCOL MANUAL



Prepared by:



**March 2014
DRAFT**

CONTENTS

	PAGE
INTRODUCTION	1
Phase II Illicit Discharge Elimination Requirements	1
What is an Illicit Connection?	1
What is an Illicit Discharge?	1
What are Acceptable Non-Storm Water Discharges?	2
Genesee County's Illicit Discharge Elimination Plan	2
Purpose of this Protocol Manual	2
A. INITIAL PLANNING	4
A.1 Weekly Work Plans	4
A.2 Traffic Control Plans	4
A.3 Intent of Work Notification	4
B. FIELDWORK PREPARATION	5
B.1 Weather Conditions	5
B.2 Supplies and Equipment	5
C. PHASE I INVENTORY FIELDWORK	6
C.1 Locating the Discharge Points and Outfalls	6
C.2 Traffic Control	7
C.3 Drainage System Inventory	7
C.4 Inventory – Sketch	7
C.5 Inventory – Photo	8
C.6 Inventory – Pipes	9
D. SCREENING PHASE FIELDWORK	10
<i>Dry Weather Flow</i>	10
D.1 Observations	11
<i>Floatables</i>	11
<i>Odor</i>	12
<i>Foam</i>	12
<i>Other Indicators</i>	12
<i>Chemical Analysis</i>	12

	<i>Results/Actions</i>	13
D.2	Sample Collection	13
	<i>Free Fall Discharge Sampling</i>	14
	<i>Open Channel Sampling</i>	14
	<i>Manhole Pipe Sampling</i>	14
	<i>Field Testing</i>	15
	<i>Laboratory Testing</i>	15
D.3	Flow Measurements	16
D.4	Notification	17
E.	PHASE I AND PHASE II POST FIELDWORK	18
E.1	Data Entry	18
E.2	Evaluate Results	20
	<i>Reporting a Suspected Illicit Discharge</i>	20
E.3	Signs of an Illicit?	20
E.4	Source Isolated?	21
	<i>Sound Testing</i>	21
F.	SOURCE CONFIRMATION	23
F.1	Televising and Dye Testing	23
F.2	Source Confirmed	23
G.	NOTIFICATION	24
G.1	Notification of Additional Discharge points and outfalls	24
	<i>Requirements</i>	24
G.2	Notification of Illicit Discharges and/or Connections	24
	<i>Requirements</i>	24
G.3	Reporting Other Field Observations	25

CONTENTS

APPENDICES

- Appendix A Supplies and Equipment
- Appendix B pH Pen Calibration Instructions
- Appendix C Structure Numbering
- Appendix D DEQ Fact Sheets
- Appendix E Sampling Devices
- Appendix F Flow Measurement Methods
- Appendix G Contact Information
- Appendix H MSDS
- Appendix I Paper Field Forms
- Appendix J Genesee IDEP SOP

LIST OF TABLES AND FIGURES

Tables	Page
Table 1 - Sample Parameter Information	16
Figures	
Figure 1 - Planning Flow Chart	4
Figure 2 - Preparation Flow Chart	5
Figure 3 - Inventory Flow Chart	6
Figure 4 - Example of Sketch	8
Figure 5 - Photo Label Sample	8
Figure 6 - Fieldwork Flow Chart	10
Figure 7 - Post Fieldwork Flow Chart	18
Figure 8 - IDEP Data Management System	19
Figure 9 - Parameter Cut-Off Limits	20
Figure 10 - Source Confirmation Flow Chart	23

INTRODUCTION

PHASE II ILLICIT DISCHARGE ELIMINATION REQUIREMENTS

The United States Environmental Protection Agency's (EPA) Phase II Storm Water regulations require all permitted MS4 communities and agencies to address six minimum measures. Amongst the six measures are the Illicit Discharge Detection and Elimination Minimum Control Measures. Under the regulations, these measures must include the following:

- A storm sewer system map showing the location of all discharge points and outfalls and the names and location of all waters of the United States that receive discharges from those points.
- Through an ordinance or other regulatory mechanism, a prohibition on non-storm water discharges into the MS4 community and appropriate enforcement procedures and actions.
- A plan to detect and address non-storm water discharges, including illegal dumping into the MS4 community.
- The education of public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste.
- The determination of appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

WHAT IS AN ILLICIT CONNECTION?

An illicit connection is the discharge of pollutants or non-storm water materials into a storm sewer system via a pipe or other direct connection. Sources of illicit connections may be sanitary sewer taps, wash water from commercial laundry facilities or carwashes, and other similar sources.

WHAT IS AN ILLICIT DISCHARGE?

An illicit discharge is the discharge of pollutants or non-storm water materials to the storm sewer systems via overland flow or direct dumping of materials into a catch basin. Some examples of illicit discharges include the overland drainage from a carwash, or dumping used motor oil in or around a catch basin.

WHAT ARE ACCEPTABLE NON-STORM WATER DISCHARGES?

Acceptable non-storm water discharges include:

- Water line flushing and discharge from potable water sources
- Landscape irrigation runoff, lawn watering runoff, and irrigation waters
- Diverted stream flows and flows from riparian habitats and wetlands
- Rising groundwater and springs
- Uncontaminated groundwater infiltration and seepage
- Uncontaminated pumped groundwater, except for groundwater cleanups specifically authorized by NPDES permits
- Foundation drains, water from crawl space pumps, footing drains, and basement sump pumps
- Water from non-commercial, residential car washing
- De-chlorinated swimming pool water from single, two, or three family residences. (A swimming pool operated by the permittee shall not be discharged to a separate storm sewer or to surface waters of the state without NPDES permit authorization from the MDEQ.)
- Residual street wash waters
- Discharges or flows from emergency firefighting activities

GENESEE COUNTY'S ILLICIT DISCHARGE ELIMINATION PLAN

Genesee County has received an NPDES Phase II Storm Water Certificate of Coverage (COC). The County has been and will continue to conduct IDEP investigations for all participating municipalities within the County's permit agreement.

PURPOSE OF THIS PROTOCOL MANUAL

The purpose of this manual is to define the procedures for the Illicit Discharge Elimination Program (IDEP) plan. This manual reviews the steps used to find and locate illicit connections/discharges. The primary steps are:

- A. Planning
- B. Preparation
- C. Inventory Phase Fieldwork
- D. Screening Phase Fieldwork
- E. Post Fieldwork
- F. Source Confirmation

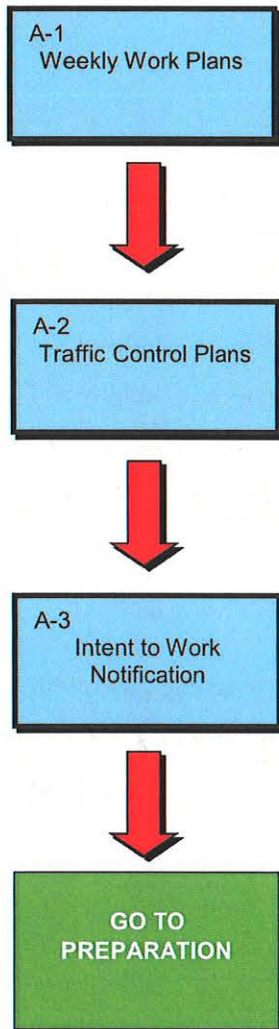
Also discussed are notification requirements and procedures, contact information, structure numbering and health and safety issues.

The IDEP investigations in Genesee County will initially focus on the inventory phase of the fieldwork. The inventory phase will identify the location of discharge points and outfalls and determine which of these should be revisited for further investigation during the screening phase by identifying the presence or absence of dry weather flow and documenting physical observation of the site. This data will be used to prioritize the screening phase of the investigations.

The screening phase will be conducted as suspected problems arise. The screening phase will look at those discharge points and outfalls which have dry weather flow and identify, through sampling, if an illicit connection is present. If an illicit connection is present, the storm sewer system will be further investigated until the source is identified and removed.

A. INITIAL PLANNING

Figure 1 - Planning Flow Chart



Prior to beginning investigation planning, a copy of the discharge points and outfall maps submitted with the permit application must be obtained. Storm sewer drainage maps should also be acquired, if available. Other valuable information that may be collected, if applicable and available, includes:

- Land use maps
- Depth of groundwater
- Age of development
- Areas of failing infrastructure
- CSO areas
- Contact information

A.1 WEEKLY WORK PLANS

Weekly work plans should be developed to identify the discharge points and outfalls or points to investigate for that week's work and the roads where lane closures may be occurring. The weekly work plans should also remind the crew to confirm that the weather is appropriate and to check supplies.

A.2 TRAFFIC CONTROL PLANS

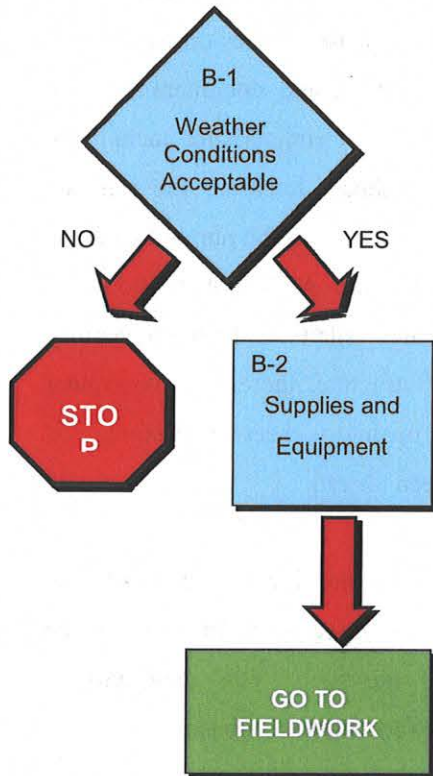
Traffic control must be conducted in accordance with the local community's traffic control requirements and individual company policy and procedures. Work required on the MDOT rights-of-way must follow the Michigan Manual of Uniform Traffic Control Devices.

A.3 INTENT OF WORK NOTIFICATION

If work is required on Michigan Department of Transportation (MDOT) rights-of-way, an Advanced Notice form must be completed and sent to the MDOT Transportation Service Center five days prior to the field visit. If work is being conducted on private property the landowner must also be notified at least one week prior to fieldwork. All local intent of work notifications must be followed.

B. FIELDWORK PREPARATION

Figure 2 - Preparation Flow Chart



B.1 WEATHER CONDITIONS

To minimize the chance of observing and sampling wet weather storm water flow, a dry weather period of 72 hours with less than 0.10 inches of total precipitation must be observed prior to sampling.

Screening phase fieldwork, therefore, must be planned several days in advance based on the precipitation totals and the forecast. Weather data should be checked prior to going into the field. This data can be obtained from the National Weather Service website www.weather.gov or commercial weather sites such as www.accuweather.com or from local rain gauges.

B.2 SUPPLIES AND EQUIPMENT

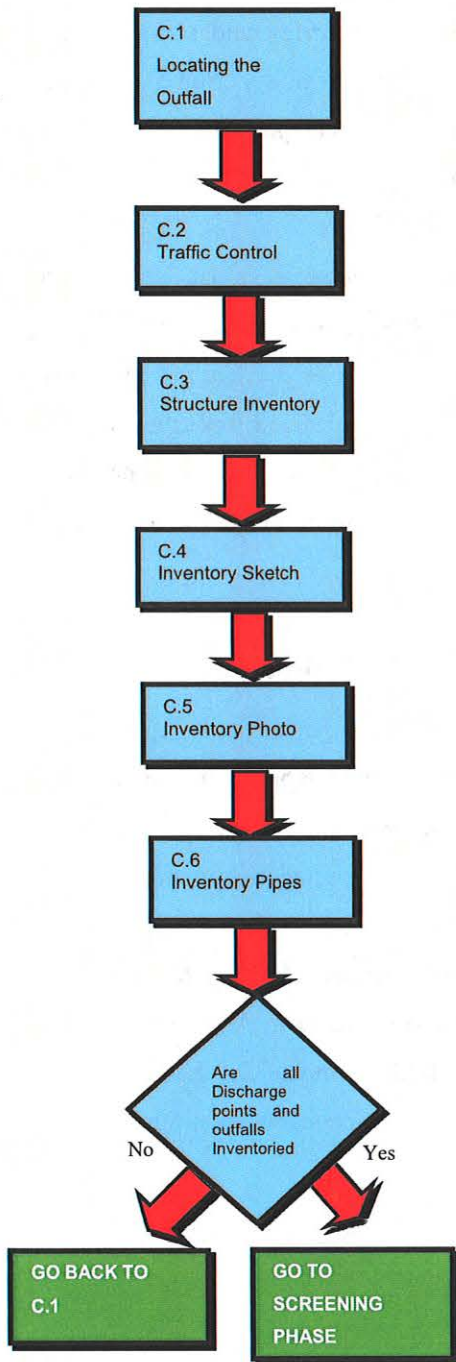
To insure that the proper equipment and supplies are available for field investigations, supplies and equipment should be inventoried prior to any scheduled fieldwork day.

A suggested list of supplies and equipment for field investigations is located in Appendix A.

At least once a week, field testing equipment must be calibrated against a known standard. The calibration instructions and procedures for using the pH pen are located in Appendix B. The thermometer should be verified by comparison with a certified thermometer. Each time the thermometer and pH pen are verified, the results must be recorded on a calibration log provided in Appendix B.

C. PHASE I INVENTORY FIELDWORK

Figure 3 - Inventory Flow Chart



The inventory phase will be the initial phase of fieldwork conducted in the IDEP investigation. This phase focuses on finding the structures, geo-referencing them, and documenting their physical characteristics. These characteristics include its latitude and longitude coordinate location, the type of structure, the size of the structure, and the number and size of conduits entering the structure. An inventory should be completed for each structure visited. Only one inventory should be conducted per structure, therefore, subsequent visits will not require an inventory sheet to be completed unless the structure has been altered.

During the inventory phase, the investigator will also identify the presence of dry weather flow and make physical observations of the site. This data will be recorded on the screening form in the database.

C.1 LOCATING THE DISCHARGE POINTS AND OUTFALLS

Identifying the location of structures in the field should be done by utilizing the previously mentioned maps submitted with the NPDES Phase II permit, in conjunction with municipal drainage system maps. If reliable latitude and longitude data is available a GPS unit may be used to locate the structures..

C.2 TRAFFIC CONTROL

As previously specified, traffic control must be conducted in accordance with the local municipality's traffic control requirements. Work required on the MDOT rights-of-way (ROW) must follow the Michigan Manual of Uniform Traffic Control Devices.

C.3 DRAINAGE SYSTEM INVENTORY

A brief description of each field is provided below.

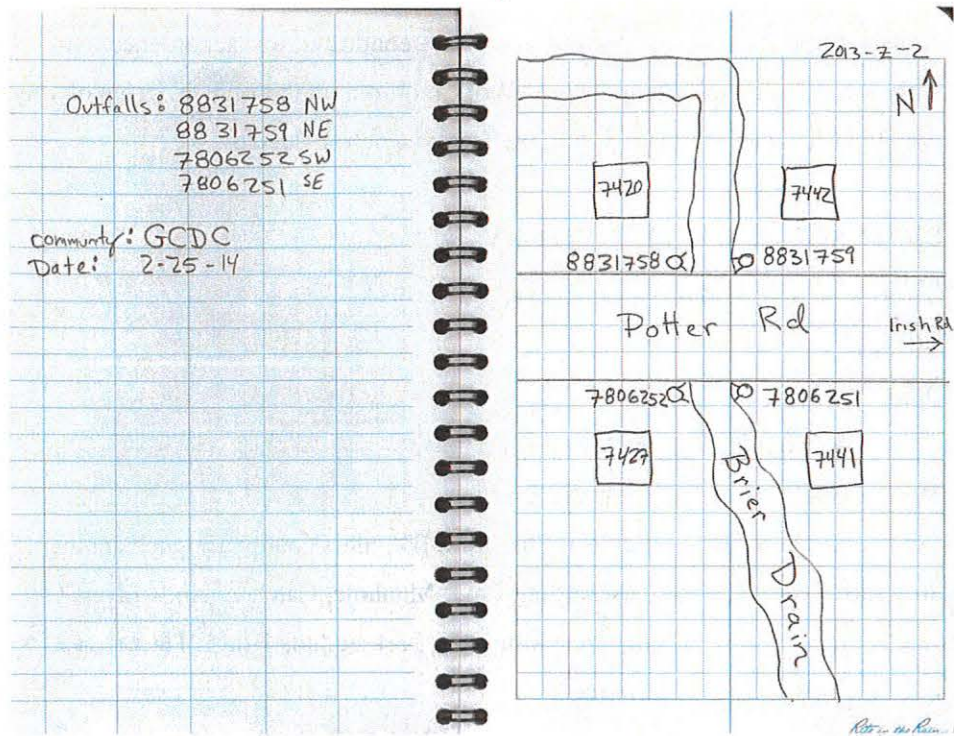
SELECTIONS

Date:	Date of fieldwork
Crew 1 & Crew 2:	Field crew initials
Structural ID:	Id of structure
County Assigned ID:	Same as Structural ID unless county assigned another ID
Structure Type:	Discharging Pipe, Manhole, Catch Basin, Culvert Outlet, Point in Open Channel, Not Found, Blind Tie or Tap, Non-Point Source
Ownership:	Public, private, GCDC, GCRC, other
Photo Number:	Number of photo (using identification board in photo)
Latitude/Longitude:	GPS location of structure
XY_Accuracy:	Sub-meter GPS, sub-centimeter GPS, estimates from USGS, estimated from Google Earth
Receiving Water Body:	Name of receiving water body (required)
Offset Description:	Description of structure offset
Inventory Comments:	Any comments by the field investigator

C.4 INVENTORY – SKETCH

Sketches are done in All-Weather Field Books and then scanned as an image and downloaded to the IDEP website. The inventory sketch is an opportunity to provide a diagram of the structure location in respect to buildings, rivers, and roads, or just to provide any visual description of the structure.

Figure 4 - Example of Sketch



C.5 INVENTORY – PHOTO

Inventory Photo is to take a snapshot of the structure for reference of a problem with structure or water quality. Use a camera and dry-erase board to identify the structure number, date and community. Put the Structure ID, community and date on the dry-erase board and place the board in front of the structure so you can identify the photo.

Figure 5 - Photo Label Sample



C.6 INVENTORY – PIPES

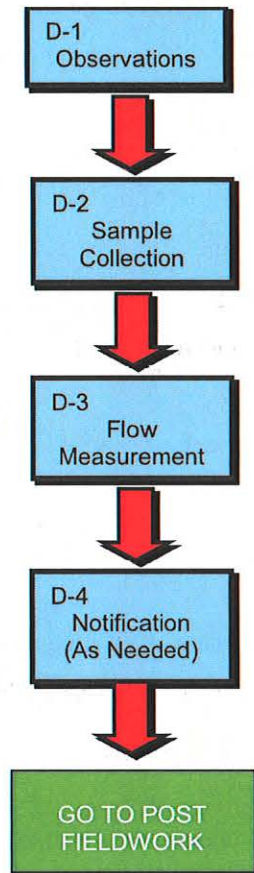
A pipe inventory data form must be completed for all conduits to and from the structure or making up the structure. These include a pipe discharging into a water body, an open channel, or the pipes entering and leaving a manhole. Multiple pipe inventory data forms can be filled out for one structure inventory or inventory sketch.

A brief description of each field is provided below.

Pipe ID:	City assigned ID (not required)
Pipe Direction:	N, NE, E, SE, S, SW, W, NW
Conduit Type:	Unknown, Pipe, Culvert End, Open Channel
Shape:	Unknown, Round, Rectangular, Elliptical, Open Channel
Diameter:	Diameter of pipe (inches)
Width:	Width of open channel or rectangular pipe (inches)
Depth:	Open channel (inches)
Measure Down:	Rim to manhole bottom (feet)
Invert Elevation:	Rim to pipe invert
Conduit Material:	Unknown, RCP, VCP, Brick, Poured-in-Place, PVC, Segmented Tile, Cast Iron, DIP, Corrugated Steel Pipe, Clay Tile Pipe, Other
Inlet/Outlet:	Inlet: flow entering a structure Outlet: flow leaving a structure
General Comments:	Any comments regarding the pipe

D. SCREENING PHASE FIELDWORK

**Figure 6 - Fieldwork
Flow Chart**



The screening phase investigates each of the discharge points and outfalls identified during the inventory phase of the program for illicit connections. To conduct a screening on a structure, record physical observations, calculate flow rates, and take samples (if necessary).

Screenings may be repeated for structures if the results of a previous screening suggest that an illicit connection may be present. In this scenario, a new inventory of the structure is not needed, but a new screening record must be made in the database to show the results from that day's investigation. The observations, sample results, and flow measurements should all be recorded in the database.

Dry Weather Flow

Dry weather flow can be a valuable tool to determine the presence of illicit connections or discharges. Dry weather flow is flow that is observed 72 hours after the last rainfall greater than 0.10 inches and may indicate the presence of an illicit connection or discharge. Dry weather by itself may not indicate an illicit discharge problem however, as there are many sources of non-

storm water discharge like those listed in the introduction section of this manual. If dry weather flow alone is observed, other indicators should be explored that could provide further evidence of an illicit connection.

If no flow is present during the initial screening, but evidence such as staining or odor indicates an illicit connection may be present, a check for intermittent dry weather flow should be made. To check for intermittent flows, place a sandbag so that it is blocking the lower part of the flow channel of the pipe or open channel in question. If a dry weather flow check is required in a

manhole, a sandbag can be secured to a rope and lowered into position. Secure the top of the rope to a manhole step for easy retrieval. Sandbags should only remain in the conduit for a maximum of 1 to 2 days, and never when rain is forecasted. If water has ponded behind the sandbag and no rain has fallen, then intermittent flow is likely. Be sure to remove the sandbags after testing is completed.

D.1 OBSERVATIONS

Careful observation of conditions at an outfall structure is critical in determining the likelihood of an illicit connection within the upstream drainage system. Physical observations such as odor, staining, coloring, and deposition can strongly indicate an illicit discharge is present, even though no dry weather flow is observed. Observations of the receiving water body are also noted.

Odor:	None, Musty, Sewage, Rotten Egg, Gas, Oil, Other
Floatables:	None, Trash, Sewage, Bacterial Sheen, Oil Sheen, Suds, Other
Deposits/Stains:	None, Mineral, Sediment, Oily, Grease, Suds, Other
Vegetation:	None, Normal, Excessive, Algae, Slime
Structural:	Normal, Cracking, Spalling, Corrosion, Settlement, Other
Color:	Clear, Light Brown, Dark Brown, Green, Gray, Black, Other
Turbidity:	Enter #
Description:	Any observation of structure that needs to be addressed

RECEIVING WATER OBSERVATIONS

Odor:	None, Musty, Sewage, Rotten Egg, Gas, Oil, Other
Floatables:	None, Trash, Sewage, Bacterial Sheen, Oil Sheen, Suds, Other
Deposits/Stains:	None, Mineral, Sediment, Oily, Grease, Suds, Other
Vegetation:	None, Normal, Excessive, Algae, Slime
Structural:	Normal, Cracking, Spalling, Corrosion, Settlement, Other
Color:	Clear, Light Brown, Dark Brown, Green, Gray, Black, Other
Turbidity:	Enter #
Description:	Any observation of structure that needs to be addressed

Floatables

The occurrence of floatables in the storm sewer system can be one of the most defining pieces of

evidence. Floatables can consist of a variety of items including oil sheens, sewage, and sanitary trash, such as toilet paper. If sewage and/or sanitary trash are observed in the storm sewer system, it is an indicator that a sanitary system is connected. Floatables may naturally occur, like those found in streams and rivers, including algae, bryozoans, pollen, and oil-like sheens, which may actually be bacteria. Additional information on naturally occurring floatables is presented in Appendix D.

If floatables are observed in lakes or streams, an attempt to identify a relationship between these materials and any nearby discharge points and outfalls should be made. If it appears that the floatables are originating from a structure, it could be a sign of an illicit discharge.

Odor

Strong chemical or sewage odors in a storm sewer may indicate a potential illicit connection or discharge. If odors are detected, one should look for other indicators including floatables, dry weather flow, water color, and/or stains inside the manhole or pipes.

Foam

The occurrence of accumulations of foam in a storm sewer system may indicate an illicit connection or discharge. Foam can be a natural occurrence in streams and lakes, but if the foam is concentrated around a storm sewer, or appears to be originating from a structure, it may be an indication of an illicit connection or discharge in that system. Additional information on foam is shown in Appendix D.

Other Indicators

Other indicators, which may not be significant by themselves, can provide valuable additional evidence to any of the above indicators. These indicators include color, turbidity, the existence of stains or deposits, and the occurrence of excessive vegetation at the discharge point. The structural observations on the screening form are helpful for explaining sources of dry weather flow and do not necessarily indicate the presence of an illicit discharge.

Chemical Analysis

Chemical and physical testing is performed on dry weather flow water samples to determine if an

upstream investigation is warranted. Water samples for surfactant, ammonia, and E. coli are collected and submitted to a contract lab for analysis. A multi-parameter testing pen is used in the field to determine pH, temperature and specific conductance. Results of the field tests are noted on the screening form.

CHEMICAL ANALYSIS

Lab Sample ID:	ID tagged on lab sample
Surfactants:	mg/L
Ammonia:	mg/L
E.Coli	per100ml
Temperature:	Fahrenheit
pH:	
Specific Cond.:	μS

Results/Actions

As the inventory and screening process goes forward, decisions must be made about the best way to proceed. If the observations and testing are conclusive that no illicit discharge is likely to be present, then the investigation is concluded and no further work is done. If there is an indication that an illicit discharge is present, then further investigation is inventory required. Each form contains a listing of the options to follow based on the latest screening and lab results.

RESULTS/ACTIONS

Screening Results: Illicit Connection Ruled Out, Illicit Connection, Pending, Notify County, Not a Point Source Discharge

Screening Actions: None Required, Illicit Removed, Waiting on Lab Results, Dye Test, Televis, Investigate Further, Illicit Connection

Analysis Comments: Any analysis comments by user

Other values as indicated

D.2 SAMPLE COLLECTION

When dry weather flow is observed, a sample of the flow must be collected for chemical analysis. Samples of standing water should not be collected. The samples are tested at an

analytical lab for ammonia, detergents, and *E-Coli*. In the field, temperature and pH are taken for each sample and recorded on the screening form. Samples should be collected prior to flow measurements in order to ensure undisturbed samples.

Free Fall Discharge Sampling

To sample free fall discharge, secure the appropriate bottles and fill out the required information on the bottle label. Remove the bottle cap with caution as not to spill any preservative inside. Place the bottle in the flow and collect sample to the top of the shoulder of the bottle. Do not overflow bottle. If possible, avoid the introduction of sediment or other debris in the sample. Replace the cap securely and store the sample on ice in a plastic cooler for transfer to the laboratory.

Open Channel Sampling

If flow is observed in an open channel, a disposable plastic syringe may be used to obtain a sample. You may obtain a sterile, 60 ml disposable plastic syringe from a scientific supply company such as Fisher Scientific Company or a veterinary supply company. Syringe a portion of sample from the flow stream taking care not to include sediment or debris in the sample. Transfer the sample from the syringe to the appropriate bottle and secure the cap. Store as above for transfer to the laboratory.

Manhole Pipe Sampling

Sampling flow in a manhole presents several challenges. Since any manhole is considered a confined space, a manhole may not be entered to obtain a sample. Instead, a telescopic extension rod is used to reach the pipe to be sampled. Depending on the conditions in the manhole at the time of sampling, either a bottle holder or a syringe can be used to obtain a sample. To avoid confusion, label all bottles before sampling begins.

- **Bottle Holder Sampling Method**
 - If sufficient flow is observed coming from a pipe that enters the manhole above the bottom, and there is enough room to do so, a sample bottle holder may be attached to the end of a telescopic rod. Telescopic sampling poles and bottle holding hardware are available from many environmental sampling supply companies.

- Lower the bottle beneath the flowing pipe and fill with sample. As noted above, do not overflow the bottle and avoid introducing sediment and debris to the sample.
- Carefully bring the bottle back to the surface, replace cap, and store as above.

▪ **Syringe Method**

If a pipe enters the manhole at or near the bottom, or if sampling a pipe using the Bottle Holder Sampling Method is not practical, then the Syringe method may be used. See Appendix E, Fig1.

- Secure a light string such as masons twine to the plunger of a sterile, disposable plastic syringe and secure the barrel of the syringe to the end of a telescoping extension rod with heavy-duty tape (duct tape works best). A photo of this sampler is provided in Appendix E.
- While holding the string, extend the telescopic rod until the tip of the syringe enters the flow. To avoid introducing sediment into the sample and clogging the tip of the syringe, hold the tip of the syringe above the bottom of the pipe.
- Gently pull the string until the plunger of the syringe is fully extended and the barrel is full of sample.
- Bring the syringe full of sample back to the surface and fill the appropriate sample bottle(s).
- Repeat as necessary until all the sample bottles have been filled.
- Discard used syringe and store filled sample bottles as above.

Complete a chain of custody form for all samples prior to delivery to the lab.

Field Testing

Temperature and pH are measured in the field immediately after the collection of a sample with a calibrated thermometer and pH pen. The calibration methods are located in Appendix B. The results are recorded in the field database.

Laboratory Testing

Prepared sample bottles from the laboratories are to be picked up prior to the screening activities. Water samples will be collected for both the chemical parameter tests and the microbiology tests, where possible, and sent to the respective laboratories for analysis. Samples should arrive at the testing lab in a timely manner. Samples should be kept cool until delivered to the laboratory. This requires storing samples on ice on warm days. Microbiology tests have a hold time of 6

hours between the time when the sample is collected and when the sample needs to be at the laboratory. Due to the nature of this work, this hold time may need to be exceeded. The microbiology samples should be dropped off at the lab by the end of the day in which the samples were taken. All other samples are sent to the designated laboratory via overnight courier.

Table 1 summarizes the chemical parameters being tested and corresponding bottle characteristics. Refer to Appendix G for testing laboratory contact information. Upon receiving results, the data must be entered into the database.

Table 1 - Sample Parameter Information

Analyze	Test Method	Bottle Type/Size	Preservative	Hold Time
Ammonia	SM 2340C/ EPA 130.2	150 mL plastic	Sulfuric Acid (H ₂ SO ₄)	28 days
E. Coli	EPA 340.2/300	100 mL sterile plastic	Thiosulfate	6 hours
Surfactant (Detergent)	SM 5540C	250 mL plastic	None	48 hours

Notes: All samples are grab samples.
All bottles are pre-prepared by the laboratory.

D.3 FLOW MEASUREMENTS

Dry weather flow rate measurements are intended to provide an estimate of the existing flow rate. Field crews should make an initial assessment regarding the level of effort required to estimate flows. If flow measurements require more than approximately 10 to 15 minutes to perform, note the flow depth, approximate velocity, and pipe size so that flow data can be calculated. Flow estimates should not become the primary focus of the dry weather field screening activities. Flow measurements should be performed only after a water quality grab sample has been collected to avoid disturbing bottom sediments. The results will be recorded in the screening form of the field database on Page 2 (See Appendix I).

Three methods are outlined for estimating dry weather flow rates at field screening points. These methods include (1) measuring the time it takes to fill a bucket; (2) measuring area and velocity, and calculating flow as the cross-sectional area times the average velocity; and (3) measuring the depth, width, and slope of the channel and calculating the flow based on Manning's equation.

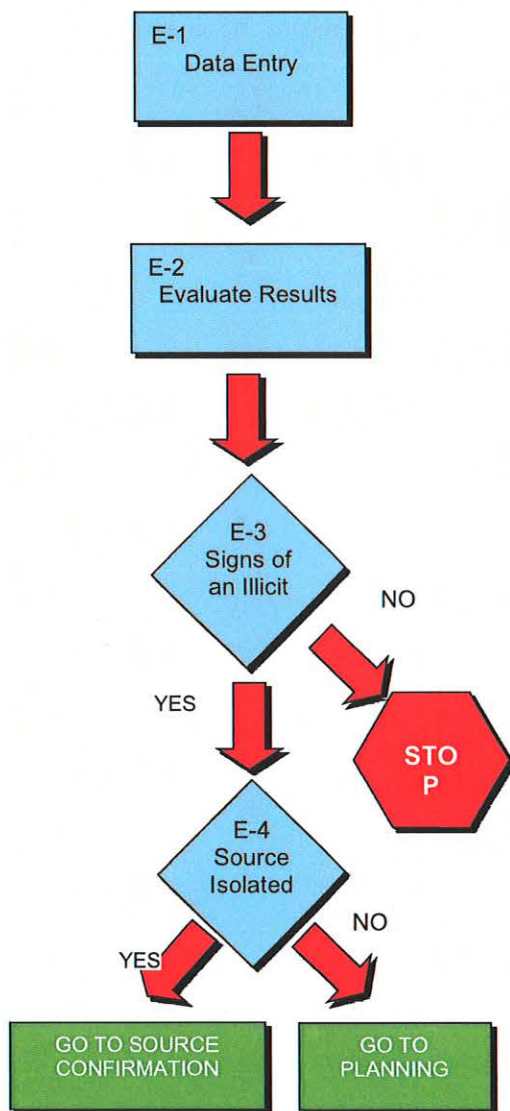
Information on calculating flow is found in Appendix F.

