

PERMIT NO. MI0060181



STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq.*, as amended; the "Federal Act"); Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2019-06,

Village of Grosse Pointe Shores
795 Lake Shore Road
Grosse Pointe Shores, MI 48236

is authorized to discharge from the Municipal Separate Storm Sewer System (MS4)

designated as **Grosse Pointe Shores MS4-Wayne**

to surface waters of the state of Michigan in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit takes effect on May 1, 2021. This permit is based on a complete application submitted March 28, 2008, as amended through September 11, 2019.

The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede Certificate of Coverage No. MIG610318 issued on December 16, 2003, which is hereby revoked upon the effective date of this permit.

This permit and the authorization to discharge shall expire at midnight, **October 1, 2024**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environment, Great Lakes, and Energy (Department) by **April 4, 2024**.

Issued: April 21, 2021.

Original signed by Christine Alexander
Christine Alexander, Manager
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3118 of the NREPA, the permittee shall make payment of an annual storm water fee to the Department for each January 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. Payment may be made electronically via the Department's MiWaters system. The MiWaters website is located at <https://miwaters.deq.state.mi.us>. Payment shall be submitted or postmarked by March 15 for notices mailed by February 1. Payment shall be submitted or postmarked no later than 45 days after receiving the notice for notices mailed after February 1.

Annual Permit Fee Classification: Municipal Storm Water – Population Range of more than 1,000 people, but fewer than 3,001.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Warren District Office of the Water Resources Division. The Warren District Office is located at 27700 Donald Court, Warren, MI 48092-2793, Telephone: 586-753-3700, Fax: 586-751-4690.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Michigan Administrative Hearing System within the Michigan Department of Licensing and Regulatory Affairs, c/o the Michigan Department of Environment, Great Lakes, and Energy, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

PART I**Section A. Limitations and Monitoring Requirements****1. Authorized Discharges**

- a. **Authorized Outfalls and Points of Discharge**
This permit authorizes the discharge of storm water from the permittee's MS4 to the surface waters of the state via the outfalls and points of discharge identified in the permittee's application and as modified in accordance with this permit. Such discharges shall be controlled and monitored by the permittee in accordance with this permit.
- b. **Nested MS4 Discharges**
This permit authorizes the discharge of storm water to surface waters of the state from a nested MS4 owned or operated by public bodies that include, but are not limited to, public school districts; public universities; airports; or county, state, or federal agencies. The permittee may request to modify permit coverage to add or remove a nested MS4 by submitting a request to the Department for approval. Modifications to the permit coverage may result in a permit modification, after opportunity for public comment.
- c. **Discharges Authorized Under Other National Pollutant Discharge Elimination System (NPDES) Permits**
This permit does not prohibit the use of an MS4 for other discharges authorized under other NPDES permits, or equivalent Department approval under the NREPA or the Federal Act.
- d. **Water Quality Requirements**
Discharges from the permittee's MS4 shall not cause or contribute to an exceedance of water quality standards in the receiving waters. This includes, but is not limited to, the requirement set forth in R 323.1050 of the Water Quality Standards stating that the receiving waters shall not have any of the following unnatural physical properties as a result of the discharge, in quantities which are or may become injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits.

2. Outfall or Point of Discharge Identified, Constructed, or Installed After Permit Issuance

- a. **Outfall or Point of Discharge Within the Permittee's Regulated Area**
Authorization from the Department is required to discharge storm water to a surface water of the state from a permittee owned or operated outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit and located within the permittee's regulated area as identified in the application. For each outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit, the permittee shall request authorization to discharge storm water by providing the following to the Department in a written request:
 - 1) whether the discharge is from an outfall or point of discharge;
 - 2) the outfall or point of discharge identification number assigned by the permittee;
 - 3) the surface water of the state receiving the discharge from the outfall or point of discharge;
 - 4) a certification statement that the outfall or point of discharge is within the permittee's regulated area as identified in the application;
 - 5) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) includes best management practices (BMPs) to comply with the minimum requirements of the permit for the outfall or point of discharge; and

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- 6) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) is being implemented in the regulated area served by the outfall or point of discharge, including having available an up-to-date storm sewer system map required in Part I.A.3.d.1) of this permit.
- b. **Outfall or Point of Discharge Outside the Permittee's Regulated Area**
Authorization from the Department is required to discharge storm water to a surface water of the state from a permittee owned or operated outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit and located outside the permittee's regulated area as identified in the application (e.g., area served by an expanded MS4 or area previously served by a combined sewer system that is now separated). For each outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit, the permittee shall request authorization to discharge storm water by providing the following to the Department in a written request:
 - 1) whether the discharge is from an outfall or point of discharge;
 - 2) the outfall or point of discharge identification number assigned by the permittee;
 - 3) the surface water of the state receiving the discharge from the outfall or point of discharge;
 - 4) a map identifying the expanded regulated area served by the permittee's MS4;
- 5) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) includes BMPs to comply with the minimum requirements of the permit for the outfall or point of discharge and expanded regulated area; and
- 6) a certification statement that the previously approved Storm Water Management Program (Part I.A.3. of this permit) is being implemented in the expanded regulated area served by the outfall or point of discharge, including having available an up-to-date storm sewer system map as required in Part I.A.3.d.1) of this permit.
- c. Upon review of the request to authorize the discharge from an outfall or point of discharge identified, constructed, or installed after issuance but during the term of this permit in accordance with Part I.A.2.a. or Part I.A.2.b. of this permit, the Department may determine that a permit modification is required, after opportunity for public comment. The Department will notify the permittee if a modification is required.

3. Storm Water Management Program (SWMP)

The permittee submitted a SWMP with its application for an NPDES permit. The SWMP is approved as submitted. The permittee shall implement the approved SWMP to comply with the minimum requirements identified in this permit. The SWMP shall cover the regulated area served by, or otherwise contributing to discharges from, the MS4 owned or operated by the permittee identified in the application. The permittee shall implement and enforce the SWMP to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the NREPA and the Federal Act. The approved SWMP is an enforceable part of this permit and any Department approved modifications made to the SWMP shall also become enforceable parts of this permit.

- a. **Enforcement Response Procedure (ERP)**
The permittee shall implement the ERP for violations of the permittee's ordinances or regulatory mechanisms identified in the SWMP to the maximum extent practicable. The ERP shall be implemented to compel compliance with the permittee's ordinances and/or regulatory mechanisms and to deter continuing violations.

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The permittee shall track and document all enforcement conducted pursuant to the permittee's ERP. At a minimum, the permittee shall track and document the following: the name of the person responsible for violating the permittee'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.

b. **Public Participation/Involvement Program (PPP)**

The permittee shall implement the PPP to encourage public participation/involvement in the implementation and periodic review of the SWMP to the maximum extent practicable. The permittee shall implement the PPP as part of the SWMP. The permittee has chosen to work collaboratively with watershed or regional partners to implement the PPP or part of the PPP, therefore each permittee working collaboratively is responsible for complying with the PPP as described in the SWMP.

The PPP requires implementation of the following minimum requirements:

- 1) The procedure for making the SWMP available for public inspection and comment, including complying with local public notice requirements, as appropriate; and
- 2) The procedure for inviting public participation and involvement in the implementation and periodic review of the SWMP.

c. **Public Education Program (PEP)**

The permittee shall implement the PEP as part of the SWMP to the maximum extent practicable. At the minimum, the PEP shall promote, publicize, and facilitate education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water runoff. The PEP shall be implemented to achieve measurable improvements in the public's understanding of storm water pollution and efforts to reduce the impacts of storm water pollution. The permittee has chosen to work collaboratively with watershed or regional partners to implement the PEP or part of the PEP, therefore each permittee working collaboratively is responsible for complying with the PEP as described in the SWMP.

The permittee shall implement the PEP in accordance with the procedure for prioritizing the following PEP topics based on high-priority, community-wide issues and targeted issues to reduce pollutant loads to storm water to the maximum extent practicable.

The PEP requires implementation of the following minimum requirements:

- 1) BMPs to address the following PEP topics:
 - (a) Promote public responsibility and stewardship in the permittee's watershed.
 - (b) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges can have on surface waters of the state.
 - (c) Educate the public on illicit discharges and promote public reporting on 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.

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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.
- (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 storm water runoff.

2) The procedure for determining the overall effectiveness of implementation and the process for modifying the PEP to address ineffective implementation. The Department may determine that a permit modification is required, after opportunity for public comment, based on modifications to the PEP. The Department will notify the permittee if a modification is required.

d. **Illicit Discharge Elimination Program (IDEP)**

The permittee shall implement and enforce the IDEP to detect and eliminate illicit discharges and connections to the permittee's MS4. The permittee shall implement the IDEP as part of the SWMP to the maximum extent practicable.

The IDEP requires implementation of the following minimum requirements:

1) An available, up-to-date storm sewer system map identifying the following: the storm sewer system, location of all outfalls and points of discharge the permittee owns or operates in the regulated area, and the names and location of all surface waters of the state that receive discharges from the permittee's MS4. The map shall be retained by the permittee and made available to the Department upon request. The map shall be maintained and updated as outfalls and points of discharge are identified, constructed, and installed in accordance with Part I.A.2. of this permit.

2) The plan to detect and eliminate non-storm water discharges to the permittee's MS4, including illegal dumping/spills. The plan includes the following:

- a) A procedure for conducting field observations, field screening, and source investigations. The permittee shall conduct a field observation in accordance with the procedure during dry-weather at least once during the term of the permit. Field screening and source investigation shall be conducted in accordance with the schedule in the procedure.

Field observations, field screening, and source investigations shall include the following:

(1) **Field Observation** – The permittee shall observe the outfall or point of discharge for the following during dry-weather in accordance with the procedure: presence/absence of flow, water clarity, color, odor, floatable materials, deposits/stains on the discharge structure and bank, vegetation condition, structural condition, and biology (e.g. bacterial sheens, algae, and slimes).

(2) **Field Screening** – If flow is observed at an outfall or point of discharge, the permittee shall analyze the flow for the indicator parameters identified in the procedure. If the source of an illicit discharge is identified during the field observation, field screening may not be necessary.

(3) **Source Investigation** – If the source of the illicit discharge was not identified by the field screening, the permittee shall conduct an investigation to identify the source in accordance with the procedure. If the permittee opts to use tracer dyes, the discharge of the dyes shall be authorized in accordance with Part I.A.6. of this permit.

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If the permittee is made aware of illegal dumping/spills, or complaints received, the permittee shall conduct field observations and follow-up field screening and source investigations as appropriate in accordance with the procedure, including the schedule, in the IDEP. The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state in accordance with Part II.C.7. of this permit.

- b) A procedure for responding to illicit discharges and pursuing enforcement action. The permittee shall implement the procedure to respond and pursue enforcement action once the source of the illicit discharge is identified, including the corrective action required to eliminate the illicit discharge. The permittee shall also implement the procedure to respond to illegal spills/dumping. For each illicit discharge not eliminated within 90 days of its discovery, the permittee shall provide, with the next progress report due, a written certification that the illicit discharge was eliminated or a description of how the illicit discharge will be eliminated.
 - 3) The employee training program, which includes the following:
 - a) Training on techniques for identifying illicit discharges and connections, including field observations, field screening, and source investigations;
 - b) Training on procedures for reporting, responding to, and eliminating an illicit discharge or connection and the proper enforcement response; and
 - c) A schedule and requirement for training at least once during the term of the permit for existing staff and within the first year of hire for new staff.
 - 4) The procedure for IDEP evaluation and determining the overall effectiveness of the IDEP.
- e. Construction Storm Water Runoff Control Program
- The permittee shall implement the construction storm water runoff control program to address areas of construction activity that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale. The permittee shall implement the construction storm water runoff control program as part of the SWMP to the maximum extent practicable.
- The construction storm water runoff control program requires implementation of the following minimum requirements:
- 1) The procedure to notify the Part 91 Agency, or appropriate staff (if the permittee is a Part 91 Agency), when soil or sediment is discharged to the permittee's MS4 from a construction activity.
 - 2) The procedure to notify the Department when soil, sediment, or other pollutants are discharged to the permittee's MS4 from a construction activity.
 - 3) The procedure for ensuring that construction activity one (1) acre or greater in total earth disturbance with the potential to discharge to the permittee's MS4 obtains a Part 91 permit or is conducted by an approved Authorized Public Agency, as appropriate.
 - 4) The procedure to advise the landowner or recorded easement holder of the State of Michigan Permit by Rule (R 323.2190 of the Part 21 Rules promulgated pursuant to Part 31 of the NREPA).
- f. Post-Construction Storm Water Runoff Program
- The permittee shall implement and enforce the program to address post-construction storm water runoff from new development and redevelopment projects that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale, and that discharge into the permittee's MS4. The permittee shall implement and enforce the post-construction storm water control program as part of the SWMP, to the maximum extent practicable and in accordance with the approved ordinance or regulatory mechanism.

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1) On or before July 1, 2021 the permittee shall submit to the Department for review a draft Post-Construction Storm Water Control ordinance. On or before October 1, 2021, the permittee shall submit to the Department for approval an in-effect Post-Construction Storm Water Control ordinance to achieve the post-construction storm water runoff performance standards set forth in a) and b) below at the project site (including projects where the permittee is the project developer). Upon Department approval of the ordinance, the permittee shall implement and enforce the ordinance requiring implementation of BMPs by the project developer (including the permittee if the permittee is the project developer) to achieve the post-construction storm water runoff performance standards at the project site to the maximum extent practicable.

- a) **Water Quality Control (WQC) Performance Standard**
Treat the post-development runoff volume generated from a 1.0-inch rainfall event. BMPs shall be designed on a site-specific basis to achieve a minimum of 80 percent removal of total suspended solids (TSS) as compared with uncontrolled runoff or a discharge concentration of TSS not to exceed 80 milligrams per liter (mg/l).
- b) **Channel Protection Control Performance Standard (CPC)**
The CPC shall be implemented to limit the surface runoff rate and volume at the project site to maintain or restore stable hydrology in receiving waters. An alternative CPC was approved as part of the SWMP. The alternative CPC requires implementation of the following at the project site to the maximum extent practicable:

(1) Channel Protection Volume Control (CPVC): Retain onsite the post-development runoff volume from a 1.0-inch rainfall event, and

(2) Channel Protection Rate Control (CPRC): Provide extended detention for the post-development runoff volume from a 1.9-inch rainfall event.

On or before April 1, 2022 and on or before April 1 of every year following, as part of the approved alternative, the permittee shall submit an annual report to the Department for the previous calendar year documenting the results of implementing the alternative CPC in the regulated area. The annual report shall tabulate the following for each development or redevelopment project (including projects where the permittee is the project developer) and provide an overall summary for each reporting line:

- (1) Change in impervious area, pervious area by cover type, and total area by site.
- (2) CPVC volume provided at the site.
- (3) Difference between required and provided CPVC volume by site.
- (4) Percent of site in each Hydrologic Soil Group (Type A, B, C, D).
- (5) Site location in geographic information system (GIS) polygon format, or an approved alternative format.
- (6) Site outfalls and points of discharge in GIS point format, or an approved alternative format.
- (7) Site MS4 outfall drainage area in GIS polygon format, or an approved alternative format, including any offsite drainage that passes through the outfall or points of discharge.
- (8) CPRC volume provided at the site.
- (9) Difference between required and provided CPRC volume by site.

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(10) CPVC volume required for each primary road project with receiving water of the state identified.

(11) Cumulative CPVC volume provided for all new development and redevelopment projects discharging to the same receiving water of the state with a road project(s) starting November 1, 2021.

The permittee shall submit documentation to support implementation of the alternative CPC upon request. The alternative CPC approval is limited to the permit term. The results from the annual reports will be evaluated as part of permit reissuance using methods agreed to by the permittee and Department, which may result in an updated alternative CPC.

2) The permittee shall implement and enforce the following site-specific requirements as part of meeting the post-construction storm water runoff performance standards set forth in a) and b), above:

- a) The procedure for reviewing the use of infiltration BMPs to achieve the performance standards in areas of soil or groundwater contamination in a manner that does not exacerbate existing conditions.
- b) The ordinance or regulatory mechanism requiring BMPs to address the associated pollutants in potential hot spots as part of meeting the performance standards. Hot spots include areas with the potential for significant pollutant loading including, but not limited to, the following: gas stations; vehicle maintenance and repair; auto recyclers; recycling centers and scrap yards; landfills; solid waste facilities; and railroads. Hot spots also include areas with the potential for contaminating public water supply intakes.

3) All structural and vegetative BMPs installed and implemented to meet the performance standards shall be operated and maintained in perpetuity. The permittee shall implement and enforce the ordinance or regulatory mechanism program to ensure long-term operation and maintenance of BMPs.

4) The ordinance or regulatory mechanism and procedures for site plan review and approval for projects that disturb one (1) or more acres, including projects less than one (1) acre that are part of a larger common plan of development or sale, and discharge to the permittee's MS4, including projects where the permittee is the developer. The site plan review and approval shall demonstrate compliance with the performance standards and long-term operation and maintenance requirements of this permit.

g. **Pollution Prevention and Good Housekeeping Activities for Municipal Operations**

The permittee shall implement the pollution prevention and good housekeeping program with the goal of preventing or reducing pollutant runoff from municipal facilities and operations that discharge storm water to surface waters of the state. The permittee shall implement the program as part of the SWMP to the maximum extent practicable.

1) **Municipal Facility and Structural Storm Water Control Inventory**

The permittee shall make available to the Department upon request an up-to-date map or maps of the facilities and structural storm water controls owned or operated by the permittee with a discharge to surface waters of the state in the regulated area. In accordance with the procedure for updating and revising the permittee's facility inventory and map(s), the permittee shall submit to the Department the type and location for any new facility obtained or constructed during this permit term with a discharge of storm water to surface waters of the state and the information requested in Part I.A.2. of the permit.

PART I**Section A. Limitations and Monitoring Requirements****2) Facility-Specific Storm Water Management**

The permittee shall implement the facility-specific standard operating procedure (SOP) for each facility the permittee identified as having the high potential to discharge pollutants to surface waters of the state. The permittee shall implement the BMPs identified in the procedure to prevent or reduce pollutant runoff at each facility the permittee identified as having the medium or low potential to discharge pollutants to surface waters of the state. The permittee shall assess new facilities for the potential to discharge pollutants to surface waters of the state in accordance with the procedure to determine a priority level. High-priority facilities shall include permittee-owned or operated fleet maintenance and storage yards unless a demonstration is submitted and approved by the Department demonstrating how the permittee's fleet maintenance or storage yard has the low potential to discharge pollutants to surface waters of the state. The assessment shall be submitted in writing to the Department for approval within 30 days of ownership or operation of the new facility. The permittee shall certify in writing to the Department that a facility-specific SOP is being implemented within 90 days of ownership or operation of a new high-priority facility. Within 90 days of ownership or operation, the permittee shall certify in writing to the Department that BMPs are being implemented in accordance with the procedure developed to prevent or reduce pollutant runoff at each new medium- or low-priority facility. For new facilities, the Department may determine that a permit modification is required, after opportunity for public comment. The Department will notify the permittee if a modification is required. The permittee shall document all other changes to the facility assessment as part of the progress report and as an update to the procedure.