D.4 NOTIFICATION

If the source to an obvious illicit connection or discharge is known (i.e. sanitary line connected to the storm sewer system), follow the procedures outlined above to record the connection and immediately notify the municipality (see G. Notification section).

E. PHASE I AND PHASE II POST FIELDWORK

Figure 7 - Post Fieldwork Flow Chart



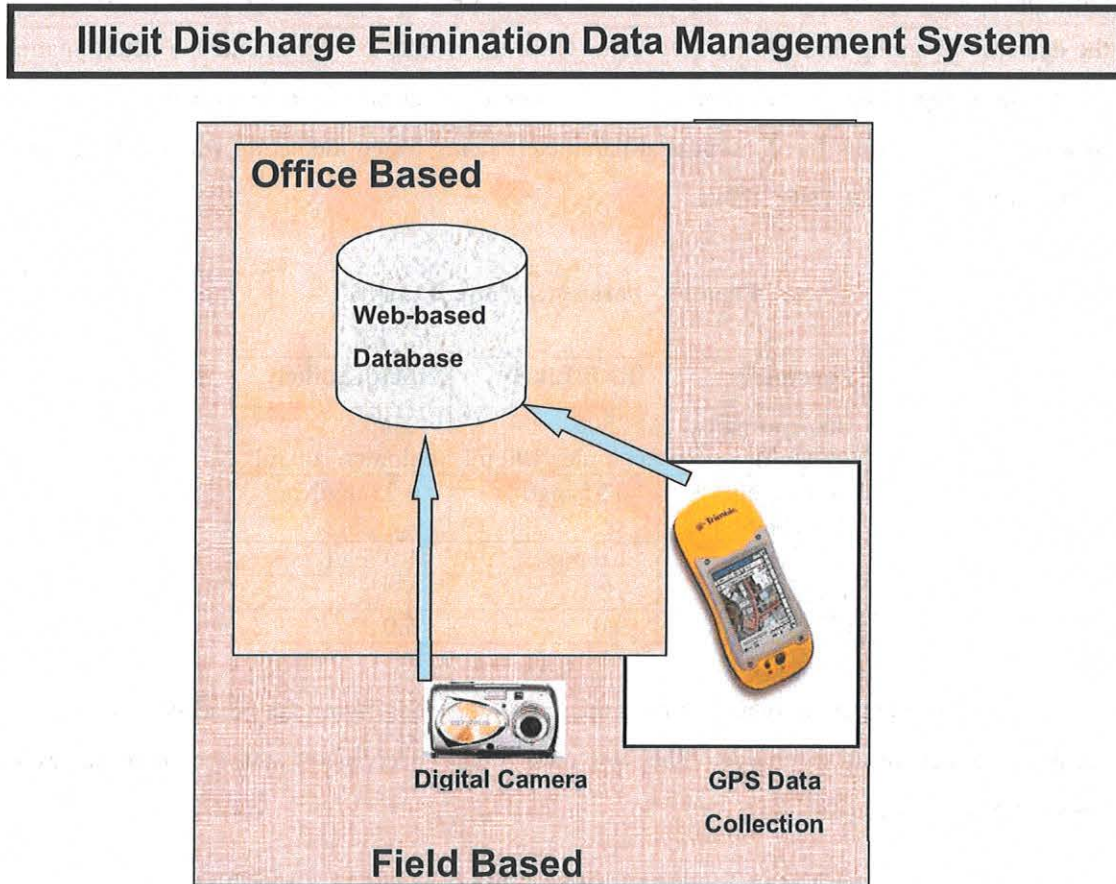
Post fieldwork is required for both the inventory phase and the screening phase fieldwork. The inventory phase post fieldwork primarily focuses on consolidating the data, identifying if any obvious illicit connections exist from observations recorded, and preparing a summary of those structures that need to be investigated in the screening phase.

The post fieldwork for the screening phase includes consolidating the data, evaluating the laboratory and observation results, determining if follow-up work is needed, and identifying if an illicit connection is likely present.

E.1 DATA ENTRY

All inventory and screening information must be routinely entered into the web-based database. Data from fieldwork should be entered into the database as soon as is practical following fieldwork. Progress and data summary reports can be compiled from the database. See Figure 8.

Figure 8 - IDEP Data Management System



E.2 EVALUATE RESULTS

Once the laboratory analysis is completed, the results are compiled into the screening section of the database by going through the SQL edit. Once the results are documented, a determination can be made regarding the likelihood of an illicit connection or discharge. Figure 9 shows the parameter cut-off limits for the chemical parameters being tested indicating whether the sample results are out of the "normal" range.

Figure 9 - Parameter Cut-Off Limits

Parameter	Illicit Likely	Illicit Unlikely
Bacteriological (<i>E. Coli</i>)	>2500 colonies/100 ml	<2500 colonies/100 ml
Surfactants (Detergents)	>0.25 mg/l	<0.25 mg/l
Ammonia	>1.0 mg/l	<1.0 mg/l
Temperature	>72°	<45°
pH	>9.0	<6.0

Chemical parameters are only a portion of the decision in identifying the presence or absence of an illicit connection or discharge. The flow rate, visual observations, and the chemical results must all be considered.

Reporting a Suspected Illicit Discharge

If laboratory results and/or field observations indicate that an illicit discharge is likely and follow-up investigation to find the source is required, then a written report must be made to GCDC within 5 days. The report shall contain the outfall number where the suspected discharge was found, the location of the outfall, the laboratory results or observations that indicate a problem, and any other pertinent information that will be helpful in finding and removing the illicit discharge.

E.3 SIGNS OF AN ILLICIT?

Based on the results evaluation, if an illicit connection or discharge is likely present, then further work is needed to isolate the source. Dry weather flow and sediment must be investigated

further to confirm the source. A windshield survey should be conducted to locate potential sources of water and sediment throughout the drainage area. If excessive sediment is a significant issue, a catch basin survey should be conducted in addition to the windshield survey to try and track the source of the problem. If there is no indication of an illicit connection or discharge, then the appropriate results should be recorded by editing the record in the Access database.

E.4 SOURCE ISOLATED?

If the investigation results suggest that there is a potential illicit discharge within the drainage system, then follow-up investigations will be required. Tracking a potential illicit discharge through a sewer system is limited to the access points of the sewer system. Key points or confluences within the drainage area should be targeted and investigated using the methodology discussed in previous sections. The discharge point or outfall must be sampled each time the drainage system is visited and structures are investigated and sampled within it. Investigations should continue until the problem is isolated between one or two stretches of pipe. Once the source has been isolated to a specific reach, the task will become source confirmation.

Sound Testing

Sound testing can be used to quickly determine the pipe connectivity within an underground sewer system. This method relies on the ability of open piping to conduct sound over great distances and is especially efficient in large diameter pipes (e.g. 12 inch pipes or larger). While this testing method has limitations, it is a quick method for tracing piping upstream from an outfall to find the source of dry weather flow or an illicit discharge. Once the possible source of an illicit discharge is found, a dyed water test should be used to positively identify the location of the source.

To conduct a sewer connectivity sound test, proceed as follows:

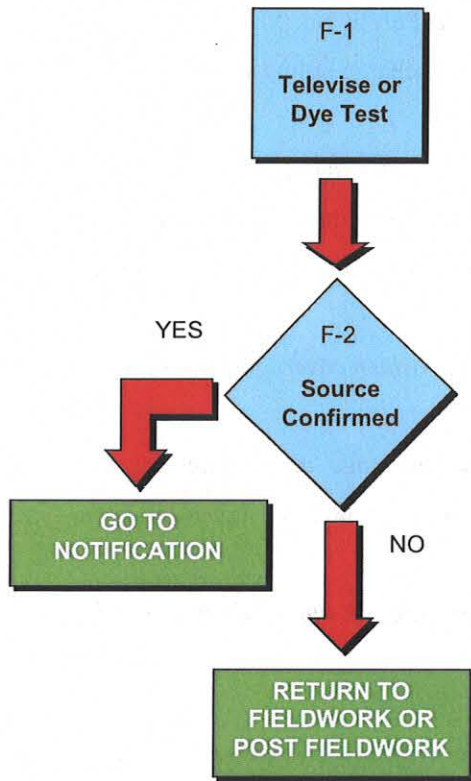
- Station one person (the listener) at the downstream outfall, catch basin, or manhole. If the downstream end is a manhole, remove the cover taking all appropriate safety measures. Position the listener so that they are in close proximity to the outfall pipe in question, or so they can listen directly over the manhole or catch basin.
- A second person (the striker) proceeds to the next upstream manhole or catch basin

and, using a light sledge hammer or similar device, strikes the structure with enough force so that the listener can hear the sound through the pipe system. To help eliminate background noise interference, the striker should hit the structure cover in a rhythmic fashion with a short, evenly spaced pause between strikes.

- An absence of sound between structures may mean that there is no connection between the structures. Bear in mind that underground pipes may be crushed or contain water or debris that prevents sound from travelling between two structures. A positive sound test may be bright and clear or, in some instances, faint and echoed depending on a number of factors including distance, pipe size, multiple connections, and compromised pipes.
- If a positive test is confirmed, repeat the process, if necessary, moving upstream through the system.

F. SOURCE CONFIRMATION

Figure 10 - Source Confirmation Flow Chart



F.1 TELEVISIONING AND DYE TESTING

An illicit connection can be connected directly into the manhole or can be connected into the system between manholes, where visual observations of the illicit connection cannot be made. In these instances, televising the storm sewer line may be utilized. This method is also valuable when access to private property is not available to conduct dye testing.

Dye testing should be utilized to confirm the source of an illicit connection. The building owners and/or tenants must be contacted to acquire available building plans and to set up an appointment to conduct the site visit. This notification should be coordinated through the municipality. A permit must be submitted to the MDEQ to obtain permission to dye test. Once the permit has been

approved, the MDEQ must be notified prior to all dye testing and only approved dyes may be used. Additional notifications to the local Health Department, Fire, and Police Departments may be required and should be coordinated through the local municipality.

F.2 SOURCE CONFIRMED

If the source is not confirmed, additional fieldwork or dye testing will be necessary. If the source is identified, refer to the notification procedure section.

G. NOTIFICATION

G.1 NOTIFICATION OF ADDITIONAL DISCHARGE POINTS AND OUTFALLS

Requirements

The general watershed-based storm water NPDES permit (Permit No. M1G619000) has the following requirements for notification of additional Discharge points and outfalls:

If the permittee becomes aware of any storm water drainage system discharges which were not identified in the application, the permittee shall provide the following information to the Department as part of the annual progress report (Part I.B.3.):

- a. the location of the discharge of storm water for which coverage is requested,*
- b. the receiving water for the discharge, and*
- c. any necessary updates to the map of the drainage area indicating the hydrologic boundary and approximate square miles of the coverage area (originally submitted with the application).*

These requirements can be satisfied by providing an updated map of the permittee's separate storm water drainage system.

G.2 NOTIFICATION OF ILLICIT DISCHARGES AND/OR CONNECTIONS

Requirements

Compliance with all requirements set forth in the Federal Act, Parts 31 and 41 of the Michigan Act, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

- a. 24 Hours Reporting – Any noncompliance which may endanger health or the environment (including daily maximum discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five (5) days.
- b. Other Reporting – The permittee shall report in writing all other instances of

noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: (1) a description of the discharge and cause of noncompliance; and (2) the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the step taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

G.3 REPORTING OTHER FIELD OBSERVATIONS

During IDEP investigation activities, notable deficiencies such as broken or failing infrastructure, field observations that are inconsistent with maps, or activities that compromise water quality may be noted by field staff. Any observations of this nature must be added to the screening comments on the IDEP field form and reported to GCDC in a timely manner.

If an activity is noted that is an immediate threat to public health such as a possible hazardous material spill or leak, call and report the incident to 911 and then contact GCDC and inform them of the situation. Activities that threaten water quality but are not an emergency should be reported to GCDC as soon as possible. These situations include dumping or leaking of garbage or pet waste, dumping lawn clippings or other yard waste into a drain or catch basin, disposing of oil, paint, or other materials into a storm sewer, or other violations of Stormwater Good Housekeeping Best Management Practices.

Damage to storm water infrastructure should also be noted and reported to GCDC. This includes damage to pipes, catch basins, manholes, etc. as well as erosion along a riparian buffer or around an outfall pipe. These observations should be included in weekly or bi-weekly updates to GCDC.

Appendix A
Supplies and Equipment

Example Field Equipment and Supplies List

Traffic Safety	<input type="checkbox"/> Arrow Board
	<input type="checkbox"/> Traffic Cones
	<input type="checkbox"/> Safety Vest
	<input type="checkbox"/> Truck
Inventory	<input type="checkbox"/> Data forms, clipboard
	<input type="checkbox"/> Handheld GPS with Differential Receiver
	<input type="checkbox"/> Manhole hook
	<input type="checkbox"/> Grade Rod
	<input type="checkbox"/> Survey Tape
	<input type="checkbox"/> Folding Ruler
	<input type="checkbox"/> Sledge hammer
Screening	<input type="checkbox"/> Survey Wheel
	<input type="checkbox"/> Stop Watch or a watch with a second hand
	<input type="checkbox"/> Water Marking Paste
	<input type="checkbox"/> Grade Rod Fitted for Sample Removal. Disposable syringes mounted to grade rod with pull string and duct tape
	<input type="checkbox"/> Disposable 60 ml Syringes
	<input type="checkbox"/> pH Pen
	<input type="checkbox"/> Thermometer
	<input type="checkbox"/> Sample bottles laboratory (automated partial chemistry)
	<input type="checkbox"/> Sample bottles from Health Department (microbiology)
	<input type="checkbox"/> Instrument Cleaning Supplies
	<input type="checkbox"/> Cooler
Miscellaneous	<input type="checkbox"/> Camera, flash, film, 200 ASA color
	<input type="checkbox"/> Mobile Phone and/or Pager
	<input type="checkbox"/> Flash Light
	<input type="checkbox"/> Mirror (for shining into manholes)
	<input type="checkbox"/> Marking Paint, case
	<input type="checkbox"/> Storm Drainage Maps
	<input type="checkbox"/> Phone Numbers (office staff, emergency)
	<input type="checkbox"/> Permit to work in MDOT ROW
	<input type="checkbox"/> Business Cards and/or Field Badge
	<input type="checkbox"/> Metal detector
	<input type="checkbox"/> Spray paint
	<input type="checkbox"/> Two spades/shovels
	<input type="checkbox"/> Waders
	<input type="checkbox"/> Fluorescent dye
	<input type="checkbox"/> Corks, fish bobbers, etc.
	<input type="checkbox"/> Pencils, pens, sharpener
	<input type="checkbox"/> Daily field log to summarize activities
	<input type="checkbox"/> Truck log
	<input type="checkbox"/> Accident/ incident report form
	<input type="checkbox"/> Insurance/registration
	<input type="checkbox"/> Sunscreen and bug spray
	<input type="checkbox"/> Antibacterial hand sanitizer (waterless)
	<input type="checkbox"/> First Aid Kit

Appendix B
pH Pen Calibration Instructions

pH

Pocket Pal pH Tester

Range: 0 – 14 pH units

Procedure

1. Turn on unit.
2. Remove protective cap from the bottom
3. Immerse the bottom of the Pocket Pal 1 to 3½ inches into the sample.
4. Using the Pocket Pal, gently stir the sample for several seconds. After stirring, and when the digital display stabilizes, read the pH value.
5. Rinse the bottom of the Pocket Pal and replace the protective cap.
6. For faster response and longer tester life, place several drops of DI water in the protective cap to prevent the glass bulb from drying out between uses.

Calibration

1. Prepare a pH 7.00 and a pH 4.00 or 10.00 buffer solution.
2. Measure the pH using the tester.
3. If necessary, adjust the Calibration Trimmer (small screws on back) until the reading corresponds to the pH of the buffer.

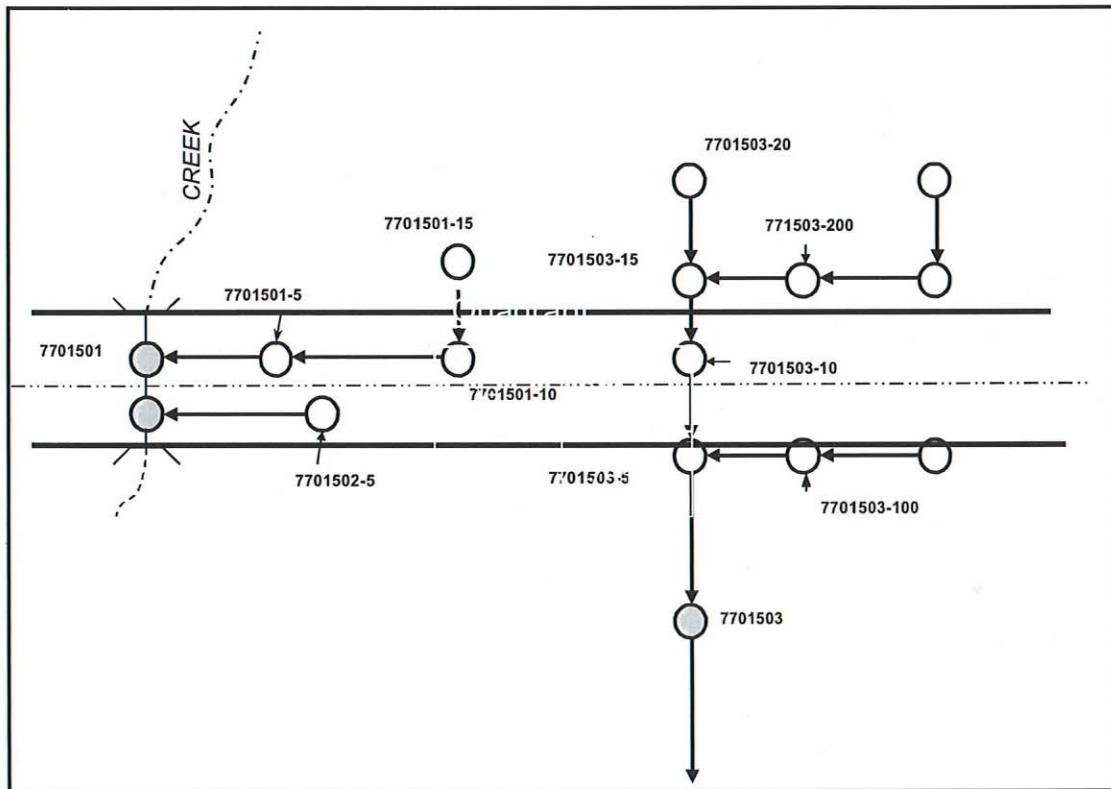
Notes

- Soak the electrode tip in tap water for a few minutes each week to condition the electrode.
- If pH readings become erratic, replace the batteries.
- Potassium chloride, used as a reference solution electrolyte, may deposit on the tester as a white precipitate. Although the precipitate is normal and does not affect performance, it may be removed with a damp cloth or tissue.

Table B-1 Calibration Log

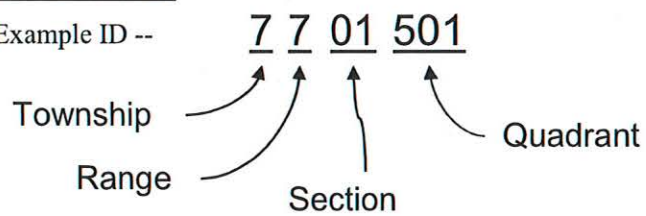
Date	Person	Certified Thermo- meter Reading	Field Thermo- meter Reading	Thermometer ID/pH Instrument ID	Reference Standard (name and concentration)	Instrument Reading against Reference Standard		Comments
						Before Calibration	After Calibration	

Appendix C
Structure Numbering



ID Number Key

Example ID --



Quadrant Key

1-250	251-500
501-750	751-999

Appendix D
MDEQ Fact Sheets

Appendix E
Sampling Devices



Fig 1 - Syringe Sampling Setup

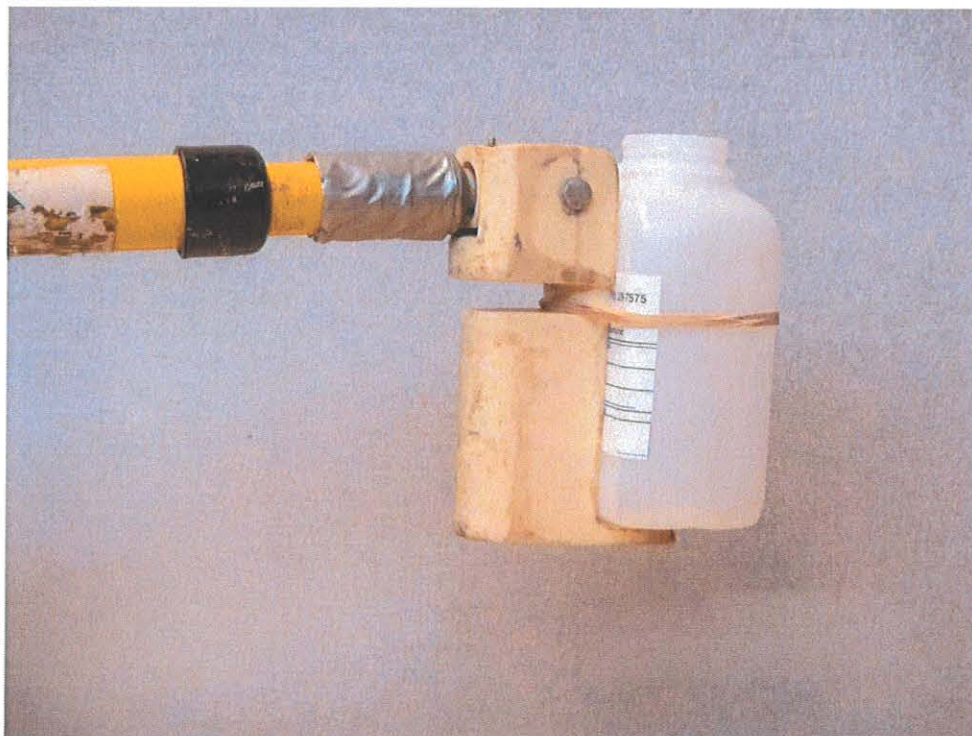


Fig 2 - Bottle Holder Sampling Setup

Appendix F
Flow Measurement Methods

Bucket Method

This method is typically limited to locations where there is free fall of water at the discharge point. The free fall must be high enough and concentrated along a narrow area so that a calibrated container can be positioned to collect all of the flow.

Equipment Needed:

1. Wide mouthed container(s) (bucket) graduated in known volume increments.
2. Stopwatch.

Procedure:

1. Place container under flow discharge point so that entire flow is collected.
2. Measure the time it takes to fill the bucket to a known volume.
3. Record the time duration and the volume.
4. Repeat Steps 1 through 3 at least once. Repeat steps at least twice, if the results vary by more than 20 percent.
5. Calculate the average time.
6. Compute the flow rate as follows: (Calculations to be done in the office).

$$Q = V/t$$

where:

Q = flow rate

V = volume

t = time required

7. Convert the calculated flow rate to liters per second.

Channel/Pipe Measurements

The second method for estimating flow requires channel measurements. The cross-sectional area of the flowing water and velocity must be estimated. This method should be used to estimate flow rates in pipes or channels where a significant, measurable, or steady velocity is observed and cross-sectional measurements can be readily obtained. The channel measurements can be fairly accurately measured for pipes of a known diameter. However, open channel measurements will generally rely on estimates of a top and bottom width. Velocity

measurements will be performed using floats and a stopwatch. Channel pipe flow calculations will be performed in the office.

Equipment Needed:

1. Depth Measurement Rod.
2. Tape Measure.
3. Float(s). These might include corks, fishing bobbers, wooden sticks, sticks and leaves, Cheerios, orange peel, or popcorn. If the float is not recoverable, then only objects that are non-objectionable in streams should be used.
4. Stopwatch.

Procedure:

1. Locate a relatively uniform section of the channel/pipe between 3 to 10 feet long.
2. Mark off a known length of the channel/pipe using available objects, such as rocks or sticks. If the site is at a manhole the diameter (typically 4 feet) of the manhole can be used as the travel length. If the discharge point location is at the end of a pipe and is accessible, a yardstick can be placed into the pipe or measure the length of a pipe section with a tape measure or folding ruler.
3. Use the stopwatch to measure the time required in seconds for a float to travel the marked off distance. If conditions are windy, it is desirable to have a float that is partially submerged. The float can be inserted upstream and timed as it passes the starting point. If swirls or eddies are observed, or if the flow depth is not very deep, this technique may not be applicable.
4. Step No. 3 should be repeated at least twice. If the velocity measurements vary by more than 20 percent a fourth measurement should be performed. The measurements should be averaged after dropping any outliers.
5. Measurements to calculate the cross-sectional area of the discharge should be obtained. For flow in a pipe, measure the depth of flow and the size of the pipe (if the pipe is other than round, sufficient measurements are needed to fully describe the shape of the pipe). For flow in a natural channel, measure the depth of flow, the bottom width of the channel, and the width of the channel at the flow surface.

6. Calculate the cross-sectional area of the flow. Calculations are to be done in the office. The following equations or (for partially filled circular pipes) may be used.

Rectangular Pipes: area = width * depth

Trapezoidal Channels: area = (top width + bottom width)/2 * depth

Circular Pipes:

$$A = \frac{d^2}{4} (\Theta - \sin(\Theta) \cos(\Theta))$$

$$\Theta = \cos^{-1} \left(1 - \frac{2y}{d} \right)$$

where:

A = Area

d = diameter of pipe

y = depth of flow

7. Calculate the flow rate and express the result in units of liters per second. Calculations are to be done in the office.

$$\text{Flow} = \text{Area} * \text{Velocity}$$

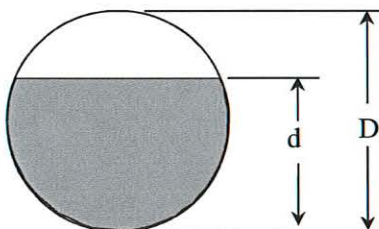
Table F-1 Area of Partial Filled Round Pipe

Diameter(in)	8	10	12	15	18	24	27	30	36	42	48	54	60
Diameter(ft)	0.67	0.83	1.0	1.3	1.5	2.0	2.3	2.5	3.0	3.5	4.0	4.5	5.0
Depth (ft)	Area (sf)												
0.05	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03
0.10	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09
0.15	0.06	0.07	0.07	0.08	0.09	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.17
0.20	0.09	0.10	0.11	0.13	0.14	0.16	0.17	0.18	0.20	0.22	0.23	0.25	0.26
0.25	0.12	0.14	0.15	0.17	0.19	0.23	0.24	0.26	0.28	0.31	0.33	0.35	0.37
0.30	0.15	0.18	0.20	0.23	0.25	0.30	0.32	0.33	0.37	0.40	0.43	0.46	0.48
0.40	0.22	0.26	0.29	0.34	0.38	0.45	0.48	0.51	0.56	0.61	0.65	0.70	0.74
0.50	0.28	0.34	0.39	0.46	0.52	0.61	0.66	0.70	0.77	0.84	0.91	0.97	1.02
0.60	0.33	0.42	0.49	0.58	0.66	0.79	0.85	0.91	1.01	1.10	1.18	1.26	1.33
0.70		0.49	0.59	0.71	0.81	0.98	1.06	1.13	1.25	1.37	1.48	1.58	1.67
0.80		0.54	0.67	0.83	0.96	1.17	1.27	1.35	1.51	1.66	1.79	1.91	2.03
0.90			0.74	0.95	1.11	1.37	1.49	1.59	1.78	1.96	2.12	2.26	2.40
1.00			0.79	1.05	1.25	1.57	1.71	1.83	2.06	2.27	2.46	2.63	2.80
1.10				1.14	1.39	1.77	1.93	2.08	2.35	2.59	2.81	3.01	3.20
1.20				1.21	1.52	1.97	2.16	2.33	2.64	2.92	3.17	3.40	3.62
1.30					1.63	2.16	2.38	2.58	2.94	3.25	3.54	3.81	4.06
1.40					1.72	2.35	2.60	2.83	3.23	3.59	3.92	4.22	4.50
1.50					1.77	2.53	2.82	3.08	3.53	3.94	4.30	4.64	4.95
1.60						2.69	3.02	3.32	3.83	4.29	4.69	5.07	5.42
1.70						2.85	3.22	3.55	4.13	4.64	5.09	5.50	5.89
1.80						2.98	3.41	3.78	4.43	4.99	5.48	5.94	6.36
1.90						3.08	3.58	4.00	4.72	5.33	5.88	6.38	6.85
2.00						3.14	3.73	4.21	5.01	5.68	6.28	6.83	7.33
2.10							3.86	4.40	5.29	6.03	6.68	7.28	7.83
2.20							3.95	4.58	5.56	6.37	7.08	7.73	8.32
2.30								4.72	5.82	6.70	7.48	8.18	8.82
2.40								4.84	6.06	7.03	7.87	8.63	9.32
2.50								4.91	6.29	7.35	8.26	9.07	9.82
2.60									6.51	7.66	8.65	9.52	10.32
2.70									6.70	7.96	9.02	9.96	10.82
2.80									6.87	8.25	9.40	10.40	11.31

Diameter(in)	8	10	12	15	18	24	27	30	36	42	48	54	60
2.90									7.00	8.52	9.76	10.84	11.81
3.00									7.07	8.78	10.11	11.26	12.30
3.10										9.01	10.45	11.68	12.79
3.20										9.22	10.78	12.10	13.27
3.30										9.40	11.09	12.50	13.75
3.40										9.54	11.38	12.89	14.22
3.50										9.62	11.66	13.27	14.68
3.60											11.91	13.64	15.13
3.70											12.14	13.99	15.58
3.80											12.33	14.33	16.01
3.90											12.48	14.64	16.43
4.00											12.57	14.94	16.84
4.10												15.21	17.23
4.20												15.45	17.61
4.30												15.65	17.96
4.40												15.82	18.30
4.50												15.90	18.61
4.60													18.90
4.70													19.15
4.80													19.37
4.90													19.54
5.00													19.63

Table F-2 Area and Hydraulic Radius for Various Flow Depths

d/D	A/D ²	R/D	d/D	A/D ²	R/D	d/D	A/D ²	R/D
0.01	0.0013	0.0066	0.36	0.2546	0.1978	0.71	0.5964	0.2975
0.02	0.0037	0.0132	0.37	0.2642	0.2020	0.72	0.6054	0.2987
0.03	0.0069	0.0197	0.38	0.2739	0.2062	0.73	0.6143	0.2998
0.04	0.0105	0.0262	0.39	0.2836	0.2102	0.74	0.6231	0.3008
0.05	0.0147	0.0326	0.40	0.2934	0.2142	0.75	0.6319	0.3017
0.06	0.0192	0.0389	0.41	0.3032	0.2182	0.76	0.6405	0.3024
0.07	0.0242	0.0451	0.42	0.3130	0.2220	0.77	0.6489	0.3031
0.08	0.0294	0.0513	0.43	0.3229	0.2258	0.78	0.6573	0.3036
0.09	0.0350	0.0575	0.44	0.3328	0.2295	0.79	0.6655	0.3039
0.10	0.0409	0.0635	0.45	0.3428	0.2331	0.80	0.6736	0.3042
0.11	0.0470	0.0695	0.46	0.3527	0.2366	0.81	0.6815	0.3043
0.12	0.0534	0.0755	0.47	0.3627	0.2401	0.82	0.6893	0.3043
0.13	0.0600	0.0813	0.48	0.3727	0.2435	0.83	0.6969	0.3041
0.14	0.0668	0.0871	0.49	0.3827	0.2468	0.84	0.7043	0.3038
0.15	0.0739	0.0929	0.50	0.3927	0.2500	0.85	0.7115	0.3033
0.16	0.0811	0.0986	0.51	0.4027	0.2531	0.86	0.7186	0.3026
0.17	0.0885	0.1042	0.52	0.4127	0.2562	0.87	0.7254	0.3018
0.18	0.0961	0.1097	0.53	0.4227	0.2592	0.88	0.7320	0.3007
0.19	0.1039	0.1152	0.54	0.4327	0.2621	0.89	0.7384	0.2995
0.20	0.1118	0.1206	0.55	0.4426	0.2649	0.90	0.7445	0.2980
0.21	0.1199	0.1259	0.56	0.4526	0.2676	0.91	0.7504	0.2963
0.22	0.1281	0.1312	0.57	0.4625	0.2703	0.92	0.7560	0.2944
0.23	0.1365	0.1364	0.58	0.4724	0.2728	0.93	0.7612	0.2921
0.24	0.1449	0.1416	0.59	0.4822	0.2753	0.94	0.7662	0.2895
0.25	0.1535	0.1466	0.60	0.4920	0.2776	0.95	0.7707	0.2865
0.26	0.1623	0.1516	0.61	0.5018	0.2799	0.96	0.7749	0.2829
0.27	0.1711	0.1566	0.62	0.5115	0.2821	0.97	0.7785	0.2787
0.28	0.1800	0.1614	0.63	0.5212	0.2842	0.98	0.7816	0.2735
0.29	0.1890	0.1662	0.64	0.5308	0.2862	0.99	0.7841	0.2666
0.30	0.1982	0.1709	0.65	0.5404	0.2881	1.00	0.7854	0.2500
0.31	0.2074	0.1756	0.66	0.5499	0.2900			
0.32	0.2167	0.1802	0.67	0.5594	0.2917			
0.33	0.2260	0.1847	0.68	0.5687	0.2933			
0.34	0.2355	0.1891	0.69	0.5780	0.2948			
0.35	0.2450	0.1935	0.70	0.5872	0.2962			



Manning's Equation

Manning's equation can be used under certain circumstances to provide an estimate of the flow rate without velocity measurements. Manning's equation requires measurements of the channel cross-section, depth of flow, and slope of the channel, and a roughness coefficient, n , must be estimated. Manning's equation should only be used where the cross-section of the channel or pipe is uniform, the slope and roughness of the channel can be estimated, where measurements are taken at the upstream end of a uniformly sloping channel and where flow discharges freely with no backwater or impoundment due to a downstream condition. Slope of the channel should either be taken off as-builts or should be surveyed.

Equipment Needed:

1. Tape measure and/or depth measuring rod.

Procedure:

1. Measurements to calculate the cross-sectional area of the discharge should be obtained. For flow in a pipe, measure the depth of flow and the size of the pipe (if the pipe is other than round, sufficient measurements are needed to fully describe the shape of the pipe). For flow in a natural channel, measure the depth of flow, the bottom width of the channel, and the width of the channel at the flow surface.
2. Additional observations should include information to determine Manning's roughness coefficient. If possible, photographs should be taken of channel to help select the Manning roughness coefficients.
3. Calculate flows using the Manning equation. All calculations are to be done in the office. The Manning equation is:

$$Q = \frac{c1}{n} A^{(5/3)} P_w^{-(2/3)} \sqrt{S}$$

Rectangular Channels

$$A = by$$

$$P_w = b + 2y$$

Trapezoidal Channels

$$A = \frac{y(b + B)}{2}$$

$$P_w = b + 2\sqrt{y^2 + \left(\frac{B - b}{2}\right)^2}$$

Circular Channels

$$A = \frac{d^2}{4}(\Theta - \sin(\Theta)\cos(\Theta))$$

$$P_w = \Theta d$$

$$\Theta = \cos^{-1}\left(1 - \frac{2y}{d}\right)$$

where:

Q = flow (cms)

c1 = 1.0 for cms; 1.49 for cfs.

n = Manning's roughness coefficient

A = Area (square feet)

P_w = Wetted Perimeter (ft)

S = Channel Slope (ft/ft)

y = depth of water (ft)

d = diameter (ft)

b = bottom width (ft)

B = top width (width at water surface) (ft)

Table F-3 Typical Manning's Roughness Coefficient Values

Description	n
A. Closed Conduits Flowing Partly Full	
Cast Iron	
Coated	0.013
Uncoated	0.014
Corrugated Metal	
Subdrain	0.019
Storm drain	0.024
Concrete	
Culvert	0.013
Sewer	0.014
Clay	
Vitrified sewer	0.013
B. Lined or Built-up Channels	
Concrete	
Trowel Finish	0.013
Float Finish	0.015
Finished, with gravel on bottom	0.017
Unfinished	0.017
Concrete bottom float finished with sides of	
Dressed stone in mortar	0.017
Random stone in mortar	0.020
Cement rubble masonry	0.025
Gravel bottom with sides of	
Formed concrete	0.020
Random stone in mortar	0.023
Dry rubble or rip-rap	0.033
Asphalt	
Smooth	0.013
Rough	0.016
C. Excavated or Dredged	
Earth, straight and uniform	
Clean, recently completed	0.018
Clean, after weathering	0.022
Gravel, uniform section, clean	0.025
With short grass, few weeds	0.027
Earth, winding and sluggish	
No vegetation	0.025
Grass, some weeds	0.030
Dense weeds or aquatic plants in deep channels	0.035
Earth bottom and rubble sides	0.030
Stony bottom and weedy banks	0.035
Cobble bottom and clean sides	0.040
Channels not maintained, weeds and brush uncut	
Dense weeds, high as flow depth	0.080
Clean bottom, brush on sides	0.050

* Source: Open-Channel Hydraulics by Ven Te Chow, Ph.D. 1959

Appendix G

Contact Information

The following contact information is offered for this project.

Table G-1 Tetra Tech Contact Information

Name	Contact Information	Responsibilities
Steve Pennington	Tetra Tech 401 S. Washington Sq. Suite 100 Lansing, MI 48933 Office: (517) 316-3958 Cell: (517) 204-9232	Project Manager
Natalie Trotter	Tetra Tech 401 S. Washington Sq. Suite 100 Lansing, MI 48933 Office: (517) 316-3947	Technical Assistance
Robert Domm	Tetra Tech 401 S. Washington Sq. Suite 100 Lansing, MI 48933 Office: (517) 316-3943 Cell: (734) 891-4250	Technical Assistance

Table G-2 Laboratory Contact Information

Laboratory Name	Address	Telephone
MDEQ Drinking Water Laboratory	3350 N. Martin Luther King Blvd Lansing, MI 48909	(517) 335-8184
Brighton Analytical LLC	2105 Pless Drive Brighton, MI 48114	(810) 229-7575

Appendix H

MSDS

Material Safety Data Sheet

Section 1. Product and Company Identification

Product Name	Nitric Acid	Product Code	NX0409
Manufacturer	EM Science A Division of EM Industries P.O. Box 70 480 Democrat Road Gibbstown, N.J. 08027	Effective Date	3/22/2002
For More Information Call	856-423-6300 Technical Service Monday-Friday: 8:00 AM - 5:00 PM	In Case of Emergency Call	800-424-9300 CHEMTREC (USA) 613-996-6666 CANUTEC (Canada) 24 Hours/Day: 7 Days/Week
Synonym	None.		
Material Uses	Laboratory Reagent		
Chemical Family	Inorganic acid.		

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
NITRIC ACID	7697-37-2	100

+ Section 3. Hazards Identification

Physical State and Appearance	Liquid. (Yellowish.)
Emergency Overview	DANGER! POISON! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. VAPOR REDUCES OXYGEN AVAILABLE FOR BREATHING. MAY BE FATAL IF INHALED OR SWALLOWED. CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, MUCOUS MEMBRANES, RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA, TEETH.
Routes of Entry	Absorbed through skin. Inhalation. Ingestion.

Potential Acute Health Effects

Eyes	Hazardous in case of eye contact (corrosive). Causes eye burns.
Skin	Corrosive to skin on contact.
Inhalation	Extremely hazardous in case of inhalation (lung corrosive). Do not breathe vapor or mist. May be fatal if inhaled. Inhalation of vapors may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.
Ingestion	Extremely hazardous in case of ingestion. May be fatal if swallowed.

Potential Chronic Health Effects

Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
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Additional information See Toxicological Information (section 11)

Medical Conditions	Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.
Aggravated by	Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Overexposure:	

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flammability of the Product	Non-flammable.
Auto-ignition Temperature	Not applicable.
Flash Points	Not applicable.
Flammable Limits	Not available.
Products of Combustion	Not applicable.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of static discharge: No. Risks of explosion of the product in presence of mechanical impact: No.

Fire Fighting Media and Instructions	Not applicable.
Protective Clothing (Fire)	Not applicable.
Special Remarks on Fire Hazards	Not available.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill and Leak	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.
Large Spill and Leak	Stop leak if without risk. Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.
Spill Kit Information	The following EM SCIENCE SpillSolv (TM) absorbent is recommended for this product: SX1310 Acid Treatment Kit

Section 7. Handling and Storage

Handling	Handle and open container with care. Avoid contact with combustible materials. Do not breathe vapor or mist. Do not ingest. Do not get in eyes, on skin or clothing. After handling, always wash hands thoroughly with soap and water.
Storage	Keep container tightly closed. Handle and open container with care. Keep container in a cool, well-ventilated area. Separate from acids, alkalis, reducing agents and combustibles.

+ Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Face shield.
Body	Full suit.
Respiratory	Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands	Gloves.

Feet	Boots.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Product Name	Exposure Limits
NITRIC ACID	<p>ACGIH (United States, 1994).</p> <p>STEL: 10 mg/m3</p> <p>STEL: 4 ppm</p> <p>TWA: 5.2 mg/m3</p> <p>TWA: 2 ppm</p> <p>NIOSH REL (United States, 1994).</p> <p>STEL: 10 mg/m3</p> <p>STEL: 4 ppm</p> <p>TWA: 5 mg/m3 Period: 10 hour(s).</p> <p>TWA: 2 ppm Period: 10 hour(s).</p> <p>OSHA Final Rule (United States, 1989).</p> <p>STEL: 10 mg/m3</p> <p>STEL: 4 ppm</p> <p>TWA: 5 mg/m3</p> <p>TWA: 2 ppm</p> <p>National Authority for Occupational Safety/Health (Ireland, 1999).</p> <p>STEL: 10 mg/m3</p> <p>STEL: 4 ppm</p> <p>OEL: 5 mg/m3</p> <p>OEL: 2 ppm</p>

+ Section 9. Physical and Chemical Properties

Odor	ACRID; SUFFOCATING
Color	Colorless to light yellow.
Physical State and Appearance	Liquid. (Yellowish.)
Molecular Weight	63.02 g/mole
Molecular Formula	H-N-O3
pH	Not available.
Boiling/Condensation Point	83.94°C (183.1°F)
Melting/Freezing Point	-41.06°C (-41.9°F)

Specific Gravity	1.49 (Water = 1)
Vapor Pressure	0.3 kPa (2.6 mmHg) (@ 20°C)
Vapor Density	>1 (Air = 1)
Odor Threshold	2 ppm
Evaporation Rate	Not available.
LogKow	Not available.
Solubility	Soluble in water.

+ Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Container explosion may occur under fire conditions or when heated.
Incompatibility with Various Substances	Reactive with combustible materials, organic materials, metals, acids, alkalis.
Rem/Incompatibility	Not available.
Hazardous Decomposition Products	NOx
Hazardous Polymerization	Will not occur.

+ Section 11. Toxicological Information

RTECS Number:

Nitric Acid QU5900000, QU5775000

Toxicity	Acute toxicity of the vapor (LC50): 76 ppm 4 hour(s) [Rat].
Chronic Effects on Humans	Not available.
Acute Effects on Humans	Corrosive to eyes and skin. May be fatal if swallowed.
Synergetic Products (Toxicologically)	Not available.
Irritancy	Draize Test: Not available.
Sensitization	Not available.
Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
Toxicity to Reproductive System	Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).

Teratogenic Effects	Not available.
Mutagenic Effects	Not available.

+ Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	D002 D001
Treatment	Specified technology- Neutralize to pH 6-9. Contact your local permitted waste disposal site (TSD) for permissible treatments sites. ALWAYS CONTACT PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS. ALWAYS CONTACT PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

Section 14. Transport Information

DOT Classification	Proper Shipping Name: NITRIC ACID Hazard Class: 8 UN number: UN2031 Packing Group: II RQ: 1000 lbs. (453.6 kg)
TDG Classification	Not available.
IMO/IMDG Classification	Proper Shipping Name: NITRIC ACID Hazard Class: 8 UN number: UN2031 Packing Group: II RQ: 1000
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations	TSCA 8(b) inventory: NITRIC ACID SARA 302/304/311/312 extremely hazardous substances: NITRIC ACID SARA 302/304 emergency planning and notification: NITRIC ACID
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	SARA 302/304/311/312 hazardous chemicals: NITRIC ACID
	SARA 311/312 MSDS distribution - chemical inventory - hazard identification: NITRIC ACID: fire, reactive, immediate health hazard
	SARA 313 toxic chemical notification and release reporting: Nitric Acid
	Clean Water Act (CWA) 307: No products were found.
	Clean Water Act (CWA) 311: Nitric Acid
	Clean air act (CAA) 112 accidental release prevention: Nitric Acid
	Clean air act (CAA) 112 regulated flammable substances: No products were found.
	Clean air act (CAA) 112 regulated toxic substances: Nitric Acid
WHMIS (Canada)	<p>CLASS C: Oxidizing material.</p> <p>Class D-1B: Material causing immediate and serious toxic effects (TOXIC).</p> <p>CLASS E: Corrosive liquid.</p> <p>CEPA DSL: Nitric Acid</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all required information.</p>
International Regulations	
EINECS	Nitric Acid 231-714-2
DSCL (EEC)	<p>R8- Contact with combustible material may cause fire.</p> <p>R35- Causes severe burns.</p>
International Lists	<p>Australia (NICNAS): Nitric Acid</p> <p>Japan (MITI): Nitric Acid</p> <p>Korea (TCCL): Nitric Acid</p> <p>Philippines (RA6969): Nitric Acid</p> <p>China: No products were found.</p>
State Regulations	<p>Pennsylvania RTK: Nitric Acid: (environmental hazard, generic environmental hazard)</p> <p>Massachusetts RTK: Nitric Acid</p> <p>New Jersey: Nitric Acid</p> <p>California prop. 65: No products were found.</p>

Section 16. Other Information

	National Fire	Health	0	Fire Hazard
	Protection		4	Reactivity
	Association			Specific Hazard
	(U.S.A.)			
Changed Since Last Revision	+			

Notice to Reader

The statements contained herein are based upon technical data that EM Industries believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EM INDUSTRIES MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Material Safety Data Sheet

+ Section 1. Product and Company Identification

Product Name	Sulfuric Acid, GR	Product Code	SX1244
Manufacturer	EM Science A Division of EM Industries P.O. Box 70 480 Democrat Road Gibbstown, N.J. 08027	Effective Date	11/27/2001
For More Information Call	In Case of Emergency Call		
856-423-6300 Technical Service Monday-Friday: 8:00 AM - 5:00 PM	800-424-9300 CHEMTREC (USA) 613-996-6666 CANUTEC (Canada) 24 Hours/Day: 7 Days/Week		
Synonym	OIL OF VITRIOL		
Material Uses	Analytical reagent.		
Chemical Family	Acid.		

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
SULFURIC ACID	7664-93-9	100

+ Section 3. Hazards Identification

Physical State and Appearance	Liquid. (Clear viscous liquid.)
Emergency Overview	DANGER! POISON! MAY BE FATAL IF INHALED OR SWALLOWED. CAUSES SEVERE EYE AND SKIN BURNS. CAUSES RESPIRATORY TRACT BURNS. OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, MUCOUS MEMBRANES,

	RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA, TEETH.
Routes of Entry	Absorbed through skin. Eye contact. Inhalation. Ingestion.
Potential Acute Health Effects	
Eyes	Extremely hazardous in case of eye contact (corrosive). Causes severe eye burns.
Skin	Extremely hazardous in case of skin contact (corrosive). Skin contact produces severe burns.
Inhalation	Extremely hazardous in case of inhalation. May be fatal if inhaled. Hazardous in case of inhalation (lung corrosive).
Ingestion	Extremely hazardous in case of ingestion. May be fatal if swallowed.
Potential Chronic Health Effects	
Carcinogenic Effects	Classified A2 (Suspected for human.) by ACGIH.
Additional information See Toxicological Information (section 11)	
Medical Conditions	Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.
Aggravated by	Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Overexposure:	

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flammability of the Product	Non-flammable.
Auto-ignition Temperature	Not applicable.
Flash Points	Not applicable.
Flammable Limits	Not applicable.
Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	Flammable in presence of combustible materials
Explosion Hazards in	Risks of explosion of the product in presence of static discharge: No.

Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: No.
Fire Fighting Media and Instructions	Do not use water or foam.
Protective Clothing (Fire)	Wear MSHA/NIOSH approved self-contained breathing apparatus or equivalent and full protective gear.
Special Remarks on Fire Hazards	Flammable hydrogen gas may be produced on prolonged contact with metals such as aluminum, tin, lead and zinc.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill and Leak	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.
Large Spill and Leak	Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.
Spill Kit Information	The following EM SCIENCE SpillSolv (TM) absorbent is recommended for this product: SX1310 Acid Treatment Kit

+ Section 7. Handling and Storage

Handling	Store in tightly closed container. Avoid contact with combustible materials. Do not ingest. Do not get in eyes, on skin, or on clothing. Avoid breathing vapors or spray mists.
Storage	Keep container in a cool, well-ventilated area. Separate from acids, alkalis, reducing agents and combustibles.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Face shield.
Body	Full suit.
Respiratory	Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Hands	Gloves.
Feet	Boots.

Personal Protection in Case of a Large Spill Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name

Exposure Limits

SULFURIC ACID

AUVA (Austria, 1995).
 Spitzenbegrenzung: 2 mg/m³ 8 times per shift, Period: 5 minute(s).
 MAK: 1 mg/m³

Belgium Minister of Labour (Belgium, 1998).
 VCD: 3 mg/m³
 VL: 1 mg/m³

BAUA (Germany, 1997).
 Spitzenbegrenzung: 1 mg/m³
 MAK: 1 mg/m³

DK-Arbejdstylsinet (Denmark, 1996).
 GV: 1 mg/m³

Tyterveyslaitos (Finland, 1998).
 STEL: 3 mg/m³
 TWA: 1 mg/m³

INRS (France, 1996).
 VLE: 3 mg/m³
 VME: 1 mg/m³

National Authority for Occupational Safety/Health (Ireland, 1999).
 OEL: 1 mg/m³

Arbeidsinspectie (Netherlands, 1999).
 TGG 8 uur: 1 mg/m³

N-Arbejdstylsinet (Norway, 1996).
 AN: 1 mg/m³

AFS (Sweden, 1996).
 KTV: 3 mg/m³
 NGV: 1 mg/m³

EH40-OES (United Kingdom (UK), 1997).
 TWA: 1 mg/m³

ACGIH (United States, 1996).
 STEL: 3 mg/m³
 TWA: 1 mg/m³

NIOSH REL (United States, 1994).
 TWA: 1 mg/m³ Period: 10 hour(s).

OSHA Final Rule (United States, 1989).
 TWA: 1 mg/m³

Section 9. Physical and Chemical Properties

Odor	Odorless.
Color	Colorless.
Physical State and Appearance	Liquid. (Clear viscous liquid.)
Molecular Weight	98.08 g/mole
Molecular Formula	H2-O4-S
pH	Acidic.
Boiling/Condensation Point	290.05°C (554.1°F)
Melting/Freezing Point	-10°C (14°F)
Specific Gravity	1.84 (Water = 1)
Vapor Pressure	0.1 kPa (1 mmHg) (@ 20°C)
Vapor Density	Not available.
Odor Threshold	>1 ppm
Evaporation Rate	<1
LogKow	Not available.
Solubility	Soluble in water.

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Extremely reactive or incompatible with reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.
Rem/Incompatibility	Not available.
Hazardous Decomposition Products	Not available.
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

RTECS Number:

Sulfuric Acid

WS5600000

Toxicity

Acute oral toxicity (LD50): 2140 mg/kg [Rat].

Acute toxicity of the vapor (LC50): 320 mg/m³ 2 hour(s) [Mouse].

Chronic Effects on Humans	CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH.
Acute Effects on Humans	Extremely hazardous in case of eye contact (corrosive). Causes severe eye burns. Extremely hazardous in case of skin contact (corrosive). Skin contact produces severe burns. Extremely hazardous in case of inhalation. May be fatal if inhaled. Hazardous in case of inhalation (lung corrosive). Extremely hazardous in case of ingestion. May be fatal if swallowed.
Synergetic Products (Toxicologically)	Not available.
Irritancy	Draize Test (Rabbit): Eyes: 5 mg/30s. Reaction: Severe.
Sensitization	Not available.
Carcinogenic Effects	Classified A2 (Suspected for human.) by ACGIH.
Toxicity to Reproductive System	Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).
Teratogenic Effects	Not available.
Mutagenic Effects	Tests on laboratory animals for mutagenic effects are cited in Registry of Toxic Effects of Chemical Substances (RTECS).

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	D002
Treatment	Specified Technology - Neutralize to pH 6-9. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. Always contact a permitted waste disposal (TSD) to assure compliance with all current local, state, and Federal Regulations.

Section 14. Transport Information

DOT Classification	Not available.
TDG Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations	TSCA 8(b) inventory: SULFURIC ACID
	SARA 302/304/311/312 extremely hazardous substances: SULFURIC ACID
	SARA 302/304 emergency planning and notification: SULFURIC ACID
	SARA 302/304/311/312 hazardous chemicals: SULFURIC ACID
	SARA 311/312 MSDS distribution - chemical inventory - hazard identification: SULFURIC ACID: reactive, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
	SARA 313 toxic chemical notification and release reporting: SULFURIC ACID
	Clean Water Act (CWA) 307: No products were found.
	Clean Water Act (CWA) 311: SULFURIC ACID
	Clean air act (CAA) 112 accidental release prevention: No products were found.
	Clean air act (CAA) 112 regulated flammable substances: No products were found.
	Clean air act (CAA) 112 regulated toxic substances: No products were found.
WHMIS (Canada)	CLASS C: Oxidizing material.
	Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
	CLASS E: Corrosive liquid.
	CEPA DSL: SULFURIC ACID
International Regulations	
EINECS	SULFURIC ACID 231-639-5
DSCL (EEC)	R35- Causes severe burns.
International Lists	Australia (NICNAS): SULFURIC ACID
	Japan (MITI): SULFURIC ACID
	Korea (TCCL): SULFURIC ACID
	Philippines (RA6969): SULFURIC ACID
	China: No products were found.
State Regulations	Pennsylvania RTK: SULFURIC ACID: (environmental hazard, generic environmental hazard)
	Massachusetts RTK: SULFURIC ACID
	New Jersey: SULFURIC ACID
	California prop. 65: No products were found.

Section 16. Other Information

National Fire Protection Association (U.S.A.)	Health	0	Fire Hazard
		3 2	Reactivity
		W	
			Specific Hazard

Changed Since Last +
Revision
Notice to Reader

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Appendix I
Paper Field Forms

DRAINAGE SYSTEM INVENTORY

GENERAL

Date _____ Time _____ ID _____
 Initial (1) _____ Initial (2): _____
 Photographs: Roll # _____ Picture #'s _____

STRUCTURE TYPE

- ☐ Discharging pipe
☐ Manhole
☐ Catch Basin
☐ Culvert Outlet
☐ Point in Open Channel
- ☐ Not Found
☐ Blind Tie or Tap
☐ Non-Point Source (circle below)
 • Seepage
 • Overland Flow

Ownership

- ☐ Public
☐ Private
☐ GCDC
- ☐ GCRC
☐ Other _____

LOCATION (see back side for location sketch)

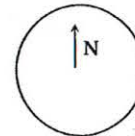
Latitude _____
 Longitude _____
 Offset Description: _____

Receiving Waterbody: _____

Inventory Comments: _____

CONDUIT INFORMATION

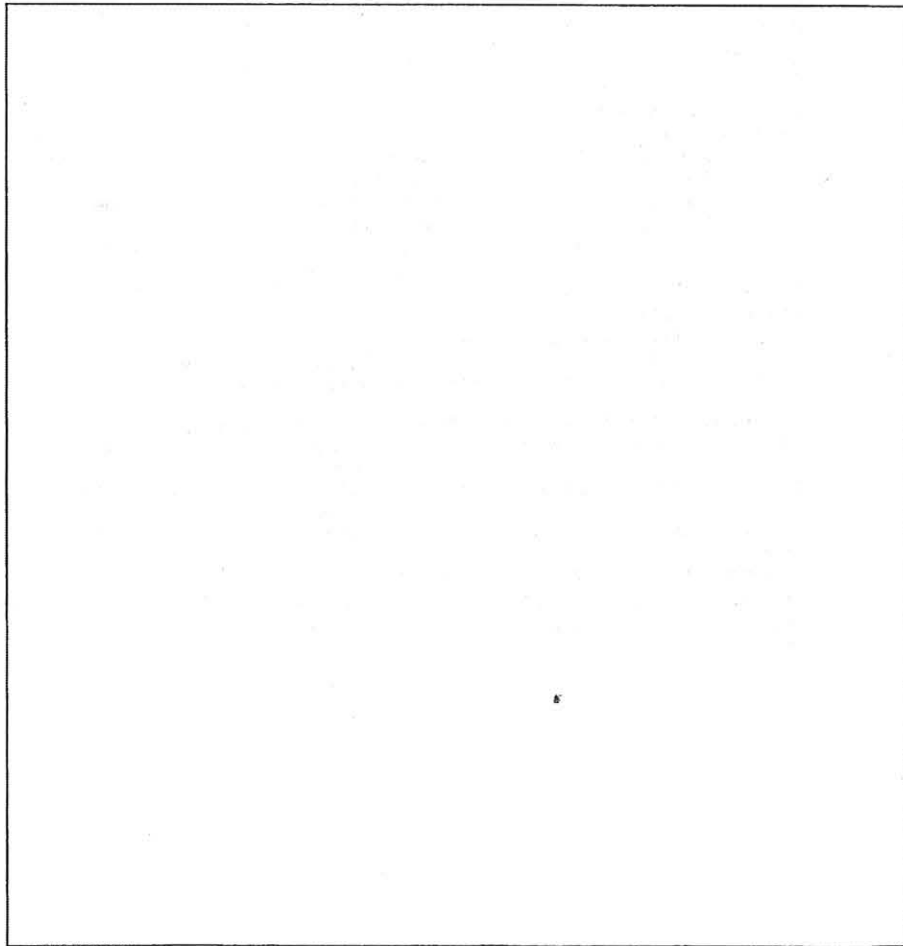
Pipe ID							
Direction from MH							
Shape							
Diameter (in)							
Width (in) (Open Channel)							
Depth (in)							
Measure Down (ft) (Manhole)							
Invert Elevation (ft) (Pipes)							
Conduit Material							
Inlet/Outlet							



LOCATION SKETCH

LOCATION SKETCH CHECK LIST

- ☐ Label Street Names
- ☐ Indicate North
- ☐ Locate manholes by dimensions from property lines, back of curb, or edge of pavement
- ☐ Sketch catch basins and connections (no measurements necessary).
- ☐ Indicate (if possible) distance to upstream and downstream manholes
- ☐ Landmarks/nearest address, if any
- ☐ Flow direction
- ☐ Sample point
- ☐ Special access/traffic control notes
- ☐ Between mile markers ____ & ____ or ____ tenths past mile marker ____
- ☐ Velocity/depth measure location



Updated 5-13-06

DRAINAGE SYSTEM SCREENING

GENERAL

Date _____

Time _____

ID _____

Air Temp _____

Rain ☐ Yes ☐ No

☐ Clear/Sunny

☐ Partly Cloudy

☐ Overcast

Crew Initials _____

Chk By: _____

Photographs: Roll # _____ Picture # _____

DRY WEATHER FLOW PRESENT

☐ Yes, Dry Weather Flow Present

☐ Trace, Insufficient

☐ No Dry Weather Flow Present

☐ Standing Water

☐ Submerge

☐ Inundated

☐ N/A

FLOW MEASUREMENTS

Pipe Sampled: Size (in) _____ Direction _____

Method: ☐ Tt Method

☐ Area * Velocity

☐ Bucket

☐ Manning's

General Data

Depth, (in) _____

Dist Traveled, (ft) _____

Bucket Vol, (l) _____

Channel Slope (%) _____

Channel Material _____

Channel, n _____

Travel

Time Trials

#1 (sec) _____

#2 (sec) _____

#3 (sec) _____

Avg (sec) _____

Vel (fps) _____

Flow: _____

Intermittent ☐ Not Checked

Flow Check ☐ Left Sand Bag in Channel

☐ Removed Sand Bag, intermittent DWF present ☐ Yes ☐ No

if possible describe frequency, duration, time of day of flow slugs - put in comments section

DISCHARGE OBSERVATIONS (if "other" checked fill in description at bottom of page)

Odor ☐ None ☐ Musty ☐ Sewage ☐ Rotten Egg ☐ Gas ☐ Oil ☐ Other

Floatables ☐ None ☐ Trash ☐ Sewage ☐ Bacterial Sheen ☐ Oil Sheen ☐ Suds ☐ Other

Deposits/ ☐ None ☐ Mineral ☐ Sediment ☐ Oily ☐ Grease ☐ Suds ☐ Other

Stains ☐ None ☐ Normal ☐ Excessive ☐ Algae ☐ Slime ☐ Other

Vegetation ☐ Normal ☐ Cracking ☐ Spalling ☐ Corrosion ☐ Settlement ☐ Staining ☐ Other

Structural ☐ Normal ☐ Cracking ☐ Spalling ☐ Corrosion ☐ Settlement ☐ Staining ☐ Other

Color _____ Enter # _____

Turbidity _____ Enter # _____

Description: _____

RECEIVING WATER OBSERVATIONS (if "other" checked fill in description at bottom of page)

Odor	<input type="checkbox"/> None	<input type="checkbox"/> Musty	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rotten Egg	<input type="checkbox"/> Gas	<input type="checkbox"/> Oil	<input type="checkbox"/> Other
Floatables	<input type="checkbox"/> None	<input type="checkbox"/> Trash	<input type="checkbox"/> Sewage	<input type="checkbox"/> Bacterial Sheen	<input type="checkbox"/> Oil Sheen	<input type="checkbox"/> Suds	<input type="checkbox"/> Other
Deposits/ Stains	<input type="checkbox"/> None	<input type="checkbox"/> Mineral	<input type="checkbox"/> Sediment	<input type="checkbox"/> Oily	<input type="checkbox"/> Grease	<input type="checkbox"/> Suds	<input type="checkbox"/> Other
Vegetation	<input type="checkbox"/> None	<input type="checkbox"/> Normal	<input type="checkbox"/> Excessive	<input type="checkbox"/> Algae	<input type="checkbox"/> Slime		<input type="checkbox"/> Other
Bank	<input type="checkbox"/> Excessive Vegetation	<input type="checkbox"/> Staining of Banks	<input type="checkbox"/> Erosion	<input type="checkbox"/> Trash			<input type="checkbox"/> Other
Color	_____ Enter #						
Turbidity	_____ Enter #						

Description:

DRAINAGE SYSTEM SCREENING (Continued)

ID

CHEMICAL ANALYSIS
FIELD ANALYSIS

LAB SAMPLE COLLECTED ID _____

Surfactants	_____ mg/L	Temperature	_____
Ammonia	_____ mg/L	pH	_____
Boron	_____ mg/L	Specific Cond.	_____
Potassium	_____ mg/L		
E. Coli	_____ per 100ml		

RESULTS

- ☐ Illicit Connection Ruled Out
- ☐ Illicit Connection (undocumented connection)
- ☐ Pending
- ☐ Notify City
- ☐ Not a PSD

ACTION

- ☐ None Required
- ☐ Illicit Removed
- ☐ Waiting on Lab Results
- ☐ Dye Test
- ☐ Televis
- ☐ Investigate Further
- ☐ Illicit Connection

Comments

Appendix J
Genesee IDEP SOP

Standard Operating Procedure for:

Genesee County Illicit Discharge Elimination Program

Purpose of SOP:

To obtain and record inventory information for outfalls including construction material, size, Global Positioning System (GPS) location. To conduct field screening of Outfalls to schedule, report, track and enforce the Elimination of illicit discharges. To perform a round of dry-weather screening of county outfalls every 5 years and to track the effectiveness of the IDEP program. To track the disconnection of illicit discharges.

Procedures/Practices:

Suggested Frequency:

Field Screening and Inventory of Existing Outfalls

5 years

- Conduct a field screening and inventory of all existing county outfalls. Outfalls should only be screened in dry weather. (E.g. 72 hours after the last rainfall event that produced more than 0.1 inches of rainfall.)
- Perform a dry-weather screening of each outfall noting dry weather flow, pipe size and material, direction of pipe from manhole, date and time of inspection and GPS location within 1 meter. Note any visual indications of an illicit discharge. Use the IDEP Field Screening and Inventory Form that is included at end of this SOP.
- Take a digital photograph of the outfall pipe or manhole showing the structure and its immediate surroundings.
- Collect sample of any dry weather flow and test for Ammonia, Surfactant, E. coli, pH, and Temperature.
- Conduct a follow-up, upstream investigation on outfalls that fall outside of chemical testing parameters: Ammonia >1Mg/L; Surfactant >0.2Mg/L; E. coli >2000 colonies/100ml; Temperature > ambient air temperature; pH >9 or <6.

Procedures/Practices:**Suggested Frequency:****Field Screening and Inventory of Existing Outfalls****Dry Weather Flow****Outfall Sampling**

- Conduct a follow-up, upstream investigation on any outfall that exhibits visual or physical signs of sewage contamination (Smell, sewage bacteria, sanitary debris).
- Watch for discharges from Sanitary Sewer Overflows (SSO) and non-point-source discharges and record them on the IDEP Field Screening and Inventory Form.
- Train field personnel to spot, identify, and report suspected illicit discharges.

Immediately**Upstream Tracking and Discharge Verification**

- Trace the suspected illicit discharge upstream through the storm sewer system, sampling any flowing input pipes along the way.
- Try to isolate any suspected illicit discharge to a single stretch of sewer or discrete location.
- Dye test suspected illicit discharge sources (toilets, sinks, sump drains, floor drains, etc.) to isolate the source.

Annually**Immediately****As soon as practical****Reporting of Illicit Discharges**

- Report verbally to MDEQ within 24 hours of time an illicit discharge is confirmed.

24 hours

Procedures/Practices:

Suggested Frequency:

Field Screening and Inventory of Existing Outfalls

- Report in writing within 5 days from the time the illicit discharge is confirmed. Include a description of the discharge and cause of noncompliance, the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the discharge.