The facility-specific SOP shall be kept at the site described in the SOP and made available upon request by the Department. The facility-specific SOP for each high-priority facility shall include implementation of the following.

- a) Structural and non-structural storm water controls to prevent or reduce the discharge of pollutants to surface waters of the state.
- b) Up-to-date list of significant materials stored on-site that could pollute storm water with a description of the handling and storage requirements and potential to discharge for each significant material.
- c) Good housekeeping practices including, but not limited to, maintaining a clean and orderly facility, properly storing and covering materials, and minimizing pollutant sources to prevent or reduce pollutant runoff.
- d) Routine maintenance and inspections of storm water management and control devices to ensure materials and equipment are clean and orderly and prevent or reduce pollutant runoff. The written report of the inspection and corrective actions shall be retained in accordance with Part II.B.5. of this permit.
- e) Comprehensive site inspections at least once every six (6) months. The comprehensive site inspection shall include an inspection of all structural storm water controls and a review of non-structural storm water controls to prevent or reduce pollutant runoff. A written report of the inspection and corrective actions shall be retained in accordance with Part II.B.5. of this permit.

3) Structural Storm Water Control Operation and Maintenance Activities

- a) The permittee shall implement the procedures for inspecting, cleaning, and maintaining permittee-owned or operated catch basins in the regulated area using the priority level assigned to each catch basin. The permittee shall document changes to the priority level for a catch basin as part of the progress report and as an update to the procedure.

The permittee shall also implement the procedure for dewatering and disposal of materials extracted from the catch basins in accordance with Part 111 (Hazardous Waste), Part 115 (Solid Waste), and Part 121 (Liquid Industrial Waste) of the NREPA.

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- b) The permittee shall implement the procedure for inspecting and maintaining permittee-owned or operated structural storm water controls other than catch basins in the regulated area. The permittee shall document changes to the procedure as part of the progress report and as an update to the procedure.
- c) The permittee shall implement the procedure requiring that new permittee-owned or operated facilities or structural storm water controls to address water quantity be designed and implemented in accordance with the post-construction storm water runoff performance standards and long-term operation and maintenance requirements in Part I.A.3.f. of this permit.

4) Municipal Operations and Maintenance Activities

- a) The permittee shall implement the procedure, including the BMPs identified, to prevent or reduce pollutant runoff from the permittee's operation and maintenance activities identified in the SWMP. The permittee shall document changes to the assessment of operation and maintenance activities for the potential to discharge pollutants to surface waters of the state as part of the progress report and as an update to the procedure.
- b) The permittee shall implement the procedure for the street sweeping program for permittee-owned or operated streets, parking lots, or other impervious infrastructure in the regulated area using the sweeping methods and assigned priority levels identified in the procedure. The permittee shall document changes to the priority level for a street, parking lot, or other impervious infrastructure as part of the progress report and as an update to the procedure.

The permittee shall also implement the procedure for dewatering and disposal of street sweeper waste material.

5) Managing Vegetated Properties

The permittee shall implement the procedure requiring the permittee'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.

6) Employee Training

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

7) Contractor Requirements and Oversight

The permittee shall implement the procedure requiring contractors hired by the permittee to perform municipal operation and maintenance activities that comply with the permittee's pollution prevention and good housekeeping program and contractor oversight to ensure compliance.

h. Total Maximum Daily Load (TMDL) Implementation Plan

The permittee shall implement the TMDL Implementation Plan to reduce the discharge of pollutants from the permittee's MS4 to make progress in meeting Water Quality Standards. The permittee shall implement the TMDL Implementation Plan as part of the SWMP.

The following TMDL is applicable to the discharge from the permittee's MS4:

Name of TMDL

Lake St. Clair Metropolitan and Memorial Beach

Pollutant of Concern

E.coli

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The permittee shall implement the prioritized BMPs included in the TMDL Implementation Plan during the permit cycle to make progress in achieving the pollutant load reduction requirement in the TMDL. The permittee shall review, update, and revise the list of BMPs implemented as part of the TMDL Implementation Plan in accordance with the procedure included in the SWMP. The Department may determine that a permit modification is required, after opportunity for public comment, based on modifications to the TMDL Implementation Plan. The Department will notify the permittee if a modification is required.

The permittee shall implement the monitoring plan included in the TMDL Implementation Plan for assessing the effectiveness of the BMPs implemented in making progress toward achieving the TMDL pollutant load reduction. Available monitoring data shall be submitted with each progress report.

4. SWMP Modifications**a. SWMP Modifications Requested by the Permittee**

Modifications to the previously approved SWMP may be requested by the permittee as follows:

1) Modifications adding BMPs (but not replacing, subtracting, or affecting the level of implementation of any other BMP) to the previously approved SWMP may be made by the permittee at any time upon written notification to the Department. Notification shall include a description of the modification, which may include a description of a new BMP with a corresponding measurable goal. Upon notification to the Department, the modification is considered an enforceable part of the approved SWMP.

2) Modifications replacing an ineffective or unfeasible BMP identified in the previously approved SWMP with an alternative BMP may be requested at any time by written notification to the Department. The ineffective or unfeasible BMP identified shall not be replaced in the previously approved SWMP unless the replacement is approved by the Department. Modifications to the previously approved SWMP may result in a permit modification after opportunity for public comment. Such requests shall include the following:

- a) an analysis of why the BMP is ineffective or unfeasible (including cost-prohibitive);
- b) a measurable goal for the replacement BMP; and
- c) an analysis of why the replacement BMP is expected to achieve the intent of the BMP to be replaced.

3) Modifications subtracting an ineffective or unfeasible BMP identified in the previously approved SWMP may be requested by written notification to the Department. The identified BMP shall not be subtracted from the previously approved SWMP unless the subtraction is approved by the Department. Modifications to the previously approved SWMP may result in a permit modification after opportunity for public comment. Such requests shall include the following:

- a) an analysis of why the BMP is ineffective or unfeasible (including cost prohibitive); and
- b) a determination of why the removal of the BMP will not change the permittee's ability to comply with the permit requirements.

b. Modifications Required by the Department

The Department may require the permittee to modify the SWMP as needed to:

- 1) address contributions from the permittee's MS4 discharge that impair receiving water quality;
- 2) include more stringent requirements necessary to comply with new state or federal statutory or regulatory requirements; and/or

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- 3) include such other conditions deemed necessary by the Department to comply with the goals and requirements of the Federal Act or the NREPA, including the requirement to reduce the discharge of pollutants from the MS4 to the maximum extent practicable.

5. Request for Approval to Use Water Treatment Additives

This permit does not authorize the use of any water treatment additive without prior written approval from the Department. Such approval is authorized under separate correspondence. Water treatment additives include any materials that are added to water used at the facility, or to wastewater generated by the facility, to condition or treat the water. Permittees proposing to use water treatment additives, including a proposed increased concentration of a previously approved water treatment additive, shall submit a request for approval via the Department's MiWaters system. The MiWaters website is located at <https://miwaters.deq.state.mi.us>. Instructions for submitting such a request may be obtained at <http://www.michigan.gov/npdes> (near the bottom of that page, click on one or both of the links located under the Water Treatment Additives banner). Additional monitoring and reporting may be required as a condition of approval to use the water treatment additive.

A request for approval to use water treatment additives shall include all of the following usage and discharge information for each water treatment additive proposed to be used:

- a. The Safety Data Sheet (SDS);
- b. Ingredient information, including the name of each ingredient, CAS number for each ingredient, and fractional content by weight for each ingredient;
- c. The proposed water treatment additive discharge concentration with supporting calculations;
- d. The discharge frequency (i.e., number of hours per day and number of days per year);
- e. The outfall(s) and monitoring point(s) from which the water treatment additive is to be discharged;
- f. The type of removal treatment, if any, that the water treatment additive receives prior to discharge;
- g. The water treatment additive's function (i.e., microbiocide, flocculant, etc.);
- h. The SDS shall include a 48-hour LC50 or EC50 for a North American freshwater planktonic crustacean (either *Ceriodaphnia* sp., *Daphnia* sp., or *Simocephalus* sp.); The results shall be based on the whole water treatment additive, shall not be results based on a similar product, and shall not be estimated; and
- i. The SDS shall include the results of a toxicity test for one (1) other North American freshwater aquatic species (other than a planktonic crustacean) that meets a minimum requirement of R 323.1057(2) of the Water Quality Standards. The results shall be based on the whole water treatment additive, shall not be results based on a similar product, and shall not be estimated. Examples of tests that would meet this requirement include a 96-hour LC50 for rainbow trout, bluegill, or fathead minnow.

6. Tracer Dye Discharges

This permit does not authorize the discharge of tracer dyes without approval from the Department. Requests to discharge tracer dyes shall be submitted to the Department in accordance with Rule 1097 (R 323.1097 of the Michigan Administrative Code).

PART I**Section A. Limitations and Monitoring Requirements****7. Storm Water Program Manager (Facility Contact)**

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

- a. The facility contact shall be (or a duly authorized representative of this person):
 - for a corporation, a principal executive officer of at least the level of vice president; or a designated representative if the representative is responsible for the overall operation of the facility from which the discharge originates, as described in the permit application or other NPDES form,
 - for a partnership, a general partner,
 - for a sole proprietorship, the proprietor, or
 - for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.
- b. A person is a duly authorized representative only if:
 - the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
 - the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

PART I**Section B. Program Assessment and Reporting****1. Progress Reports**

Progress reports shall be submitted on or before April 1, 2022 and on or before April 1 every two (2) years following. The Department may approve alternate dates for progress report submittal if requested and adequately justified by the permittee. Each progress report shall contain the following information for the entire period that has elapsed since the last progress report submittal (i.e., the reporting cycle):

a. **Compliance Assessment**

The permittee shall describe the status of compliance with the approved SWMP identified in Part I.A.3 of this permit. The permittee shall assess and describe the appropriateness of the BMPs identified in the SWMP. The report shall describe the progress made towards achieving the identified measurable goals for each of the BMPs, and specific evaluation criteria as follows:

1) For the PEP, provide a summary of the evaluation of the overall effectiveness of the PEP, using the evaluation methods described in the PEP.

2) For the IDEP, provide a summary of the evaluation and determination of the overall effectiveness of the IDEP, using the evaluation methods described in the IDEP. For each illicit discharge that was not eliminated within 90 days of its discovery the permittee shall provide a written certification that the illicit discharge was eliminated or a description of how the illicit discharge will be eliminated.

3) If applicable, the permittee shall submit to the Department any new outfall or point of discharge information as required in Part I.A.2. of this permit.

4) For the TMDL Implementation Plan, if monitoring data is available in accordance with the monitoring plan, provide an assessment of progress made toward achieving the TMDL pollutant load reduction requirement.

b. **Data and Results**

The permittee shall provide a summary of all of the information collected and analyzed, including monitoring data, if any, during the reporting cycle.

c. **Upcoming Activities**

The permittee shall provide a summary of the BMPs to be implemented during the next reporting cycle.

d. **Changes to BMPs and Measurable Goals**

The permittee shall describe any changes to BMPs or measurable goals in the approved SWMP. In accordance with the permit, these changes will be reviewed to determine if a permit modification is necessary. The Department will notify the permittee if a permit modification is required.

e. **Notice of Changes in Nested Jurisdiction Agreements**

The permittee shall identify any nested jurisdictions that enter into or terminate permit agreements with the permittee which were not identified in the SWMP. The permittee may request to modify the permit coverage to add or remove a nested MS4 by submitting a request to the Department for approval in accordance with Part I.A.1.b. of this permit. Modifications to the permit coverage may result in a permit modification, after opportunity for public comment.

f. **Required Signatures**

All reports required by this permit, and other information requested by the Department, shall be signed by either a principal executive officer or ranking elected official, or by a duly authorized representative of that person in accordance with 40 CFR 122.22(b).

PART II

Part II may include terms and /or conditions not applicable to discharges covered under this permit.

Section A. Definitions

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Annual monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Authorized public agency means a state, local, or county agency that is designated pursuant to the provisions of Section 9110 of Part 91, Soil and Sedimentation Control, of the NREPA, to implement soil erosion and sedimentation control requirements with regard to construction activities undertaken by that agency.

Best management practices (BMPs) means structural devices or nonstructural practices that are designed to prevent pollutants from entering into storm water, to direct the flow of storm water, or to treat polluted storm water.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

CAFO means concentrated animal feeding operation.

Certificate of Coverage (COC) is a document, issued by the Department, which authorizes a discharge under a general permit.

Chronic toxic unit (TU_C) means $100/MATC$ or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules, Land Application of Biosolids, promulgated under Part 31 of the NREPA. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Combined sewer system is a sewer system in which storm water runoff is combined with sanitary wastes.

Composite sample is a sample collected over time, either by continuous sampling or by mixing discrete samples. A composite sample represents the average wastewater characteristics during the compositing period. Various methods for compositing are available and are based on either time or flow-proportioning, the choice of which will depend on the permit requirements.

Continuous monitoring refers to sampling/readings that occur at regular and consistent intervals throughout a 24-hour period and at a frequency sufficient to capture data that are representative of the discharge. The maximum acceptable interval between samples/readings shall be one (1) hour.

PART II**Section A. Definitions****Daily concentration**

FOR PARAMETERS OTHER THAN pH, DISSOLVED OXYGEN, TEMPERATURE, AND CONDUCTIVITY – Daily concentration is the sum of the concentrations of the individual samples of a parameter taken within a calendar day divided by the number of samples taken within that calendar day. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations. For guidance and examples showing how to perform calculations using results below quantification levels, see the document entitled “Reporting Results Below Quantification,” available at https://www.michigan.gov/documents/deq/wrd-npdes-results-quantification_620791_7.pdf.

FOR pH, DISSOLVED OXYGEN, TEMPERATURE, AND CONDUCTIVITY – The daily concentration used to determine compliance with maximum daily pH, temperature, and conductivity limitations is the highest pH, temperature, and conductivity readings obtained within a calendar day. The daily concentration used to determine compliance with minimum daily pH and dissolved oxygen limitations is the lowest pH and dissolved oxygen readings obtained within a calendar day.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the “MAXIMUM” column under “QUANTITY OR LOADING” on the DMRs.

Daily monitoring frequency refers to a 24-hour day. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Department means the Michigan Department of Environment, Great Lakes, and Energy.

Detection level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

Discharge means the addition of any waste, waste effluent, wastewater, pollutant, or any combination thereof to any surface water of the state.

EC₅₀ means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a discharge event. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the “AVERAGE” column under “QUALITY OR CONCENTRATION” on the DMR. If the period in which the discharge event occurred was partially in each of two months, the calculated monthly value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a reporting month. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the “AVERAGE” column under “QUALITY OR CONCENTRATION” on the DMR.

PART II**Section A. Definitions****Fecal coliform bacteria 7-day**

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days of discharge during a discharge event. If the number of daily concentrations determined during the discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean value for the month in the “MAXIMUM” column under “QUALITY OR CONCENTRATION” on the DMRs. If the 7-day period was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days in a reporting month. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean for the month in the “MAXIMUM” column under “QUALITY OR CONCENTRATION” on the DMRs. The first calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

Flow-proportioned composite sample is a composite sample in which either a) the volume of each portion of the composite is proportional to the effluent flow rate at the time that portion is obtained, or b) a constant sample volume is obtained at varying time intervals proportional to the effluent flow rate.

General permit means an NPDES permit authorizing a category of similar discharges.

Geometric mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

Grab sample is a single sample taken at neither a set time nor flow.

IC₂₅ means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Illicit connection means a physical connection to a municipal separate storm sewer system that primarily conveys non-storm water discharges other than uncontaminated groundwater into the storm sewer; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

Illicit discharge means any discharge to, or seepage into, a municipal separate storm sewer system that is not composed entirely of storm water or uncontaminated groundwater. Illicit discharges include non-storm water discharges through pipes or other physical connections; dumping of motor vehicle fluids, household hazardous wastes, domestic animal wastes, or litter; collection and intentional dumping of grass clippings or leaf litter; or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-storm water waste directly into a separate storm sewer.

Individual permit means a site-specific NPDES permit.

Inlet means a catch basin, roof drain, conduit, drain tile, retention pond riser pipe, sump pump, or other point where storm water or wastewater enters into a closed conveyance system prior to discharge off site or into waters of the state.

PART II

Section A. Definitions

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts a POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference].

Land application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC₅₀ means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

Maximum extent practicable means implementation of best management practices by a public body to comply with an approved storm water management program as required by a national permit for a municipal separate storm sewer system, in a manner that is environmentally beneficial, technically feasible, and within the public body's legal authority.

MBTU/hr means million British Thermal Units per hour.

MGD means million gallons per day.

Monthly concentration is the sum of the daily concentrations determined during a reporting period divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity $[1 \text{ minus the quantity (monthly effluent concentration divided by the monthly influent concentration)}]$, shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during a reporting period. The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMR.

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Municipal separate storm sewer means a conveyance or system of conveyances designed or used for collecting or conveying storm water which is not a combined sewer and which is not part of a POTW as defined in the Code of Federal Regulations at 40 CFR 122.2.

PART II

Section A. Definitions

Municipal separate storm sewer system (MS4) means all separate storm sewers that are owned or operated by the United States, a state, city, village, township, county, district, association, or other public body created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as a sewer district, flood control district, or drainage district, or similar entity, or a designated or approved management agency under Section 208 of the Clean Water Act that discharges to the waters of the state. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Clean Water Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact cooling water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Nonstructural controls are practices or procedures implemented by employees at a facility to manage storm water or to prevent contamination of storm water.

NPDES means National Pollutant Discharge Elimination System.

Outfall is the location at which a point source discharge first enters a surface water of the state.

Part 91 agency means an agency that is designated by a county board of commissioners pursuant to the provisions of Section 9105 of Part 91 of the NREPA; an agency that is designated by a city, village, or township in accordance with the provisions of Section 9106 of Part 91 of the NREPA; or the Department for soil erosion and sedimentation control activities under Part 615, Supervisor of Wells; Part 631, Reclamation of Mining Lands; or Part 632, Nonferrous Metallic Mineral Mining, of the NREPA, pursuant to the provisions of Section 9115 of Part 91 of the NREPA.

Part 91 permit means a soil erosion and sedimentation control permit issued by a Part 91 agency pursuant to the provisions of Part 91 of the NREPA.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's NPDES permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Point of discharge is the location of a point source discharge where storm water is discharged directly into a separate storm sewer system.

Point source discharge means a discharge from any discernible, confined, discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock. Changing the surface of land or establishing grading patterns on land will result in a point source discharge where the runoff from the site is ultimately discharged to waters of the state.

Polluting material means any material, in solid or liquid form, identified as a polluting material under the Part 5 Rules, Spillage of Oil and Polluting Materials, promulgated under Part 31 of the NREPA (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

PART II

Section A. Definitions

POTW is a publicly owned treatment work.

Predevelopment is the last land use prior to the planned new development or redevelopment.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

Public (as used in the MS4 individual permit) means all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, and construction contractors and developers.

Public body means the United States; the state of Michigan; a city, village, township, county, school district, public college or university, or single-purpose governmental agency; or any other body which is created by federal or state statute or law.

Qualified Personnel means an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the storm water sample.

Qualifying storm event means a storm event causing greater than 0.1 inch of rainfall and occurring at least 72 hours after the previous measurable storm event that also caused greater than 0.1 inch of rainfall. Upon request, the Department may approve an alternate definition meeting the condition of a qualifying storm event.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Regulated area means the permittee's urbanized area, where urbanized area is defined as a place and its adjacent densely-populated territory that together have a minimum population of 50,000 people as defined by the United States Bureau of the Census and as determined by the latest available decennial census.

Secondary containment structure means a unit, other than the primary container, in which significant materials are packaged or held, which is required by state or federal law to prevent the escape of significant materials by gravity into sewers, drains, or otherwise directly or indirectly into any sewer system or to the surface waters or groundwaters of the state.

Separate storm sewer system means a system of drainage, including, but not limited to, roads, catch basins, curbs, gutters, parking lots, ditches, conduits, pumping devices, or man-made channels, which is not a combined sewer where storm water mixes with sanitary wastes, and is not part of a POTW.

PART II

Section A. Definitions

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process waste stream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Significant materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111, Hazardous Waste Management, of the NREPA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills and significant leaks means any release of a polluting material reportable under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

Special-use area means storm water discharges for which the Department has determined that additional monitoring is needed from: secondary containment structures required by state or federal law; lands on Michigan's List of Sites of Environmental Contamination pursuant to Part 201, Environmental Remediation, of the NREPA; and/or areas with other activities that may contribute pollutants to the storm water.

Stoichiometric means the quantity of a reagent calculated to be necessary and sufficient for a given chemical reaction.

Storm water means storm water runoff, snow melt runoff, surface runoff and drainage, and non-storm water included under the conditions of this permit.

Storm water discharge point is the location where the point source discharge of storm water is directed to surface waters of the state or to a separate storm sewer. It includes the location of all point source discharges where storm water exits the facility, including *outfalls* which discharge directly to surface waters of the state, and *points of discharge* which discharge directly into separate storm sewer systems.

Structural controls are physical features or structures used at a facility to manage or treat storm water.

SWPPP means the Storm Water Pollution Prevention Plan prepared in accordance with this permit.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total maximum daily loads (TMDLs) are required by the Clean Water Act for waterbodies that do not meet water quality standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet water quality standards, and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity reduction evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

PART II

Section A. Definitions

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of the NREPA, being R 323.1041 through R 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value, or observation shall be reported for that period if a discharge occurs during that period. If the calendar week begins in one month and ends in the following month, the analytical result, reading, value, or observation shall be reported in the month in which monitoring was conducted.

WWSL is a wastewater stabilization lagoon.

WWSL discharge event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14-day period.

3-portion composite sample is a sample consisting of three equal-volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily concentrations determined. If the number of daily concentrations determined during the WWSL discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the WWSL discharge event in the “MAXIMUM” column under “QUALITY OR CONCENTRATION” on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations in the reporting month. When required by the permit, report the maximum calculated 7-day concentration for the month in the “MAXIMUM” column under “QUALITY OR CONCENTRATION” on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

PART II**Section A. Definitions****7-day loading**

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily loadings determined. If the number of daily loadings determined during the WWSL discharge event is less than 7 days, the number of actual daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the WWSL discharge event in the “MAXIMUM” column under “QUANTITY OR LOADING” on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days in a reporting month divided by the number of daily loadings determined. If the number of daily loadings determined is less than 7, the actual number of daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations in the reporting month. When required by the permit, report the maximum calculated 7-day loading for the month in the “MAXIMUM” column under “QUANTITY OR LOADING” on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

24-hour composite sample is a flow-proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period and in which the volume of each portion is proportional to the discharge flow rate at the time that portion is taken. A time-proportioned composite sample may be used upon approval from the Department if the permittee demonstrates it is representative of the discharge.

PART II**Section B. Monitoring Procedures****1. Representative Samples**

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Clean Water Act (40 CFR Part 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. **Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations.** For lists of approved test methods, go to <https://www.epa.gov/cwa-methods>. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Manager of the Permits Section, Water Resources Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30458, Lansing, Michigan, 48909-7958. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Assurance/Quality Control program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II**Section C. Reporting Requirements****1. Start-Up Notification**

The permittee shall notify the Department of start-up if one of the following conditions applies and in accordance with the applicable condition:

a. Non-CAFOs

- 1) **If this is an individual permit** and the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department via MiWaters within 14 days following the effective date of this permit, and then again 60 days prior to commencement of the discharge.
- 2) **If this is a general permit** and the permittee will not discharge during the first 60 days following the effective date of the Certificate of Coverage (COC) issued under this general permit, the permittee shall notify the Department via MiWaters within 14 days following the effective date of the COC, and then again 60 days prior to commencement of the discharge.

b. CAFOs

- 1) **If this is an individual permit** and the permittee will not populate with animals during the first 60 days following the effective date of this permit, the permittee shall notify the Department via MiWaters within 14 days following the effective date of this permit, and then again 60 days prior to populating with animals.
- 2) **If this is a general permit** and the permittee will not populate with animals during 60 days following the effective date of the Certificate of Coverage (COC) issued under this general permit, the permittee shall notify the Department via MiWaters within 14 days following the effective date of the COC, and then again 60 days prior to populating with animals.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of the NREPA (specifically Section 324.3110(7)); and R 323.2155(2) of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, allow the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self-Monitoring," the permittee shall submit self-monitoring data via the Department's MiWaters system.

The permittee shall utilize the information provided on the MiWaters website, located at <https://miwaters.deq.state.mi.us>, to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the Department no later than the 20th day of the month following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

PART II**Section C. Reporting Requirements****3. Retained Self-Monitoring Requirements**

If instructed on the effluent limits page (or otherwise authorized by the Department in accordance with the provisions of this permit) to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Department. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th (April 1st for animal feeding operation facilities) of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous year's monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

Retained self-monitoring may be denied to a permittee by notification in writing from the Department. In such cases, the permittee shall submit self-monitoring data in accordance with Part II.C.2., above. Such a denial may be rescinded by the Department upon written notification to the permittee. Reissuance or modification of this permit or reissuance or modification of an individual permittee's authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the NREPA or Rule 35 of the Mobile Home Park Commission Act, 1987 PA 96, as amended, for assurance of proper facility operation, shall be submitted as required by the Department.

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a written notification to the Department via MiWaters (<https://miwaters.deq.state.mi.us>) indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

PART II**Section C. Reporting Requirements****6. Noncompliance Notification**

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

- a. **24-Hour Reporting**
Any noncompliance which may endanger health or the environment (including maximum and/or minimum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC). A written submission shall also be provided via MiWaters (<https://miwaters.deq.state.mi.us>) within five (5) days.
- b. **Other Reporting**
The permittee shall report, in writing via MiWaters (<https://miwaters.deq.state.mi.us>), 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.

Reporting shall include: 1) a description of the discharge and cause of noncompliance; 2) the period of noncompliance, including exact dates and times, or, if not yet corrected, the anticipated time the noncompliance is expected to continue; and 3) the steps taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if the notice is provided after regular working hours, by calling the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706.

Within 10 days of the release, the permittee shall submit to the Department via MiWaters (<https://miwaters.deq.state.mi.us>) a full written explanation as to the cause of the release, the discovery of the release, response measures (clean-up and/or recovery) taken, and preventive measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

PART II**Section C. Reporting Requirements****8. Upset Noncompliance Notification**

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset shall notify the Department by telephone within 24 hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

- a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;
- b. that the permitted wastewater treatment facility was, at the time, being properly operated and maintained (note that an upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation); and
- c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

9. Bypass Prohibition and Notification

- a. Bypass Prohibition
Bypass is prohibited, and the Department may take an enforcement action, unless:
 - 1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - 2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and
 - 3) the permittee submitted notices as required under b. or c. below.
- b. Notice of Anticipated Bypass
If the permittee knows in advance of the need for a bypass, the permittee shall submit written notification to the Department before the anticipated date of the bypass. This notification shall be submitted at least 10 days before the date of the bypass; however, the Department will accept fewer than 10 days advance notice if adequate explanation for this is provided. The notification shall provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions specified in a. above.
- c. Notice of Unanticipated Bypass
As soon as possible but no later than 24 hours from the time the permittee becomes aware of the unanticipated bypass, the permittee shall notify the Department by calling the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if notification is provided after regular working hours, call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706.

PART II**Section C. Reporting Requirements****d. Written Report of Bypass**

A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of a., b., c., and d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.11. of this permit.

f. Definitions

- 1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.
- 2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of R 323.1098 and R 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

PART II**Section C. Reporting Requirements****11. Notification of Changes in Discharge**

The permittee shall notify the Department, via MiWaters (<https://miwaters.deq.state.mi.us>), as soon as possible but within no more than 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit, for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

12. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under R 323.1098 (Antidegradation) of the Water Quality Standards or b) by written notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.10.; and 4) the action or activity will not require notification pursuant to Part II.C.11. Following such written notice, the permit or, if applicable, the facility's COC, may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

13. Transfer of Ownership or Control

In the event of any change in ownership or control of facilities from which the authorized discharge emanates, the following requirements apply: Not less than 30 days prior to the actual transfer of ownership or control – for non-CAFOs, or within 30 days of the actual transfer of ownership or control – for CAFOs, the permittee shall submit to the Department via MiWaters (<https://miwaters.deq.state.mi.us>) a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

For wastewater treatment facilities that serve the public (and are thus subject to Part 41 of the NREPA), Section 4104 of Part 41 and associated Rule 2957 of the Michigan Administrative Code allow the Department to require an Operations and Maintenance (O&M) Manual from the facility. An up-to-date copy of the O&M Manual shall be kept at the facility and shall be provided to the Department upon request. The Department may review the O&M Manual in whole or in part at its discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M Manual shall include the following information: permit standards; descriptions and operation information for all equipment; staffing information; laboratory requirements; record keeping requirements; a maintenance plan for equipment; an emergency operating plan; safety program information; and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

PART II**Section C. Reporting Requirements**

Certification of the existence and accuracy of the O&M Manual shall be submitted to the Department at least sixty days prior to start-up of a new wastewater treatment facility. Recertification shall be submitted sixty days prior to start-up of any substantial improvements or modifications made to an existing wastewater treatment facility.

15. Signatory Requirements

All applications, reports, or information submitted to the Department in accordance with the conditions of this permit and that require a signature shall be signed and certified as described in the Clean Water Act and the NREPA.

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

The NREPA (Section 3115(2)) provides that a person who at the time of the violation knew or should have known that he or she discharged a substance contrary to this part, or contrary to a permit, COC, or order issued or rule promulgated under this part, or who intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit or COC or in a notice or report required by the terms and conditions of an issued permit or COC, or who intentionally renders inaccurate a monitoring device or record required to be maintained by the Department, is guilty of a felony and shall be fined not less than \$2,500.00 or more than \$25,000.00 for each violation. The court may impose an additional fine of not more than \$25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than \$25,000.00 per day and not more than \$50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of the effluent is in conformance with and obedient to a rule, order, permit, or COC of the Department. In addition to a fine, the attorney general may file a civil suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation.

16. Electronic Reporting

Upon notice by the Department that electronic reporting tools are available for specific reports or notifications, the permittee shall submit electronically via MiWaters (<https://miwaters.deq.state.mi.us>) all such reports or notifications as required by this permit, on forms provided by the Department.

PART II**Section D. Management Responsibilities****1. Duty to Comply**

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit, more frequently than, or at a level in excess of, that authorized, shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the NREPA and/or the Clean Water Act and constitutes grounds for enforcement action; for permit or COC termination, revocation and reissuance, or modification; or denial of an application for permit or COC renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the NREPA. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the NREPA.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

- a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or
- b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

PART II**Section D. Management Responsibilities****6. Containment Facilities**

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code). For a POTW, these facilities shall be approved under Part 41 of the NREPA.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the NREPA, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department, or the Regional Administrator, upon the presentation of credentials and, for animal feeding operation facilities, following appropriate biosecurity protocols:

- a. to enter upon the permittee's premises where an effluent source is located or any place in which records are required to be kept under the terms and conditions of this permit; and
- b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Clean Water Act and Rule 2128 (R 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit and required to be submitted to the Department shall be available for public inspection via MiWaters (<https://miwaters.deq.state.mi.us>). As required by the Clean Water Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Clean Water Act and Sections 3112, 3115, 4106 and 4110 of the NREPA.

10. Duty to Provide Information

The permittee shall furnish to the Department via MiWaters (<https://miwaters.deq.state.mi.us>), within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or the facility's COC, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

PART II**Section E. Activities Not Authorized by This Permit****1. Discharge to the Groundwaters**

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the NREPA.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW shall be by permit issued under Part 41 of the NREPA.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Clean Water Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environment, Great Lakes, and Energy permits, or approvals from other units of government as may be required by law.

City of Grosse Pointe Shores
NPDES Stormwater Application
March 2014

Appendix List

Appendix A – MS4 Permit Application Summary
Appendix B – Urbanized Map
Appendix C – Storm Sewer Map
Appendix D – City Code of Ordinances
Appendix E – Lake St. Clair Direct Drainage Public Participation Plan (PPP)
Appendix F – Clinton River Watershed Public Education Plan
Appendix G – PEP Prioritization Table 2
Appendix H – Illicit Discharge Elimination Plan
Appendix I – Spill Response & Complaint Form
Appendix J – OCWRC Engineering Standards for Storm Water Holding Facilities
Appendix K – Wayne County Engineering Standards
Appendix L – Facilities List
Appendix M – Standard Operating Procedures
Appendix N – Stormwater Pollution Prevention Plan -Pollution Incident Prevention Plan (SWPPP-PIPP)
Appendix O – Surface Water Drainage Ordinance Template
Appendix P – Total Maximum Daily Load (TMDL) Implementation Plan

Supplemental Documents

- Attachment 1 – IDEP Inspection Forms
- Attachment 2 – MDEQ PIPP Informational Packet
- Attachment 3 – Storm Sewer Outfall List
- Attachment 4 – Regulated Area Map
- Attachment 5 – Sample SWPPP Inspection Form

Section VII. SWMP

1. Enforcement Response Procedure (ERP) - The City currently has a complaint response system in place that forwards complaints to the WCHD. The County utilizes a 24-hour hotline for community and general public use. The City has established a reliable system to receive and investigate citizen reports regarding suspicious discharges from storm sewer outfalls, waste dumping, construction sites, etc. The reporting system includes:

- Telephone complaint system with emergency number for non-business hours;
- Complaint documentation and tracking system;
- Follow-up notification to reporting citizens to inform them what corrective actions have been or are being taken.

When the City of Grosse Pointe Shores receives complaints regarding illicit discharges, the City investigates each suspected connection as outlined above and takes appropriate action(s). The City will handle all ordinance violations as they are identified (by WCHD, residents, staff, etc.). We utilize a form for all IDEP related issues – spills, complaints and follow-up. The Spill Response & Complaint Form is attached with this application.

The City's Code of Ordinances (Appendix D) that regulates enforcement regarding storm sewers, sanitary sewers, and illegal dumping into waters of the state are attached with this application.

Chapter 28 – *Solid Waste* (a) provides details on enforcement.

Additional ERP information can be found in the Enforcement Response Procedure SOP and Storm Water Pollution Prevention-Pollution Incident Prevent Plan (SWPPP-PIPP), Appendix N.

2-3. Public Participation Plan (PPP) - The Lake St. Clair Direct Drainage (LSCDD) Subwatershed Public Participation Plan (PPP) was completed in 2010. The City and its consultant provided input on this plan. See the attached PPP (Appendix E) for community and subwatershed-wide specific tasks.

Watershed planning efforts in the LSCDD Subwatershed began in 2003 to: 1) fulfill the National Pollutant Discharge Elimination System (NPDES) Phase II requirements (MDEQ's *General Permit No. MIG619000 for Coverage of Storm Water Discharges for Municipal Separate Storm Sewer Systems Subject to Watershed Plan Requirements*) for non-Phase I governmental units in the urbanized area; and 2) make all of the entities represented in the subwatershed eligible for various grant funding opportunities to implement actions for watershed improvement.

During development of the subsequent LSCDD Subwatershed management plan finalized in 2006 and required as part of the Phase II Watershed-based Storm Water Permit program, the subwatershed group held two public forums and received feedback from the general public through the use of surveys.

HRC: Once approved by the MDEQ, the SWMP will be posted on the Village's website for comment. Comments will be requested via email. The SWMP will remain on the website and updated as necessary. All comments will be forwarded to the Village's engineering consultant for tracking in a spreadsheet. This will be posted in a prominent location on the website visible to all residents visiting the website. The City, with coordination from our consultant, will review the SWMP every 3-5 years.

4-6. Public Education Program (PEP) - See PEP Table 2 (Appendix G) for a prioritization list of PEP activities. The LSCDD Subwatershed Advisory group prioritized the key messages that the PEP would cover for the 2015-2020 permit cycle. A representative from each community rated the 11 permit topics as low, medium or high for their individual community. The ratings were based on local knowledge of each community's characteristics and the attitudes of residents. See PEP Prioritization Table 2 and associated language for details on the LSCDD prioritization methods.