5 days



Outfall Documentation



Sewage Stain



Positive Dye Test

Field Screening and Inventory of New Outfalls

- Conduct a dry-weather screening and inventory of new outfalls created using the IDEP Field Screening and Inventory Form.
- Perform a dry-weather screening for each new outfall noting dry weather flow, pipe size and material, direction of pipe from manhole,

Ongoing

Procedures/Practices:**Suggested Frequency:****Field Screening and Inventory of Existing Outfalls**

depth of pipe invert relative to manhole rim (if applicable), date and time of inspection and GPS location within 1 meter. Note any visual indications of an illicit discharge. Use the IDEP Field Screening and Inventory Form that is included at end of this SOP.

- Take a digital photograph of the outfall pipe or manhole showing the structure and its immediate surroundings.
- Enter Data from Screening and inventory in the Genesee County IDEP data base.

Tracking and Reporting

- Document the date, time, and screening results of existing outfalls as they are visited. Enter these results in the IDEP database.
- Track the location and resolution of all illicit discharges in the IDEP database. Document upstream follow up investigations including results for any dye testing or sewer TV work.
- Provide documentation of the actions taken to eliminate illicit discharges to MDEQ.
- For significant illicit discharges, provide MDEQ with a list of the pollutants of concern, estimate of the volume and load discharged, and provide locations of the discharges into both the separate storm water sewer system and the receiving water body.
- Report new outfalls to MDEQ

Ongoing



Emergency Spill

Emergency Spill Response

- In the event the spill or release poses a threat to public safety, call 9-1-1 immediately.
- Report spills or accidental releases immediately to the MDEQ Pollution Emergency Alerting System (PEAS) 24-hour hotline at 1-800-292-4706.
- Within 10 days of the spill or release, submit to the MDEQ a full written explanation as to the cause, discovery, response (clean-up and/or recovery) measures taken, and preventative measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

Immediate

Individual Permittee ERP

Attachment 2 to MDEQ Stormwater Discharge Permit Application

1. Provide the ERP. The ERP shall include the applicant's expected response to violations to compel compliance with an ordinance or regulatory mechanism implemented by the applicant in the SWMP (e.g., written notices, citations, and fines). The ERP shall contain a method for tracking instances of non-compliance, including, as appropriate, the name of the person responsible for violating the applicant's ordinance or regulatory mechanism, the date and location of the violation, a description of the violation, a description of the enforcement response used, a schedule for returning to compliance, and the date the violation was resolved. The applicant may keep an electronic file or hard copy file of the enforcement tracking.

Section 14 of Draft IDEP Ordinance will be revised to designate violation of the ordinance as a misdemeanor, punishable by fine, jail or both. Violators will also be responsible for all costs of cleanup, remediation and restoration, including consultant costs, associated with the violation.

13. Provide the procedure for responding to illegal dumping/spills. The procedure shall include a schedule for responding to complaints, performing field observations, and follow-up field screening and source investigations as appropriate.

Any reports of illegal dumping would be directed to the Fenton Township Ordinance Enforcement Officer. He would conduct an appropriate level of investigation to determine the accuracy of the reported activity. If illegal dumping is confirmed or suspected, the Ordinance Enforcement Officer would complete the Spill Notification form and notify the appropriate agency immediately. The Ordinance Enforcement Officer will open and maintain a file for each instance of non-compliance, monitor the progress of any additional investigation and remediation activities, and continue to update the file until the issue is closed. All such files will be maintained in the Township's permanent records.

15. Provide the procedure that includes a requirement to immediately report any release of any polluting materials from the MS4 to the surface waters or groundwaters of the state, unless a determination is made that the release is not in excess of the threshold reporting quantities in the Part 5 Rules, by calling the appropriate MDEQ District Office, or if the notice is provided after regular working hours call the MDEQ's 24-Hour Pollution Emergency Alerting System telephone number: 800-292-4706

We use the Spill Notification form (Page 27-28 of the IDEP plan).

Illicit Discharge Ordinance/ Regulatory Mechanism

Attachment 2 to MDEQ Stormwater Discharge Permit Application

Community Name: Charter Township of Fenton

- 20. Provide the ordinance or regulatory mechanism in effect that prohibits non-stormwater discharges into the applicant's MS4 (except the non-stormwater discharges addressed in Questions 21 and 22).
- 23. Provide the ordinance or regulatory mechanism that regulates the contribution of pollutants to the applicant's MS4.
- 24. Provide the ordinance or regulatory mechanism that prohibits illicit discharges, including illicit connections and the direct dumping or disposal of materials into the applicant's MS4.
- 25. Provide the ordinance or regulatory mechanism with the authority established to inspect, investigate, and monitor suspected illicit discharges into the applicant's MS4.
- 26. Provide the ordinance or regulatory mechanism that requires and enforces elimination of illicit discharges into the applicant's MS4, including providing the applicant the authority to eliminate the illicit discharge.

20, 23-26: See attached Ordinance No. 769, adopted September 8, 2014.

Illicit Discharge and Connection Stormwater Ordinance
Ordinance No. 769
Adopted September 8, 2014

THE CHARTER TOWNSHIP OF FENTON, GENESEE COUNTY, MICHIGAN ORDAINS:

SECTION 1. Purpose

The purpose of this ordinance is to provide for the health, safety, and general welfare of the citizens of the Charter Township of Fenton through the regulation of non-stormwater discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are:

- (1) To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user.
- (2) To prohibit Illicit Connections and Discharges to the municipal separate storm sewer system.
- (3) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance.

SECTION 2. Definitions

For the purposes of this ordinance, the following shall mean:

Authorized Enforcement Agency. Employees or designees of the director of the municipal agency designated to enforce this ordinance.

Best Management Practices (BMPs). Schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act. The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity. Activities subject to NPDES Construction Permits. Currently these include construction projects resulting in land disturbance of 5 acres or more. Beginning in March 2003, NPDES Stormwater Phase II permits will be required for construction projects resulting in land disturbance of 1 acre or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials. Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Discharge. Any direct or indirect non-stormwater discharge to the storm drain system, except as exempted in Section X of this ordinance.

Illicit Connections. An illicit connection is defined as either of the following:

Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency

or

Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Industrial Activity. Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14)

National Pollutant Discharge Elimination System (NPDES) Discharge Permit. A permit issued by EPA (or by a State under authority delegated pursuant to 33 USC § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-Stormwater Discharge. Any discharge to the storm drain system that is not composed entirely of stormwater.

Person. Any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant. Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises. Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Storm Drainage System. Publicly-owned facilities by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Stormwater. Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Stormwater Pollution Prevention Plan. A document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to

Stormwater, Stormwater Conveyance Systems, and/or Receiving Waters to the Maximum Extent Practicable.

Wastewater. Any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

SECTION 3. Applicability

This ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency.

SECTION 4. Responsibility For Administration

The Charter Township of Fenton ("Township") and/or the Township Engineer shall be the authorized enforcement agency and shall administer, implement, and enforce the provisions of this ordinance. Any powers granted or duties imposed upon the authorized enforcement agency may be delegated in writing by the Director of the authorized enforcement agency to persons or entities acting in the beneficial interest of or in the employ of the agency.

SECTION 5. Severability

The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Ordinance.

SECTION 6. Ultimate Responsibility

The standards set forth herein and promulgated pursuant to this ordinance are minimum standards; therefore this ordinance does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

SECTION 7. Discharge Prohibitions

Prohibition of Illegal Discharges.

No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

The commencement, conduct or continuance of any non authorized discharge to the storm drain system is prohibited except as described as follows:

- A. The following discharges are exempt from discharge prohibitions established by this ordinance: water line flushing or other potable water sources; landscape irrigation or lawn watering, and irrigation waters; diverted stream flows and flows from riparian habitats and wetlands; rising ground water and springs; uncontaminated ground water infiltration and seepage; uncontaminated pumped ground water except for groundwater cleanups specifically authorized by NPDES permits; foundation drains, water from crawl space pumps, footing drains and basement sump pumps (not including active groundwater dewatering systems); air conditioning condensation; waters from non-commercial washing of vehicles; street wash water; dechlorinated swimming pool water from single, two, or three family residences; firefighting activities; and any other water source not containing Pollutants.
- B. Dye testing done under the authorization of the MDEQ (general Rule 97) is an allowable

discharge, but requires a complete Notice of Intent to the MDEQ prior to the time of the test.

- C. The prohibition shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

Prohibition of Illicit Connections.

- D. The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.
- E. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.
- F. A person is considered to be in violation of this ordinance if the person connects a line conveying sewage to the MS4, or allows such a connection to continue.

SECTION 8. Suspension of MS4 Access

Suspension due to Illicit Discharges in Emergency Situations

The Township Engineer may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or Waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or Waters of the United States, or to minimize danger to persons.

Suspension due to the Detection of Illicit Discharge

Any person discharging to the MS4 in violation of this ordinance may have their MS4 access terminated if such termination would abate or reduce an illicit discharge. The Township Engineer will notify a violator of the proposed termination of its MS4 access. The violator may petition the authorized enforcement agency for a reconsideration and hearing.

A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the Township.

SECTION 9. Industrial or Construction Activity Discharges

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the authorized enforcement agency prior to the allowing of discharges to the MS4.

SECTION 10. Monitoring of Discharges

A. Applicability.

This section applies to all facilities that have stormwater discharges associated with industrial activity, including construction activity.

B. Access to Facilities.

1. The Township shall be permitted to enter and inspect facilities subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.
2. Facility operators shall allow the Township ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.
3. The Township shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.
4. The Township has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.
5. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the Township and shall not be replaced. The costs of clearing such access shall be borne by the operator.
6. Unreasonable delays in allowing the Township access to a permitted facility is a violation of a stormwater discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the authorized enforcement agency reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.
7. If the Township has been refused access to any part of the premises from which stormwater is discharged, and is able to demonstrate probable cause to believe that there may be a violation of this ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this ordinance or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the Township may seek issuance of a search warrant from any court of competent jurisdiction.

SECTION 11. Requirement to Prevent, Control and Reduce Stormwater Pollutants by the Use of Best Management Practices

The Township will adopt requirements identifying Best Management Practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of stormwater, the storm drain system, or waters of the U.S. The owner or operator of a commercial or

industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of these structural and non-structural BMPs. Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section. These BMPs shall be part of a stormwater pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

SECTION 12. Watercourse Protection

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

SECTION 13. Notification of Spills

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into stormwater, the storm drain system, or water of the U.S. said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Township in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Township within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 14. Enforcement

Notice of Violation.

Whenever the Township finds that a person has violated a prohibition or failed to meet a requirement of this Ordinance, the Township Engineer may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

- (a) The performance of monitoring, analyses, and reporting;
- (b) The elimination of illicit connections or discharges;
- (c) That violating discharges, practices, or operations shall cease and desist;

- (d) The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property; and
- (e) Payment of a fine to cover administrative and remediation costs; and
- (f) The implementation of source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency or a contractor and the expense thereof shall be charged to the violator.

SECTION 15. Appeal of Notice of Violation

Any person receiving a Notice of Violation may appeal the determination of the Township Engineer. The notice of appeal must be received within seven (7) days from the date of the Notice of Violation. Hearing on the appeal before the Township Board shall take place within fifteen (15) days from the date of receipt of the notice of appeal. The decision of the Township Board shall be final.

SECTION 16. Enforcement Measures After Appeal

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or, in the event of an appeal, within thirty (30) days of the decision of the Township Board upholding the decision of the Fenton Township Engineer, then representatives of the Township shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the Township or designated contractor to enter upon the premises for the purposes set forth above.

SECTION 17. Cost of Abatement of the Violation

Within fifteen (15) days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment within five (5) days. If the amount due is not paid within a timely manner as determined by the decision of the Township Board or by the expiration of the time in which to file an appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment.

SECTION 18. Injunctive Relief

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. If a person has violated or continues to violate the provisions of this ordinance, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

SECTION 19. Violations Deemed a Public Nuisance

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

SECTION 20. Criminal Prosecution

Violation of any of the provisions of this Ordinance shall hereafter constitute a misdemeanor and shall be punished by a fine not to exceed five hundred dollars (\$500.00) together with the cost of prosecution and/or imprisonment in the Genesee County Jail or such other place of detention as the court may prescribe for a period of time not to exceed ninety (90) days.

The Township may recover all attorneys' fees, court costs and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

SECTION 21. Remedies Not Exclusive

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the Township to seek cumulative remedies.

SECTION 22. Severability.

This ordinance and the various parts, sections, subsections, provisions, sentences and clauses are severable. If any part of this ordinance is found to be unconstitutional or invalid it is declared the remainder of this ordinance shall not be affected hereby.

Section 33. Effective Date

This ordinance shall be published as required by law and shall take effect 30 days after adoption and publication. Enacted at a regular meeting of the Fenton Township Board held on the 8th day of September 2014.

Bonnie K. Mathis, Supervisor

Robert E. Krug, Clerk

Attachment 3

To MDEQ Stormwater Discharge Permit Application
(PPP Plan)

Public Participation Plan (PPP)

Attachment 3 to MDEQ Stormwater Discharge Permit Application

2. Provide the procedure for making the SWMP available for public inspection and comment. The procedure shall include a process for notifying the public when and where the SWMP is available and of opportunities to provide comment. The procedure shall also include a process for complying with local public notice requirements, as appropriate.

Once the SWMP application has been submitted, the entire application packet will be available for inspection and comment at the Fenton Township office during regular business hours for a period of 45 days. The document will also be posted on the Township's website for the 45 day period, with the opportunity to provide comment electronically. The availability of the document at the township office and on the website will be included in a notice published in a newspaper of local circulation.

After the permit has been issued, we will follow the same steps outlined above for public inspection and comment on the issued permit.

3. Provide the procedure for inviting public involvement and participation in the implementation and periodic review of the SWMP.

Same procedure as above.

Attachment 4

To MDEQ Stormwater Discharge Permit Application

(PEP plan- Table 2)

(Procedure for assessment and effectiveness of PEP)

Attachment 4 – Public Education

Procedure for assessment and effectiveness of PEP

The Genesee County Drain Commissioner's Office leads a consortium of communities (through the provisions of a 342 agreement) that collaboratively work to meet their Phase II stormwater permit requirements, including their Public Education activities. Additionally, there are several nested jurisdiction under Genesee County participating in the group that participate.

The PEP sub-committee (derived from a selection of 342 community representatives) annually review the public education activities/actions to be undertaken for the forthcoming year. The actions are reviewed to make sure they are meeting their goals before a budget for those actions is voted on for implementation. All actions that are proposed address one or more of the Education Topics (A through K) identified in the Stormwater Discharge Permit Application in #5. Table 2 outlines those actions being done.

Question 4- procedure with assessment of high priority, community wide issues and targeted issues to reduce pollutants in the stormwater runoff as part of the PEP.

Chapter 6 of the watershed plan:

Water Quality Concerns

Water quality concerns were solicited from the public and stakeholders through a series of workshops and meetings, Described in Section 5.

A list of the public's concerns is provided below:

- Flooding Problems
- Concerns Affecting Drainage Ditches
- Parking Lot Spills
- Landfill Runoff/Groundwater Leachate
- Car Wash
- Groundwater pumping, irrigation affecting local wells
- Over-fertilization
- Sedimentation and soil erosion
- Source of Funding to Address the Above Concerns
- Wetland Destruction
- Need for Ordinance and Permit Compliance Enforcement for Environmental Protections
- Development Concerns
- Negative Public Perception of Flint River
- Need for Cooperation with Health Department
- Lack of Citizen and Municipal Education
- Lack of access to recreational opportunities

The concerns identified by the stakeholders are ranked and presented below. The public and stakeholders ranked their concerns to determine which issues they felt were more important. Each Concern is labeled as Rural (R), Urban (U) or Both (B) to indicate where in the watershed the concern is of most relevance.

1. Funding (B)
2. Education for planning commissions and zoning boards-municipals, government officials (B)
3. Need innovative ideas and solutions implemented locally-pilot project w/education component (B)
4. Sanitary Connections to storm sewer (U)
5. Education for builders and developers (B)
6. Stormwater treatment with BMPs must be maintained (U)
7. Streets directly discharge into river within minutes of rain events (U)
8. Flooding due to new development (B)
9. Master Gardeners-Volunteer Work link to projects (U)
10. Promote education at a publicly planned event (B)
11. Time of Sale Homeowner Packet (U)
12. Education (B)
13. More recreational opportunities (B)

We also looked at DESIGNATED USES IN THE STATE

The Michigan Department of Environmental Quality (MDEQ), acting under authority of the federal Clean Water Act, aims to make waters in the state meet certain designated uses (State of Michigan, 1999):

- Agricultural Water Supply • Industrial Water Supply
- Public Water Supply • Warm water Fishery
- Other Aquatic Life / Wildlife • Partial Body Contact
- Coldwater Fisheries (specifically identified waterbodies only)
- Total Body Contact (May 1st – October 31st)
- Navigation

This was used to develop the Public Education program. Based on the work done we have determined that the high priority community wide issues are:

- Educate the public (residential) on how their actions impact the water.
- Educate the public on how the water system is interconnected.
- Promote proper disposal practices for pollutants. (residential)

The high priority targeted issues are:

- Manage riparian lands to protect water quality
- Educate on septic system use and maintenance
- Educate developers on Green infrastructure and LID

The following topics has been ranked from 1 to 11, with 1 being highest and 11 being lowest:

• A=1	• G=10
• B=2	• H=6
• C=8	• I=9
• D=3	• J=7
• E=5	• K=11

Note at this time we do not have enough information on commercial, industrial, and institutional entities within Genesee County Communities to develop an effective program for **K**. Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff. During the new permit cycle the Public Education Committee will inventory the commercial, industrial, and institutional entities to determine where an effective public education program can be developed.

Question 6 – Determining Effectiveness

From the watershed plans:

Program Assessment

“Program assessment involves reviewing the attainment of primarily the indirect measures of success. Measures of success will be reviewed for achievement and if the desired level of achievement is not attained, an investigation will be conducted to determine possible factors causing failure.

The PEP has developed and administered a phone survey to the public. Besides as a tool to direct the education committee, it can be used as a baseline assessment of where the public’s knowledge is now. Future surveys can be used to measure change in knowledge and behavior. Other methods can provide measurable quantities like counting number of hits on the website or how many pounds of household hazardous waste have been dropped off.

Assessing the attainment of the measures of success is a yearly task that will be reported in the annual progress reports. The annual progress report is required to cover decisions made, actions performed, and results for the IDEP, PEP, SWPPI, and any other storm water actions conducted during the previous permit year (The IDEP and PEP are separate documents containing additional actions and measures of success not covered in this WMP.) The annual report must also cover updates of nested drainage system agreements and point source discharges to the storm water system.”

Additionally, there is a second iteration of the social survey planned for this permit cycle aimed at assessing the public’s knowledge, attitudes, and behaviors. Also, please note the last column in Table 2 that indicates the specific evaluation measure to be undertaken for each public education activity.

Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Table 2: Public Education Program Best Management Practices (BMPs)

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Road/stream crossing and watershed signs	A B	Public, Residents, Visitors	Educate on specific watershed. Waterbodies the public can affect.	Get 50% of people to know the stream names and that they are in a watershed	Drivers and passengers, visitors going by specific sign	Entering a watershed; specific waterbodies; and watershed website	Increase in number of people recognizing the watershed and waterbodies they live in or passing by. Awareness leads to stewardship	Signs have been installed beginning in 2008	Will continue to install until reached 200 sites, approx. 400 to 600 signs, then maintain existing signs. Proposed plan to expand with signs in Parks	SWM/ Road Commission	\$3,000/yr.	Measure the number of residents that went to the website based on the information on the sign; social survey response
Watershed Maps	A B C D E F	School Children, Teachers	Definition of a watershed - Educate on Specific Watershed the public can affect, purpose for protecting the watershed. Effects of human activities on waterways, illicit discharge, what is it? Promoting illicit discharge reporting.	Get 50% of students to know what a watershed is and which one they live in.	Teachers/classrooms	What is a watershed; specific waterbodies; and watershed website	Have maps posted in as many classrooms as possible and discussed in class. Also designed to be used as handouts	Printed 2014	Distribute to appropriate teachers for class use. Reprint and send out upon request as needed. Available on website for download and printing	SWM	Development - \$780.00 'Printing - \$3,000 Promotion - \$910.00/yr Distribution/work shop - \$5,200.00/per session	Number of teachers incorporating lessons into curriculum.
Benthic Monitoring Program	A B	Residents, School Children	Ways that individuals can affect the watershed through their activities. What is the actual condition of our waters?	Maintain current level of sites monitored or expand that number. Currently 18	Interested volunteers. Produce results for public on website. (general health of Our Water)	Your efforts help us to better understand the watershed.	Consistent trends begin to paint a clearer picture of different reaches.	Program has been running in Flint River Watershed since 1999. Shiawassee Watershed added in 2008	Twice a year	SWM/FRWC to administer program	\$5,150/yr	No. of volunteers and sites surveyed. Use information to aid decision-making.
Project Green WQ monitoring Program	A B (Depending on who does the Mentoring, the following topics can be covered C, D, E, F, G)	School Children, Teachers Groups	Ways that individuals can affect the watershed through their activities. What is the actual condition of our waters? How pollution occurs	Maintain current level of participation or increase number of classrooms.	School children, teachers	Our actions have impacts on local waterways; how to act to better protect adjacent waterbodies.	Increased demand for the program	Program has been running since 1991. Since 2005 it has been under the FRWC administration.	Yearly	SWM/FRWC to administer program	\$7,500/yr for sampling + private funds Up to \$5,000 for analysis	#participating schools/sites survey. Information to aid decision-making. Increased public awareness - social survey.

A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
C. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4. D. Promote preferred cleaning materials and procedures for car, pavement, and power washing.
E. Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers. F. Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.
G. Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous wastes, travel trailer sanitary wastes, chemicals, and motor vehicle fluids.
H. Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure. I. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
J. Promote methods for managing riparian lands to protect water quality. K. Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff.

Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Display Booth for events	A B C D E F G H J	Public, public employees	Definition of a watershed - Ways those individuals can affect the watershed through their activities.	Residents adopt the recommended behavior changes.	Home owners, various associations and businesses	Same as "Seven Simple Steps"	Display at 6+functions a year	Developed	Ongoing training of volunteers to man booth. attendance of booth at several events throughout year # of people spoken to	SWM/Cons Dist	\$9,500/yr	social survey Number of public spoken to. Number of events attended
Website: http://cleargene.seewater.org/	A, B, C D, E, F G, H, I J, K	Public	Have messages on most topics.	Residents adopt the recommended behavior changes.	Permittees, home owners, associations, businesses	Same as key message	Number of hits per year stay the same or increase.	Developed	Expand site as new material becomes available. Update as needed	SWM	100 hrs a year. Plus periodic costs for updates.	Number of hits on the site Number of times brochure is downloaded.
Conservation District presentation to school districts with Enviroscapes	A, B, C, D (Depending on who does the training, the following topics can be covered E, F, G, I)	School Children, Teachers	What is a watershed - Importance of a riparian corridor, effects of human activities on waterways and wetlands.	Make presentation 5000 students/ teachers per year	School children	Our actions have impacts on local waterways; how to act to better protect adjacent waterbodies.	Number of presentations per year.	Developed	Schedule presentations annually to reach at least 5000 students/year	SWM/ Conservation District	\$16,000/yr	- Number of presentation s, - Answer questions on social survey - Improvement in other metrics
Catch basin stenciling program that includes door to door delivery of brochures	A B	Residents, schools, owners and employees of local businesses and industries, boy/girl scouts, volunteers groups	- Storm drains discharge to water bodies - Storm water discharged from separate storm sewer systems does not receive treatment prior to discharge - Impacts of storm water pollutants in the watershed - Knowledge of separate storm water drainage system in your front ditch and that it flows to a river	Get 10% of the people in the watershed where the catch basins were labeled to understand where there storm water goes and what the impacts are.	Homeowners; parties distributing brochures and stenciling	Same as key message	Stencil 1000 catch basins/yr - with residents receiving a brochure when stenciling is in their neighborhood	Program began in 2005; materials have been developed	Continue to deliver program plan training and brochure. Repurchase supplies, brochure as needed. Evaluate and modify message as needed when reprinting doorhangers	FRWC/CD & SWM maintenance dept.	\$5,300/yr.	Phone or mail survey of residents' awareness of the watershed; number of residents that volunteer to stencil storm drains.

A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
C. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4. D. Promote preferred cleaning materials and procedures for car, pavement, and power washing.
E. Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers. F. Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.
G. Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous wastes, travel trailer sanitary wastes, chemicals, and motor vehicle fluids.
H. Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure. I. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
J. Promote methods for managing riparian lands to protect water quality. K. Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff.

Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Distribute brochures promoting the "seven simple steps"	A B C D E F G	Public and public employees	Actions everyone can take to improve water quality. Effects of residential waste on our waterbodies.	Residents adopt the recommended behavior changes.	All residents	Specific to each of the seven steps: Car Care, proper fertilizing, pet waste, water conservation, HHW, storm drains, earth friendly landscaping	Distribute 2500+ /yr	"Seven Simple Steps" brochure has been developed.	Continue to distribute "seven simple steps" through permittees/ events. Evaluate message, amend as needed, reprint as needed	SWM/ Permittees	Reprinting costs	- social survey - Other # of brochures distributed to public
Speakers	B (Depending on who does the training, the following topics can be covered A, C, D, E, F, G, H, I, J)	Home owner associations, non-profit groups, rotary clubs...	What is a watershed - Actions everyone can take to improve water quality, effects of residential waste on our waterbodies; and other specific messages (7 simple steps) The talk is broken into segments by topic so each talk can be customized	Residents adopt the recommended behavior changes.	Home owners, various associations and businesses	Same as "Seven Simple Steps"	Address 10+ groups a year	Developed	Train new volunteers to give presentations as needed	FRWC	\$2,040/yr	- social survey - Other Number of presentation given, number of attendees.
Articles on seven measures/ Newsletters on Ph II program	A B C D E F G	Public, non-profit groups, public employees	What is a watershed - Actions everyone can take to improve water quality, effects of residential waste on our waterbodies, The Ph II program. Implementation efforts	Residents adopt the recommended behavior changes. PhII permittees educated on program	Homeowners, businesses, industries, Ph II permittees. Non Ph II Municipalities.	Same as key message	Increase sense of community stewardship and actions taken to protect waterways.	Some have been developed; new articles will be to address timely issues.	Submit articles to group, newsletters & newspaper for print	SWM	None	-Articles get published - Responses to the pending social survey
Advertise and distribute flyers about the Household Hazardous Waste Collection Day	G	Public, public employees, businesses	Identification of HHW (household hazardous waste), disposal locations and availability	Increase the number of residents dropping off HHW at events by 10%	Homeowners, businesses (painters, landscapers, etc.)	How and where to dispose of oil-based paint, pesticides, herbicides, etc.	Increase awareness of household hazardous waste and where and when it can be disposed	Develop advertisements/flyers for distribution twice a year	Distribution twice a year of advertisements /flyers developoend by HHW group	All Permittees/ HHW Committee	Cost of advertisement / flyers, staff time, and hazardous waste disposal costs	Track the number of residents and the amount of waste collected during HHW Collection.

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C. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4. D. Promote preferred cleaning materials and procedures for car, pavement, and power washing.
E. Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers. F. Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.
G. Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous wastes, travel trailer sanitary wastes, chemicals, and motor vehicle fluids.
H. Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure. I. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
J. Promote methods for managing riparian lands to protect water quality. K. Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff.

Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Educational materials for Homeowners With Septic Systems to be Given at "Time of Sale". Main Topic: Septic System Maintenance.	C G H	Homeowners, public employees, realtors, haulers, inspectors	Proper septic system care and maintenance, how to recognize a system failure, where to go for assistance.	Educate septic system owners on proper care and maintenance, recognizing a failure and correcting	Septic system owners	How to properly maintain your septic system	Educate septic system owners on the proper care and maintenance of their systems and how to recognize failing systems.	Information has been developed. Delivery mechanism is being worked out.	Printing materials beginning in 2009 and distribute through communities & real estate agents.	SWM and TBD	300 - 500 hours "printing - \$3000.00 Mail/distribution - \$1500.00 (estimated until 2013)	Social survey
Canoe trips	A B J	Public, landowners	Purpose for protecting the watershed, ways those individuals can affect the watershed through their activities, improving water quality and habitat and benefits to all.	Realize an increase in the use of the riparian corridor and a corresponding increase of volunteering/ stewardship of the waterbodies	Any resident	People that use the waterbodies for recreation are going to want to protect the waterbodies	Increase in volunteerism	Already ongoing	Schedule events annually 4+ /year.	SWM/FRWC	\$4,000/yr.	- The number on new people participating in each event. Participant comment
Presentation information about proper disposal of medications and personal care products on website	G	Public	Proper disposal of HHW, specifically medications and personal care products	Get 20% of those educated to utilize HHW program to properly dispose of in landfill	Public	Proper disposal of HHW, specifically medications and personal care products	Educate 10% public on program. Increase use of HHW program	Done	Information on WWS website	Water and Waste Services (WWS)	Staff time	Attendance and website hits
Information to riparian landowners on landscape improvements to protect waterways.	A B I J	Riparian landowners,	- Importance of riparian corridors - BMPs for riparian lands - Landscaping for water quality - Shoreline stabilization techniques - Native vegetation alternative	residential riparian landowners to learn how to better manage the land.	Lake and stream associations, riparian land owners	How to properly manage and dispose of grass, leaf and animal wastes; how to improve your property to better protect adjacent waterbodies.	Educate the number of riparian land owners in the knowledge of how to protect banks from erosion and water quality. Educate 25% by 2012 and All watersheds by 2014	Mailers and workshop literature developed and printed for distribution 2009	Information is passed out to public at events and available on website	SWM	Printing	Number of information packets given out.

A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
C. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4. D. Promote preferred cleaning materials and procedures for car, pavement, and power washing.
E. Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers. F. Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.
G. Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous wastes, travel trailer sanitary wastes, chemicals, and motor vehicle fluids.
H. Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure. I. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
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Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Pub ed workshop on proper disposal of restaurant waste	K	Business owners	Proper disposal of kitchen waste	Get restaurant owners that have had attended workshop to properly dispose of restaurant waste	Business owners	Proper disposal of kitchen waste	Educate 20% restaurants on program	Program developed by WWS. Will add stormwater component to their program	Have workshops in permit cycle or distribute information brochure.	WWS	Staff time and TBD workshop costs	Attendance to workshop
What is Green Infrastructure workshop	I	Engineers, Developers	What is Green Infrastructure?, Why should we develop with Green Infrastructure?, how to design Green Infrastructure?	Get Developers to support GI	Engineers, Developers	Get Engineers educated on how to design for GI, Get Developers, to buy into green Infrastructure	Educate 75% Engineers, 25% Developers	2015	1 workshop before 2016	SWM	Cost of development/ printing/ workshop	Attendance to workshop, voluntary compliance to GI
Operation and maintenance 1/2 day workshop for municipalities, entities and their contractors (Good House Keeping)	B C D E F K	Public employees, contractors	Good housekeeping practices and their impact on water quality.	Adoption and recording of good housekeeping practices	PowerPt and manual	How to properly manage and maintain public infrastructure and related activities	Educate 50% by 2011 and 90% by 2015; Have maintenance crews adopt maintenance protocols on property by 2014	Training is developed	Complete. Schedule training as-needed.	SWM/Tetra Tech	\$6,000/ first yr. up to \$6000/ year	Pass MDEQ inspections
Good House Keeping training video	B C D E F K	Public employees, contractors	Good housekeeping practices and their impact on water quality.	Adoption and recording of good housekeeping practices	Attendance of training by video/ internet	How to properly manage and maintain public infrastructure and related activities	Have maintenance crews/ B&G staff trained within 1 st year of hire or within permit cycle.	Training is developed. Transferring information to a video or internet format is in development	Produce Video/ internet training. Schedule training as-needed.	SWM/Tetra Tech	\$6,000/ first yr. up to \$6000/ year	Pass MDEQ inspections

A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
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Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Education efforts by individual Permittee (EXAMPLES of what you can do. You MUST provide enough detail to the State so they know what your specific commitment is. If you provide literature to public, where is it made available, if you post information on a board, where is that board located and who will see it, etc...)

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Provide a link on our website to the Clear.geneseewater.org website	A, B, C D, E, F G, H, I J, K	Pubic	Have messages on most topics.	Residents adopt the recommended behavior changes.	Permitees, homeowners, associations, businesses.	Same as key message.	Number of hits per year stays the same or increases.	Completed.	Completed.	Fenton Township, GCDC	None	Are website visitors accessing the link.
Provide literature at Fenton Twp Office: Seven Simple steps, Septic Booklet, Riparian Landowners, IDEP identification	A, B, C D, E, F G, H, I J	Public, public employees	Actions everyone can take to improve water quality. Effects of residential waste on our water bodies. Proper septic system care and maintenance, how to recognize a system failure, impact of failure, where to go for assistance. - Importance of riparian corridors - BMPs for riparian lands - Landscaping for water quality - Shoreline stabilization techniques - Native vegetation alternative	Residents follow recommended actions from literature.	Permitees, homeowners, associations.	Same as key message.	Quantities of literature needed to restock racks stays the same or increases each year.	Completed.	Completed.	Fenton Township, GCDC	None	Is the public taking the literature.
Creation of an illicit discharge reporting mechanism (See IDEP plan- Attachment C & E for more information-)	C	Public	What is an illicit discharge? How to report illicit discharge.	Eliminate known illicit discharges to storm drains and waterways	Public	Recognize and Report illicit discharges or improper disposal of materials that threaten the water supply	Reporting mechanism for IDEP is being used by the communities.	Attachment E has been created and is in place. Attachment C is based on Rouge Rivers and has to be customized	Printing can be done as-needed. Placed on Website, Place on Counter for Public	Fenton Township	Staff costs printing cost	Is the illicit discharge reporting mechanism being used.