IDEP Fact Sheets (Appendix I) are distributed to Public Works staff. Grosse Pointe Woods hosts an annual HHW event in the spring. We advertise this event on our website and in the annual calendar.

The website, newsletter, calendar, and information distributed at the City Hall are very cost-effective ways of educating the public – we will continue to implement these throughout the permit period.

We are seeing an increase in stewardship participation and inquiries from residents at events. Residents are asking questions regarding proper fertilizers and lawn care providers to utilize; native vegetation buffers; etc. Regional stormwater management education is coming across with the types of feedback we are receiving. Residents are genuinely concerned about the quality of Lake St. Clair.

We feel the public education program has been successful to date.

See Appendix F – Clinton River Watershed Public Education Plan (Section VI, page 5) for methods of determining PEP effectiveness. This Plan was approved by MDEQ in January 2012. In addition, the CRWC and LSCDD SWAG have begun reviewing the SE Michigan PPP online survey results for the local area and have started to draw conclusions on PEP effectiveness.

The progress report will be reviewed biennially and changes will be made to the PEP portion based on:

- PPP Survey results
- Increase in stewardship participation
- Increase in resident inquiries regarding lawn care, riparian management, etc.
- Increase in MGIA 'Healthy Lawn Care Program for Watershed Protection' participating lawn care providers
- Decrease in trash/debris found in local waterbodies
- Decrease in beach closures
- Increase in lawn care education

See the attached Public Education Plan and PEP Table 2 (Appendix F and G) for more information. The Village of Grosse Pointe Shores will continue to implement the Public Education Plan.

7. Storm Sewer Map - An outfall map is provided with this application. Storm sewer maps are located at City Hall. See Appendix C for details.

8-17. Illicit Discharge Elimination Program (IDEP) – An up-to-date storm sewer map (including all: City-owned outfalls and catch basins) is attached with this application.

The City will NOT be working collaboratively on any of the BMPs in the IDEP.

The City currently owns 24 outfalls and will NOT be prioritizing these at this time. See the Storm Sewer Map (Appendix C) for the location of these outfalls, storm sewers, and catch basins.

Dry weather inspections are conducted if no rain/precipitation event has occurred for a minimum of 48 hours. If flow is observed in the sewer at that time, it may be attributed to sewage, cooling water, sump pump discharge, infiltration from ground water sources, or runoff from potable water sources such as lawn sprinklers.

The City may be able to locate the source of an illicit connection/discharge solely through visual observation of flow in the storm sewer at manholes. Odor, color, turbidity, bacteria growth, quantity of flow, etc., may lead to the source of a problem without additional sampling.

All storm outfalls that are discharging during dry weather will be investigated further by upstream visual inspection or with televising, as-built pipe schematic review, dye and/or smoke testing, sampling, or other investigation as needed to determine the nature and source of the flow. Most illicit connections/discharges within the City have been identified by City staff while out in the field, or by City residents.

1. Televising - The City may elect to televise those storm sewers that have suspicious flows to identify pollutant sources that cannot be located through simple visual observation and/or sampling. For example, the City may determine through visual observation and/or sampling that an illicit connection exists between two specific manholes. Video inspection of the stretch of storm sewer between these two manholes could be used to isolate the exact source of the connection/discharge.
2. As-built pipe schematic review - Where available, the City utilizes as-built pipe schematic drawings as a tool to determine the source of an illicit connection/discharge.
3. Dye or smoke testing - The City conducts physical inspection of commercial and/or residential facilities as needed to verify suspected illicit connections that are detected through visual observations/sampling of yards, outfalls and manholes. As necessary, facility inspections include dye or smoke testing of suspect facility plumbing fixtures to determine if the fixture discharges to the sanitary sewer or to the storm sewer. All facility inspections are documented.
4. Sampling - Investigation of dry weather discharges will be prioritized based on the number of discharges identified as well as other factors including location, volume of flow, and suspected contaminants based on color, turbidity, or odor. If flow is observed during the dry weather outfall inspections and visual observations do not lead to a source, the City may decide to sample the flow for pollutant parameters typically found in illicit connections. Sampling can rule out some dry weather discharges such as groundwater. The sampling will typically begin at the outfall and continue upstream from manhole to manhole until a source is found. The choice of sampling parameters will depend on several factors including:
 - Location of the storm outfall (i.e., in residential or commercial area);
 - Turbidity and color of discharge which could distinguish between an illicit discharge from a commercial establishment versus a residence;
 - Odor associated with discharge such as petroleum odor, or raw sewage odor.

Detailed information can be found in the attached Illicit Discharge Elimination Plan (IDEP), Appendix H.

For source investigations outside of field screening, outside of priority areas, and complaints, the City responds by site investigations. In addition, possible illicit discharges or connections may be identified by field staff while out in the field. City staff visits the site, takes photo documentation,

Appendix A

and samples if warranted. The field investigation is to verify if follow-up source investigations or sampling is needed. If necessary, illicit discharges and connections are traced to their source and eliminated within 120 days of notification. The City typically performs site investigations within 24 hours after receiving the complaint. The City forwards complaints to the Wayne County Health Department (WCHD). All complaints in this manner are recorded.

The City will report any identified significant illicit discharges including those of untreated or partially treated sewage to the MDEQ within 24 hours after the discharge begins or is discovered and of corrective actions being taken to eliminate the connection/discharge. The reports will cover the information required by the General Permit and Certificate of Coverage.

The City analyzes the samples for some or all of the following parameters:

Parameters	Found In	Potential Source(s)
<i>Escherichia coli</i>	Sewage	Human or Animal Waste
Surfactants	Soap, Emulsifiers	Industrial/Commercial/ Residential
Ammonia	Sewage, Fertilizers, Industrial Chemicals	Industrial/Residential/ Agricultural
Nitrates	Sewage, Fertilizers, Industrial Chemicals	Fertilizers/ Industrial/ Residential/Agricultural
Nitrites	Sewage, Fertilizers, Industrial Chemicals	Fertilizers/ Industrial/ Residential/Agricultural
Conductivity	Industrial Waste, Sewage, Salt	Industrial/ Residential/ Agricultural
Total Dissolved Solids	Industrial Waste, Sewage, Salt	Industrial/Residential/ Agricultural
Temperature	Cooling Water, Sewage	Industrial/ Residential
pH	Acids and Bases	Industrial/ Residential

Indicator parameters (pH, temperature, ammonia, and detergents) will be utilized if the source is not identified during the field observation.

The City will submit a biennial progress report to MDEQ summarizing the activities completed including illicit connections and discharges City identified and corrected. For significant illicit discharges, the City will list the pollutants of concern, the estimated load and volume discharged, and the locations of the discharge into the system and to the waters of the state.

For spills, Department of Public Works (DPW) staff visit the site and take a spill kit out to contain the spill and cover nearby catch basins. For larger spills and spills directly into waters of the state (oil sheens, etc.), DPW staff will contact the PEAS hotline. Detailed spill response information is provided in the Storm Water Pollution Prevention-Pollution Incident Prevention Plan (SWPPP-PIPP), Appendix N, Page 10-11, 23-27.

18-19. IDEP Training and Evaluation - All City field personnel (Public Works staff) receive IDEP training at least once per permit cycle. New hires are trained within the first year of their hire date. The City has utilized both the county agencies and Hubbell, Roth & Clark, Inc. for IDEP training. Training topics are: identifying illicit discharges or connections, and procedures

for responding to and enforcement. All 11 Public Works employees received IDEP training to date. All staff viewed a Stormwater DVD in January 2014 and the City is looking into additional training for Spring 2014.

The City feels that dry-weather inspections, responding to complaints, and City staff investigations are effective ways of implementing the IDEP.

Evaluation Methods

- Staff Training frequency
- Number of illicit discharges eliminated over the permit cycle
- IDEP Notification successes/failures
- Number of resident/business complaints received over the permit cycle
- Evaluation of program efficiency
- Changes in receiving water quality data over time

Evaluation methods will be re-evaluated biennially during the progress report submittal process.

20-26. Illicit Discharge Ordinance - The City's Code of Ordinances (Appendix D): Chapter 10 – *Environment*, Article III – *Soil Erosion and Sedimentation Control*; Chapter 26, Article III – *Development Design Standards*, Division 3 – *Grading, Soil Erosion and Sedimentation Control*; Division 5 – *Storm Sewers*, Division 6 – *Stormwater Retention and Detention*; Chapter 28 – *Solid Waste*; and Chapter 36 – *Utilities* are attached to this application for your reference.

Chapter 28, *Solid Waste* (Section 5 and 9) prohibits non-stormwater discharges into the City's MS4.

The SWPPP-PIPP has been revised (see Page 16) to prohibit non-stormwater discharges or flows if identified as significant contributors of pollutants to the applicant's MS4 and exclude prohibitions of firefighting activities.

Chapter 10, Article V – *Soil Erosion and Sedimentation Control* (Section 135); Chapter 26, Division 3 – *Grading, Soil Erosion and Sedimentation Control* (Section 132) and Chapter 28, *Solid Waste* Chapter (Section 5 and 9) regulate contribution of pollutants to the MS4.

Chapter 10, Article V – *Soil Erosion and Sedimentation Control* (Section 135) and Chapter 28, *Solid Waste* (Section 5 and 9) prohibit illicit discharges, including illicit connections and the direct dumping or disposal of materials into the MS4, and allow for the City to perform inspections, investigations, and monitor suspected illicit discharges.

Chapter 28, *Solid Waste* (Page Section 5 and 9) requires and enforces elimination of illicit discharges into the MS4 including providing the authority to inspect, investigate, and monitor, and eliminate suspected illicit discharges. The *Surface Water Drainage Ordinance* will be adopted by September 2014 to include additional language pursuant to the permit requirements (see attached suggested ordinance).

The Illicit Discharge Elimination Plan (Page III-3) provides schedules on responding to potential illicit discharges and connections and goals for elimination. The *Surface Water Drainage Ordinance* will be adopted by September 2014 to include additional language pursuant to the permit requirements (see attached suggested ordinance).

27-31. Construction Stormwater Runoff Control - The City relies on Wayne County to administer and enforce the SESC program within the City's jurisdiction. Wayne County is the acting Part 91 enforcing agency on behalf of the City.

Chapter 10 – Environment, Article V – *Soil Erosion and Sedimentation Control* is attached to this application.

Chapter 10, Article V – *Soil Erosion and Sedimentation Control* requires a SESC permit to be issued for all construction activity disturbing 1 acre or more in size.

When a SESC complaint is received, City staff will visit the site and investigate. The City will notify the developer and/or property owner of any SESC violations, requesting that the issue be remedied within 14 days of notification. If it is an issue that violates City ordinances, the City will proceed accordingly. The City will notify the WCHD to investigate and enforce the issue. If the developer/owner does not remedy the SESC issue within 14 days, the City then contacts MDEQ.

All construction within the City limits requires a building permit. If a site is within 500 feet of a waterway and/or one acre or more in size, then a SESC permit is to be submitted with the building permit application. Building permits are issued after the SESC or Notice of Coverage permit is provided. SESC, NOC, and other permit requirement information are relayed at all pre-construction meetings with the developers and landowners. NO building permits are issued until ALL SESC and NPDES (Permit By Rule) permits are issued through the appropriate agency.

32-33. Ordinance or Other Regulatory Mechanism - The City ordinances currently reference the existing OCWRC *Engineering Standards for Stormwater Holding Facilities* (Appendix J). It is anticipated that the OCWRC will update their Engineering Standards by Fall 2015 due to their upcoming MS4 post-construction requirements. The City will revise its ordinances by December 2015 to reflect the OCWRC standards. The City does not currently have an ordinance in place to address post-construction water quality standards (as identified in the permit application).

36-38. Water Quality Treatment Performance Standard - The City ordinances currently reference the existing OCWRC *Engineering Standards for Stormwater Holding Facilities* (Appendix J). It is anticipated that the OCWRC will update their Engineering Standards by Fall 2015 due to their upcoming MS4 post-construction requirements. The City will revise its ordinances by December 2015 to reflect the OCWRC standards. The City does not currently have an ordinance in place to address post-construction water quality standards (as identified in the permit application).

39-40. Channel Protection Performance Standard - The City is exempted from Channel Protection requirements all storm drains outlet to Lake St. Clair, which is a connecting channel to the Great Lakes.

41-42. Site Specific Requirements – The City ordinances currently reference the existing OCWRC *Engineering Standards for Stormwater Holding Facilities* (Appendix J). It is anticipated that the OCWRC will update their Engineering Standards by Fall 2015 due to their upcoming MS4 post-construction requirements. The City will revise its ordinances by December 2015 to reflect the OCWRC standards. The City does not currently have an ordinance in place to address site specific requirements for development and re-development (as identified in the permit application).

43-52. Off-Site Mitigation and Payment in Lieu Programs - The City does not currently have an ordinance or regulatory mechanism that meets the optional requirements, as identified in questions 44-53. The City will not be pursuing this option.

53-55. Site Plan Review – Chapter 26, Division 6 – *Stormwater Retention and Detention* (a) – requires that a stormwater drainage plan be developed. All site plans are reviewed by the City Engineers and /or the Planning Engineer, and/or the Planning Commission.

Site Plan Review Procedures – Chapter 26, Article III, Division 5, Section 171 states, ‘Submission for approval of storm systems shall be made to the City Manager and shall include a detailed estimate of costs and 3 sets of storm sewer plans and specifications. Detailed storm sewer design computations and the drainage area map indicating the various areas going into the points of inlet shall be provided. The City Engineers shall review the estimate and plans and determine whether they are consistent with this article and all other applicable requirements, after which, the village engineers shall return one of the three sets, with appropriate comments. After making any changes required, the applicant shall then submit three sets of revised plans to the City for final approval. The City Engineers shall then review the revised plans for conformity, and if such plans are consistent with this article and all applicable requirements, the City Engineers shall retain 2 copies for the City's records, and return one approved copy to the applicant. The applicant shall obtain approval of the county road commission and county department of public services, where applicable.’

56-58. Long-Term Operation and Maintenance of BMPs – Chapter 26, Division 6 (h) – requires a maintenance agreement for all for all privately-owned detention and retention basins. This chapter will be modified by September 2014 to require maintenance agreements for ALL structural and vegetative BMPs.

The maintenance agreement allows the City to: inspect the structural or vegetative BMP, perform the necessary maintenance or corrective actions neglected by the BMP owner or operator, and tracks the transfer of operation and maintenance responsibility of the BMP.

59-61. Municipality Facility and Structural Stormwater Control Inventory - See Appendix L for a complete list of municipally-owned facilities and structural controls. A storm sewer map is provided, which identifies all: catch basins, storm manholes, outfalls, and storm pipes within the City’s jurisdiction. As-builts of all City-owned facilities are located at the City Hall. As new structural controls are added, removed, or no longer operated by the City, the current map will be revised within 90 days of identification.

62-69. Facility-Specific Stormwater Management – The City-owned facilities (shown in Appendix L– High/Medium/Low Priorities) were assessed during the application process. The following factors were considered during the assessment: 1) information currently identified in the Storm Water Pollution Prevention Initiative (SWPPI); 2) SWPPP-PIPP – Appendix N; 3) amount of urban pollutants stored at the site; 4) identification of improperly stored materials; 5) the potential for polluting activities to be conducted outside; 6) proximity to waterbodies; and 7) current housekeeping practices. The list will be revised within 30 days of determining a discharge from a new facility or when a major spill occurs at either of these facilities.

Police vehicles are washed indoors, and fire station vehicles are washed inside the fire station. All wash water waste is sent to the sanitary sewer system. DPW vehicles and equipment are

washed either inside the Public Works Building or outdoors (the wash water is directed to the sanitary sewer system). Fleet vehicle maintenance, as well as police and fire vehicles are maintained at the Public Works Building.

Public Works Building, Good Housekeeping – An environmental assessment was performed by SEMCOG in 2010 and it was determined that a Storm Water Pollution Prevention Plan-Pollution Incident Prevention Plan (SWPPP-PIPP) is needed for this site (which was developed in 2010). 1 catch basin and 3 sanitary manholes are located on the DPW Maintenance Complex property.

A SWPPP-PIPP, Appendix N was developed in 2010. The document identifies the significant materials that are located at the DPW complex, as well as provides good housekeeping information.

The outdoor fuel storage area (1 gasoline and 1 diesel tank) is double-walled. The outdoor materials are stockpiled inside concrete barriers. Chemicals stored indoors are located on pallets or on shelving units. Vehicles and equipment and outdoor dumpsters are inspected regularly for leaks. Spill kits (oil dry) are located inside the building. An interior floor drain (trench drain) is located inside the DPW building, which is connected to an oil/water separator. All salt is store inside the DPW building.

Monthly routine site inspections are performed at the Public Works Building and recorded on inspection sheets. These inspections cover areas such as the: indoor and outdoor materials storage areas, fuel areas, and secondary containment. Weekly inspections are also conducted by staff to check for leaks, spills, sweeping needs, etc. Bi-annual comprehensive inspections are performed by a certified stormwater operator. Additional information can be found in the SWPPP-PIPP, 13-14 and 19-23.

For medium to lower potential areas (Administration Building, etc.) – Pet waste receptacles and signs were installed along Lake Shore Road. Mowing and fertilizing practices have been cut back. Fertilizing and herbicide applications are contracted out. 15' no-mow, fertilizer-free buffers are maintained along waterways. Our fertilizer/pesticide application contractor is an endorsed MGIA Lawn Care Provider.

Lawn care information is provided on the City website and is periodically posted in the City annual newsletter.

Osious Municipal Park - Osious Municipal Park and Marina is lakeside park with amenities that include tennis courts, picnic areas, lockers, restrooms, and showers. The park also accommodates boats and yachts. All SOPs referenced in Appendix M applies to this facility. This municipal park is not known to store any chemical/hazardous/pollutant materials and/or house maintenance equipment or fuel areas for boats. A SWPPP would not be necessary for the park.

According to the MDEQ PIPP and Part 5 Rules Information Packet, since the facility is not an oil storage facility or on-land facility, a marina is excluded from the PIPP/SWPPP.

70-75. Structural Stormwater Control Operation and Maintenance Activities - All catch basins in the City are located in the Storm Sewer Map, which is attached to this application.

Catch basin investigations and cleaning are performed on a rotating basis; a few sections of the City are performed per year. All catch basins are cleaned every 2 years. No catch basins are

prioritized – all are given high priority. During investigations/cleaning, if some areas are identified as being severely clogged, these areas will then be put on the priority list for cleaning in the future.

Catch basin waste is taken to the Grosse Pointe Woods Wastewater Treatment Plant to be dried, and then hauled away to a landfill for disposal.

Underground/Aboveground Storage Tanks – The City has 1 diesel and 1 gasoline fueling tank at the DPW facility (above ground). A spill kit is located just outside the Public Works building to clean up and fueling leaks or spills during the fueling process. Both tanks have underground secondary containment. The tanks are owned by the City and are inspected monthly and quarterly by a contractor who has proper DEQ UST Certification. DPW staff also periodically inspects the tanks for leaks and other maintenance needs. The City has Class A, B, and C operators on staff to handle daily activities on site. They are certified to operate fuel dispensing which occurs daily. Leak inspection reports are generated every week by an automatic tank gauging machine.

Secondary containment and USTs are inspected during the SWPPP-PIPP inspections, which are performed bi-annually. Areas are inspected for detection of leaks, cracks in the structure, etc. If any leaks or issues are found with the secondary containment or USTs, an alternative schedule for inspections will be made.

The City does not own any detention or retention basins, nor are there any privately-owned basins within the City.

The City applied for SAW Funding for Asset Management Planning of our sanitary and storm sewer system.

76-80. Municipal Operations and Maintenance Activities - The City does not own or maintain any bridges or unpaved roads. Potential pollutants from operations and maintenance activities include: sediment from parking lots and catch basins, fertilizers utilized on City-owned properties, salt utilized on parking lots and sidewalks, and fluids from vehicles and equipment.

All City-owned streets are swept monthly. Street sweeping waste is dried at the Grosse Pointe Woods Wastewater Treatment Plant, and then taken to a landfill for disposal. Priority is given to curbed areas – see the Storm Sewer Map for details.

The City utilizes an Elgin Crosswind street sweeping machine. The machine has a 12 foot sweeping path with a debris hopper of approximately 8 cubic yards.

We consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc. For example (found in Street & Parking Lot Maintenance SOP):

- High pollutant loadings areas
- Areas identified by staff with sediment accumulation
- High litter or erosion areas

See Appendix M. All SOPs are provided for operation and maintenance activities. Inspection protocol can be found in Appendix N – SWPPP and PIPP. The 2014 IDEP identifies illicit discharge identification.

81. Managing Vegetated Properties - Fertilizing and herbicide applications are contracted out. Zero phosphorus, slow-release nitrogen fertilizers are used on all properties. Mowing practices and fertilizing/weed control have been cut back. 15' no-mow, fertilizer-free buffers are maintained along waterways. We have hired an endorsed MGIA Lawn Care Provider for fertilizing and weed control.

Lawn care information is provided on the City website and is periodically posted in the City annual newsletter.

The City reviews the contractors' credentials to ensure they are certified by the State of Michigan as an applicator for vegetated properties. During the growing season, the City will inspect our properties every other month to ensure that: fertilizers are being swept up from impervious surfaces; zero-phosphorus fertilizers are being utilized; and buffers are maintained along waterways.

82. Employee Training - All City field personnel (Public Works staff) receive Good Housekeeping/Pollution Prevention training at least once per permit cycle. New hires are trained within the first year of their hire date. The City has utilized both the county agencies and Hubbell, Roth & Clark, Inc. for IDEP training. Training topics are: what is stormwater; how stormwater relates to maintenance and lawn care operations; materials handling and response; chemicals management; vehicle and equipment washing and maintenance; street and parking lot maintenance; salt storage and application; materials disposal and storage; landscape practices; and waterfowl management. All staff viewed a Stormwater DVD in January 2014 and the City is looking into additional GH/P2 training for Spring 2014.

83. Contractor Requirements and Oversight – We only utilize a fertilizing/weed control contractor. All other duties are performed in-house. We have requested for MGIA Endorsement verification for our files. See the 'Contractor Requirements SOP' for more details.

During the growing season, the City will inspect our properties every other month to ensure that: fertilizers are being swept up from impervious surfaces; zero-phosphorus fertilizers are being utilized; and buffers are maintained along waterways.

84-87. Total Maximum Daily Load Implementation Plan – Lake St. Clair Metro Beach and Memorial Beach have a Total Maximum Daily Load (TMDL) for *E. coli*. Lake St. Clair Metropolitan and Memorial Beaches were placed on the 2006 Section 303(d) list due to impairment of recreational uses as indicated by elevated levels of *E. coli* reported by the Macomb County Health Department (MCHD) (Edly and Wuycheck, 2006). The 2003-2004 monitoring data indicated occasional daily maximum WQS exceedances at both TMDL beaches. The TMDL was established in September 2007.

The listed reaches for this TMDL cover approximately two miles of Lake St. Clair at Metropolitan Beach and approximately one mile of Lake St. Clair at Memorial Beach. There are several municipalities (including Grosse Pointe Shores), located either wholly or in part, within the Lake St. Clair watershed, the largest of which includes Clay Township (17 percent) and Casco Township (13 percent).

Land use is primarily high and low density residential development in the mid to southern portions of the TMDL watershed (L'Anse Creuse Bay) (USACE, 2004). About 40 percent of the northern portion of the TMDL watershed (Anchor Bay subwatershed) was agricultural land in 2004 (Alexander, 2005). However, agricultural land in the TMDL watershed is being converted

to residential use at an unprecedented rate. Population growth across the Lake St. Clair watershed averaged 15 percent between 1990 and 1999, but in portions of the Anchor Bay area, populations have increased by 80 percent (USACE, 2004). Population growth is most rapid in townships adjacent to the lakeshore. Possible sources of *E. coli* include combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), failing septic systems, illicit connections to storm sewers, and wildlife and/or pet waste.

[E. coli TMDL Priorities](#) – The Total Maximum Daily Load (TMDL) Implementation Plan in Appendix P of the application outlines the City’s activities for reducing or eliminating *E. Coli* and other pollutants from entering the waters of the state. The proposed activities consist of:

1. [Illicit Discharge Elimination Plan \(IDEP\) Outfall Inspections](#)
2. [Catch Basin Cleaning](#)
3. [Street Sweeping](#)
4. [Public Education](#)
5. [Riparian Management](#)
6. [Reginal Collaboration](#)

[The data from the regular water monitoring conducted by the Macomb County Health Department will be utilized to determine the effectiveness of the program.](#)

Measurable Goals – Updates on these goals will be provided in progress reports:

Enforcement Response Procedure – Proper tracking of complaints and spills. Timeframe: immediate.

Public Education Program – See Clinton River Watershed Collaborative PEP.

Storm Sewer Map – Update the map every 5 years as appropriate.

Illicit Discharge Identification & Investigations – Continue outfall dry-weather screening investigations every 5 years. Work to reduce an illicit discharge or connection within 120 days of identification.

IDEP Training & Evaluation – Train ALL existing DPW staff at least once throughout the permit period and all new hires within the calendar year of their hiring date.

IDEP Ordinances – Decrease in IDEP issues and hotline complaints received by City and County staff; improve water quality of the Lake St. Clair over time. Timeframe: throughout the permit period. Update City ordinances by September 2014.

Construction Stormwater Runoff Control – Continue to work with WCHD and MDEQ as appropriate to address all SESC issues in the City. Timeframe: throughout the permit period.

Site Plan Review – Number of site plan reviews performed during the permit period. Increase in stormwater BMPs installed in the City during the permit period.

Water Quality/Channel Protection – Number of site plan reviews per year; Increase in stormwater BMPs throughout the City and County.

Long-Term Operation & Maintenance of BMPs – Implement maintenance agreements for ALL vegetative and non-structural BMPs by September 2014 to increase O&M on structural and non-structural BMPs throughout the City.

Municipal Facility & Structural Stormwater Control Inventory – Update inventory information in progress reports as appropriate (i.e. facilities are installed or changed ownership; changes in ranking; etc.).

Facility-Specific Stormwater Management – Conduct monthly and bi-annual facilities inspections at the DPW facility and correct deficiencies as needed. Review the SWPPP annually and update as appropriate.

Structural Stormwater Control Operation & Maintenance Activities – Number of catch basins cleaned annually. Inspect new City-owned structural and non-structural controls within 1 year of their installation.

Municipal Operations & Maintenance Activities – Continue to sweep 50% of City-owned catch basins annually and streets and lots at least monthly.

Managing Vegetated Properties – We will continue to utilize no-phosphorus fertilizers and mow turf at 3". Continue to utilize an MGIA endorsed contractor for turf management.

Employee Training – Train ALL existing DPW staff at least once throughout the permit period and all new hires within the calendar year of their hiring date.

Contractor Requirements & Oversight – If we decide to utilize a contractor for any additional services in the future, we will provide directives in the bid specifications regarding proper good housekeeping and pollution prevention of BMPs and stormwater management.

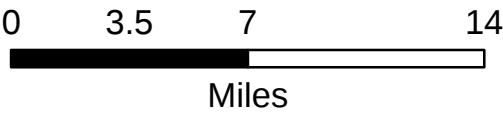
Total Maximum Daily Load Implementation – Continue to work with MCHD, MCPWO, and other entities to address the *E. coli* TMDL. Provide updates in progress reports.

DETROIT URBANIZED AREA 2010 CENSUS

Urban Area Population: 3,903,377

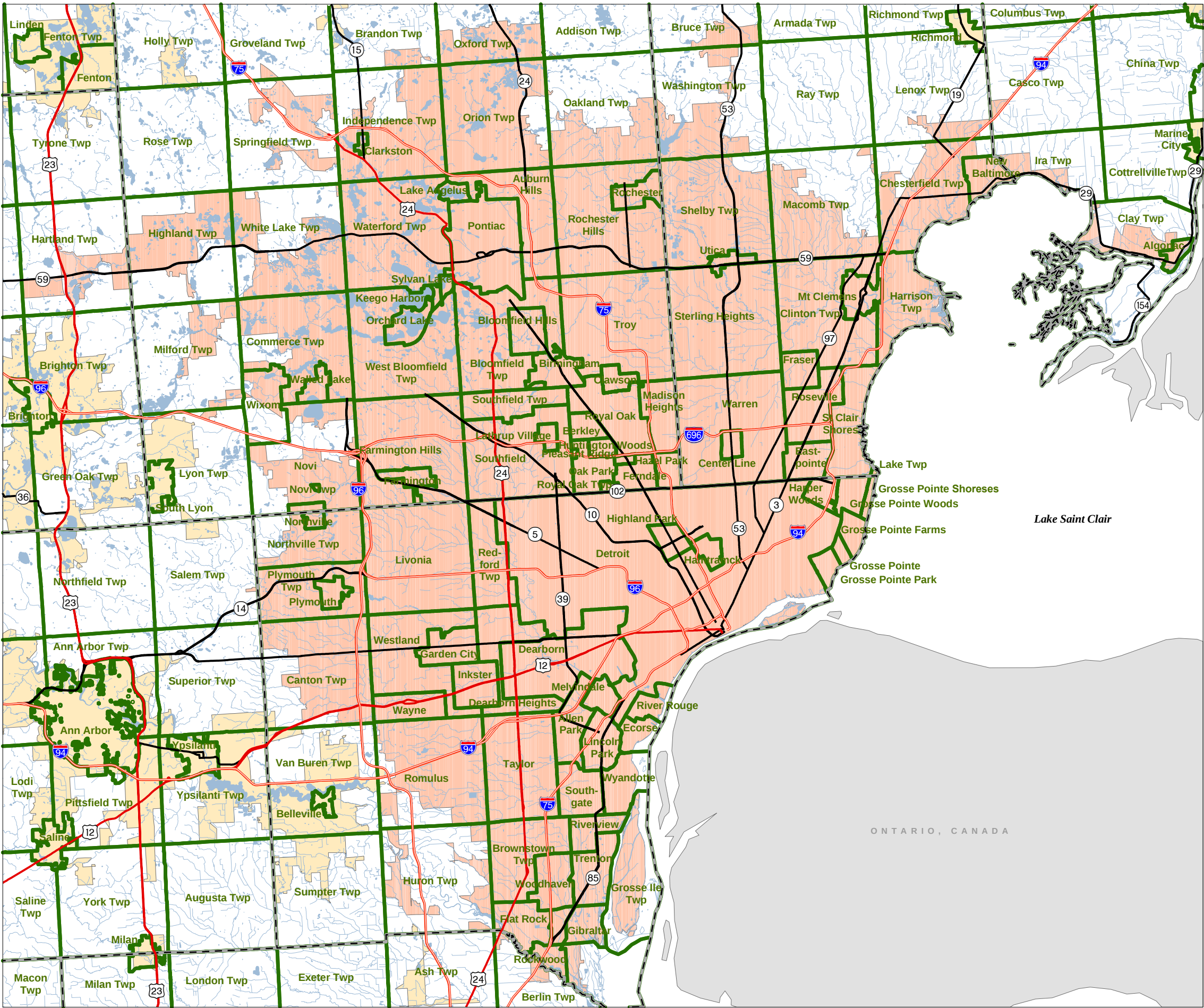
GEOGRAPHY

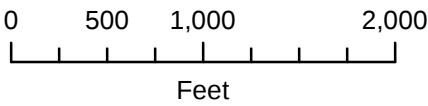
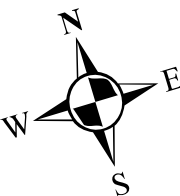
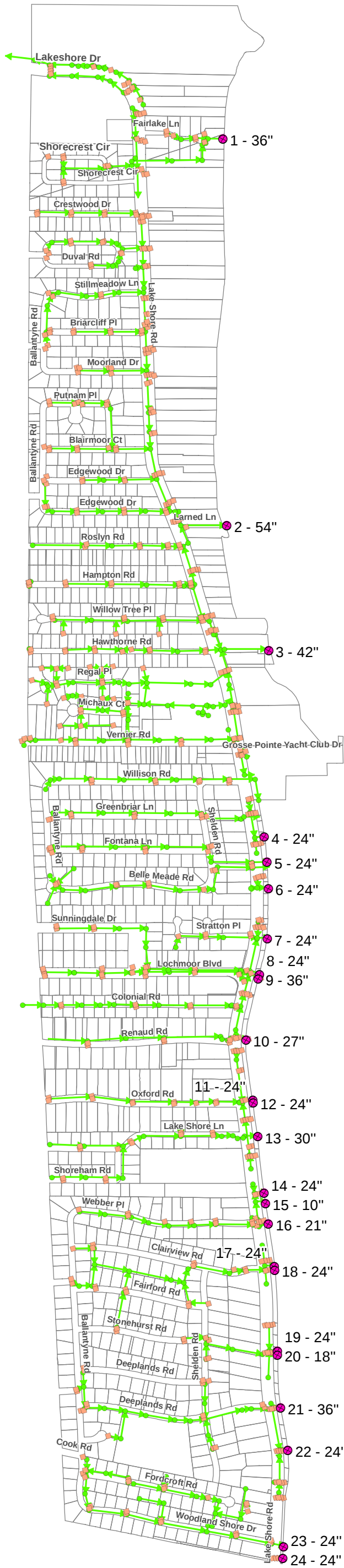
- Urbanized Area (area of interest)
- Other UA or UC
- County Boundary
- Minor Civil Division
- Interstate Highway
- U.S. Highway
- State Highway
- Roads
- Lakes / Rivers
- Hydrography



Produced by
Michigan Center for Geographic Information
Department of Information Technology
May 2002

SOURCE: Urban Areas from U.S. Census Bureau TIGER/Line, 2002.
Basemap from Michigan Geographic Framework, 2002.





Village of Grosse Pointe Shores
Illicit Discharge Elimination Plan
Storm Sewer Map
March 2014

Storm Sewer System

- Outfalls - ID & Size
- Storm catch basins = 542
- Storm manholes
- Storm pipes

* Curbed Areas = Priority Sweeping

PART II - CODE OF ORDINANCES

Chapter 10 - ENVIRONMENT

ARTICLE V. - SOIL EROSION AND SEDIMENTATION CONTROL

ARTICLE V. - SOIL EROSION AND SEDIMENTATION CONTROL ^[16]

[Sec. 10-131. - Enforcing agency.](#)

[Sec. 10-132. - Rules adopted.](#)

[Sec. 10-133. - Submission of plans.](#)

[Sec. 10-134. - Permits and fees.](#)

[Sec. 10-135. - Site inspection.](#)

Sec. 10-131. - Enforcing agency.

It is the intent of the village to become the local enforcing agency in regard to implementing the soil erosion and sedimentation control law in part 91 of Public Act No. 451 of 1994 (MCL 324.9101 et seq.), within the corporate limits of the village.

(Ord. No. 139, § 1, 12-17-1974; Code 1992, § 15-1)

Sec. 10-132. - Rules adopted.

The village hereby adopts by reference the latest rules promulgated by the state department of natural resources relative to the soil erosion and sedimentation control law in part 91 of Public Act No. 451 of 1994 (MCL 324.9101 et seq.). Such rules shall be available for public distribution, at a reasonable charge, with not less than ten copies to be available for public inspection at the office of the village clerk.

(Ord. No. 139, § 2, 12-17-1974; Code 1992, § 15-2)

Sec. 10-133. - Submission of plans.

Before groundbreaking of any construction project in the village involving one or more acres of land, an erosion and sedimentation control plan shall be submitted to the village in accordance with rules of the state department of natural resources as referred to in [section 10-132](#).

(Ord. No. 139, § 3, 12-17-1974; Code 1992, § 15-3)

Sec. 10-134. - Permits and fees.

Upon payment of the necessary fees to the village in accordance with a fee schedule to be determined by the village council, and amended from time to time by simple resolution, the submitted plans shall be reviewed and approved and a permit shall be issued, provided, the plans meet standards of the state department of natural resources, which have been adopted by reference, to prevent soil erosion at all major construction sites in the village in excess of one acre, except isolated single-family dwellings.

(Ord. No. 139, § 4, 12-17-1974; Code 1992, § 15-4)

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Chapter 10 - ENVIRONMENT

ARTICLE V. - SOIL EROSION AND SEDIMENTATION CONTROL

Sec. 10-135. - Site inspection.

The local enforcing agency shall inspect the construction site at least at the beginning, during construction and at the end of the project, and shall issue cease and desist orders upon violation of the rules set forth in part 91 of Public Act No. 451 of 1994 (MCL 324.9101 et seq.).