Way to get over 10-12 per yr

est 10-20 cr per yr

- A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
C. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4. D. Promote preferred cleaning materials and procedures for car, pavement, and power washing.
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H. Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure. I. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
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Michigan Department of Environmental Quality – Water Resources Division
STORMWATER DISCHARGE PERMIT APPLICATION

Delivery Mechanism / Activity	Public Education Topics	Target Audience(s)	Key Message	Standard of Effectiveness (recommended)	Mechanism Specific Audience (recommended)	Mechanism Specific Message(s) (recommended)	Milestone(s) (recommended)	Timetable / Timeline		Responsible Party	Cost (recommended)	Evaluation
								Development	Implementation			
Staff Training on Goodhousekeeping/ IDEP identification	B, C, D, E, F, K	Public employees	Implement BMP's; Learn how to identify illicit discharges.	Employees identify and report illicit discharges.	Public employees	Same as key message	Training completed during permit cycle.	Training Manual developed (GCDC-SWM)	First Training completed before 12/31/15.	Fenton Township	Staff costs printing cost	Documentation of training sessions.
Participate in HHW Promote? financial? Host?	G	Public	Proper disposal of hazardous materials rather than landfill.	Residents dispose of HHW at designated collection events.	Public	Same as key message.	Volume of HHW collected stays the same or increases each year.	Completed	Ongoing	Fenton Township	\$1,500 annual contribution from Fenton Township for HHW collection days.	Volume of HHW collected.

Many of the Public Education actions are performed by other Permittees or non- Permittee partners. Each Permittee is responsible to execute the permitted Public education efforts regardless of who is actually doing the work.
 All work identified in the PEP is being done on a Countywide basis. They have not been ranked by priority.

A. Promote public responsibility and stewardship in the applicant's watershed(s). B. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
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Attachment 5

To MDEQ Stormwater Discharge Permit Application
(Construction Stormwater Runoff Control)

Construction Stormwater Runoff Control

Attachment 5 to MDEQ Stormwater Discharge Permit Application

For Fenton Township, the County Enforcing Agency (CEA) for SESC is:

Genesee County Drain Commissioner's Office
Water and Waste Services (GCDC-WWS)
G-4610 Beecher Road
Flint MI 48532
(810) 732-7870.

28. Provide the procedure with the process for notifying the Part 91 Agency or appropriate staff when soil or sediment is discharged to the applicant's MS4 from a construction activity. The procedure shall allow for the receipt and consideration of complaints or other information submitted by the public or identified internally as it relates to construction stormwater runoff control. For non-Part 91 agencies, consideration of complaints may include referring the complaint to the qualifying local Soil Erosion and Sedimentation Control Program as appropriate. Construction activity is defined pursuant to Part 21, Wastewater Discharge Permits, Rule 323.2102 (K). The applicant may consider as part of their procedure when and under what circumstances the Part 91 Agency or appropriate staff will be contacted.

If soil or sediment is being discharged from a construction site and it is witnessed by staff or we have been informed by the public, this information will be directed to the Ordinance Enforcement Officer, who will conduct an investigation. If the investigation confirms that soil or sediment is being discharged from a construction site, he will report this to the GCDC-WWS immediately. The Ordinance Enforcement Officer may also, at his discretion, issue a stop-work order for the construction site until corrective actions have been taken. All referrals to the GCDC-WWS will be logged by the Ordinance Enforcement Coordinator and tracked until closed.

Our policy is for ANY SESC event within our jurisdiction.

29. Provide the procedure for when to notify the MDEQ when soil, sediment, or other pollutants are discharged to the applicant's MS4 from a construction activity. Other pollutants include pesticides, petroleum derivatives, construction chemicals, and solid wastes that may become mobilized when land surfaces are disturbed. The applicant may consider as part of their procedure when and under what circumstances the MDEQ will be contacted.

If any soil, sediment or pollutants from a construction activity are discharged to MS4's owned and operated by Fenton Township, the Ordinance Enforcement Officer shall conduct an investigation as to the extent and volume of discharge, enlisting the assistance of the Township Engineer if appropriate. If the investigation reveals that the discharge has created a potentially hazardous situation, the information will be reported to the MDEQ immediately via telephone and/or e-mail. All referrals to the MDEQ will be logged by the Ordinance Enforcement Coordinator and tracked until closed.

30. Provide the procedure for ensuring that construction activity one acre or greater in total earth disturbance with the potential to discharge to the applicant's MS4 obtains a Part 91 permit, or is conducted by an approved Authorized Public Agency as appropriate. Note: For applicants that conduct site plan review, the procedure must be triggered at the site plan review stage.

For individual building permits, obtaining the soil erosion permit or waiver is part of the checklist that must be completed prior to issuance of the building permit, (sample checklist and soil erosion insert attached). For pre-construction excavation, (i.e. a new development), our current site plan review requirements do not currently address soil erosion permits. These requirements are in the process of being updated to require the issuance of a soil erosion permit or waiver prior to the issuance of the zoning permit needed to begin work. The revised procedures will be completed no later than 9/30/14.

31. Provide the procedure to advise the landowner or recorded easement holder of the property where the construction activity will occur of the State of Michigan Permit by Rule (Rule 323.2190).

For individual building permits, the attached document will be inserted into the building permit packet. For new developments our current site plan review requirements do not currently address the State of Michigan Permit by Rule. These requirements are in the process of being updated. The revised procedures will be completed no later than 9/30/14.

**ATTENTION
BUILDERS – CONTRACTORS
PROPERTY OWNERS**

**SOIL EROSION PERMITS ARE
REQUIRED FOR ANY TYPE OF
EXCAVATION AND/OR LAND
CHANGES INCLUDING POST HOLES,
FOOTINGS, FILL DIRT, OR REMOVAL
OF DIRT, LAND LEVELING, AND
DEMOLITION.**

**QUESTIONS ARE TO BE DIRECTED
TO THE GENESEE COUNTY DRAIN
COMMISSIONERS OFFICE AT (810)
732-7870.**

**THIS OFFICE DOES NOT ISSUE THIS
PERMIT, HOWEVER AS A COURTESY
WE OFFER THIS INFORMATION IN
ADVANCE TO PREVENT YOU FROM
VIOLATING THEIR POLICY.**

Building Permit Checklist

The following items must be completed and submitted to this office along with your application. Applications submitted incomplete will not be reviewed until all items have been received.

- _____ Completed, signed and dated permit application
Please indicate estimated value of the construction only in the space provided
- _____ Detailed site plan showing all set backs and dimensions of building project
Site plan must match the construction plans submitted
- _____ Detailed grade plan showing how you plan to manage storm water drainage
*Must comply with Storm Water Management Ordinance No. 574.
Grade review fees (\$350.00) may apply depending on property location & extent of the grade plan. Grade inspections (\$100.00) are required on ALL properties where excavation has taken place.*
- _____ Michigan Uniform Energy Code worksheet
Your insulation contractor may be able to help you fill this form out
- _____ Sewer contractor information-(if connecting to Fenton Twp. sewer)
Contractor must be licensed and registered with Fenton Township
- _____ SESC Permit -obtained at GC Water & Waste
You must submit a copy with your application to this office
- _____ Well permit – obtained at GC Health Department
You must submit a copy with your application to this office
- _____ Septic permit-obtained at GC Health Department (if applicable)
You must submit a copy with your application to this office
- _____ Detailed wall section-if not on plans
- _____ Details on floor joist and truss system
If engineered, please be sure to indicate this on your application or plans
- _____ Three (3) sets of scaled plans including ALL floors, a foundation plan, front, side & rear elevations
*If home consists of more than 3500 sq. ft. plans must be sealed, stamped, and signed by an architect (after deducting hallways, closets, bathrooms, etc.)
NOTE: PLEASE DO NOT SUBMIT PLANS THAT ARE LARGER THAN 24 X 60 IN SIZE. SMALLER SIZED PLANS ARE ACCEPTED AS LONG AS THEY ARE CLEARLY SCALED.*
- _____ Flood plain certificate-if you are building on lake, channel, or river you are required to furnish a flood plain certificate showing where the flood plain is located. Your finished floor must be above the flood plain. This information can be obtained by getting a survey report.

Fees include .40 cents per square foot on living space, .30 cents per square foot on garage space and a \$350.00 bond is required to be posted with this permit and is refunded by check within 30 days of final inspection.

Attachment 6

To MDEQ Stormwater Discharge Permit Application

(Insert ordinance or regulatory mechanism here)
(Procedure for Post Construction Stormwater Runoff Program)

Procedure for Post Construction Stormwater Runoff Program
Attachment 6 to MDEQ Stormwater Discharge Permit Application

32. Is an ordinance or other regulatory mechanism in effect to address post-construction stormwater runoff from new development and redevelopment projects, including preventing or minimizing water quality impacts? The ordinance or other regulatory mechanism shall apply to private, commercial, and public projects, including projects where the applicant is the developer. This requirement may be met using a single ordinance or regulatory mechanism or a combination of ordinances and regulatory mechanisms.

The *Genesee County Stormwater and Flood Control Design Standard Requirements*, (attached), was adopted as Fenton Township's regulatory mechanism on 1/19/15 (adoption later than planned due to oversight).

33. Does the ordinance or other regulatory mechanism apply to projects that disturb at least one or more acres, including projects less than an acre that are part of a larger common plan of development or sale and discharge into the applicant's MS4?

Yes. *Genesee County Stormwater and Flood Control Design Standard Requirements*, page 2.

36. Does the ordinance or other regulatory mechanism include one of the following water quality treatment standards?

Yes.

Treat the first one inch of runoff from the entire site.

or

Treat the runoff generated from 90 percent of all runoff-producing storms.

Genesee County Stormwater and Flood Control Design Standard Requirements, page 9.

38. Does the ordinance or other regulatory mechanism require that BMPs be designed on a site-specific basis to reduce post-development total suspended solids loadings by 80 percent or achieve a discharge concentration of total suspended solids not to exceed 80 milligram per liter?

Yes. *Genesee County Stormwater and Flood Control Design Standard Requirements*, page 9.

39. Does the ordinance or other regulatory mechanism require that the post-construction runoff rate and volume of discharges not exceed the pre-development rate and volume for all storms up to the two-year, 24-hour storm at the site? At a minimum, predevelopment is the last land use prior to the planned new development or redevelopment.

Yes. *Genesee County Stormwater and Flood Control Design Standard Requirements*, page 10.

41. Provide the procedure for reviewing the use of infiltration BMPs to meet the water quality treatment and channel protection standards for new development or redevelopment projects in areas of soil or groundwater contamination in a manner that does not exacerbate existing conditions. The procedure shall include the process for coordinating with MDEQ staff as appropriate.

Question 41 is Not Applicable. Fenton Township does not own any property that contains soil or ground water contamination, nor is there any offsite property draining to our MS4's that contains soil or ground water contamination. If this becomes an issue in the future, the Township will implement appropriate BMP's that will not exacerbate existing conditions.

42. Does the ordinance or other regulatory mechanism require BMPs to address the associated pollutants in potential hot spots as part of meeting the water quality treatment and channel protection standards for new development or redevelopment projects? Hot spots include areas with the potential for significant pollutant loading such as gas stations, commercial vehicle maintenance and repair, auto recyclers, recycling centers, and scrap yards. Hot spots also include areas with the potential for contaminating public water supply intakes.

Question 42 is Not Applicable. Fenton Township does not own any property that could be considered a Hot Spot as defined in question 42, nor is there any offsite property draining to our MS4's that could be considered a Hot Spot as defined in question 42. If this becomes an issue in the future, the Township will implement appropriate BMPs to address the associated pollutants in potential hot spots as part of meeting the water quality treatment and channel protection standards.

53. Does the ordinance or other regulatory mechanism include a requirement to submit a site plan for review and approval of post-construction stormwater runoff BMPs?

Yes. *Genesee County Stormwater and Flood Control Design Standard Requirements*, pages 3-7.

54. Provide the procedure for site plan review and approval.

Genesee County Stormwater and Flood Control Design Standard Requirements, pages 3-7.

55. Provide the reference in the site plan review and approval procedure to the process for determining how the developer meets the performance standards and ensures long-term operation and maintenance of BMPs.

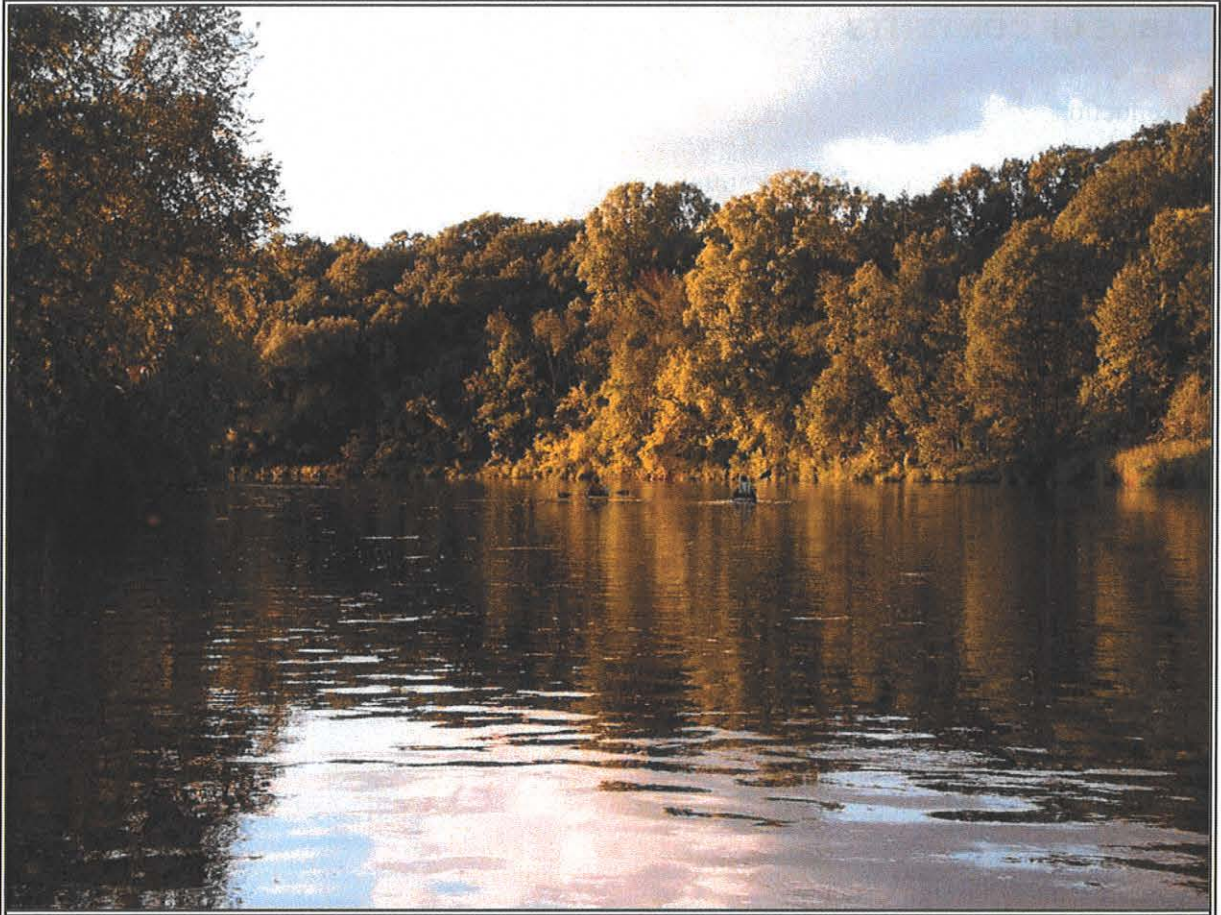
Genesee County Stormwater and Flood Control Design Standard Requirements, page 3.

56. Does the ordinance or other regulatory mechanism require the long-term operation and maintenance of all structural and vegetative BMPs installed and implemented to meet the performance standards in perpetuity?

Yes. Genesee County Stormwater and Flood Control Design Standard Requirements, page 15.

57. Does the ordinance or other regulatory mechanism require a maintenance agreement between the applicant and owners or operators responsible for the long-term operation and maintenance of structural and vegetative BMPs installed and implemented to meet the performance standards?

Yes. Genesee County Stormwater and Flood Control Design Standard Requirements, page 15.



Genesee County Stormwater and Flood Control Design Standard Requirements



Effective date: _____

TABLE OF CONTENTS

Introduction	1
Role of the Genesee County Drain Commissioner	1
<i>Table 1: Hierarchy of Preferred Best Management Practices (BMPs)</i>	2
Applicability	2
Design Manual and Standard Details	2
Storm Water Plan Submittal Requirements	2
Submittal Process	4
<i>Figure 1: Submittal Process Flow Chart</i>	4
General Information Requirements	5
Drainage Information Requirements	5
Construction Plan Submittal and Approval	6
Genesee County Design Criteria	7
Explanation of Requirements	8
Flood Control Requirements	10
<i>Table 2: Storm Water Requirements</i>	13
Appeal Procedures	14
Permits and Fees for the Genesee County Drain Commissioner	14
Residential Example	
Commercial Example	

INTRODUCTION

The intent of this document is to provide information specific to Genesee County Drain Commissioner's design standards to address storm water quantity and quality. This manual will provide the policy framework, implementation procedures and design standards for storm water controls. **Note:** additional standards and requirements not in this document are required for storm systems that are to be dedicated to this office as public.

This document outlines design requirements for storm water quantity and storm water quality. The Drain Commissioner's office has adopted the *State's Low Impact Development (LID) Manual for Michigan* to guide the design of proposed Best Management Practices (BMPs) for water quality that target the standards provided in this document.

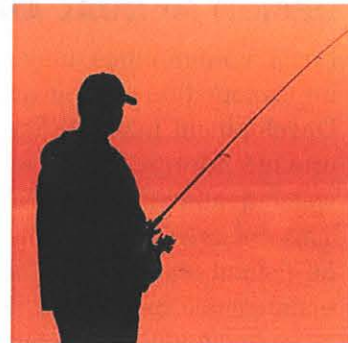
This edition of the design standards and requirements of the Genesee County Drain Commissioner reflects a storm water management philosophy that considers not only flood control, but also stream channel protection and storm water quality management. These revisions are based upon the most current State Permit requirements concerning storm water management. This manual will be updated periodically as additional BMPs are developed and/or as requirements change.

The following section outlines basic ideas and principals of storm water management, and provides a conceptual foundation for the design standards contained in this document.

THE ROLE OF THE GENESEE COUNTY DRAIN COMMISSIONER

The Office of the Drain Commissioner will review all plans submitted to the standards outlined in this document. Those sites that must submit to this office for review are listed on page 3. This office exercises authority over permitted activities of structural facilities that convey and treat storm water runoff that will be generated from a site as a result of its design. The Drain Commissioner's Rules will govern the design of such management facilities with the following objectives:

- Incorporate design standards to control both water quantity and quality.
- Encourage innovative storm water management practices that meet the criteria contained within these rules.
- Ensure future maintenance of facilities by planning for it as a part of system design.
- Make the safety of facilities a priority.
- Strengthen the protection of natural features.
- Encourage more effective soil erosion and sedimentation control measures.



The preferred hierarchy discussed above and summarized in Table 1, below, provides a comprehensive framework for evaluating the place and function of individual BMPs within a storm water management system. While the most important BMPs are source controls that preserve and protect the natural environment, the Genesee County Drain Commissioner cannot mandate these. We must look to the staff and officials of local governments, as well as to developers and their design engineers and planners, to implement source reduction approaches.

Table 1: Hierarchy of Preferred Best Management Practices (BMPs)

Non-Structural (Source) Controls	Structural (Site) Controls
<ol style="list-style-type: none"> 1. Preservation of the natural environment 2. Minimization of impervious surfaces 3. Use of vegetated swales and natural storage 	<ol style="list-style-type: none"> 1. Infiltration of runoff on-site (trenches, etc.) 2. Structural (Site) Controls 3. Storm water detention structures 4. Storm water retention ponds * 5. Conveyance off-site 6. Proper maintenance

*Storm water retention is allowed when no acceptable outlet is available and soil conditions allow.

APPLICABILITY

To prevent an increase in non-point source pollution, these Standards requirements shall apply to any earth-disturbing activities greater than or equal to 1-acre (≥ 1 ac.) on new development or redevelopment projects. Earth disturbing activities less than 1-acre but are a part of a larger plan or development apply because the earth disturbance activities are considered cumulative. For those individual parcels with earth disturbing activities less than 1-acre but have more than > 0.5 acres of impervious surface shall apply.



Typically these sites require approval of a plat, a site development plan, building permit, and other permits to be obtained. The aforementioned requirements will include storm water plans that shall be designed, constructed, and maintained to prevent flooding, minimize stream channel impacts, protect water quality, and achieve the purposes of each local community's storm water ordinance for managing the quantity and quality of storm water runoff.

DESIGN MANUAL AND STANDARD DETAILS

Local communities may furnish additional policy, criteria and information, for the proper implementation of their own local ordinance. This document together with the State Low Impact Development manual (State LID manual) (Chapter 5 through 9 with relevant appendices) will provide information on water quality and quantity standards as well a list of acceptable storm water treatment practices, including the specific design criteria for each storm water practice. This document and the State LID manual may be updated and expanded from time to time based on federal and state requirements, improvements in engineering, science, monitoring, and local maintenance experience. Storm water treatment practices that are designed and constructed in accordance with these design and sizing criteria contained in the State LID manual should meet the minimum water quality and channel protection performance standards outlined in this document. Calculations to demonstrate that BMP designs will perform to meet required water quality, channel protection and flood control standards are to be submitted to the appropriate reviewing agency. Failure to construct storm water treatment practices in accordance with these standards may subject the violator to a civil penalty as described in section 6 of the storm water ordinance.

STORM WATER PLAN Submittal Requirements

These requirements have been developed in the context of plat submittal under Act 288 of the Public Acts of 1967, as amended, the Michigan Land Division Act. However, they shall also be followed for all other categories of development, including site condominiums and site plans.

The following developments will be submitted to the Genesee County Drain Commissioner's Office for review and approval:

1. Plats submitted under Act 288 of the Public Acts of 1967, as amended, the Michigan Land Division Act
2. Applications for permits to discharge to or perform work on a county drain under P.A. 40 of 1956, as amended. Permits are required for any work done to a drain, work within the drain easement or work done that will increase flow to a county drain.
3. All new and redevelopment projects undertaken by Genesee County that disturb one (1) acre or more, including projects less than one (1) acre that are part of a larger common plan of development or sale that would disturb one (1) acre or more. This includes Genesee County Road Commission plans that include changes to the storm water system that serves the road.
4. Review of storm water system plans in other classes of developments or redevelopments, when required by local municipalities.
5. Site Condominium plans prepared under Act 59, P.A. 1978, as amended, where local government ordinances require.
6. Mobile home plans prepared under Act 96, PA. 1987.

The developer will describe the mechanism to be established for long-term maintenance of the development's private storm water management system, including maintenance schedule and enforcement. County enforcement of private development is limited to permitted activities. (See Requirement E)

Should the proprietor plan to subdivide or develop a given area but wishes to begin with only a portion of the total area, the original preliminary plan will include the proposed general layout for the entire area. The first phase of the subdivision will be superimposed upon the overall plan in order to illustrate clearly the method of development that the proprietor intends to follow. Each subsequent plat or phase will follow the same procedure until the entire area controlled by the proprietor is developed.

Final acceptance by the Drain Commissioner of only one portion or phase of the development does not ensure final acceptance of any subsequent phases or the overall general plat for the entire area; nor does it mandate that the overall general plat or plan be followed as originally proposed, if deviations or modifications acceptable to the Drain Commissioner are proposed.

Preliminary plan approval shall remain in effect for one year. Extensions must be requested in writing.

SUBMITTAL PROCESS

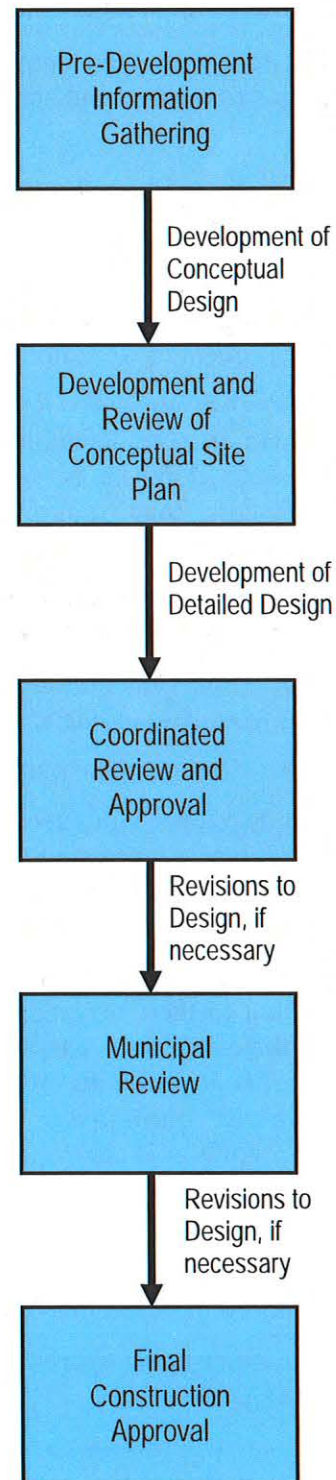
STEP 1: Pre Development Information Gathering - For all applicable projects, developers (or their designated design representatives) will contact representatives from each of the following: the County Road Commission, Health Department, municipal officials (zoning, planner, engineer, DPW, building official), and Drain Commissioner's office (Water and Waste Services and Surface Water). The purpose will be to gather information on design standards, development guidelines, and to identify the type of information developers and their representatives must furnish to comply with this ordinance. In some instances it may be expedient to hold one conference with all the involved parties. Communication between the project designer and developer, as well as the relevant local officials and developer, are two key components of this framework.

STEP 2: Development and Review of Conceptual Site Plan - Review of the conceptual site plan for approval at the County level by the appropriate personnel in Water & Waste Services, soil erosion, surface water, the Road Commission and the Health Department. Comments are returned to the owner/client and designer. **At this time the developer will have his design engineer submit a statement that their site has been reviewed to determine if it's size is capable of accommodating soil erosion and soil conservation measures during construction.**

STEP 3: Coordinated Review and Approval: Review of the Storm Water Plan and the proposed BMPs will occur at the same time as the review of the site plan by representatives from the appropriate agencies. All required documentation should be submitted two weeks prior to the meeting.

STEP 4: Municipal Review and Approval - Developers shall provide a storm water plan for post-construction management of storm water to the Municipality for review and approval. Guidance will be provided to zoning administrators and local planning commission members on the ordinance and design standards and they will be provided with

Figure 1:
Submittal Process Flow Chart



a checklist for reference during site plan review. At this stage all necessary permits should have been obtained from Federal, State, and County agencies. Once all of the above documents have been obtained construction approval will be given by the municipality.

GENERAL INFORMATION REQUIREMENTS

All preliminary plans will include the following information:

1. The location of the proposed development by means of a small location map.
2. The township, city, or village in which the parcel is situated.
3. The section and part of section in which the parcel is situated.
4. The number of acres to be developed.
5. Contours, at 2-foot intervals or less, shown in a U.S.G.S. datum that is marked on prints.
6. The proposed drainage system for the development.
7. The proposed street, alley and lot layouts and approximate dimensions.
8. The location and description of all on-site and adjacent off-site features that may be relevant in determining the overall requirements for the development. These features may include, but are not limited to, the following:
 - Adjoining roads, subdivisions, and other developments
 - Schools, parks, and cemeteries
 - Drains, sewers, water mains, septic fields and wells
 - High tension power lines, underground transmission lines, gas mains, pipelines, or other utilities
 - Railroads
 - Existing and proposed easements
 - Natural and artificial watercourses, wetlands and wetland boundaries, floodplains, lakes, bays, and lagoons
 - Designated natural areas
 - Soils description in accordance with the USDA NRCS standard soils criteria
 - Any proposed environmental mitigation features
9. Soil borings, may be required at various locations including the sites of proposed retention/detention facilities, and in areas where high ground water tables exist.



STORM WATER MASTER PLAN INFORMATION REQUIREMENTS

All plans will include the following storm water management information:

A. Stormwater Plan Preparation

The Stormwater Plan shall be prepared by a registered civil engineer. Other persons and professionals may assist in the preparation of the plan.

B. Scale for Mapping

The Stormwater Plan shall be drawn at an appropriate scale to be legible

C. Required Information

-
-
1. The Stormwater Plan must be sufficiently detailed to specify the type, location, and size of stormwater management facilities, using preliminary calculations. Detailed construction drawings are not required at the Stormwater Plan review stage.
 2. The storm water management plan for the proposed development will indicate and where the drainage will outlet.
 3. If it is proposed to develop a parcel in two or more phases, the Stormwater Plan shall be prepared and submitted for the total project.
 4. The location by means of a small location map, drawn to a scale no less than 1" = 2000'.
 5. Zoning classification of petitioner's parcel and all abutting parcels.
 6. The location and description of all on-site features and all adjacent off-site features within 50 feet, and all other off-site features that may be impacted in determining the overall requirements for the development. This includes:
 - (a) Existing site topography with contours at two-foot intervals or less based on the NAVD88 datum
 - (b) Adjoining roads and developments
 - (c) Railroads
 - (d) High tension power lines or underground transmission lines
 - (e) Cemeteries
 - (f) Parks
 - (g) Natural and artificial watercourses, wetlands and wetland boundaries, environmental feature boundaries,
 - (h) floodplains, lakes, bays, existing stormwater storage facilities, conveyance swales (natural or artificial) with identification of permanent water elevations
 - (i) Information supporting that the outlet is acceptable. An acceptable outlet is a natural watercourse under regulation of Act 451 part 301 Inland Lake and Stream, county drain, county road ditch, or a regulated wetland with an acceptable outlet. The development may discharge across a neighboring private property with the appropriate written approvals/easements.
 - (j) Location of woodlands
 - (k) Designated natural areas
 - (l) Any proposed environmental mitigation features
 - (m) Drains, sewers, and water mains
 - (n) Existing and proposed easements
 - (o) A map, at the U.S.G.S. scale, showing the drainage boundary of the proposed development and its relationship with existing drainage patterns
 - (p) Boundaries of any off-site drainage area contributing flow to the development
 - (q) Any watercourse passing through the development, along with the following:
 - (i) Area of upstream watershed and current zoning
 - (ii) Calculations of runoff from the upstream area for both the 100-year and two-year 24-hour design storms, for fully developed conditions according to the current land use plan for the area.

-
- (iii) A description of how drainage, which originates outside of the development boundaries and flows onto or across the development, will be managed.
 - (r) Soil borings may be required at various locations including the sites of proposed retention/detention and infiltration facilities, and as needed in areas where high groundwater tables or bedrock near the surface exist
 - (s) Proposed site improvements including lot divisions and building footprints
 - (t) Stormwater BMP information including:
 - (i) Location of all stormwater BMPs
 - (ii) Identification of stormwater quality and quantity treatment facilities and method of stormwater conveyance
 - (iii) Sizing calculations for stormwater quality and quantity, including preliminary estimates of runoff volume captured by BMPs, (e.g., infiltration losses,) for treatment facilities
 - (iv) Tributary area map for all stormwater management facilities indicating total size and average runoff coefficient for each subarea
 - (v) Analysis of existing soil conditions and groundwater elevation and bedrock depth (including submission of soil boring logs) as required for proposed retention and infiltration facilities
 - D. Landscaping plan for stormwater BMPs
 - E. Easements for stormwater management facilities
 - F. Required natural features setbacks
 - G. Drinking water wells, public wellheads, Wellhead Protection Areas (WHPAs), underground storage tanks, and brownfields

Proposed drainage for the development will conform to any established County drainage districts. Proposed drainage should complement any local storm water management plans that may exist and/or comply with any ordinance in effect in the municipality/ies where the proposed development is located.

GENESEE COUNTY DESIGN CRITERIA

In an effort to standardize design procedures for storm sewers and open channels in Genesee County, the Genesee County Drain Commissioner has developed these standards. It is hoped that these standards will facilitate planning from both the position of the design and reviewing engineer.

It is recognized that design conditions vary and there is no substitute for the professional judgment of an experienced engineer. In all cases this judgment should be applied.



The development shall meet the following storm water *design requirements*:

- A A minimum treatment volume standard to minimize water quality impacts.*

-
-
- B Channel protection criteria to prevent resource impairment resulting from flow volumes and rates.*
 - C Flood Control*
 - D Operation and maintenance requirements.*
 - E Enforcement mechanisms with recordkeeping procedures.*

EXPLANATION OF REQUIREMENTS

Requirement A: “A minimum treatment volume standard to minimize water quality impacts.”