(Ord. No. 139, § 5, 12-17-1974; Code 1992, § 15-5)

FOOTNOTE(S):

⁽¹⁶⁾ **Cross reference**— Grading, soil erosion and sediment control, § 26-131 et seq. [\(Back\)](#)

⁽¹⁶⁾ **State Law reference**— Soil erosion and sedimentation control, MCL 324.9101 et seq.; soil conservation districts, MCL 324.9301 et seq. [\(Back\)](#)

PART II - CODE OF ORDINANCES
Chapter 26 - PLANNING
ARTICLE III. - DEVELOPMENT DESIGN STANDARDS

DIVISION 3. - GRADING, SOIL EROSION AND SEDIMENT CONTROL

DIVISION 3. - GRADING, SOIL EROSION AND SEDIMENT CONTROL ^[31]

[Sec. 26-131. - Submittal procedure.](#)

[Sec. 26-132. - Design standards.](#)

[Sec. 26-133. - Retaining walls and landscape walls.](#)

[Secs. 26-134—26-150. - Reserved.](#)

Sec. 26-131. - Submittal procedure.

Submission for approval of the grading plan and erosion and sediment control measures shall be made to the village manager, and shall include a detailed estimate of the costs and three sets of the subdivision and/or site grading plans. The village engineers shall review the estimate and plans for conformity with this article and all other applicable requirements, after which the village engineers shall return one of the three sets of plans with appropriate comments. After making any changes required, the applicant shall then submit four sets of revised plans to the village for final approval. The village engineers shall then review the plans for conformity, and if such plans are consistent with this article and all applicable requirements, the village engineers shall transmit six additional copies to the county department of public services for review and for forwarding to the state department of natural resources for a construction permit.

(Ord. No. 178, art. VII, § 1, 7-24-1990; Code 1992, § 13-66)

Sec. 26-132. - Design standards.

In order to provide effective erosion and sediment control, practical combinations of the following technical principles shall be applied to the erosion control aspects of the grading plan:

- (1) The smallest practical area of land shall be exposed at any one time during development.
- (2) When land is exposed during development, the exposure shall be kept to the shortest period of time.
- (3) Temporary vegetation and/or mulching shall be used to protect critical areas exposed during development. The plans submitted to the village shall specify such treatment.
- (4) Sediment basins, debris basins or silt traps shall be installed and maintained to remove sediment from runoff waters from land undergoing development. The plans submitted to the village shall specify such treatment.
- (5) Provisions shall be made to effectively accommodate the increased runoff caused by changed soil and surface conditions during and after development. The plans submitted to the village shall specify such treatment.
- (6) The permanent final vegetation and structures shall be installed as soon as practical in the development. The plans submitted to the village shall specify such treatment.
- (7) The development plan should be fitted to the topography and soil so as to create the least soil erosion potential.

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DIVISION 3. - GRADING, SOIL EROSION AND SEDIMENT CONTROL

(8) Wherever feasible, natural vegetation should be retained and protected.

(Ord. No. 178, art. VII, § 2, 7-24-1990; Code 1992, § 13-67)

Sec. 26-133. - Retaining walls and landscape walls.

- (a) When it is determined by the applicant or required by the village engineers, based upon reasonable standards and principles, that retaining walls will be necessary to provide proper grading for development of a subdivision or other improvement, the applicant shall furnish design drawings for such walls as part of the submittal procedure specified in [section 26-131](#). The drawings shall be sealed and prepared by the applicant's consulting engineer and shall be complete drawings, showing the wall construction in the plan and elevation views. Sectional views and details shall be provided to indicate typical and atypical conditions of the wall construction.
- (b) The following limits and technical principles shall be applied to the design of retaining walls:
- (1) *Foundation.* The foundation shall bear on soil unaffected by previous or proposed frost penetration of 42 inches in depth. The bearing capacity of the supporting soil and underlying strata shall be determined by soil analysis. In lieu of soil analysis, if the grade difference measured at each face of wall does not exceed six feet in height, the maximum allowable pressure on supporting soils can be taken as one-half the presumptive values given in the building code.
 - (2) *Stability.* Retaining walls shall be designed to resist the pressure of the retained material, including both dead and live surcharges to which they may be subjected, and to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. The minimum factor of safety against overturning shall be 1.75. The minimum safety against sliding shall be 1.5, and shall not be based upon any passive earth pressure at the toe.
 - (3) *Load.* Retaining walls shall be designed to resist the pressure of the retained material in accordance with accepted engineering practice. Walls retaining drained earth may be designed for pressure equivalent to that exerted by a fluid weighing not less than 36 pounds per cubic foot and having a depth equal to that of the retained earth. Any surcharge shall be in addition to the equivalent fluid pressure.
 - (4) *Material; strength.* Walls shall be designed and constructed of approved masonry, reinforced concrete, steel sheet piling or other approved materials within the allowable stresses specified in the building code.
 - (5) *Backfill material.* The space for a distance of at least 18 inches from the back of retaining walls and from the top of the footing to an elevation of two feet below proposed earth grade shall be backfilled with granular material in a manner so as to provide drainage. The granular material shall meet the requirements of the state department of transportation's (MDOT) specification for granular material class II.
 - (6) *Drainage.* Provisions shall be made to prevent accumulation of water behind the wall. As a minimum, weep holes for drainage shall be provided.
 - (7) *Top of wall.* Where there is a grade difference on either side of a wall in excess of four feet, and a walk is located two feet or less from the back of the wall, a guard shall be constructed in accordance with the building code or other approved protective measure. All masonry retaining walls, other than reinforced concrete walls, shall be protected with an approved coping.

(Ord. No. 178, art. VII, § 3, 7-24-1990; Code 1992, § 13-68)

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ARTICLE III. - DEVELOPMENT DESIGN STANDARDS

DIVISION 5. - STORM SEWERS

DIVISION 5. - STORM SEWERS ^[33]

[Sec. 26-171. - Submittal procedure.](#)

[Sec. 26-172. - Design standards.](#)

[Secs. 26-173—26-190. - Reserved.](#)

Sec. 26-171. - Submittal procedure.

Submission for approval of storm systems shall be made to the village manager and shall include a detailed estimate of costs and three sets of storm sewer plans and specifications. Detailed storm sewer design computations and the drainage area map indicating the various areas going into the points of inlet shall be provided. The village engineers shall review the estimate and plans and determine whether they are consistent with this article and all other applicable requirements, after which, the village engineers shall return one of the three sets, with appropriate comments. After making any changes required, the applicant shall then submit three sets of revised plans to the village for final approval. The village engineers shall then review the revised plans for conformity, and if such plans are consistent with this article and all applicable requirements, the village engineers shall retain two copies for the village's records, and return one approved copy to the applicant. The applicant shall obtain approval of the county road commission and county department of public services, where applicable.

(Ord. No. 178, art. IV, § 1, 7-24-1990; Code 1992, § 13-106)

Sec. 26-172. - Design standards.

- (a) Storm drainage systems shall be designed for a ten-year storm. The rational method for arriving at stormwater runoff shall be used and shall be computed using the following formula:

$$I = 175 / T + 25$$

in which T is the time of concentration. The consulting engineer shall use judgment in arriving at proper impervious factors. The consulting engineer shall submit a map outlining the various areas, including off-site upstream areas, which drain to the points of inlet used for design, together with the storm sewer design computations. In general, sufficient capacity shall be provided in the storm sewer system to take fully developed (fully paved and sewer) upstream drainage into the system.

- (b) Where the hydraulic gradient is above the top of the sewer pipe, the design evaluation of the hydraulic gradient shall be indicated (i.e., hydraulic gradient shall be shown in profile).
- (c) Manhole spacing for storm sewers shall be as follows:

Diameter of Sewer (in inches)	Maximum Manhole Spacing (in feet)
<u>12</u> —15	330

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DIVISION 5. - STORM SEWERS

18 —30	350
36 —42	400
48	450
54—60	500
66 and larger	600

Note: The height of elliptical pipe shall be used as a criterion for manhole spacing.

Catchbasins shall not be constructed over a sewer line to replace manholes.

- (d) The following information shall be indicated on the storm sewer profile:
- (1) Length of run between the manholes.
 - (2) Size and slope of the sewer between manholes.
 - (3) Class of bedding where concrete is required.
 - (4) Top elevation of all manholes.
- (e) A note or detail shall show the type of bedding upon which the sewer pipe shall be installed. Bedding shall be approved by the village engineer, based upon the application of reasonable standards.
- (f) Where possible, a minimum of three feet of cover shall be provided from the top of the curb, or road centerline, to the top of any storm sewer. If the depth of cover to the top of the pipe is less than two feet, C-76-CLIV pipe shall be used. If the cover is between two feet and three feet from the top of the curb to the top of the pipe, C-76-CLIII pipe shall be used. All catchbasin leads within a street shall be C-76-CLIV pipe, including the leads to the manholes.
- (g) Catchbasins shall be located as follows, subject only to deviations granted by the village engineer, based upon a showing that an alternate location is compelled:
- (1) At the radius return of street intersections. One hundred fifty feet maximum distance along the street between a high point and a corner catchbasin is allowed when drainage is required to go around the corner.
 - (2) At all low points in streets.
 - (3) At intermediate points along the street so that there is a maximum of 600 feet of drainage draining from a high point to a catchbasin or from a previous intercepting catchbasin to this catchbasin.

A maximum of 900 feet of drainage is allowed from two directions.

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DIVISION 5. - STORM SEWERS

- (h) Field catchbasins shall be provided at all low points in easements. Field catchbasins shall be located so that not more than 600 feet of drainage runs into any one catchbasin, other than a low point of the catchbasin. One thousand two hundred feet of drainage is allowed to run into a low point catchbasin. Field catchbasins shall be located in a rear lot easement swale when such swale changes direction by more than 45 degrees.
- (i) Finished easement grades shall be indicated on the plans.
- (j) Improved open drains may be permitted upon special circumstances in accordance with requirements of the village engineer.
 - (1) A permit must be obtained from the county department of public services for all connections to county drains. Plans shall conform to all current requirements of state law pertaining to floodplain determination, stream crossing requirements and other statutes relating to waterways.
 - (2) Open drains shall have side slopes no steeper than six horizontal to one vertical, where such slopes abut the development being proposed. Three-to-one slopes, with four-foot chainlink fencing, may be considered along a development boundary where the adjacent property is undeveloped, with fencing as specified by the village engineers. A cunette or low flow channel within a major drain easement may be constructed with three-to-one side slopes, where approved by the village engineers. An easement at least 30 feet wider than the widest point from top of bank to top of bank is to be recorded as part of a subdivision or otherwise dedicated.
 - (3) Adequate culverts are required at all roads crossing a drain. The minimum length of a culvert is 40 feet. End section, curtain walls and emergency deflectors shall not be considered as part of such minimum length. A curtain wall and/or energy deflectors are required under all culvert ends. Six-inch thick, nonreinforced concrete riprap is required on all slopes at culvert crossings. Concrete filled burlap bags may be used for riprap upon approval of the village engineers. The riprap must be anchored by a footer a minimum of two feet deep to prevent washing away during highwater periods.
 - (4) Open drains must have slope protection (riprap) at bends with a radius of 500 feet or less and at other points designated by the village engineers.
 - (5) The drain bottom and slopes to the hydraulic gradient line must be sodded. The remainder of the easement may be seeded. The village will not accept the work until all turf is established.
- (k) Headwalls and inlet structures shall be placed as required.
- (l) Allowable types of sewer pipe and joints shall meet current village standards, and shall be covered on the plan by note or on the profile, where applicable.
- (m) Lateral storm sewers shall be constructed to provide an outlet for the footing drain discharge house leads. Extensions of the storm sewer laterals to provide for footing drain discharge only shall be a minimum of eight inches diameter on a minimum of four-tenths of one percent grade, with manholes spaced a maximum of 300 feet apart.
- (n) A minimum four-inch diameter storm sewer lead shall be constructed from the lateral storm sewer to the property line to provide an outlet for the footing drain discharge. The lead shall be constructed at a minimum depth of 3½ feet on a minimum of one percent grade. The materials and methods of construction shall be in accordance with the current village standards.

(Ord. No. 178, art. IV, § 2, 7-24-1990; Code 1992, § 13-107)

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ARTICLE III. - DEVELOPMENT DESIGN STANDARDS

DIVISION 6. - STORMWATER RETENTION AND DETENTION

DIVISION 6. - STORMWATER RETENTION AND DETENTION ^[34]

[Sec. 26-191. - General requirements.](#)

[Secs. 26-192—26-210. - Reserved.](#)

Sec. 26-191. - General requirements.

- (a) Any new development or addition to an existing development must retain the increased runoff on site unless otherwise directed by the village engineer or unless the village master storm drainage plan allows for unrestricted improved site runoff. Acceptable means of retention can be achieved through standing water in parking areas or a separate retention basin. Either or both of such designs may be utilized to achieve the required retention.
- (b) The Oakland County Method of Retention Basin Design, as available from the Oakland County Drain Commission Office, shall be utilized in determining the volume of retention required. Basins with orifice outlets will be required to hold the volume of a ten-year storm, while basins with no outlets will be required to hold two 100-year storms. Discharge on an orifice outlet must be throttled to a restricted rate.
- (c) All open retention basins must be fenced if the side slopes exceed one vertical to six horizontal. Such requirement may be waived by the village council when the design is an integral part of the landscaping and the location and depth does not present a potential hazard. Fences shall be a minimum of five-foot high, vinyl clad chainlink, or other fencing material of comparable durability and safety as approved by the village council, with a locking access gate eight feet wide. Depending upon the location in relation to adjoining properties or rights-of-way, the village council may require a landscape screen in front of the fencing.
- (d) The basin must be constructed to drain entirely unless designed to retain a permanent water level that conforms to the aesthetics of a landscape plan relating to the surrounding landscape.
- (e) The bottom of the basin must have stable vegetative cover, be paved or have some other approved method of stabilization.
- (f) A minimum of 12 inches of freeboard must be maintained, with a positive, nonerrodible overflow, capable of handling the capacity of a 100-year storm.
- (g) Minimum grade on the bottom of the retention basin shall be 1.2 percent, when sodded. The minimum grade shall be 0.5 percent for paved swales in basins.
- (h) A maintenance agreement shall be required for all retention basins.

(Ord. No. 178, art. V, § 1, 7-24-1990; Code 1992, § 13-126)

Secs. 26-192—26-210. - Reserved.

PART II - CODE OF ORDINANCES

Chapter 28 - SOLID WASTE

Chapter 28 - SOLID WASTE ^[37]

[Sec. 28-1. - Definitions.](#)

[Sec. 28-2. - Duty of occupants to comply.](#)

[Sec. 28-3. - Placement of disposable containers for collection.](#)

[Sec. 28-4. - Time of placement of rubbish and refuse for collection.](#)

[Sec. 28-5. - Garbage and food wastes.](#)

[Sec. 28-6. - Heavy and extraordinary accumulations.](#)

[Sec. 28-7. - Household goods.](#)

[Sec. 28-8. - Brush.](#)

[Sec. 28-9. - Construction wastes.](#)

[Sec. 28-10. - Rubbish and refuse.](#)

[Sec. 28-11. - Grass mowings, trimmings and leaves.](#)

Sec. 28-1. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Brush means and includes, but is not necessarily limited to, tree limbs, shrubs and bushes.

Construction wastes means and includes, but is not necessarily limited to, bricks, broken concrete, concrete blocks, stones, rocks, dirt, cinders, sand, gravel, lumber, shavings, sawdust, construction sweepings, metal, eave troughs, downspouts and other waste building material or debris, felled trees, tree limbs, tree trunks, tree stumps and other wastes resulting from site clearing operations, construction and/or maintenance of any property.

Garbage and food wastes means and includes, but is not necessarily limited to, every refuse accumulation of animal, fowl, fish, fruit, vegetable or other similar or like substances that pertain to the preparation, use, cooking, handling and/or storing of meat, fish, fowl, fruits, vegetables or any products or processes involving the use thereof, including dead animals, fish or fowl requiring disposal, any condemned food or food products or other similar disposable substances, materials or things found or situated within the village.

Hauling, transporting and handling mean the collection, hauling and/or transportation of any materials regulated by the provisions of this chapter in or upon the streets, public rights-of-way or any other public places of the village.

Heavy and extraordinary accumulations means all materials exceeding the weight and length limitations as set forth in this chapter, but is not necessarily limited to, automobiles, automobile frames, parts and tires, or any other heavy and bulky items or materials which may be injurious or too large for the mechanical rubbish collection equipment of the village to handle.

Household goods means, but is not limited to, discarded furniture, carpeting, appliances, mattresses, bed springs, plumbing fixtures, recreational equipment, lawnmowers, barbecue equipment and other similar objects or equipment.

PART II - CODE OF ORDINANCES

Chapter 28 - SOLID WASTE

Rubbish and *refuse* mean and include, but are not necessarily limited to, trash, sweepings, paper, cardboard, tin cans, glass and plastic containers, rags, clothing, ashes, garden cuttings or branches, grass mowings, yard rakings, tree leaves and twigs, and any other similar materials which may be so classified by the village and which are accumulated upon the premises of any property within the village for collection and disposal through the village rubbish collection system.

Storage means the accumulation of materials regulated by the provisions of this chapter which are awaiting final collection, transportation and disposal.

(Ord. No. 146, § 2, 6-20-1978; Code 1992, § 8-1)

Cross reference— Definitions generally, § 1-2.

Sec. 28-2. - Duty of occupants to comply.

It is hereby made the duty of the occupants of every dwelling, building and other structure or premises in the village to comply with the provisions of this chapter regarding the disposal, storage, collection, hauling, transporting or handling of construction wastes, garbage and food wastes, brush, and rubbish and refuse therefrom.

(Ord. No. 146, § 1, 6-20-1978; Code 1992, § 8-2)

Sec. 28-3. - Placement of disposable containers for collection.

The owner, occupant, tenant or lessee of any property or premises shall place any disposable rubbish bag or other materials for collection at a point designated by the village as being the most accessible for collection and removal.

(Ord. No. 146, § 7, 6-20-1978; Code 1992, § 8-3)

Sec. 28-4. - Time of placement of rubbish and refuse for collection.

All rubbish and refuse shall be prepared for collection and placed at the designated collection point on or before 7:00 a.m. on the regularly scheduled collection day for the particular area being serviced. No such rubbish or refuse shall be placed at the collection point in any residential area before 5:00 p.m. on the day preceding the regularly scheduled collection day. Until the time of placement for collection, such rubbish bags or containers shall be concealed from view.

(Ord. No. 146, § 8, 6-20-1978; Code 1992, § 8-4)

Sec. 28-5. - Garbage and food wastes.

- (a) It shall be unlawful to deposit, place, scatter, strew or bury any garbage or food wastes upon private or public property of any premises within the village.
- (b) It shall be unlawful to mix or deposit garbage or food wastes in any container or other means of accumulation and storage of rubbish.
- (c) The disposal of garbage and food wastes shall be primarily accomplished by means of the installation, use and operation of garbage disposal units or equipment which is properly connected and discharged into the municipal sewer system of the village.

(Ord. No. 146, § 3, 6-20-1978; Code 1992, § 8-5)

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Chapter 28 - SOLID WASTE

Sec. 28-6. - Heavy and extraordinary accumulations.

All heavy and extraordinary accumulations shall be collected and disposed of outside the corporate limits of the village at the expense and as a responsibility of the owner, occupant, renter, tenant or lessee of the property or premises from which such accumulations resulted.

(Ord. No. 146, § 10, 6-20-1978; Code 1992, § 8-6)

Sec. 28-7. - Household goods.

All household goods shall be collected and disposed of on a regular basis as a municipal service provided by the village and in accordance with established schedules, rules and regulations.

(Ord. No. 146, § 11, 6-20-1978; Code 1992, § 8-7)

Sec. 28-8. - Brush.

- (a) *Regular collection and disposal.* All brush shall be collected and disposed of on a regular basis as a municipal service provided by the village and in accordance with established schedules, rules and regulations.
- (b) *Limitations.* All such brush shall not contain individual tree, shrub or bush cuttings, trimmings or any limbs exceeding three inches in diameter, six feet in length and 50 pounds in weight.
- (c) *Responsibility of tree services.* Any tree trimming contractor, nurseryman, utility company employee or other privately employed person who performs or provides a tree trimming or tree removal service for a fee, or as a company service on any property or premises within the village, shall be responsible for the removal and disposal, beyond the corporate limits of the village, of all tree limbs, brush, trunks and/or stumps accumulated from the performance of such service.

(Ord. No. 146, §§ 9, 16, 6-20-1978; Code 1992, § 8-8)

Sec. 28-9. - Construction wastes.

- (a) Building contractors shall be responsible for the removal of all wastes, rubbish, remodeling or maintenance materials and site-clearing materials from the building site, and for the transportation and disposal of such wastes beyond the corporate limits of the village.
- (b) The provisions of this section shall not be construed so as to prevent the disposal of flammable materials in an incinerator or furnace installed in the building structure after the incinerator or furnace has been properly inspected and approved by the village.
- (c) All building contractor's wastes, rubbish and site-clearing materials shall be removed and/or cleared from the premises before final inspection shall be made or before a certificate of occupancy shall be issued.

(Ord. No. 146, §§ 13, 14, 6-20-1978; Code 1992, § 8-9)

Cross reference— Buildings and building regulations, ch. 6.

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Chapter 28 - SOLID WASTE

Sec. 28-10. - Rubbish and refuse.

- (a) *Regular collection and disposal.* Rubbish and refuse shall be collected and disposed of on a regular basis as a municipal service provided by the village in accordance with established schedules, rules and regulations.
- (b) *Unlawful disposal.* It shall be unlawful to deposit, place, scatter, strew or bury any rubbish or refuse upon the property of another person or any public property, premises, street, right-of-way or other public place within the village.
- (c) *Weight restriction.* No rubbish shall be set out for collection which has a weight exceeding 50 pounds per disposable bag, container or bundle.

(Ord. No. 146, §§ 4—6, 6-20-1978; Code 1992, § 8-10)

Sec. 28-11. - Grass mowings, trimmings and leaves.

- (a) *Removal by hired services.* Any grass mowing or grass trimming contractor, landscaper, nurseryman or other privately licensed or employed person who performs or provides a grass mowing, grass trimming or leaf raking service for a fee on any property or premises within the village shall be responsible for the removal and disposal, beyond the corporate limits of the village, of all grass mowings, trimmings or leaves accumulated from the performance of such services.
- (b) *Removal by village services.*
 - (1) During the months of October—December, all tree leaves may be raked up and placed near the curb for collection as a municipal service.
 - (2) During the months of January—September, the collection of tree leaves, as a municipal service, shall be accomplished by the same means as other rubbish and refuse.

(Ord. No. 168, 11-27-1984; Ord. No. 146, §§ 12, 15, 6-20-1978; Code 1992, § 8-11)

Cross reference—Vegetation, ch. 38.

FOOTNOTE(S):

⁽³⁷⁾ **Cross reference—** Any ordinance relating to sewage treatment or industrial waste control saved from repeal, § 1-12(16); buildings and building regulations, ch. 6; environment, ch. 10; utilities, ch. 36. [\(Back\)](#)

⁽³⁷⁾ **State Law reference—** Authority to regulate disposal of garbage and rubbish, MCL 123.361 et seq.; solid waste facilities, MCL 324.4301 et seq.; hazardous waste management act, MCL 324.11101 et seq.; hazardous materials transportation act, MCL 29.471 et seq.; solid waste management act, MCL 324.11501 et seq.; waste reduction assistance act, MCL 324.14501 et seq.; low-level radioactive waste authority act, MCL 333.26201 et seq. [\(Back\)](#)

PART II - CODE OF ORDINANCES

Chapter 36 - UTILITIES

ARTICLE III. - SEWERS

DIVISION 2. - DRAINAGE FROM RAINWATER DOWNSPOUTS

DIVISION 2. - DRAINAGE FROM RAINWATER DOWNSPOUTS

[Sec. 36-131. - Purpose.](#)

[Sec. 36-132. - Disconnection from sanitary sewer system required.](#)

[Sec. 36-133. - Exemptions.](#)

[Sec. 36-134. - Appeals; authority to modify fee and fines.](#)

[Sec. 36-135. - Placement of downspouts.](#)

[Secs. 36-136—36-160. - Reserved.](#)

Sec. 36-131. - Purpose.

In order to reduce the sudden inflow of rainwater into the village sewer system during rainstorms and thereby reduce the overflow and the resulting pollution of Lake St. Clair, the village council does hereby adopt the rules and regulations set out in this division requiring the disconnection of rainwater downspouts within the village.

(Ord. No. 201, art. X, § A, 11-18-1997)

Sec. 36-132. - Disconnection from sanitary sewer system required.

- (a) It shall be unlawful and a violation of this division for any owner of property located within the village to permit, allow or maintain the connection of gutter downspouts with the sanitary sewer system of the village unless an exemption has been granted in accordance with [section 36-133](#). Every day of noncompliance with this section will be deemed a separate violation. The fine for such violation shall be \$10.00 dollars per day, per downspout.
- (b) Existing connections shall be disconnected on or before June 1, 1998. No new connections shall be permitted to connect to the sanitary sewer from and after the effective date of the ordinance from which this division is derived. All downspouts on all new construction commenced from and after the effective date of the ordinance from which this division is derived shall, however, be properly connected to the village storm sewer system.

(Ord. No. 201, art. X, § B, 11-18-1997)

Sec. 36-133. - Exemptions.

Under the following circumstances, the village manager or an authorized deputy may grant an exemption from the provisions of this division, which exemption shall be in writing and recorded in a record to be kept by the building department, provided, in each such case, there is no practical way of otherwise diverting the discharge:

- (1) If such disconnection would cause water to discharge onto a driveway or sidewalk, creating a hazardous condition.
- (2) If such disconnection would cause water to flow next to a basement wall and tend to create a basement water problem.

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ARTICLE III. - SEWERS

DIVISION 2. - DRAINAGE FROM RAINWATER DOWNSPOUTS

- (3) If such disconnection would cause water to discharge across or onto a patio or onto the ground near where children's play equipment is permanently installed.
- (4) If such disconnection would cause water to flow directly into an in-ground swimming pool.
- (5) If such disconnection would create a flooding problem because of low grade.
- (6) If such disconnection would cause water runoff to discharge onto a neighbor's property.
- (7) For a reason that such disconnection would otherwise create an undue hardship.

(Ord. No. 201, art. X, § C, 11-18-1997)

Sec. 36-134. - Appeals; authority to modify fee and fines.

- (a) Any property owner, including abutting owners affected by water flowing from a disconnected downspout, may appeal a decision of the village manager or an authorized deputy, which decision ordered or authorized the disconnection of one or more downspouts. Such appeal shall be in writing, addressed to the village council, accompanied by an appeal fee in an amount established by the village council, and shall state the reason the property owner or abutting property owner believes an exemption should be granted. The appeal shall be reviewed by the council, which may confirm the decision of the village manager or deputy or may modify such decision or grant an exemption.
- (b) The appeal fee and fines set forth in this division may be modified by a resolution of the village council as adopted from time to time.

(Ord. No. 201, art. X, § D, 11-18-1997)

Sec. 36-135. - Placement of downspouts.

Rainwater downspouts that are existing upon any real property in the village shall be directed in a manner so that the water discharged from such downspouts shall be directed toward the street or other area of the property to minimize or reduce the flow of rainwater onto abutting properties.

(Ord. No. 201, art. X, § E, 11-18-1997)

Secs. 36-136—36-160. - Reserved.

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Chapter 40 - ZONING

ARTICLE VII. - ENVIRONMENTAL REGULATIONS

ARTICLE VII. - ENVIRONMENTAL REGULATIONS ^[55]

Sec. 40-331. - Signs.

Sec. 40-332. - Preservation of wooded and shrubbed areas.

Secs. 40-333—40-360. - Reserved.

Sec. 40-331. - Signs.

- (a) No billboard, signboard, banner, pennant or other advertising media shall be permitted, except the following:
- (1) One "For Sale" sign, not exceeding seven square feet in area, and advertising the property on which the sign is erected. Such sign shall in no case be erected nearer to any right-of-way line or front lot line than one-third of the distance from the right-of-way line or front lot line to the setback of the building or proposed building. Such sign, including "Sold" signs, shall be removed within ten days after execution of a purchase agreement for the property.
 - (2) One building or contractor's sign may be maintained on buildings only while the buildings are actually under construction, provided that no such sign shall exceed seven square feet in area, or be located nearer to any right-of-way line or front lot line than one-third of the distance from the right-of-way line or front lot line to the setback of the building or proposed building.
 - (3) Signs advocating the election of political candidates or the passage or defeat of ballot issues to be voted upon by the public in an upcoming election in the village, not exceeding seven square feet in area, and in no case located nearer to any right-of-way line or front lot line than one-third of the distance from the right-of-way line or front lot line to the setback of the building. No lot shall contain more than one sign for any single candidate or issue. All such signs shall be removed within five days after the election to which they are addressed.
 - (4) A freestanding sign, no greater than one-half square foot, unobtrusively located on the premises, indicating the security provider.
 - (5) Garage sale signs, no greater than seven square feet, unobtrusively located as provided in [section 40-243](#)
- (b) If a sign becomes unsightly or in a state of disrepair, the village building department may order the sign to be repaired or removed, and failure to comply with such an order shall result in a violation of this chapter.

(Ord. No. 200, art. 13, § 1300, 7-7-1997)

Sec. 40-332. - Preservation of wooded and shrubbed areas.

- (a) The intent of this section is to preserve the wooded and shrubbed areas of the village to the extent such preservation is reasonable and compatible with the following purposes:
- (1) Filtering pollution from the atmosphere.
 - (2) Decreasing noise.
 - (3) Providing a habitat for wildlife.

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ARTICLE VII. - ENVIRONMENTAL REGULATIONS

(4) Visual character.

- (b) Recognizing the benefits of vegetation and woodlands cited in subsection (a) of this section, it is important to preserve such natural features, maintain the community's environmental quality and enhance the visual character of the constructed environment. Development shall be consistent with such intent and the following provisions:
- (1) The builder or owner of property to be developed, redeveloped or where there are substantial alterations to the front yard shall provide the commission with a detailed description of the natural features and characteristics located on the site. Alterations of the site, such as tree removal, shrub and ground cover removal, regrading or filling, are prohibited prior to submission of an inventory and preservation plan to the commission. Any such site alteration shall be considered a violation of this chapter and may require substantial replacement as a condition of approval.
 - (2) The plan submission shall meet the requirements of article II, division 4 of this chapter, and further contain the following:
 - a. A current, or not older than five years, one inch equals 100 feet, aerial photograph and USGS quadrant map of the area to provide a vegetation map source;
 - b. A preliminary field survey of the typical size and type of trees and other vegetation. All significant trees (six-inch caliper or greater) should be noted by type, size and location. All thriving existing trees which are not located within an area which is adjacent to, and ten feet larger than, the footprint of the proposed principal building and its attached accessory buildings, or within the area where the driveway or other improvements are to be located, shall be preserved by the builder or person developing the site. The builder or person developing the site shall erect and maintain suitable barriers, such as snow fencing or cyclone fencing, to protect the trees to be preserved from damage caused by construction activities. Such person may remove any trees that are dead or dying, as determined by the village manager. This subsection shall not, however, prevent the homeowner actually occupying the lot from removing any trees from the lot;
 - c. A preservation plan with specifications describing removal of any trees, individually or as groupings, that are six-inch caliper or greater, as well as shrubbed areas. The plan shall also describe the method to be employed for protection of trees and shrubbed areas designated to remain during construction. The plan and specifications shall include grade changes or other work adjacent to the remaining trees and shrubbed areas which might produce an adverse effect, such as, but not limited to, surface drainage, aeration and piling of excavated soil;
 - d. Request for special consideration in developing wooded areas; however, any grant of special consideration shall be based upon specific conditions applicable to the site. If special consideration is not granted, the applicant will be required to maintain the percentage of wooded area as required in this subsection (2). A grant of special consideration may require the planting of replacement trees and/or other vegetation, as determined by the commission.
 - (3) The following species of trees shall be permitted:
 - Honey locust
 - Idaho locust
 - Little leaf linden
 - London plane

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ARTICLE VII. - ENVIRONMENTAL REGULATIONS

Modesta ash

Moraine locust

Norway maple

Pin oak

Scarlet hawthorne

Sugar maple

Other species approved by the village manager.

- (4) All trees planted pursuant to this section shall be of first quality, meeting the standards of the American Association of Nurserymen. Yards and landscaping shall be maintained in a healthy state. Dead or diseased trees, shrubs or other landscaping shall be promptly removed and replaced with healthy stock.

(Ord. No. 200, art. 13, § 1301, 7-7-1997)

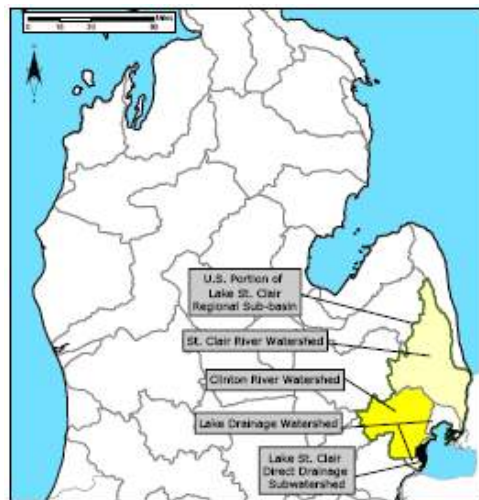
Secs. 40-333—40-360. - Reserved.

FOOTNOTE(S):

⁽⁵⁵⁾ **Cross reference**— Environment, ch. 10. [\(Back\)](#)



Lake St. Clair Direct Drainage Subwatershed Public Participation Process



Part 1. General Information

This Public Participation Process is required by the Michigan Department of Natural Resources and Environment National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge General Permit, which governs Storm Water Discharges from Municipal Separate Storm Sewer Systems Subject to Watershed Plan Requirements.

The purpose of this Public Participation Process (PPP) is to facilitate the involvement of watershed jurisdictions, agencies, organizations, and the general public in the update and implementation of our watershed management plan.

This Public Participation Plan has been prepared for the Lake St. Clair Subwatershed (LSCW), which includes all or portions of the jurisdictions of the following permittees:

Communities

Charter Township of Clinton
City of Eastpointe
City of Grosse Pointe
City of Grosse Pointe Park
City of Grosse Pointe Farms
City of Roseville
City of St. Clair Shores
Macomb County
Village of Grosse Pointe Shores
Wayne County

School Districts

East Detroit Public Schools
Lake Shore Public Schools
Roseville Community Schools

Other organizations (nonpermittees) have agreed to assist or be responsible for certain PPP items. These entities include:

Clinton River Watershed Council (CRWC)
Southeast Michigan Council of Governments (SEMCOG)

Lake St. Clair Direct Drainage Subwatershed Background

The Lake St. Clair Direct Drainage Subwatershed (LSCW), the focus of this watershed PPP, is a part of the larger Lake St. Clair Regional Sub-basin and extends along the Lake St. Clair shore from the Clinton River Spillway in Harrison Township to the outlet of Lake St. Clair into the Detroit River near the City of Grosse Pointe Park. The LSCW is a 41 square mile basin that includes waterbodies, such as the Milk River, which directly enters Lake St. Clair. The subwatershed is home to 214,000 people.

The land in the subwatershed is dominated by single-family housing with limited areas of open space. Some industrial and commercial uses exist and are concentrated along corridors in the Roseville area. Land use trends indicate that the southern portion of the subwatershed tend toward

low to medium density residential housing while the northern portion consist of medium to high density residential housing along with existing industrial and commercial zones.

Past Public Participation Efforts

A Watershed Management Plan (WMP) was previously completed for the LSCW in 2006. A copy of the WMP can be viewed at <http://www.crw.org/watershed/subwatersheds/index.html>. Public participation was sought and the table below summarizes the efforts that were taken to obtain input.

Meeting/ Mechanism	Responsible Party	Schedule	Status
SWAG Meetings	SWAG	Monthly	Held monthly meetings during the watershed management planning process.
Stakeholder Workshop (2 locations within watershed)	Coordination Team	Between January 17 - February 11, 2005	Held one meeting on January 20, 2005. A second meeting was originally proposed with the belief that people wouldn't travel across county lines to attend the meeting. However, after closer consideration, it was deemed unnecessary to have 2 separate meetings in the same subwatershed.
Presentation to Municipal Officials #1	SWAG Members	Spring/Summer 2005	Gave overview of WMP process and status on November 17, 2005.
Public Hearing #1	Coordination Team/SWAG Members	Between January 17 - February 11, 2005	Held meeting on February 3, 2005 to solicit input on goals and concerns from public.
Presentation to Municipal Officials #2	SWAG Members	Summer/Fall 2006	Presented draft WMP to municipal officials on September 27, 2006.
Public Hearing #2	Coordination Team/SWAG Members	Summer 2006	Held meeting on September 18, 2006 to present the draft WMP and get feedback from public.
Focus Groups	Coordination Team	Between January 17 - February 11, 2005	A telephone interview was held with fertilizer/lawn-care companies on September 21, 2005.
Project/Public Comment Web Site	Consultant/ USACE	November 1, 2004	A project website was launched in 2004. CRWC posted the draft WMP and public meeting announcement. The public was asked to email comments on WMP to contact@crwc.org .
Information Display at Public Places	SWAG Members	November 1, 2004	SWAG members put up displays in various facilities.