There are several different ways to calculate a minimum treatment volume (commonly referred to as first flush). The developers design representative shall determine the minimum treatment volume for water quality by one of the following methods:

- using 1” of runoff from the entire site
- the statewide analysis by region for the 90-percent annual non-exceedance storms that is summarized in the March 24, 2006 MDEQ memo. (Genesee County is considered to be part of the Detroit Metro Area for calculating runoff) A copy of this memo is available on the Drain Commissioner’s website. www.gcdcswm.com

Treatment methods shall be designed on a site-specific basis to achieve the following:

- A minimum of 80 percent removal of total suspended solids (TSS), as compared with uncontrolled runoff, or
- Discharge concentrations of TSS not to exceed 80 milligrams per liter (mg/l).

A minimum treatment volume standard is not required where site conditions are such that TSS concentrations in storm water discharges will not exceed 80 mg/l.

Sites are in compliance with this permit requirement if the minimum treatment volume from the site is treated by properly designed BMPs that achieve either 80% removal of total suspended solids, or discharge 80 mg/l or less of total suspended solids according to accepted literature. It is also important to note that new development will often be in compliance with this permit requirement if the volume control specified in the channel protection requirement of this permit is achieved.

Compliance may be shown through calculation or through direct measurement. Calculations or measurements must show reductions to the calculated TSS concentration in uncontrolled runoff using the data provided here or another acceptable literature source. Table 7.1 (pp. 122) in the State LID Manual summarizes the potential application and the quantity and quality function for most BMPs. When designed correctly, either individually or as a suite of BMPs, the treatments listed in Table 7 will meet the permit’s stormwater requirements.

Requirement B: “Channel protection criteria to prevent resource impairment resulting from flow volumes and rates.”

The channel protection criteria established in the NPDES Ph II permit is necessary to maintain post-development site runoff volume and peak flow rate at or below existing levels for all storms up to the **2-year, 24-hour event**.

“Existing levels” means the runoff flow volume and rate for the last land use prior to the planned new development or redevelopment.

An acceptable source of rainfall data for calculating runoff volume and peak flow rate is: *Rainfall Frequency Atlas of the Midwest*, Huff & Angel, NOAA Midwest Climate Center and Illinois State Water Survey, 1992. A copy of this is available on the Drain Commissioner’s website. www.gcdcswm.com

Methods for estimating pre-development and post-development runoff shall follow curve number evaluations. Any of the following methods are allowed:

- Computing Flood Discharges for Small Ungaged Watersheds
- TR55
- Hec-Raz
- Hec-HMS
- SWIM

Requirement C: "Flood Control Requirements"

Flood Control requirements are for all storms events between the **2-year, 24-hour event** and the **100-year 24-hour event**.

Many streams located in this county do not have stream gauging data available or the period of record is not of sufficient length to allow the design engineer to estimate flood flows by using flood-frequency analysis as developed by U.S.G.S. Prior to design of any storm drain improvement or enclosure, the developer or their designated design representative shall investigate any gauging station, partial record gauging station, or crest stage gages on the drainage basin for available pertinent data on flood flows.

Where insufficient data is available to develop basin hydrology by the above method, the developer shall determine flows along the watercourse by the S.C.S. method, the rational method, the brater method, or a combination of these methods. The basin hydrology shall be approved by the Genesee County Drain Commissioner's office prior to proceeding with the final design of a given project.

Implementing stormwater control BMPs can reduce the frequency and intensity of flooding even on C and D soils. And while the State LID manual does provide guidance on designing BMPs to address flooding the standard is more restrictive than Genesee County standards. Therefore, developments/Flood controls shall be developed in accordance with the following flood frequencies. For each of the frequency categories below:

- A. The following basin development projects are to be designed to the 100 year storm:
 - 1. Culverts or bridges crossing state highways or expressways where the upstream drainage area is in excess of 2 square miles;
 - 2. Detention ponds;
 - 3. Drainage enclosures in excess of 100 feet where the upstream drainage area is in excess of 2 square miles.
- B. The following basin development projects are to be designed to the 25 year storm:
 - 1. County road cross culverts and bridges.
 - 2. Open channel development or improvement (flow to be contained within the channel).
 - 3. Drain enclosures where the drainage area is greater than 300 acres but less than 2 square miles.
- C. The following basin development projects are to be designed to the 10 year storm:
 - 1. Open channels, culverts or drain enclosures where the drainage area is not in excess of 300 acres.
 - 2. Enclosed storm sewers flowing full under gravity conditions in proposed plats/developments.

Flow Estimation: Hydrology:

Many different methods of arriving at a given flow (cfs) for a selected spot in a drainage outlet have been developed over the years. Because of its general recognition and wide use within the county, the drain commissioner will accept the rational method for flow computation where the drainage area is less than 100 acres. Engineers electing to use this method for larger drainage area will be requested to also use an alternate method for comparison.

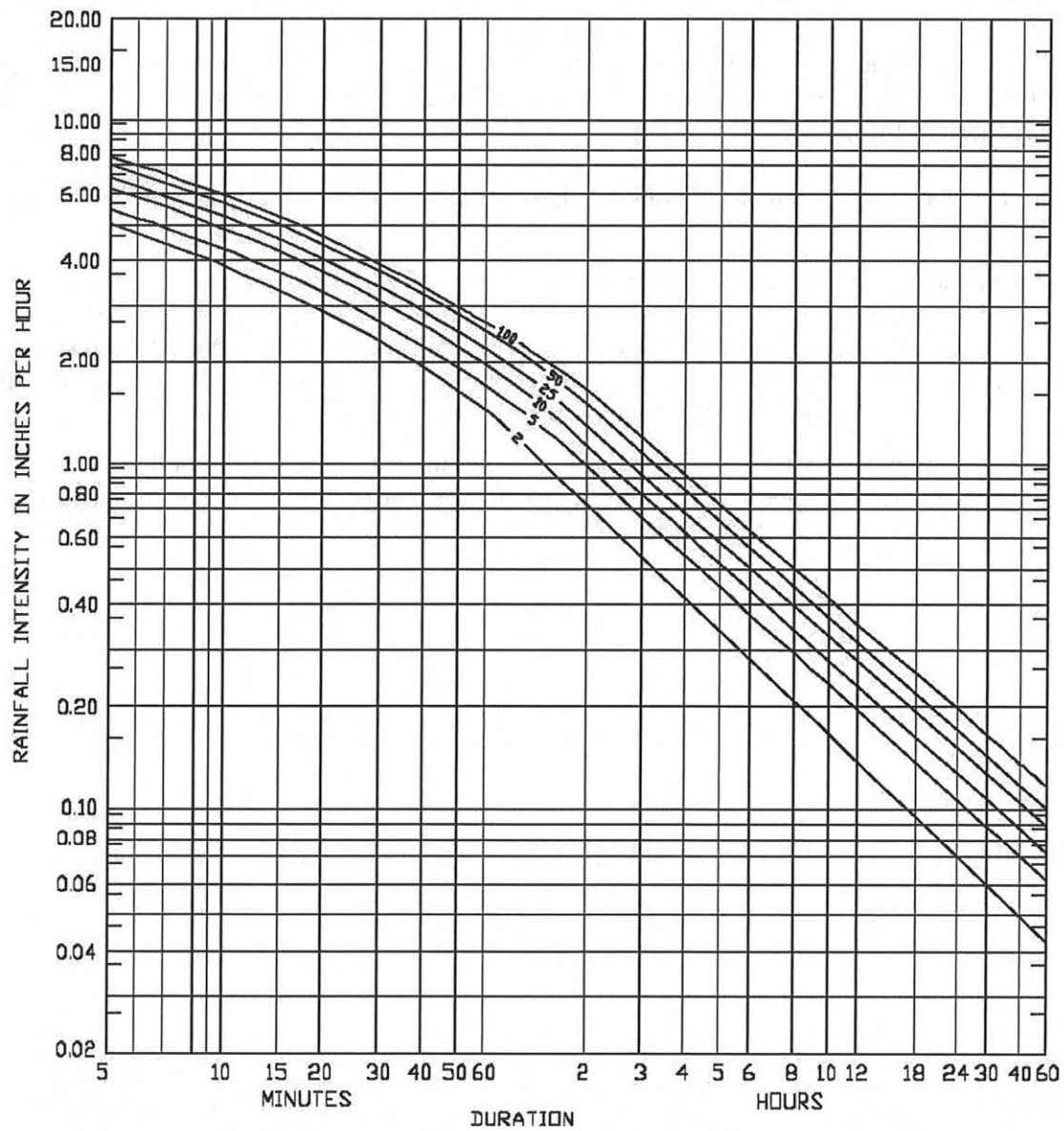
The following criteria shall be used in determining the variables of the rational formula $Q=CIA$.

1. Runoff coefficient - the runoff coefficient must be determined on the basis of this projected development using the following:

	C-factor
– Flat undeveloped lands, farms, non-wooded	0.25
– Woodlands & sloped undeveloped land	0.30
– Parks, cemeteries, playgrounds, disturbed ground*	0.35
– Residential*	0.40
– Apartments, condominiums or light manufacturing*	0.50
– Commercial and industrial*	0.70
– Impervious areas (parking, roof, etc.)	0.95
– Open water	1.00

*These are average C-factors for typical types of development. A C-weighted value may be calculated to more accurately reflect the site conditions.

2. Intensity - the rainfall intensity - Computation of an accurate time of concentration is critical to the use of these curves. For urban storm sewers time of concentration shall be the summation of the inlet time plus the time of flow in the sewer. For urbanized area a minimum initial time of 20 minutes, plus time of travel, shall be acceptable for design and for average rural basins an initial time of concentration of 30 minutes, plus time of travel, will present an adequate time for storm flows to peak. The flow time in an enclosed system shall be calculated by standard design charts. For channel velocity the standard manning equation $v=1.486 r^{2/3} s^{1/2}$ shall be accepted. A chart based on *Technical Paper 40* listing accepted N values for storm sewer design is located on page 12 for use in design analysis.
3. Area - the area of a basin or sub-basin shall be determined by use of 2' contour maps available at the county GIS department with an appropriate field check or by use of established county drain maps on file at the Drain Office, 4608 Beecher Road.



RAINFALL INTENSITY - DURATION - FREQUENCY CURVES
FOR FLINT, MI
BASED ON U.S. DEPARTMENT OF COMMERCE TECHNICAL PAPER 40

Outlet conditions:

All storm systems shall be designed to exit into an outlet with sufficient carrying capacity to carry the additional design flow. The maximum velocity allowable for an outlet to open ditch is 5 ft/s. Maximum velocity may be reduced based on poor soil conditions.

The designer engineer shall analyze this condition and submit data substantiating his conclusions. This information shall be submitted to the drain commissioner along with the required design forms.

In the event the design engineer does not have sufficient capacity in the outlet the following criteria shall apply:

1. The system shall be designed to outlet only existing runoff. Existing runoff shall consist of all water presently contributed to the drainage district. This shall mean the 2-year storm under existing conditions using agricultural land ($c = 0.25$). All excess shall be retained on site for duration of time necessary to pass the design storm without downstream flooding. The outlet discharge shall not exceed 0.2 cfs/acre under any event.
2. The township shall petition the drain commissioner to improve the outlet to the required size to pass the additional water at the design storm. In the event this petition is not successful criteria #1 above shall apply.

Requirement D: “Operation and maintenance requirements.”

All structural and vegetative BMPs installed shall include a plan for maintaining maximum design performance through long-term operation and maintenance (O&M). The O&M plans will ensure that the BMP continues to meet the **water quality treatment, channel protection & flood** controls outlined in this manual.

O&M maintenance agreements that are required under a municipal storm water ordinance will be between the property owner and the Municipality, and contain within the maintenance agreement, at the minimum, the following factors:

- Operating instructions for the outlet component;
- Vegetation maintenance schedule;
- Responsible party designation;
- Inspection checklists;
- Maintenance checklists; and
- Tracking requirements.
- As-builts showing the storm maintenance plan was built to design.

An example of a storm water maintenance agreement can be found in Appendix G (pgs 455 – 461 of the LID Manual for Michigan).

For projects located within communities that do not have a storm water ordinance, but do drain into a Road System or County Drain and would require a Genesee County Road Commission permit or Drain Commissioner’s Office – SWM permit have to provide a maintenance plan that would provide the same above information as in a maintenance agreement. If it is found that a site is not being maintained and violates the County permit issued, the Drain Commissioner’s Office and/or Road Commission will revoke the permit allowing discharge to their system and refer the violator to the local municipality.

Requirement E: “Enforcement mechanisms with record keeping procedures.”

Enforcement of the NPDES requirements will be achieved through a combination of County agencies (the Drain Commissioner and Road Commission) and local municipalities that have a storm water ordinance. Any municipality may adopt the storm water ordinance. It is assumed that each permitted municipality will adopt a storm water ordinance (a state requirement) that supports the Genesee County storm water requirements or its own storm water requirements. The individual municipality will retain records.

Post Construction authority for the Road Commission’s and Drain Commissioner’s Office begins and ends at the right of ways or easements. If the site violates the permit the GCRC or GCDC has the right to block or deny the site access to an outlet. The laws do not give either agency the right to enter the site or do any work outside our right of ways or easements. For non-Phase II communities, where the site drains to a wetland, water of the state (not a drain or road ditch) or MDOT drainage system, the County does not have any post construction authority.

The BMP/owner operator must track and record, and if required by the permittee, report all field inspection findings to ensure proper O&M occurs for the life of the BMP.

As per the ordinance, the BMP/owner operator must maintain inspection and maintenance information for the life of the BMP and make this information available to Municipality (permittee) staff during an inspection.

Municipality will maintain records of site plan process, approvals, any post construction inspection reports and non-compliance issues and resolution.

APPEAL PROCEDURES

Developments are reviewed based on the standards and requirements in this document. Approval cannot be given for developments that do not meet these requirements.

If the proprietor wishes to appeal a decision made by the Genesee County Drain Commissioner's office, a written appeal may be filed. If an appeal is filed with the Genesee County Drain Commissioner's office, an informal hearing will be scheduled.

The informational hearing will allow the proprietor an opportunity to submit additional information or re-emphasize previously submitted data. The Drain Commissioner will then review the information and make a final decision within 21 days of the informal hearing. This final decision will be forwarded to the proprietor by first class mail.

PERMITS AND FEES FOR THE GENESEE COUNTY DRAIN COMMISSIONER

A permit will be required for all activities crossing, modifying, or discharging to a county drain, or any work within a county drain easement. Submittals shall include all the following information:

3. A fully completed permit application including appropriate signatures.
4. A drawing including the following information, at a minimum:
 - a. Location of County Drain easements on the property.
 - b. Descriptions of all construction activity within drain easement.
 - c. Dimensions and elevations of all facilities being proposed for construction within the drain easement.
 - d. Type of material used for construction of facilities within drain easement.
 - e. Soil erosion and sedimentation control measures.
 - f. Any required BMP's.
5. Note: Currently there are no permit fees for permitted activities.

Inspection Fees for the Genesee County Drain Commissioner:

Inspection fees are not charged for private development. Drains that are constructed and that will be designated as a County Drain will follow the inspection fee schedule for a public storm sewer.

Example

A developer owns a 3-acre parcel. They want to place a shopping center and parking lot on a currently vacant parcel. Between the building and parking lot they would add 2.61 acres of impervious. The entire parcel drains to the road and the ground has a hydraulic soil group B. The

Requirement A

Using the 90- percent annual non-exceedance storms methodology:

$P = 0.90$ -inches [the rainfall for the "Detroit Metro" area]

The site will be 87% impervious

$R_v = 0.05 + 0.009 (87\%)$ [Volumetric runoff coefficient]

$R_v = 0.83$

$WQV = P * R_v = 0.9'' * 0.83 = 0.75$ watershed inches [Water quality volume]

Convert to cubic feet

$WQV = 0.75'' (1 \text{ ft}/12'') (3 \text{ acres}) (43560 \text{ ft}^2/1 \text{ acre}) = 8,168 \text{ ft}^3$

Requirement B

Using TR-55

2-year rainfall = 2.26''

The CN = 58 undeveloped

$Q = 0.17$ inches of runoff

$V = 0.17 \text{ inches } (1 \text{ ft}/12'') (3 \text{ acres}) (43560 \text{ ft}^2/1 \text{ acre}) = 1851.3 \text{ ft}^3$

$T_c = 0.45$

$Q_{\text{peak}} = q_u * A * WQV = (2.45 \text{ cfs/inch of runoff}) (0.17 \text{ inch}) = 0.42 \text{ cfs undeveloped}$

the CN = 92 developed

$Q = 1.59$ inches of runoff

$V = 1.59 (1 \text{ ft}/12'') (3 \text{ acres}) (43560 \text{ ft}^2/1 \text{ acre}) = 17,315.1 \text{ ft}^3$

$T_c = 0.37$ hours

$Q_p = q_u * A * WQV = (4.1 \text{ cfs/inch of runoff}) (1.59 \text{ inch}) = 6.52 \text{ cfs developed}$

Requirement C

$Q_{\text{out}} = 0.2 \text{ cfs/acre} * 3 \text{ acres} = 0.6 \text{ cfs max discharge}$

$C_w = (2.61 * .95 + .39 * .25) / 3 = .86$

$T_c = 160$ minutes for maximum volume

$V_{\text{req}} = ((0.86 * 1.4 * 3.0) - 0.6) * 160 * 60 = 28,916 \text{ ft}^3$

- Instead of conveying the water through a pipe the parking lot is able to be sloped to a 700 long bioswale. That is able to treat 9,000 ft³ before overflowing into the detention basin.
- The proposed detention basin is over dug by 17,315-1,851 = 15,464 ft³. this will hold the additional runoff volume for the 2-year storm, with a discharge rate 0.42 cfs.
- For storms above the 2-year the additional 28,916 ft³ in the pond will detain the necessary flow for up to the 100-year storm, with a discharge of 0.60 cfs.

Attachment 7

To MDEQ Stormwater Discharge Permit Application

(Facility Table 3)
(Pollution Prevention Procedure)

Pollution Prevention Procedure

Attachment 7 to MDEQ Stormwater Discharge Permit Application

Pollution Prevention and Good Housekeeping Program:

61. Provide the procedure for updating and revising the inventory in Question 59 and map (or maps) identified in Question 60 as facilities and structural stormwater controls are added, removed, or no longer owned or operated by the applicant. A suggested timeframe for updating/revising the inventory and map(s) is 30 days following adding/removing a facility or structural stormwater control.

The inventory and maps will be updated within one year of removal or new construction. The MDEQ will be notified of changes via the annual report.

62. Provide the procedure for assessing each facility identified in Question 59 for the potential to discharge pollutants to surface waters of the state. The procedure shall include a process for updating and revising the assessment. *A recommended timeframe for updating/revising the assessment is 30 days prior to discharging stormwater from a new facility and within 30 days of determining a need to update/revise the facility assessment.*

The applicant should consider the following factors when assessing each facility:

- Amount of urban pollutants stored at the site (e.g., sediment, nutrients, metals, hydrocarbons, pesticides, fertilizers, herbicides, chlorides, trash, bacteria, or other site-specific pollutants)
- Identification of improperly stored materials
- The potential for polluting activities to be conducted outside (e.g., vehicle washing)
- Proximity to waterbodies
- Poor housekeeping practices
- Discharge of pollutants of concern to impaired waters

An assessment has been completed for each of the facilities listed in Question 59 for the potential to discharge pollutants to surface water, based on the above criteria. Any new facilities will be assessed within 90 days of completion. Existing facilities will be reassessed within 90 days of determining a need for reassessment.

69. Provide the procedure identifying the BMPs currently implemented or to be implemented during the permit cycle to prevent or reduce pollutant runoff at each facility with the medium and lower potential for the discharge of pollutants to surface waters of the state using the assessment and prioritized list in Questions 62 and 63.

All catch basins, detention basins and vegetative swales will be inspected annually and cleaned/maintained as necessary.

70. Provide the procedure for prioritizing each catch basin for routine inspection, maintenance, and cleaning based on preventing or reducing pollutant runoff. The procedure shall include assigning a priority level for each catch basin and the associated inspection, maintenance and cleaning schedule based on preventing or reducing pollutant runoff. The procedure shall include a process for updating/revising the priority level for a catch basin giving consideration to inspection findings and citizen complaints. *A recommended timeframe for updating/revising the procedure is 30 days following the construction of a catch basin or a change in priority level.*

Due to the very low number of stormwater facilities, there is no need to prioritize them for inspection, maintenance and cleaning. All will be inspected, maintained and cleaned according to the established schedule. (See answer to Question 69 above)

71. Provide the geographic location of the catch basins in each priority level using either a narrative description or map.

Maps attached.

72. Provide the procedure for inspecting, cleaning, and maintaining catch basins to ensure proper performance. Proper cleaning methods include ensuring accumulated pollutants are not discharged during cleaning and are removed prior to discharging to surface waters of the state. *A compliance assistance document titled Catch Basin Cleaning Activities Guidance Document is available at http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf.*

The inspection, cleaning and maintenance of all catch basins will be contracted through a qualified service provider. The contractor will be required to follow the guidance in the Catch Basin Guidelines, including procedures for dewatering and disposal of materials extracted, which will be incorporated by referenced in the service contract.

73. Provide the procedure for dewatering and disposal of materials extracted from catch basins. *A compliance assistance document titled Catch Basin Cleaning Activities Guidance Document is available at http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf.*

Same as answer to Question 72.

74. Provide the procedure for inspecting and maintaining the structural stormwater controls identified in Question 59, excluding the structural stormwater controls included in an SOP as part of Question 64 and catch basins.. The procedure shall include a description and schedule for inspecting and maintaining each structural stormwater control and the process for disposing of maintenance waste materials. **The procedure shall require that controls be maintained to reduce to the maximum extent practicable the contribution of pollutants to stormwater.** The procedure shall include a process for updating/revising the procedure to ensure a maintenance and inspection program for each structural stormwater control. *A recommended timeframe for updating/revising the procedure is 30 days following the implementation of a new structural stormwater control.*

The detention basin and vegetative swales will be inspected annually and cleaned out and/or maintained as needed. Any materials removed during cleaning or maintenance will be disposed of at an appropriate landfill.

This procedure will apply to all existing and future structural stormwater controls.

75. Provide the procedure requiring new applicant-owned or operated facilities or new structural stormwater controls for water **quantity** be designed and implemented in accordance with the post-construction stormwater runoff control performance standards and long-term operation and maintenance requirements.

The regulatory mechanism in (questions 32-33) in regards to stormwater controls for water quantity also apply to property owned by the municipality being acquired and operated, developed or redeveloped.

76. Provide the procedure with the assessment of the applicant's operation and maintenance activities for the potential to discharge pollutants to surface waters of the state. The assessment shall identify all pollutants that could be discharged from each applicable operation and maintenance activity and the BMPs being implemented or to be implemented to prevent or reduce pollutant runoff. The procedure shall include a process for updating and revising the assessment. *A suggested timeframe for updating/revising the assessment is 30 days following adding/removing BMPs to address new and existing operation and maintenance activities.*

At a minimum, the procedure shall include assessing the following municipal operation and maintenance activities if applicable:

- Road, parking lot, and sidewalk maintenance (e.g., pothole, sidewalk, and curb and gutter repair)
- Bridge maintenance
- Right-of-way maintenance
- Unpaved road maintenance
- Cold weather operations (e.g., plowing, sanding, application of deicing agents, and snow pile disposal)

- Vehicle washing and maintenance of applicant-owned vehicles (e.g., police, fire, school bus, public works)

See attached *Municipal Operation & Maintenance Activities Table*. The only vehicles washed on Township property are the fire trucks, which are washed in the fire stations. The truck bays in the fire stations have drains connected to the sanitary sewer. All catch basins, sediment basins and vegetative swales will be inspected annually and maintained as needed. Inspection reports and documentation of maintenance activities will be maintained at the township office.

77. Provide the procedure for prioritizing applicant-owned or operated streets, parking lots, and other impervious infrastructure for street sweeping based on the potential to discharge pollutants to surface waters of the state. The procedure shall include assigning a priority level for each parking lot and street and the associated cleaning schedule (i.e., sweeping frequency and timing) based on preventing or reducing pollutant runoff. The procedure shall include a process for updating/revising the priority level giving consideration to street sweeping findings and citizen complaints. *A recommended timeframe for updating/revising the prioritization is 30 days following the construction of a new street, parking lot, or other applicant-owned or operated impervious surface or within 30 days of identifying a need to revise a priority level.*

Fenton Township does not do street sweeping. Potential discharge of pollutants from township owned parking lots are reduced through the use of existing detention basins and vegetative swales.

78. Provide the geographic location of the streets, parking lots, and other impervious surfaces in each priority level using either a narrative description or map.

Not applicable. No priorities assigned due to small number of stormwater facilities.

79. Provide the procedure identifying the sweeping methods based on the applicant's sweeping equipment and use of additional resources in sweeping seasonal leaves or pick-up of other materials. *Proper sweeping methods include operating sweeping equipment according to the manufacturers' operating instructions and to protect water quality.*

Not applicable. Fenton Township does not do street sweeping.

80. Provide the procedure for dewatering and disposal of street sweeper waste material. *A compliance assistance document titled Catch Basin Cleaning Activities Guidance Document is*

available at http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf,

Not applicable. Fenton Township does not do street sweeping.

81. Provide the procedure requiring the applicant's pesticide applicator to be certified by the State of Michigan as an applicator in the applicable category, to prevent or reduce pollutant runoff from vegetated land. A description of the categories is located at http://www.michigan.gov/mdard/0,4610,7-125-1569_16988_35289-11992--,00.html

Fenton Township only hires pesticide applicators that are certified by the State of Michigan. The contractor is required to provide evidence of said certification to the Township.

82. Provide the employee training program to train employees involved in implementing the pollution prevention and good housekeeping program. The program shall include the training schedule. At a minimum, existing staff shall be trained once during the permit cycle and new hires within the first year of their hire date.

All employees will be trained at least once during the permit cycle using the Genesee County Drain Commissioner-Stormwater Management Good Housekeeping Manual, (attached). New employees will be trained within 12 months of hire date.

83. Provide the procedure requiring contractors hired by the applicant to perform municipal operation and maintenance activities comply with all pollution prevention and good housekeeping BMPs as appropriate. The procedure shall include the process implemented for providing oversight of contractor activities to ensure compliance.

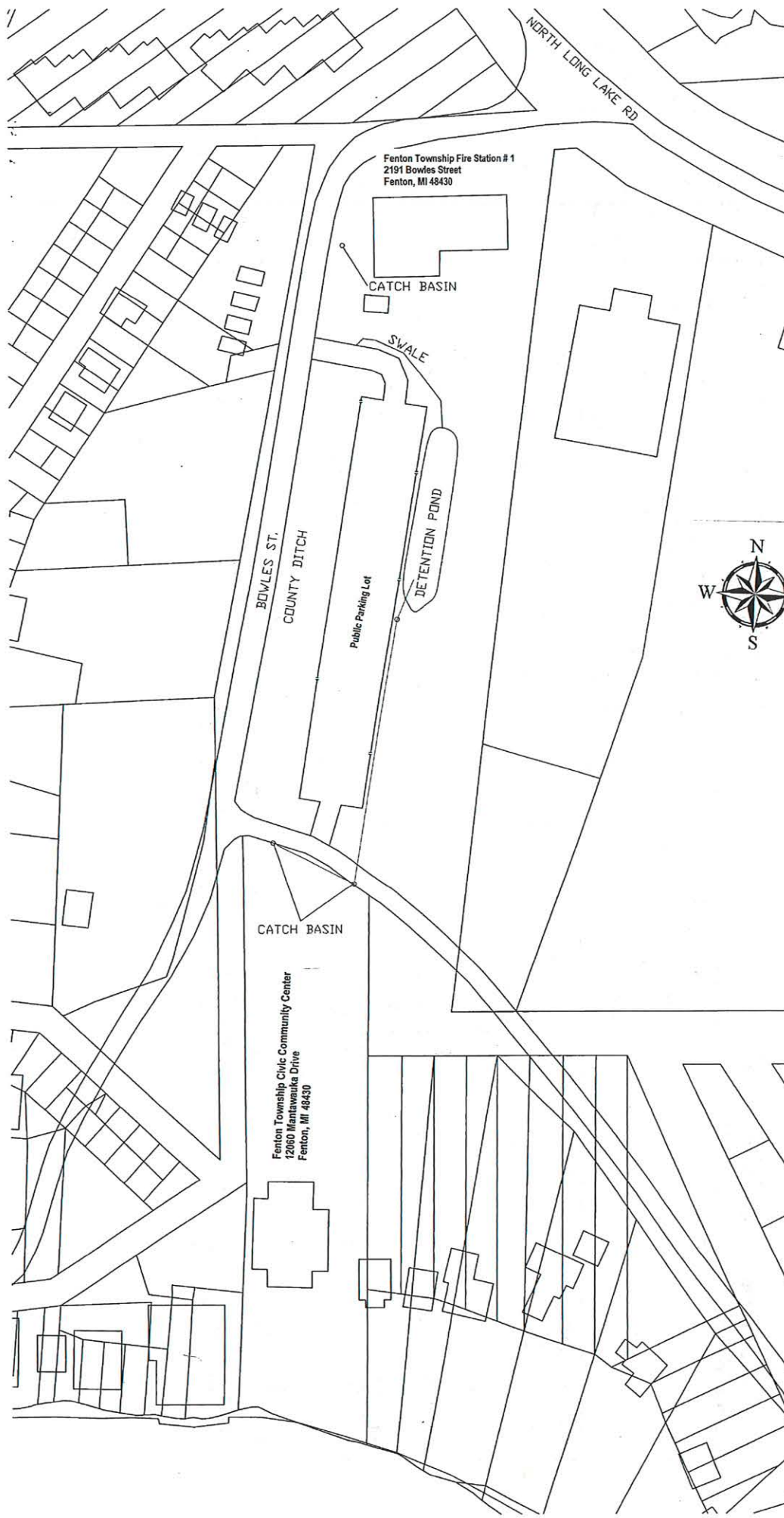
The Pollution Prevention Good Housekeeping Manual will be incorporated by reference into all maintenance contracts. Contractors will be required to attend employee training at least once during the permit cycle.

Michigan Department of Environmental Quality – Water Resources Division

STORMWATER DISCHARGE PERMIT APPLICATION

Table 3: Inventory of Applicant Owned or Operated Facilities and storm water structural controls with a discharge of Stormwater to surface waters of the state.

[illegible]



Fenton Township Fire Station #1
2191 Bowles Street
Fenton, MI 48430

CATCH BASIN

SWALE

DETENTION POND

Public Parking Lot

BOWLES ST.
COUNTY DITCH

CATCH BASIN

Fenton Township Civic Community Center
12060 Mantawauka Drive
Fenton, MI 48430





Google earth

Google earth

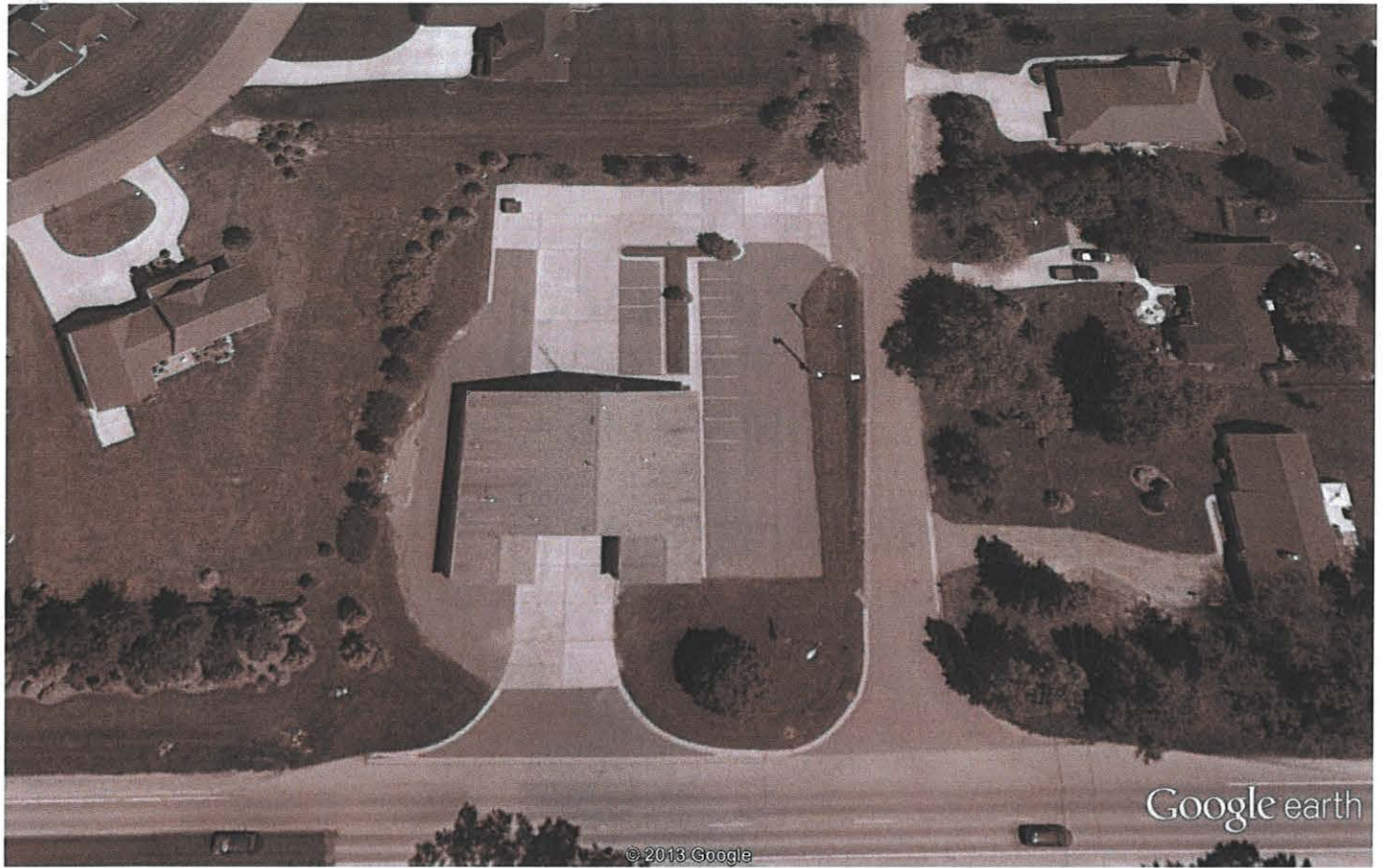
feet
meters



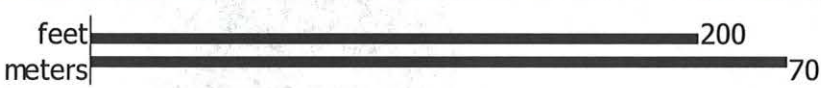


GRASS SWALE

Fenton Township Fire Station # 2
5120 Owen Road
Linden, MI 48451



Google earth



POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS: MANUAL OF BEST MANAGEMENT PRACTICES



**Genesee County Drain Commissioner
Surface Water Management**

November 2010

**POLLUTION PREVENTION/GOOD HOUSEKEEPING
FOR MUNICIPAL OPERATIONS:
A GUIDANCE DOCUMENT OF BEST MANAGEMENT PRACTICES**

Introduction.....	1
Glossary of Terms.....	2
1.0 Pollution Prevention through BMPs.....	3
2.0 Good Housekeeping.....	5
2.1 Landscaping and Lawn Care.....	6
2.2 Spill Response and Prevention.....	7
2.3 Pest Control.....	9
2.4 Pet Waste Collection.....	10
2.5 Septic System Management.....	11
2.6 Vehicle/Equipment Maintenance.....	12
2.7 Vehicle/Equipment Washing.....	14
2.8 Roadway and Bridge Maintenance.....	15
2.9 Hazardous and Waste Materials Management.....	17
2.10 Operational By-products/Wastes.....	18
2.11 Catch Basin and Storm Drain System Cleaning.....	19
2.12 Street Cleaning and Maintenance.....	21
2.13 Road Salt Storage and Application.....	22
2.14 Road Kill/Composting Operations.....	23
2.15 Construction and Land Disturbance.....	24
2.16 Marina Operations.....	25
2.17 Calculating TSS Reductions.....	26
2.18 Identifying Illicit Discharges.....	29
3.0 Preventive Maintenance of Treatment Controls.....	30
3.1 Catch Basins.....	31
3.2 Culverts.....	32
3.3 Oil/Grit Separator.....	33
3.4 Stormwater Outfalls.....	34
3.5 Porous Pavement.....	35
3.6 Detention Pond.....	36
3.7 Infiltration Basin.....	37
3.8 Rain Garden (Bioretention).....	38
3.9 Filter Strip.....	39
3.10 Vegetated Swale.....	40
3.11 Constructed Wetland.....	41

Introduction

This Manual of Pollution Prevention/Good Housekeeping Best Management Practices is intended to minimize the effects that municipal operations have on stormwater (see Table 1 and 2). The information contained in the manual is intended as guidance material for implementing measures to comply with a Stormwater Phase II Municipal Separate Storm Sewer System (MS4) Permit and is not designed to be comprehensive in all aspects of each topic. Municipalities should be “flexible” in their use of this information as pertains to their own unique municipal operations.

Glossary of Terms

Biochemical oxygen demand – Depletion of dissolved oxygen in water caused by decomposition of biologic matter or chemical oxidation.

Catch Basin – A unit that is installed to capture and retain debris, particulate matter, or other solid materials, but allows stormwater to “flow through” to its discharge location

Drip Irrigation – irrigation via a perforated device (i.e. hose) that allows for a slow watering method with reduced evaporation and runoff losses

Hydraulic – Referring to water

(IPM) Integrated Pesticide Management – An environmentally sensitive approach to pest management (**not** elimination) that uses the least toxic control method – a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.

Loading – Term used in conjunction with *sediment* and *hydraulic* to describe excessive amounts (of the term that is described)

Naturescaping – An alternative landscaping technique that incorporates native plants and creates beneficial wildlife habitat – also conserves water and energy, reduces soil/water pollution.

Oil/Water Separator – A unit that is installed “in line” to a wastewater discharge pipe which is devised to capture petroleum derived materials that float on water

Pesticides – Products that are toxic and are used to kill pests - can be classified as insecticides, rodenticides, biocides, aquacides.

POTW – Publicly Owned Treatment Works -- a municipal wastewater treatment plant

Scupper – an opening (in a bridge deck) to allow water drainage – it does not capture debris, particulate matter, or other solid materials

Sediments - Small particles of matter that settle to the bottom of a body of water

Silt – Material consisting of mineral soil particles ranging in diameter from 0.02 millimeters to 0.002 millimeters

Stormwater -rainwater runoff or snow melt waters – these waters can interact with different types of materials, transporting contaminants to surface waters (i.e. streams, creeks, rivers)

Toxicity –The relative degree of being poisonous

Xeriscaping – An alternative landscaping technique that conserves water and protects the environment through planting native vegetation.

Zero input, low input (lawns) - minimal need for care (i.e. addition of fertilizers/pesticides, water)

1.0 Pollution Prevention through BMPs

What are BMPs?

BMPs are the practices, procedures, policies, prohibitions, schedules of activities, structures or devices that are implemented to prevent or minimize pollutants coming in contact with precipitation, storm water runoff, or non-storm water flows. Table 1 illustrates the pollutants associated with Municipal *facilities* while Table 2 presents the pollutants associated with municipal *activities*. BMPs are also structures or devices that remove pollutants from storm water runoff before the runoff enters a storm water drainage system or surface water. Therefore, BMPs are often categorized as either “source control” BMPs or “treatment control” BMPs.

Source control BMPs include all types of measures designed to prevent pollution at the source, that is, to keep storm water from contacting pollutants in the first place. Source control BMPs are generally simple, low-maintenance, cost-effective and are broadly applicable. They may be categorized as either non-structural or structural. Good housekeeping is an example of a non-structural source control BMP; a canopy is an example of a structural source control BMP. Preventative maintenance may be required for both non-structural and treatment controls.

Treatment control BMPs are methods of treating storm water runoff to remove pollutants and are frequently more costly to design, install, and operate than source control BMPs. More importantly, treatment control BMPs are typically not as effective as source control BMPs, and the effectiveness is highly dependent on regular maintenance. Nevertheless, they can be appropriate and effective under certain conditions. However, treatment controls typically do not remove all pollutants from storm water runoff and should not be regarded as disposal systems.

The Manual is divided into two sections: 1) Good Housekeeping and 2) preventative maintenance of Treatment Controls.

1.2 Pollutants Associated with Municipal Facilities

Table 0-1: Potential pollutants likely associated with specific municipal facilities

Municipality Facility Activity	Potential Pollutants								
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding
Building and Grounds Maintenance and Repair	X	X	X	X	X	X	X	X	X
Parking/Storage Area Maintenance	X	X	X	X	X	X	X		X
Waste Handling and Disposal	X	X	X	X	X	X	X	X	X
Vehicle and Equipment Fueling			X	X		X	X		
Vehicle and Equipment Maintenance and Repair				X		X	X		
Vehicle and Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Outdoor Loading and Unloading of Materials	X	X	X	X		X	X	X	X
Outdoor Container Storage of Liquids		X		X		X	X	X	X
Outdoor Storage of Raw Materials	X	X	X			X	X	X	X
Outdoor Process Equipment	X		X	X		X	X		
Overwater Activities			X	X	X	X	X	X	X
Landscape Maintenance	X	X	X		X			X	X

Table 0-2: Potential pollutants likely associated with municipal activities

Municipal Program	Activities	Potential Pollutants								
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding
Roads, Streets, and Highways Operation and Maintenance	Sweeping and Cleaning	X		X	X		X			X
	Street Repair, Maintenance, and Striping/Painting	X		X	X		X	X		
	Bridge and Structure Maintenance	X		X	X		X	X		
Plaza, Sidewalk, and Parking Lot Maintenance and Cleaning	Surface Cleaning	X	X			X	X			X
	Graffiti Cleaning	X	X		X			X		
	Sidewalk Repair	X		X						
	Controlling Litter	X		X		X	X			X
Fountains, Pools, Lakes, & Lagoons Maintenance	Fountain and Pool Draining		X					X		
	Lake and Lagoon Maintenance	X	X	X		X			X	X
Landscape Maintenance	Mowing/Trimming/Planting	X	X	X		X			X	X
	Fertilizer & Pesticide Management	X	X						X	
	Managing Landscape Wastes			X					X	X
	Erosion Control	X	X							
Drainage System Operation and Maintenance	Inspection/and Cleaning of Stormwater Conveyance Structures	X	X	X		X		X		X
	Controlling Illicit Connections and Discharges	X	X	X	X	X	X	X	X	X
	Controlling Illegal Dumping	X	X	X	X	X	X	X	X	X
	Maintenance of Inlet and Outlet Structures	X		X	X		X			X
Waste Handling and Disposal	Solid Waste Collection		X	X	X	X	X	X		X
	Waste Reduction and Recycling			X	X					X
	Household Hazardous Waste Collection			X	X		X	X	X	
	Controlling Litter			X	X	X		X		X
	Controlling Illegal Dumping	X		X		X	X		X	X
Water and Sewer Utility Operation and Maintenance	Water Line Maintenance	X				X	X			
	Sanitary Sewer Maintenance	X				X	X			X
	Spill/Leak/Overflow Control, Response, and Containment	X	X			X		X		X

Source: California Stormwater BMP Handbook (<http://www.cabmphandbooks.com/>)

2.0 Good Housekeeping

Good housekeeping practices include activities that are intended to maintain a clean site and keep equipment in good working order to prevent storm water quality problems from occurring. Daily cleanup and inspections are the most effective means of achieving good housekeeping. For the most part, good housekeeping is a day-to-day activity that does not require a large expenditure of time or expense, and should be implemented on an ongoing basis. Examples of good housekeeping practices are:

- Tools and materials should be returned to designated storage areas after use;
- Waste materials should be collected and properly disposed after the completion of each job, shift, or day as appropriate;
- Indoor work areas should be neat, uncluttered, and well-ventilated to discourage outdoor work and to allow leaks and spills to be quickly detected and controlled;
- Outdoor work areas should be swept regularly (not hosed) and kept neat and clean;
- Occasionally outdoor work areas may need cleaning beyond sweeping. In such cases, all wash waters should be contained, collected, and properly disposed; and
- Outdoor waste or trash receptacles should be covered and emptied regularly and the adjacent areas inspected for misplaced or wind-blown litter.

Preventive Maintenance

Preventive Maintenance BMPs include regular inspections and maintenance intended to minimize storm water pollution by performing maintenance activities before problems arise. The NPDES Storm Water permit stipulates that municipalities must implement maintenance schedules for municipal sites and practices aimed at reducing the introduction of pollutants to waterways. Therefore, in addition to your good housekeeping practices it is necessary to periodically inspect the facilities and sites themselves. For example, an annual inspection of maintenance sheds for potential sources of pollutants is warranted as is inspection of municipal properties (e.g. city parks) to determine if BMPs are being kept up on site.

2.1 Landscaping and Lawn Care

- 1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
 - Nutrient loading (nitrogen and phosphorous) from fertilizer runoff can cause excessive aquatic plant growth
- 2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
 - Biochemical Oxygen Demand
- 3. Identify (and choose appropriate) Solutions (BMP's)**
 - Purchase only enough lawn care products necessary for one year – store properly to avoid waste generation (spills, leaks)
 - Use slow release or naturally derived (organic) fertilizers
 - Train employees in the proper application of lawn care products
 - Develop zero input/low input lawns
 - Consider alternative landscape techniques (i.e. naturescaping, xeriscaping)
 - Plant trees away from sewer lines or other underground utilities
 - Use drip irrigation techniques for landscaping
- 4. Inspection Procedures**
 - Routinely monitor lawns to identify problems during their early stages
 - Identify nutrient/water needs of plants, inspect for problems by testing soils
- 5. Maintenance Procedures**
 - Minimize/eliminate fertilizer application. Either conduct soil tests to justify the use of Phosphorous fertilizer or use no-Phosphorous fertilizer.
 - Leave grass clippings on lawn, or mulch clippings into lawn
 - Limit watering as necessary to supplement rainwater (1 inch/week is adequate)
 - Mow with sharpened blades set high (3 inches) – remove only the top 1/3 of the leaves
 - Water plants in the early A.M.
- 6. Advisory**
 - Refer to Landscaping for Water Quality, and other resources at DEQ's NPS webpage: www.michigan.gov/deqnonpointsourcepollution, choose Information and Education.
 - If contracting lawn care services, request the "Healthy Lawn Care Program for Watershed Protection", currently endorsed by the Michigan Green Industry Association (www.landscape.org).

2.2 Spill Response and Prevention

For spills, the old saying, “an ounce of prevention is worth a pound of cure” is appropriate. Spill clean-up can be labor-intensive and costly involving expenses to contain the spill, collecting the spilled substance, proper disposal of spill materials, and report filing to regulatory agencies, not to mention possible monetary fines. Spills and leaks are some of the most significant sources of water pollution and are, in most cases, avoidable.

Spill prevention and control procedures include:

- Placing bollards, berms and containment features around structures or areas where fluids are stored, so releases can be prevented, easily detected, and controlled;
- Using drip pans for maintenance operations involving fluids and under leaking vehicles and equipment waiting repair;
- Placing spill kits in areas where fluids are stored or in areas where activities may result in a spill;
- Providing training for proper use of materials and equipment used during operations and maintenance activities;
- Providing training for proper use of spill response equipment and supplies; and
- Conducting outdoor maintenance activities on paved surfaces to allow for easy detection, control, and cleanup of spills.

Spill prevention, control, and cleanup applies to all materials and wastes—not only hazardous substances. The toxic water quality effects from spills of hazardous substances (e.g., acids, oils, greases, fuels, solvents, pesticides) are commonly understood. However, non-hazardous materials—for example, sand, litter, corn oil, sweeteners, soaps, and milk, among others—can also greatly impact water quality.

Identify Materials That Impact Stormwater/Receiving Waters (Surface Waters)

- Liquids associated with vehicle/equipment maintenance products (oils, fuels, antifreeze, etc.)
- Rock salt
- Chemicals (fertilizers, pesticides)

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity
- Biochemical oxygen demand

3. Identify (and choose appropriate) Solutions (BMP's)

- Keep all materials properly stored in closed, labeled containment systems
- Use secondary containment systems where appropriate
- Obtain spill recovery materials for immediate response to a spill

4. Inspection Procedures

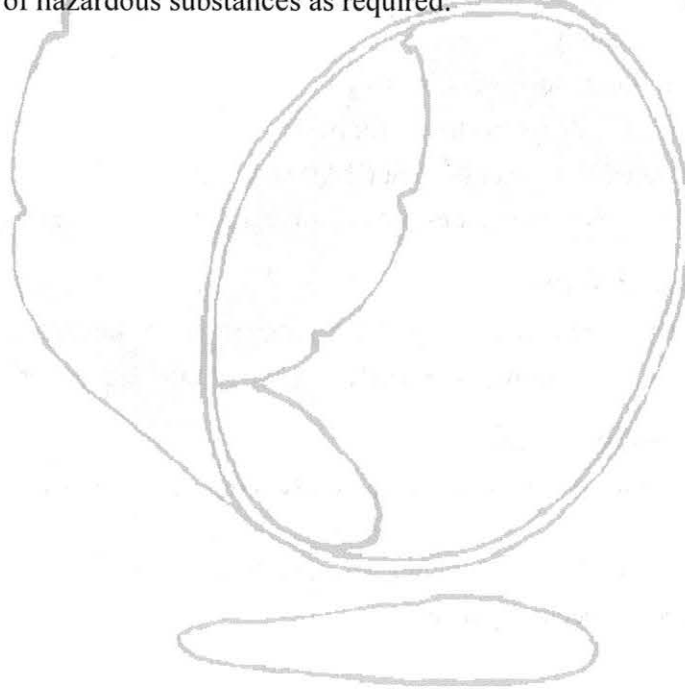
- Inspect secondary containment systems, oil/water separators periodically
- Inspect containers for leaks, areas near storm receiver inlets and outlets, floor drains for indications of spills

5. Maintenance Procedures

- Pump out oil water separators as needed
- Protect drains with oil absorbent materials
- Clean out receivers on regular schedule
- Remove spilled salt from salt loading area

6. Advisory

- Report petroleum spills to 911
- If the problems are related to sanitary please contact the Genesee County Health Department at (810) 257-3612.
- MDNRE's Pollution Emergency Alerting System Information (PEAS) hotline 1-800-292-4706. The PEAS hotline should be used to report environmental pollution emergencies such as tanker accidents, pipeline breaks, and releases of reportable quantities of hazardous substances as required.



2.3 Pest Control

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Runoff of pesticides may harm aquatic life, may contaminate water/sediment

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity to aquatic plants and animals

3. Identify (and choose appropriate) Solutions (BMP's)

- Purchase only enough pesticides necessary for one year – store properly to avoid waste generation (spills, leaks, product deterioration)
- Minimize/eliminate pesticide application, use lowest toxicity pesticides
- Do not apply pesticides immediately prior to or during rain events
- Ensure that employees are properly trained and certified in pesticide application techniques and safety
- Develop zero input, low input lawns
- Eliminate food, water, and shelter for pests
- Adopt integrated pest management (IPM) techniques
- Adopt alternatives to pesticides options (use physical, mechanical, or biological controls)

4. Inspection Procedures

- Identify pests – are levels acceptable or must action be taken to control pests?
- Inspect pesticide inventory – properly dispose of out-of-date pesticide materials

5. Maintenance Procedures

- Inspect pest traps (i.e. bait boxes) regularly – remove (and properly dispose of) dead pests
- Block/eliminate access to buildings/structures for pests
- Remove pests (insects) by hand

6. Advisory

- Refer to MSU's Integrated Pest Management site: IPM: www.ipm.msu.edu

2.4 Pet Waste Collection

- 1. Identify Impacts To/On Stormwater/Receiving Waters (Surface Waters)**
 - Municipal animal shelters
- 2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
 - Biochemical oxygen demand
 - Solids loading
- 3. Identify (and choose appropriate) Solutions (BMP's)**
 - House all animals in an enclosed, roofed structure
 - ID/utilize "permitted" waste disposal facilities for animal wastes
- 4. Inspection Procedures**
 - Inspect shelter regularly for necessary cleanup/removal of wastes
- 5. Maintenance Procedures**
 - Remove spilled food, animal wastes on a regular basis
- 6. Advisory**
 - None

2.5 Septic System Management

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Ponding of improperly treated wastewaters (on the surface of a leach field or a sand filter system) can increase the biochemical oxygen demand of receiving waters.
- Excessive amounts of disinfectant (i.e. chlorine) applied to a wastewater discharge from a sand filter system can cause toxicity to aquatic plants and animals

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Biochemical oxygen demand

3. Identify (and choose appropriate) Solutions (BMP's)

- Divert stormwater runoff (i.e. from roof drains) away from septic system
- Divert groundwater (sump pump) discharges away from septic system
- Locate swimming pools away from the septic system (at least 20' from the septic tank, at least 35' from the closest edge of the leach field or sand filter system)
- Prevent problems caused by vegetation - growth of woody plants on the system
- Prevent hydraulic loading - "Spread out" the use of devices which use large volumes of water across the entire day - clothes washing, dish washing, bathing, repair leaky fixtures
- Minimize water usage by using flow restrictors on potable water distribution devices (i.e. shower heads, water faucets)

4. Inspection Procedures

- Physical evidence of problems:
 - "back up" of wastewater in sewer lines
 - sewage odors
 - leach field/sand filter - wetness/ponding on surface
 - overflow of wastes from system components
 - heavy vegetation (woody plants) growth on system components

5. Maintenance Procedures

- "Pump out" the septic tank as needed (recommended once/year)
- Mow surface vegetation regularly
- Prevent "heavy equipment" from driving on top of the system components

6. Advisory

- Obtain site plan/site sketch of system, and retain for reference.

2.6 Vehicle/Equipment Maintenance

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Trace amounts of metals/hydrocarbons are found in materials (e.g. fuels, antifreeze, batteries, motor oils, grease, parts cleaning solvents) that are typically used in maintenance operations

2. Problem Evaluation: Assess Impact On Receiving Waters, Prioritize

- Toxicity
- Biochemical oxygen demand

3. Identify (and choose appropriate) Solutions (BMP's)

- Conduct maintenance work indoors – if work must be performed outside, guard against spillage of materials that could discharge to storm receivers
- Seal floor drains that discharge directly to the environment, if possible
- Initiate single purpose use of vehicle bays – dedicate one (or more) bays that have no (or sealed) floor drains for repairs/maintenance
- Clean up spilled materials immediately, using “dry” methods
- Install pretreatment systems (oil/water separators) where necessary in sewer lines to capture contaminants (oil, grit), and maintain as needed
- Never leave vehicles unattended while refueling
- Identify appropriate recycling/disposal options for wastes

4. Inspection Procedures

- Inspect (for maintenance purposes) floor drain systems, oil/water separators
- Monitor “parked” vehicles/equipment for leaks

5. Maintenance Procedures

- Maintain a clean work area – remove contaminants from floors, drains, catch basins, using “dry” methods
- Use non-hazardous cleaners. Use non chlorinated solvents instead of chlorinated solvents
- Repair or replace any leaking containers
- Use steam cleaning /pressure washing instead of solvent for parts cleaning
- Store waste fluids in properly capped, labeled storage containers
- Store batteries in leak-proof, compatible (i.e. non reactive) containers
- Rinse grass from lawn care equipment on permeable (grassed) areas
- Protect against pollution if outside maintenance is necessary (cover storm receivers, use secondary containment vessels, etc.)

6. Advisory

- Report petroleum spills to 911

- MDNRE's Pollution Emergency Alerting System Information (PEAS) hotline 1-800-292-4706. The PEAS hotline should be used to report environmental pollution emergencies such as tanker accidents, pipeline breaks, and releases of reportable quantities of hazardous substances as required.
- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--_00.html (Pollution Prevention and Good Housekeeping Activities) and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.



2.7 Vehicle/Equipment Washing

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Nutrients (biodegradable soaps)
- Metals
- Hydrocarbons

2. Problem Evaluation: Assess Impact On Receiving Waters, Prioritize

- Biochemical oxygen demand from nutrient sources
- Toxicity
- Hydraulic loading

3. Identify (and choose appropriate) Solutions (BMP's)

- Initiate single purpose use of vehicle bays - dedicate only one bay for washing (with floor drain system)
- Rinse with hoses that are equipped with automatic shutoff devices and spray nozzles
- Steam clean (without soap) where wastes can be captured for proper disposal (i.e. oil/water separator)

4. Inspection Procedures

- Inspect floor drain systems regularly - use only those that discharge to a sanitary sewer, identify the need for cleaning of catch basins, oil/water separators

5. Maintenance Procedures

- Map storm drain locations accurately to avoid illegal discharges
- Perform steam cleaning or pressure washing where wastes can be captured for proper disposal
- Take precautions against excess use of/spillage of detergents

6. Advisory

- Require all facilities to connect floor drain systems to sanitary sewers (if available)
- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.

2.8 Roadway and Bridge Maintenance

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Road salt components - sodium, calcium, and chlorides
- Hydrocarbons
- Particulates – such as dry paint or abrasive compounds
- Debris

2. Problem Evaluation: Assess Impact On Receiving Waters, Prioritize

- Particulate matter
- Toxicity

3. Identify (and choose appropriate) Solutions (BMP's)

- Incorporate preventive maintenance and planning for regular operations & maintenance activities
- Pave in dry weather only.
- Stage road operations and maintenance activity (patching, potholes) to reduce spillage. Cover catch basins and manholes during this activity.
- Clean up fluid leaks or spills from paving equipment/materials immediately
- Restrict the use of herbicides/pesticide application to roadside vegetation
- Sweep and vacuum paved roads and shoulders to remove debris and particulate matter
- Maintain roadside vegetation; select vegetation with a high tolerance to road salt
- Control particulate wastes from bridge sandblasting operations
- Use calcium magnesium acetate for deicing around bridges to minimize corrosion
- Clean out bridge scuppers and catch basins regularly
- Direct water from bridge scuppers to vegetated areas
- Mechanically remove (i.e. sweep) debris from bridge deck and structure prior to washing

4. Inspection Procedures

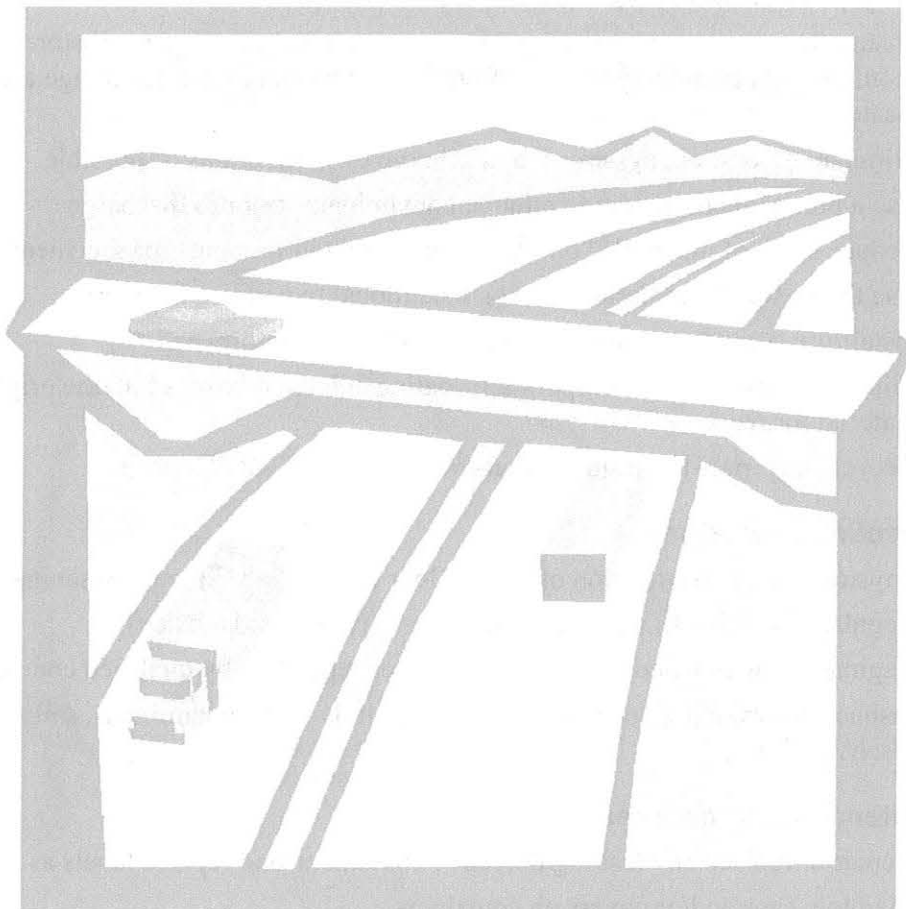
- Inspect paving, sweeping, vacuuming, and all other maintenance vehicles/equipment as appropriate
- Inspect roads and bridges for implementation of applicable BMP's

5. Maintenance Procedures

- Clean bridge scuppers routinely and keep free of debris
- Direct runoff water from bridges to vegetated areas
- Install catch basins in place of bridge scuppers
- Use tarps, booms, and vacuums during painting or blasting activities (refer to reference information to control/capture particulate matter)
- Repair leaking/defective containers or equipment on paving equipment

6. Advisory

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--00.html (Pollution Prevention and Good Housekeeping Activities) and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.



2.9 Hazardous and Waste Materials Management

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Lube oils
- Coatings and their compatible solvents (paints, thinners, etc.)
- Anti freeze
- Cleaning agents
- Fuels (gas, diesel, kerosene)

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Biochemical oxygen demand
- Toxicity to aquatic plants and wildlife
- Particulate loading

3. Identify (and choose appropriate) Solutions (BMP's)

- Ensure that all materials are stored in closed, labeled containers – if stored outside, drums should be placed on pallets, away from storm receivers – inside storage areas should be located away from floor drains
- Eliminate floor drain systems that discharge to storm drains, if possible
- Use a pretreatment system to remove contaminants prior to discharge
- Reduce stock of materials “on hand” – use “first in/first out” management technique
- Use the least toxic material (i.e. non hazardous) to perform the work
- Install/use secondary containment devices where appropriate
- Eliminate wastes by reincorporating coating/solvent mixtures into the original coating material for reuse
- Recycle materials if possible, or ensure proper disposal of wastes

4. Inspection Procedures

- Physical on-site verification of sealed floor drains (or redirected to sanitary sewer)
- Regular inspection of material storage areas (inside and outside)
- Regular inspection and cleaning of oil/water separators by qualified contractor
- Inspect stormwater discharge locations regularly (for contaminants, soil staining, plugged discharge lines)

5. Maintenance Procedures

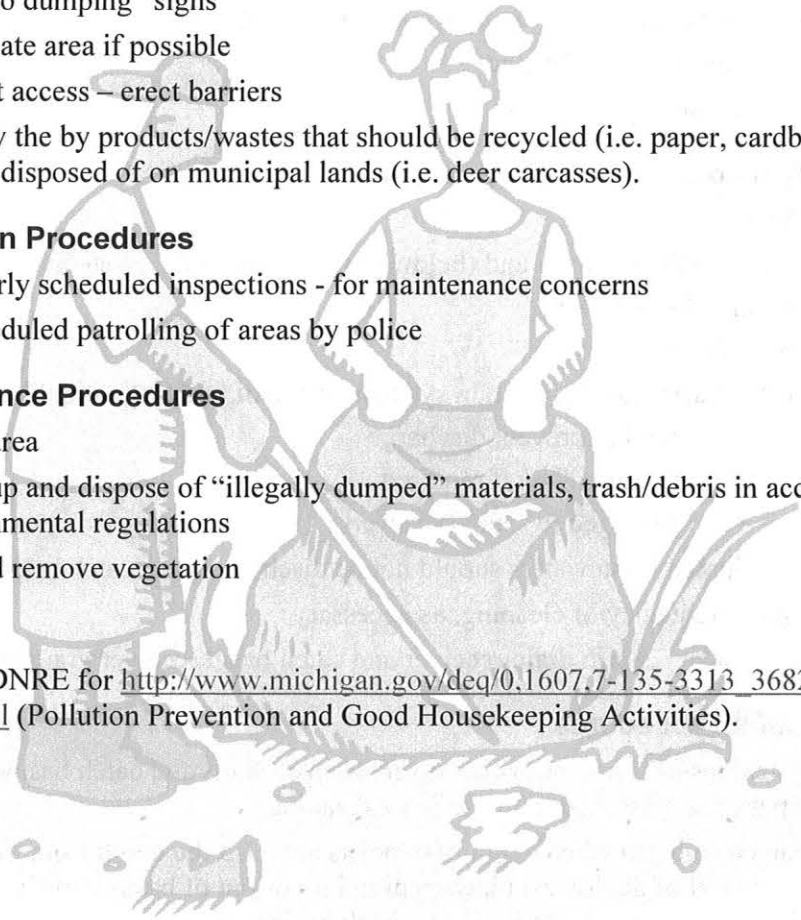
- Repair or replace any leaking/defective containers, and replace labels as necessary
- Maintain caps and/or covers on containers
- Maintain aisle space for inspection of products/wastes

6. Advisory

- None

2.10 Operational By-products/Wastes

- 1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
 - Potential for leaching of toxic and biologic contaminants to receiving waters
- 2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
 - Toxicity
 - Biochemical oxygen demand
- 3. Identify (and choose appropriate) Solutions (BMP's)**
 - Post “no dumping” signs
 - Illuminate area if possible
 - Prevent access – erect barriers
 - Identify the by products/wastes that should be recycled (i.e. paper, cardboard) or can be legally disposed of on municipal lands (i.e. deer carcasses).
- 4. Inspection Procedures**
 - Regularly scheduled inspections - for maintenance concerns
 - Unscheduled patrolling of areas by police
- 5. Maintenance Procedures**
 - Clean area
 - Clean up and dispose of “illegally dumped” materials, trash/debris in accordance with environmental regulations
 - Cut and remove vegetation
- 6. Advisory**
 - See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Pollution Prevention and Good Housekeeping Activities).



2.11 Catch Basin and Storm Drain System Cleaning

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- **Catch basins** capture grit and debris, which, if not removed in a timely fashion, can discharge toxic and biological pollutants during rain and/or snow melt events
- **Storm drainage** systems, while not designed for capture of solid materials, can perform in the same manner with similar results.
- **Storm ditches**, if stripped of vegetation during cleaning, can result in silt deposition in receiving waters

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity – heavy metals, organic compounds, etc.
- Biochemical oxygen demand
- Sediment loading

3. Identify (and choose appropriate) Solutions (BMP's)

- Address:
 - storm drain receivers and (below grade) storm sewer systems
 - parking lot receivers
 - open ditches
 - catch basins and floor drain systems inside of buildings should be either:
 - sealed to prevent discharge
 - “permitted” by if required
 - discharged to sanitary sewers
- Contaminated wastewaters should not be discharged to a catch basin/street receiver
- Increase frequency of cleaning, as necessary
- Repair/replace storm drain receiver and catch basin receiver grates as necessary

4. Inspection Procedures

- Physical inspection – prioritize storm drain systems and catch basins – catch basins on steep grades may need more frequent cleaning
- Clean catch basin when depth of deposits are $>1/3$ the depth from the bottom of the basin to the invert of the lowest pipe/opening into or out of basin – Institute temporary street parking bans to facilitate access to catch basins
- Ditch inspections – ID problems while traveling to job site
- Storm event inspection – identify pollution problems (i.e. sediments) to determine the need for additional protective measures
- Post storm event inspection – ID problems (i.e. blockages)

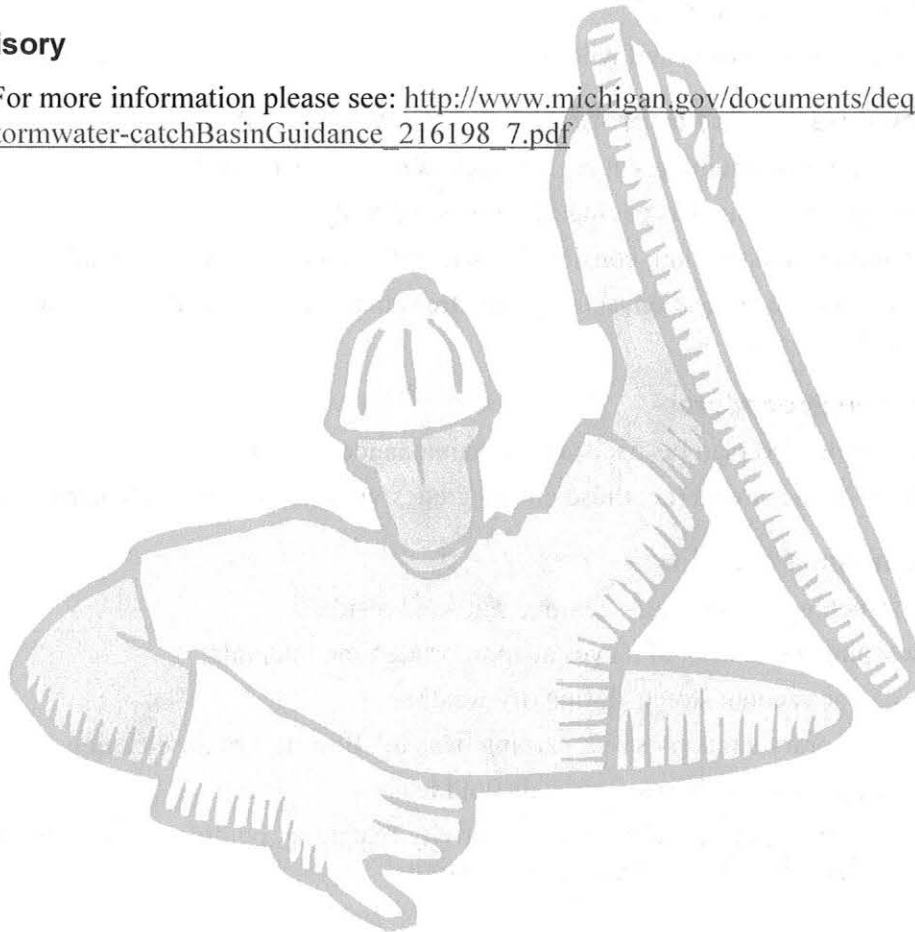
5. Maintenance Procedures

- Catch basins/storm sewer pipe – cleaning in spring to remove sand/grit/salt from winter road maintenance, cleaning in fall to remove leaves/silt/debris

- Established ditch:
 - Maintain proper slope
 - Maintain vegetation by cutting (to capture sediment) – Do not allow vegetation to grow to a height that would impair sight lines of drivers of motor vehicles
 - Remove obstacles/ debris – (i.e. trash, tree branches, brush, cut vegetation)
 - Excavation/ditch scraping – if necessary, use devices (i.e. hay bales, silt fence) to capture sediment prior to stormwater discharge into receiving waters, reseed ditch
- New installation – capture particulate matter – install sediment basins/other devices in ditch
- Proper disposal of debris

6. Advisory

- For more information please see: http://www.michigan.gov/documents/deq/wb-stormwater-catchBasinGuidance_216198_7.pdf



2.12 Street Cleaning and Maintenance

1. Identify Impacts to/on Stormwater/Receiving Water (Surface Waters)

- Poorly maintained streets allow for a “build up” of trash, grit, and debris, from which sediment and toxic/biological pollutants can be “washed out” during rain and/or snow melt events.
- Street repair/paving processes use materials that can contaminate receiving waters if they interact with stormwater.

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Particulate matter – can cause sediment loading
- Biochemical oxygen demand
- Toxicity to aquatic plants and wildlife

3. Identify (and choose appropriate) Solutions (BMP's)

- Street sweeping/vacuuming - at regular intervals, and “as needed”
- Perform operations such as paving in dry weather only.
- Prior to road reconstruction, consider the use of “shouldered roads” instead of “curbed roads”
- Maintain roadside vegetation; select plants/trees that can withstand the action of road salt and direct runoff to these areas.

4. Inspection Procedures

- Inspect streets, and plan (as needed) for maintenance/repairs
- Prioritize – some streets (i.e. those on flat grades/with many trees) may need more frequent cleaning

5. Maintenance Procedures

- Spring sweeping/vacuuming – remove salt/sand residues
- Fall sweeping, collection of leaves at appropriate time intervals
- Dry sweep or vacuum streets during dry weather
- Initiate temporary street by street parking bans to allow access for cleaning
- Maintain equipment - check for/repair fluid leaks
- Stage road operations and maintenance activity (patching, potholes) to reduce spillage of materials. Cover catch basins and manholes during activity

6. Advisory

- Also see: http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Total Suspended Solids Reductions for Roadways, Parking Lots, and Bridges (Draft)).

2.13 Road Salt Storage and Application

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- In high concentrations it can have a harmful effect on plants and aquatic life.

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity

3. Identify (and choose appropriate) Solutions (BMP's)

- Require covered facility for salt storage (prevents lumping and run-off loss), and size properly for seasonal needs
- Store salt on highest ground elevation to mitigate contact with stormwater
- Calibrate salt spreaders as necessary
- Consider alternative deicing materials (i.e. calcium chloride, magnesium chloride)
- Use a wetting agent with salt to minimize “bouncing” during application
- Cover salt loading area, or build into storage shed
- Unload salt deliveries directly into storage facility, or move inside immediately

4. Inspection Procedures

- Look for physical evidence of problems:
 - inspect salt storage shed for leaks, other problems
 - inspect salt piles for proper coverage, tarps for leaks or tears
 - inspect salt application equipment
 - inspect salt regularly for lumping or water contamination
 - inspect surface areas for evidence of runoff – salt stains on ground near and
 - around salt shelters, loading areas, or downslopes - inspect for excessive amounts of salt

5. Maintenance Procedures

- Service trucks and calibrate spreaders regularly to ensure accurate, efficient distribution
- Educate and train operators on hazards of over-salting to roads and environment
- Repair salt storage shed (leaks)
- Repair/replace tarps

6. Advisory

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--_00.html (Pollution Prevention and Good Housekeeping Activities).

2.14 Road Kill/Composting Operations

- 1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
 - Potential for leaching of biologic contaminants to receiving waters
- 2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
 - Biochemical oxygen demand
 - Bateria
- 3. Identify (and choose appropriate) Solutions (BMP's)**
 - Establish compost pile/windrow on a well drained, impervious surface that has minimal slope – segregate from other operations
 - Identify the proper types of materials that should be composted
 - Locate compost piles at least 200 ft. from receiving waters or wetlands
 - Prevent access by vermin/scavengers – erect barriers (i.e. snow fence) around pile
- 4. Inspection Procedures**
 - Check for odors, temperature of compost, exposed carcasses
 - Keep records (use a daily log)
- 5. Maintenance Procedures**
 - Monitor temperatures
 - Take samples, analyze for pathogens
 - Establish windrows
 - Prevent erosion
 - Recycle completely composted material
- 6. Advisory**
 - None

2.15 Construction and Land Disturbance

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Sediment runoff (i.e. silt, debris) can affect fish reproduction and habitat
- Removal of shade trees from stream banks can increase water temperature which can result in reduced dissolved oxygen content in streams

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Particulate matter – can cause sediment loading
- Biochemical oxygen demand – increases with temperature, depletes oxygen

3. Identify (and choose appropriate) Solutions (BMP's)

- Plan the construction and/or land clearing activities so that soil is not exposed for long periods of time
- Minimize compaction of soils and impervious cover
- Maximize opportunities for infiltration
- Install sediment control devices before disturbing soil
- Limit grading to small areas
- Stabilize site to protect against sediment runoff
- Protect against sediment flowing into storm drains
- Maintain native vegetation (especially near waterways)
- Install sediment barriers on slopes or divert stormwater

4. Inspection Procedures

- Regularly scheduled inspections (of erosion safeguards)
- Inspect during storm or snow melt events

5. Maintenance Procedures

- Check/repair all devices that have been installed to ensure protection against erosion

6. Advisory

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Construction Storm Water Runoff Control (Draft)).

2.16 Marina Operations

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- Liquids associated with boat maintenance products (oils, fuels, antifreeze, wood preservatives, etc.) and particulate matter (i.e. boat bottom paint from hull sanding) can contain toxics
- Boat sewage can contain pathogenic bacteria that contribute increased biochemical oxygen demand to waterways
- Barren soils can contribute to sedimentation

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Biochemical oxygen demand
- Toxicity
- Sediment loading

3. Identify (and choose appropriate) Solutions (BMP's)

- Construct and maintain pump out stations (for sanitary wastes)
- Build and maintain fish cleaning stations
- Stabilize shoreline
- Designate locations for boat maintenance away from the water
- Minimize impervious areas – install vegetated buffer strips (i.e. grass, shrubs)
- Provide spill clean up kits at fueling stations, covered trash receptacles
- Educate (posters, signage) boaters and other marina users of potential problems

4. Inspection Procedures

- Identify areas of runoff that lack vegetation
- Regularly inspect fueling stations (including tanks and piping), maintenance areas for spills, other potential sources of pollution
- Regularly check (empty as necessary) fish cleaning stations, sewage pump out stations, trash cans

5. Maintenance Procedures

- Empty trash cans and pump out stations as needed
- Maintain vegetated areas between the water and work areas
- Replace spill clean up kits as necessary

6. Advisory

- Refer to: Shipshape Shores and Waters: A Handbook for Marina Operators and Recreational Boaters -<http://www.epa.gov/owow/nps/marinashdbk2003.pdf>

2.17 Calculating TSS Reductions

The simplest way to meet the 25% TSS reduction goal is to implement controls that are expected to provide that reduction. Most structural practices listed in the Center for Watershed Protection's National Pollutant Removal Performance Database perform better than 25% removal. The watershed general permit stipulates that permittees must reduce TSS from municipal sites to the maximum extent practicable.

Some permittees may not be able to implement BMPs at all sites, or use additional BMPs at some facilities. In this case, to show the reduction over the entire system, a simple calculation can be done. Calculations need to be understood in order to make the best decisions regarding BMPs to add, change, or upgrade so the TSS load reduction goal may be met. In addition, these calculations need to be reported to the Department.

It should be noted that removal efficiencies assume the controls are being utilized according to design criteria, or product specifications, and are adequately maintained.

To calculate TSS load(s):

1. Determine the uncontrolled load -- with the following formula -- for each facility. Annual precipitation can be found in the LID manual, Chp 3, pg 16) and Mean TSS values in the Table below.

$$\text{Gallons} \times \text{MG} \times 3.785 \text{ L} \times 1 \text{ Pound}$$

Example: First figure out the annual precipitation (runoff) in gallons from the facility's paved areas. If the Impervious area is 1,000,000 ft² and precipitation is 2.5 ft per year (calculate: area X precipitation X 7.48 gallons per ft³) -- then total rainfall is 18,700,000 gallons/year.

Plug the rest of the numbers into the formula above. Using 77 mg/l TSS from the table below, the result (in bold) is the uncontrolled load for this site.

$$18,700,000 \text{ g/y} \times 77 \text{ mg/l} \times 3.785 \text{ l/g} \times 1 \text{ lb/453600 mg} = \mathbf{12,015 \text{ lbs/year}}$$

Mean TSS runoff values for several land uses.

Land Use Category	% Imperviousness	Mean TSS (mg/l)
Forest/Rural Open	2	51
Urban Open	11	51
Agricultural /Pasture	2	145
Low Density Residential	19	70
Medium Density Residential	38	70
High Density Residential	51	97
Commercial	56	77
Industrial	76	149
Highways	53	141
Water/Wetlands	51	6

Taken from "Rouge River Wet Weather Demonstration Project, Selection of Stormwater Pollutant Loading Factors", RPO-MOD-TM34.00, October 1994, Table 3-13. (Another way to convert mg/l to lbs/ft³ is to multiply the mg/l by 6.243 X 10).

2. Add up the uncontrolled load for each site that discharges to the same waterbody. This is the TSS loading for that system.

3. Select BMPs for each site (that are already in place or that you are considering) and calculate the TSS load, after implementation, for each site based on the chosen BMPs. The following references are approved for use in calculating reduction efficiencies for TSS load reduction controls:

- The National Pollutant Removal Performance Database, at:
www.cwp.org/Resource_Library/Center_Docs/SW/NPRPD_ver3.mdb
The technical memo is at:
www.cwp.org/Resource_Library/Center_Docs/SW/bmpwriteup_092007_v3.pdf
- The Environmental Protection Agency's database of BMPs at:
<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>
- The Environmental Protection Agency's Urban BMP effectiveness tool at:
<http://cfpub.epa.gov/npdes/stormwater/urbanbmp/bmpeffectiveness.cfm>

4. Add up the new loads for each site that discharge to the same water body. This is the TSS load for that system after BMPs are implemented.
5. Divide the sum of the TSS loading from the system, after BMPs are applied, by the sum of the loading from the same system, before BMPs are applied.
6. 1- The result, times 100, is the percentage reduction.

$$1 - \frac{TSSLoad1 \times BMPefficiency1 + \dots + TSSLoadN \times BMPefficiencyN}{TSSLoad1 + \dots + TSSLoadN} \times 100 = \%TSS \text{ reduced}$$

Some BMPs may not be listed or detailed in these references. Therefore, the Department agrees that permittees – or their consultants – may use other acceptable literature, or their own studies, provided they are scientifically defensible and submitted to the Department for review.

Example Community

Using 30 inches (2.5 feet) for the annual precipitation for this community, calculate the uncontrolled loading, assuming all listed sites are located in one watershed (one system). Remember, the formula is:

$$\text{Gallons} \times \text{MG} \times 3.785 \text{ L} \times 1 \text{ Pound}$$

Facility	Load rate	Impervious Area	Precipitation/year	lbs of TSS/year
TWP Hall	77 mg/l	150,000 ft ²	2,805,000 gallons	1,802 pounds
Police/Fire Station 1	77 mg/l	250,000 ft ²	4,675,000 gallons	3,004 pounds
Storage Yard	149 mg/l	150,000 ft ²	2,805,000 gallons	3,487 pounds
Athletic Park	51 mg/l	220,000 ft ²	4,114,000 gallons	1,751 pounds
Uncontrolled TSS Annual Loading				10,044 pounds

Then calculate the reduction in TSS with current and/or proposed BMP implementation for each site. Add up the TSS from each site.

Facility	Load rate	BMP	Reduction	New rate	lbs TSS/year
TWP Hall	77 mg/l	Detention Pond	35% from the EPA BMP database ¹	50.05 mg/l	1,171 pounds
Police/Fire Station 1	77 mg/l	Sweeping/CB Cleaning	Annual pounds collected = 500	NA	2,504 pounds
Storage Yard	149 mg/l	None	none	149 mg/l	3,487 pounds
Athletic Park	51 mg/l	Vegetated Swale	60% from the EPA BMP database ¹	20.4 mg/l	700 pounds
Controlled TSS Annual Loading					7862 pounds

1. BMP must meet the specifications of that design and for the same purpose, criteria, management, etc. Percent reduction cannot be used from the database simply because it is the best number found.

Using the formula for percent TSS reduction plug in the numbers:

$$1 - (7,862/10,044) \times 100 = 22\% \text{ reduction with the BMPs listed}$$

This will give you the percentage of TSS reduction for all municipal facilities.

2.18 Identifying Illicit Discharges

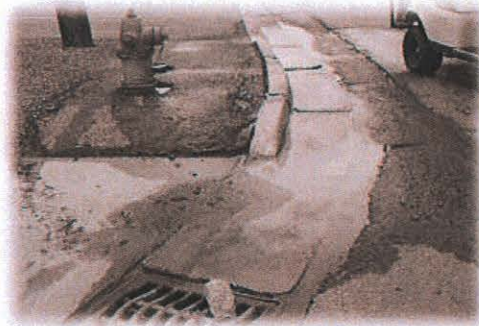
1. Recognize Sources

- Dry Weather Flow (no rain event in the last 72 hours)
- Staining
- Smell – Sanitary, Surfactant, Other
- Pipes to Catch Basin or Drain
- Debris/Waste (e.g. foam, leaks)
- Sediment

2. Typical Examples

- Laundry Connections
- Leaky Dumpsters
- Car Washing
- Equipment Washing
- Construction Sites

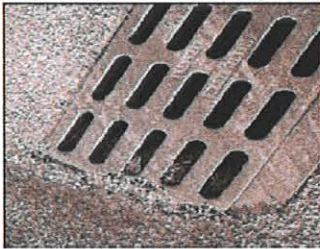
For incident reporting, please use the Illicit Discharge Reporting Sheet.



3.0 Preventive Maintenance of Treatment Controls

Preventive Maintenance BMPs include regular inspections and maintenance intended to optimize the pollutant removal efficiency of existing treatment controls. Treatment control that fail or function poorly may result in the discharge of pollutants to the storm water drainage system. Therefore, to reduce the likelihood of breakdown or failure, treatment controls should have a preventive maintenance schedule for inspection, repair, or replacement of forebays, vegetation, and revetments. Paved areas and landscaping should not be allowed to degrade to the point where they erode and contribute pollutants to runoff. Cracked pavement and berms, and any other enclosure or structural defects that may impact the quality of storm water runoff should be promptly repaired. Structural BMPs and storm drains within facility boundaries also need to be inspected and maintained regularly.

3.1 Catch Basins



GOOD

Structurally Sound
Grate/Cover Free of Debris
Sump Clean or Less than 50% Full
No Evidence of Illicit Discharge



FAIR

Structure Slightly Damaged
Some Debris On/Around Grate/Cover
Sump Near 50% Full of Sediment
No Evidence of Illicit Discharge
Minor Construction Runoff Entering Sump



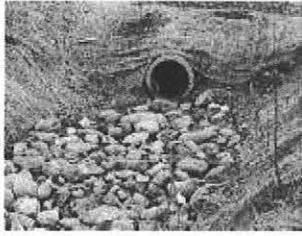
POOR

Surrounding Structure Failing
Not Functioning, Evidence of Flooding
Sump More Than 50% Full
Evidence of Illicit Discharge

Table 3.2: Catch Basins: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> Stabilize Erosion Repair Broken or Failing Concrete/Asphalt Around Structure Repair Earth Scouring Around Structure Replace Broken or Cracked Covers Report Illicit Discharge Protect Inlet from Construction Runoff 	As needed
<ul style="list-style-type: none"> Vactor Sump Remove Debris 	Semi-annually / Annually

3.2 Culverts



GOOD

No Erosion
Minimal Debris Accumulation
No Sedimentation
Pipes Structurally Sound
Minimal Scour Pool/Channelization



FAIR

Slight Erosion
Debris or Trash Accumulation
Slight Sedimentation
Pipe Slightly Crushed or Separated



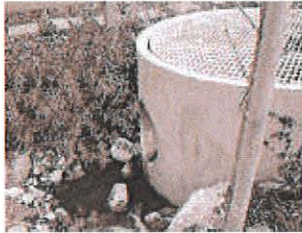
POOR

Severe Erosion Around Pipe
Heavy Debris Accumulation
Heavy Sediment Buildup
Pipe Crushed, Settled or Separated

Table 3.2: Culverts: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> • Stabilize Erosion • Replace Crushed/Cracked Pipe • Fortify with Rip Rap • Re-grade Around Outfall and Replant as Needed 	As needed
<ul style="list-style-type: none"> • Clean Up Trash and Debris • Remove Sediment 	Semi-annually / Annually

3.3 Oil/Grit Separator



GOOD

Structurally Sound
Clean Outflow
No Trash or Debris Buildup
Unit Less Than 10% Full



FAIR

Structurally Sound
Clean Outflow
Minor Trash/Debris Buildup
Unit Less Than 30% Full



POOR

Structure Compromised
Outflow Carrying Debris or Solids
Excessive Trash/Debris Buildup
Unit More Than 50% Full

Table 3.3: Oil/Grit Separator: Typical Maintenance

Activity	Schedule
• Repair Structural Defects	As needed
• Pump Accumulated Oil • Vactor Grit/Sediment out of Chamber • Clean up Trash/Debris	Semi-annually / Annually

3.4 Stormwater Outfalls



GOOD

Structurally Sound
Pipe in Good Condition
No Sedimentation/Debris Buildup
Minimal Erosion



FAIR

Minor Structural Problems
Pipe Damaged but Functional
Minimal Sedimentation/Debris Buildup
Minimal erosion



POOR

Structure Severely Compromised
Pipe Crushed or Separated, not Functional
Sediment Constricting More than 30% of Pipe
Heavy Erosion
Deep Scour Pool

Table 3.4: Stormwater Outfall: Typical Maintenance

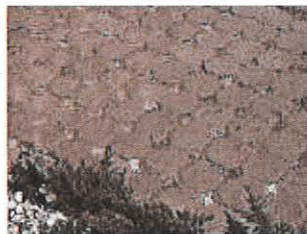
Activity	Schedule
<ul style="list-style-type: none">• Reinforce Structure with Rip Rap as Needed• Replace Crushed/Broken Pipes• Repair/Install Energy Dissipater as Needed• Report Suspected illicit Discharges	As needed
<ul style="list-style-type: none">• Remove Excess Sediment• Clean Trash Rack, Remove Accumulated Debris	Annually

3.5 Porous Pavement



GOOD

Pavement Clean of Dirt/Organic Debris
No Surface Ponding
No Settling
No Excessive Grass/Moss Growth



FAIR

Minor Dirt/Debris Accumulation
No Surface Ponding
No Settling
Moderate Grass/Moss Growth



POOR

Excessive Dirt/Debris
Surface Ponding or Runoff
Pavement/Pavers Settling
Excessive Plant Growth

Table 3.5: Permeable Pavement: Typical Maintenance

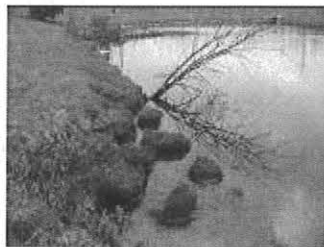
Activity	Schedule
<ul style="list-style-type: none"> Do Not Power Wash Remove Excessive Grass, Weeds or Moss around Pavers Clean Up Oil and Grease Replace Gravel Fill Between Pavers 	As needed
<ul style="list-style-type: none"> Remove accumulated sediment and particulates from the permeable pavement void spaces with high efficiency vacuum sweepers 	Annually

3.6 Detention Pond



GOOD

Inlets/Outlets clear of Debris and Trash
Minimal Sediment Buildup in Forebay
Minimal Scalping from Mowing
Surrounding Vegetation Healthy
Invasive/Non-Native Plants Absent



FAIR

Some Trash Present
Sediment Buildup in Forebay
Scalping/Improper Mowing
Dead/Dying Vegetation
Some Non-Native Plants Present



POOR

Excessive Trash Present
Forebay full of Sediment
Severe Bank Erosion
Inlets or Outlets Not Functional
Flooding

Table 3.6: Detention Pond: Typical Maintenance

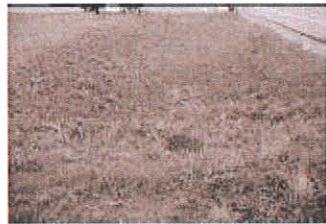
Activity	Schedule
<ul style="list-style-type: none"> Water plants as necessary during the first growing season Mow High, Avoid "Scalping" when Mowing Leave Un-Mowed Buffer Around Water 	As needed
<ul style="list-style-type: none"> Inspect pretreatment, inlet, and outlet for clogging Remove Trash Clean Inlet and Outlet Pipes and Trash Racks Check and Clear Draw-Down Pipes Remove Non-Native, Invasive Species Check for Rodent Damage (Muskrat, Beaver) 	Semi-annually
<ul style="list-style-type: none"> Inspect device for winter salting damage Check Weir Integrity Check Fence and Security Integrity 	Annually

3.7 Infiltration Basin



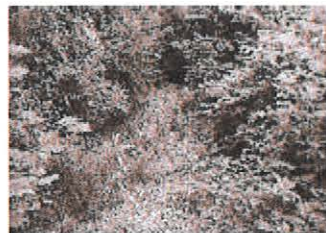
GOOD

Inlets Free From Debris
Vegetation Healthy, Covers Structure
No Scalping from Mowing
No Standing Water 1 Day After Rain
Small Amount of Trash or Debris



FAIR

Debris Around Inlet Pipe
Bare Spots in Vegetation Cover
Mowed Too Low (Scalping)
Limited Standing Water 1 Day After Rain
Small Amount of Erosion
Trash and Debris Present



POOR

Inlets Clogged with Debris
Vegetation Mostly Absent
Severe Scalping/Erosion
Evidence of Runoff or Excessive Ponding
Excessive Trash Present

Table 3.7: Infiltration Basin: Typical Maintenance

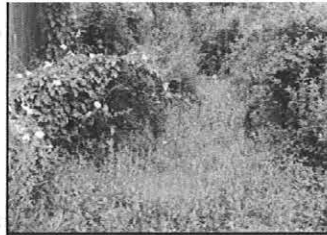
Activity	Schedule
<ul style="list-style-type: none"> • Mow at High Setting (Greater than 6 inches) • Inspect pretreatment area and trench and remove accumulated sediment and debris • Remove Trash • Check for Standing Water 	As needed
<ul style="list-style-type: none"> • Remove Sediment from Inlet 	Semi-annually
<ul style="list-style-type: none"> • Stabilize any eroded areas in pretreatment area • Check Inlet Integrity • Assess Plant Health and Abundance • Check Energy Dissipaters • Check for Channelization and Scouring 	Annually

3.8 Rain Garden (Bioretention)



GOOD

Minimal Trash
Mulch Distributed Evenly
Vegetation Robust
Minimal Weeds
Minimal Sedimentation
Inlet/Overflow Clean



FAIR

Some Trash
Bare Spots in Mulch
Vegetation Unhealthy / Bare Areas
Weedy, Un-kept Appearance



POOR

Excessive Trash
Mulch Washed Away
Vegetation Sparse
Excessively Weedy/Wild Appearance
Excessive Sedimentation

Table 3.8: Bioretention: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> Water plants as necessary during the first growing season Prune and weed plants and remove and replace unsuccessful or diseased plants Remove trash and debris Mulch replacement and/or seeding when erosion is evident 	As needed
<ul style="list-style-type: none"> Inspect pretreatment, inlet, and outlet for clogging 	Semi-annually
<ul style="list-style-type: none"> Inspect device for winter salting damage 	Annually
<ul style="list-style-type: none"> Replace mulch 2 inches thick over entire area 	2 to 3 years

3.9 Filter Strip



GOOD

Providing Good Filter Buffer Around Water Body

Minimal Sedimentation

Vegetation Healthy

Mowed High or Not at All



FAIR

Some Erosion, Sediment Runoff Reaching Water Body

Vegetation Sparse

Vegetation Mowed Too Low, Scalping

Poorly Protected from Construction



POOR

Severe Erosion, Sediment Reaching Water Body

Vegetation Dead or Missing

Severe Scalping from Mowing

Protection from Construction Activity Failing or Missing

Table 3.9: Filter Strip: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> • Water vegetation as necessary during establishment period • Repair Eroded Areas • Maintain Gravel Edging if Present • Protect from Construction Activities • Mow grass to 3 or 4 inches in height or do not mow 	As needed
<ul style="list-style-type: none"> • Inspect and remove accumulated sediment from gravel diaphragm • Inspect filter strip for rill and gullies. Reseed or re-sod as needed • Clean Up Trash 	Annually
<ul style="list-style-type: none"> • Remove accumulated sediment at the bottom of the filter strip 	Every 2 to 3 years

3.10 Vegetated Swale



GOOD

Site Free of Trash and Debris
Tidy Appearance
Vegetation Healthy
Mowed to Minimum of 6 Inches
Minimal Erosion, Scouring and Sedimentation



FAIR

Some Trash or Debris
Unkempt Appearance
Some Bare Spots in Vegetation
Mowed Too Low, Some Scalping
Some Erosion or Scouring
Sedimentation
Compaction from Traffic



POOR

Excessive Trash or Debris
Weedy, Overgrown Appearance
Vegetation Sparse or Missing
Mowed Too Low, Scalping
Severe Erosion, Scouring or Sedimentation

Table 3.10: Vegetated swale: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> Water plants as necessary during plant establishment Prune and weed plants and remove and replace unsuccessful or diseased plants Remove trash and debris Mulch replacement and/or seeding when erosion is evident If Mowing, Mow High 	As needed
<ul style="list-style-type: none"> Remove accumulated sediment and debris from the bioswale and its control structures 	Semi-annually
<ul style="list-style-type: none"> Replenish the mulch layer to maintain design depth Stabilize any eroded areas within or that drain to the bioswale 	Annually

3.11 Constructed Wetland



GOOD

Healthy Plant Life
Non-Native Plant Species Few or Absent
Minimal Litter or Trash
Inlet/Outlets Clean and free Flowing
Sediment in Forebay More Than one Foot



FAIR

Plants Unhealthy or Sparse
Some Non-Native, Invasive Plant Species
Litter or Trash Present
Inlets/Outlets Contain Sediment Buildup or Debris
Sediment in Forebay More Than one foot



POOR

Plants Dead or Missing
Excessive Non-Native, Invasive Plant Species
Excessive Litter or Trash
Inlets/Outlets Clogged or Not Functioning
Sediment in Forebay Less than One Foot From Water Surface

Table 3.11: Stormwater Wetland: Typical Maintenance

Activity	Schedule
<ul style="list-style-type: none"> Remove and replace unsuccessful or diseased plants Remove trash and debris Inspect Security Fence/Gate and Repair as Necessary Repair Erosion Damage Mow Bank on High Setting 	As needed
<ul style="list-style-type: none"> Remove accumulated sediment and debris from the wetland and its control structures Remove Debris/Sediment from Forebay 	Annually

Attachment 7 - Municipal Operation & Maintenance Activities

Fenton Township Facilities & Activities	Potential Pollutants									Best Management Practices
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances	
Building and Grounds Maintenance & Repair	X	X	X	X	X	X	X	X	X	Maintain grass lawn; Minimize use of fertilizers/pesticides; Pick up trash/debris weekly; Require contractors to maintain equipment to avoid gas/oil leaks or spills;
Parking Lot Maintenance	X	X	X	X	X	X	X		X	Plow snow from parking lots only - no salt;
Waste Handling & Disposal	X	X	X	X	X	X	X	X	X	Contract trash removal; Maintain trash dumpster with lid closed;
Vehicle Washing & Maintenance				X		X	X			Use tarps for maintenance activities; Drain wash water to sanitary sewer system;
Sanitary Sewer Maintenance	X				X	X				Soil erosion measures implemented for all excavation; Follow Genesee County construction & maintenance standards.
Sanitary Sewer Spill Control, Response & Containment	X	X			X		X		X	Monthly preventative maintenance inspections/repairs to all pump stations; Contractor on 24/7 standby for emergency response. All pump stations equipped with auto-dialer alarms to alert contractor of emergency situations; 24-hour toll free number for residents to report spills or other emergencies; Video inspection of all sewer lines on a 5-year rotating cycle.

This assessment shall be updated within 30 days of the addition or removal of BMPs to address new and existing operation and maintenance activities.