Part 2. Building the Team

The Lake St. Clair Subwatershed Advisory Group (SWAG) will oversee the implementation of this Public Participation Process. The process will include all of the stakeholders who may notably influence the permittees' ability to implement the recommendations in the watershed management plan. Table 1 outlines the mechanisms for soliciting public participation during the watershed planning update process. The first column identifies the individuals, groups, and other entities that will be specifically invited to participate in the process. The second column lists the mechanisms that will be used to solicit participation from each identified stakeholder group. The third column identifies the parties responsible for completing each participation mechanism identified in column 2.

The following activities will be used to solicit public participation in the planning process. These activities are identified in Table 1 below and are described in greater detail in Part 3.

1. Surveys (e.g., paper, electronic)
2. Web-Based Communication (e.g., web sites, Facebook, Twitter, Email blasts, Listserves)
3. Printed Media (e.g., Newspapers, newsletters)
4. Existing workshops, meetings, and events
5. Mailings (e.g., letters, water/tax bills)
6. Community cable station

Specific input from these mechanisms will focus on:

- Seeking input on potential implementation projects / providing updates on implementation projects
- Seeking input on specific community actions and timelines
- Identifying additional problem areas
- Prioritize known problem/critical areas

Responsible parties are listed in the table below. Please note that by listing the participation mechanism by a party's name, the party may not be committing to all of the potential items listed in the description. Parties commit to doing at least one of the items suggested in the description provided in Part 3.

Table 1. Soliciting Participation in the Watershed Planning Process

Stakeholder Groups	Participation Mechanisms	Responsible Parties
LOCAL GOVERNMENT/PERMITTED ENTITIES		
Municipal staff/school district/college staff (including public works, engineering, planning, parks & rec., fire department, etc.)	1. Surveys 2. Web-Based Communication 4. Existing workshops, meetings, and events	Charter Township of Clinton: 1,4 City of Eastpointe: 2,4 City of Grosse Pointe: 1 City of Grosse Pointe Farms: 1 City of Grosse Pointe Park: 1,2 City of Roseville: 1,2 City of St. Clair Shores: 1,2,4 CRWC: 1,2,4 Lakeshore Public Schools: 2 Macomb County: 1,2,4 Roseville Community Schools: 2,4 SEMCOG: 1,2 Village of Grosse Pointe Shores: 1,4 Wayne County: 1,2,4
County, City, Village & Township boards, councils, commissions, school boards	1. Surveys 2. Web-Based Communication 4. Existing workshops, meetings, and events	Charter Township of Clinton: 1,4 City of Eastpointe: 2,4 City of Grosse Pointe: 1 City of Grosse Pointe Farms: 1 City of Grosse Pointe Park: 1,2 City of Roseville: 1,2 City of St. Clair Shores: 1,2,4 CRWC: 1,2,4 Lakeshore Public Schools: 2 Macomb County: 1,2,4

Stakeholder Groups	Participation Mechanisms	Responsible Parties
		Roseville Community Schools: 2,4 SEMCOG: 1,2 Village of Grosse Pointe Shores:1,4 Wayne County: 1,2,4
ASSOCIATIONS and CONSERVATION GROUPS		
Marinas	1. Surveys 2. Web-Based Communication	SWAG: 1,2
Gardening Groups	1. Surveys 2. Web-Based Communication	SWAG: 1,2
MSU Extension	1. Surveys 2. Web-Based Communication	SWAG: 1,2
Michigan Sea Grant	1. Surveys 2. Web-Based Communication	SWAG: 1,2
Conservation Groups (such as land conservancies, sportsman clubs, trout unlimited, pheasants forever)	1. Surveys 2. Web-Based Communication	SWAG: 1,2
BUSINESS COMMUNITY		
Chambers of Commerce • Eastpointe-Roseville • Grosse Pointe • Macomb County • Metro East	1. Surveys 2. Web-Based Communication	Charter Township of Clinton: 1 City of Eastpointe: 2 City of Grosse Pointe: 1 City of Grosse Pointe Farms: 1 City of Grosse Pointe Park: 1,2 City of St. Clair Shores: 1,2 Village of Grosse Pointe Shores:1
Downtown Development Authority • Charter Township of Clinton • City of Eastpointe • City of Grosse Pointe • City of Grosse Pointe Park • City of St. Clair Shores	1. Surveys 2. Web-Based Communication	Charter Township of Clinton: 1 City of Eastpointe: 2 City of Grosse Pointe: 1 City of Grosse Pointe Park: 1,2 City of St. Clair Shores: 1,2
RESIDENTS / GENERAL PUBLIC		
General Public	1. Surveys 2. Web-Based Communication 3. Printed Media 4. Existing workshops, meetings, and events 5. Mailings 6. Community cable station	SEMCOG: 1,2 Charter Township of Clinton: 1,3,4,6 City of Eastpointe: 2,4,6 City of Grosse Pointe: 1,3 City of Grosse Pointe Farms: 1,3,5 City of Grosse Pointe Park: 1,2,3,5 City of Roseville: 1,2,3,6 City of St. Clair Shores: 1,2,4,6 East Detroit Public Schools: 3,6 CRWC: 1,2,3,4

Stakeholder Groups	Participation Mechanisms	Responsible Parties
		Lakeshore Public Schools: 2,3,6 Macomb County: 1,2,4 Roseville Community Schools: 2,4,6 Village of Grosse Pointe Shores: 1,3,4,6 Wayne County: 1,2,4
ADVISORY ORGANIZATIONS		
Clinton River Public Advisory Council	2. Web-Based Communication	SWAG: 2
Macomb County Water Quality Board	2. Web-Based Communication	SWAG: 2

Part 3. Continuing Communication with Stakeholders

Establishing ongoing mechanisms to ensure adequate communication with and between the stakeholders identified above is critical to a successful watershed planning and implementation update process. This section lists and describes the various activities and mechanisms that will be used to solicit public participation during the planning process, with an emphasis on offering multiple opportunities for input and feedback.

1. Surveys (e.g., paper, electronic)

The watershed group will obtain input from stakeholders through the use of surveys. It is anticipated that there will be multiple surveys based on various audiences and they will be internet-based to allow for easier distribution. The SWAG will solicit participation with other watershed groups to allow for consistency in questions.

2. Web-Based Communication (e.g., web sites, Facebook, Twitter, Email blasts, Listserves)

The watershed group will utilize web-based communication to inform and outreach to various stakeholders. Web-based communication could include, but will not be limited to information on a community web site, information distributed through a community or organization Facebook or Twitter page, email blasts to a select stakeholder group.

3. Printed Media (e.g., Newspapers, newsletters)

Printed media could include outreach through community newspapers, local community/organization newsletters, e-newsletters and bulletin boards. One component of this outreach could be to direct stakeholders to the survey.

4. Existing workshops, meetings, and events

Experience from the last permit has shown that initiating public meetings/workshops focused solely on development/update of the watershed management plan was not very effective. Based on this experience, this public process will focus on receiving input at existing workshops, meetings, and/or events. This could include board/council/commission/subwatershed meetings, existing workshops or events, such as local Water Week events.

5. Mailings (e.g., letters, water/tax bills)

Community mailings, such as information in water/tax bills will be used to inform residents of watershed planning and public involvement activities, including marketing the survey. Letters to certain stakeholder groups (e.g., chamber of commerce, conservation groups) may also be utilized to solicit input.

6. Community cable station

Cable television broadcasts, including cable bulletin boards, will be used to announce specific events, provide the website link, and solicit input into the planning process.

Part 4. Time Line for the Planning Process

The following schedule outlines the timeframe for soliciting input into the watershed plan update and implementation. This timeline is a general schedule of activities.

Activity	Time Line															
	2010				2011				2012				2013			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
1. Survey																
2. Web-Based Communication																
3. Printed media																
4. Existing workshops, meetings, events																
5. Mailings																
6. Community cable																

Part 5. Coming to Agreement

Currently, the Lake St. Clair SWAG works on a consensus-based approach. If needed during the planning process, the SWAG can implement the voting procedures developed under the current Operating Agreement. Differing points of view will be documented in the meeting summary. Outstanding conflict will continue to be worked through a consensus-based approach. If that fails, a voting structure will be implemented.

Part 6. Adaptive Management

The public participation process will take place over the permit period and will incorporate a variety of mechanisms. Over this period, it may become evident that certain activities are much more successful than others. In such cases, more focus may be placed on these successful mechanisms in future phases of the planning process.

The success of the public participation process will be tracked in the following ways:

- Number of surveys completed
- Web-based communications
- Number of presentations at existing meetings, workshops and events
- Number of printed media
- Watershed meeting attendance

The subwatershed group will discuss the progress of the public participation process at various points throughout the planning process and determine whether changes need to be made to encourage improved participation. If at any point the group determines that public participation is not meeting the group's expectations, it will be important to reevaluate the types of mechanisms being used and identify alternatives that will be more likely to elicit a good response.

Clinton River Watershed Public Education Plan

**Submitted by the Clinton River Watershed Council on behalf of
Macomb County, Oakland County
and the MS4 permit holders that participate in the
Clinton River Watershed Council's Stormwater Education Program**

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I. INTRODUCTION

As a requirement of the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Permit issued May 22, 2008, this watershed wide Public Education Plan (PEP) was developed to inform the public within the Clinton River Watershed about their role in protecting water quality and preventing stormwater pollution. This plan was created by the municipalities and other partners in the Clinton River Watershed with the input of stakeholders, and professionals in the environmental education field. This plan outlines the public education goals and messages that must be communicated under the requirements of the Phase II regulations. The PEP also describes the existing and future efforts the communities and other partners will undertake to achieve these education goals, and how these efforts will be evaluated.

II. PARTNERS & STAKEHOLDERS

This watershed wide PEP is submitted on behalf of Macomb County, Oakland County and the MS4 permit holders that participate in the Stormwater Education Program facilitated by the Clinton River Watershed Council (CRWC). Municipal staff, county agencies, CRWC and Southeast Council of Governments (SEMCOG) participated in the development of the PEP. The CRWC Stormwater Education program was developed to assist communities that must comply with the NPDES Phase II storm water discharge regulations. Activities facilitated by CRWC, Macomb and Oakland Counties, the Southeast Council of Governments (SEMCOG) and the MSU Extension Office will be reported on behalf of the following permit holders and their nested MS4's.

Avondale Schools	Macomb County	Rochester *
Center Line *	Macomb Township	Rochester Hills *
Eastpointe	Madison Heights *	Rochester Schools
Fraser *	Mount Clemens	Roseville *
Grosse Pointe Village	Oakland County *	Shelby Township
Grosse Pointe Park	Oakland Township *	Sterling Heights (<i>Phase I</i>)
Grosse Pointe Shores	Oakland University	St. Clair Shores *
Grosse Pointe Farms	Orchard Lake *	Sylvan Lake *
Harrison Township	Orion Township	Troy
Hazel Park *	Oxford Township	Utica
Independence Twp jd	Oxford Schools	Warren (<i>Phase I</i>)
Keego Harbor	Oxford Village	Washington Twp.
Lake Orion Village *	Pontiac *	
	Romeo	

*Communities that are still under the 2003 permit. These communities have committed to supporting the watershed wide PEP, PEP activities for these communities will continue comply with the 2003 permit and be reported on a yearly basis as required by the permit.

Clinton River watershed communities, subwatershed groups and partners agreed that approaching stormwater education on a watershed, cross-jurisdictional basis is both cost-effective and environmentally sound. The watershed approach allows the partners to share information and resources to address stormwater concerns at their source. Similarly, developing and implementing a public education program on a watershed basis provides a consistent and effective mechanism for protecting water resources across the region, while leveraging financial resources in each community.

During preparation of this PEP, various municipal staff environmental organizations, county agencies, and the MSU Extension offices were contacted.

The following information was compiled in an effort to identify and organize existing stormwater education materials and programs:

- Existing materials or programs used to educate the public about watersheds and water quality protection (e.g. brochures, videos, displays, school programs, etc.).
- Existing audiences to target for watershed education (e.g. homeowners associations, lake associations, churches, civic groups, business associations, etc.).
- Existing communication methods that could be used to disseminate watershed education (e.g. cable access channel, email, website, newsletter, water bills, etc.).

III. CLINTON RIVER WATERSHED COUNCIL'S STORMWATER EDUCATION PROGRAM

The Clinton River Watershed Council (CRWC) is a nonprofit organization dedicated to protecting, enhancing, and celebrating the Clinton River, its watershed, and Lake St. Clair. For over 37 years, CRWC has worked collaboratively with local governments, businesses, individuals, and other community groups to address water quality and land use issues in the watershed. Stormwater runoff is the leading source of pollution in the Clinton River today, thus CRWC's efforts are focused primarily on decreasing the amount of stormwater and stormwater pollution reaching our streams, rivers, and lakes. CRWC works to achieve its mission by providing education and stewardship programs to the more than 1.5 million people, 60 communities, and 4 counties in the Clinton River watershed.

Upon the request of a number of communities, CRWC developed the Stormwater Education Program to assist its members in meeting their Phase II public education requirements. The components of the Stormwater Education Program are outlined in this PEP, along with materials and programs offered by the counties, CRWC, SEMCOG and MSU extension. These materials and programs will be supported and promoted by the MS4 permittees named in this PEP. In subscribing to the Stormwater Education Program, each participating entity has entered into contract with the watershed council. CRWC has agreed to provide the programs outlined in this plan.

As outlined in this PEP, CRWC's program includes the following major components:

- Education of the public and recruitment of volunteers in each subwatershed through a variety of outreach methods (presentations, workshops, websites, cable TV, print media, etc.).
- Regular volunteer training sessions and establishment of water quality monitoring sites throughout each subwatershed.
- Annual forums for sharing information, discussing issues, and planning projects.
- Coordination of other on-going education and stewardship efforts, including River Day, Clinton Clean-Up, and the Stream Leaders student river monitoring program.
- Coordination with the Southeast Michigan Partners for Clean Water's "Our Water. Our Future. Ours to Protect." campaign.
- Development and distribution of supporting print and web-based materials.

IV. GOALS & OBJECTIVES

The goal of this PEP is to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in stormwater to the maximum extent practicable. Pollution prevention shall be encouraged.

"Public" is defined to include all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, construction contractors and developers.

This PEP is designed to ensure that the targeted audiences (“public”) are reached with the appropriate messages for the following nine topics as required in the 2008 NPDES Phase II stormwater permit:

1. Responsibility and stewardship in their watershed.
2. The connection of MS4 catch basins, storm drains, and ditches to area waterways, and the potential impacts these could have on the surface waters of the state.
3. Public reporting of illicit discharges or improper disposal of materials in MS4s.
4. The effects and need to minimize the amount of residential or noncommercial wastes discharged into MS4s, including:
 - i. Preferred cleaning materials and procedures for car, pavement, and power washing.
 - ii. Acceptable application and disposal of pesticides, herbicides, and fertilizers.
 - iii. Proper disposal practices for grass clippings, leaf litter, and animal wastes that get flushed into MS4s and the surface waters of the state.
5. The availability, location, and requirements of facilities for disposal or drop-off of household hazardous wastes, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.
6. For property owners with septic systems, the proper septic system care and maintenance, and how to recognize system failure.
7. The benefits of using native vegetation instead of non-native vegetation.
8. For permittees with riparian land owners, methods for managing riparian lands to protect water quality.
9. Additional pollutants unique to commercial, industrial, and institutional entities as the need is identified.

V. REQUIRED ELEMENTS –EDUCATION ACTIVITIES

Appendix A details the activities and methods that the **Clinton River Watershed Council, Macomb County, Oakland County, SEMCOG and MSU extension will perform on behalf of the participating communities.** The matrix breaks out the activities according to the elements and key messages that they address and describes the target audiences, delivery mechanisms, timeline, responsible parties, and evaluation methods for each activity. An overall evaluation plan is also included in Section VI.

VI. EVALUATION PLAN

A variety of mechanisms will be employed. Some will quantify the usage of materials (e.g. number of materials distributed, website hits) and participation in events (e.g. number of attendees at a presentation or workshop, number of participants at an event). These mechanisms can be useful in determining whether the education effort is reaching the audience; however it is difficult to evaluate behavior change resulting from the education activity using these purely quantitative methods.

The Clinton River Watershed Council will use an online survey tool to measure post contact behavioral changes. For example; email addresses will be collected from all CRWC facilitated event attendees, 60-90 days following the event an email with a link to the online survey will be

sent asking the participant some questions about their general knowledge and behavior changes. While the surveys are not scientifically significant the results of the survey can help mold the Public Education Efforts throughout the Clinton.

Through CRWC's Adopt-A-Stream monitoring program, it is possible to evaluate long-term changes in water quality. The results are compiled in an annual scorecard, which allows a simple mechanism for measuring improvements or declines in water quality across the various subwatersheds. Improvements in water quality cannot be attributed solely to a successful public education effort, but indicate the overall effectiveness of the stormwater management efforts in the community, subwatershed, and watershed-wide.

VII. REPORTING

The Clinton River Watershed Council will provide a biennial Progress Report on this Public Education Plan to the Michigan Department of Resources and Environment MDNRE.

VIII. APPENDIX A: ACTIVITIES AND DETAILED MATRIX

IX. APPENDIX B: LETTERS OF SUPPORT FOR SERVICES AND PROGRAMS

1. Macomb County Public Works Office
2. MSU Extension – Oakland County
3. Oakland County Water Resource's Commissioners Office
4. SEMCOG

Lake St. Clair Direct Drainage

PEP Priority Table 2

				Target Audience	Key Message(s) Addressed											YEAR	FREQUENCY	RESPONSIBLE PARTY	MEASURABLE GOAL
					Green =High Priority Yellow= Low Priority Orange= Medium Priority														
PEP TOPIC	BMP IDENTIFIER	BMP DESCRIPTOR	PARTNER COLLOBORATION		PEP Element A - Personal Watershed Stewardship	PEP Element B - Ultimate Storm Water Discharge Locations and Potential Impacts	PEP Element C - Public Reporting of Illicit Discharges	PEP Element D - Car, Pavement PowerWashing	PEP Element E- Pesticides, Herbicides, Fertilizer Education	PEP Element F-Grass Clippings, Leaf Litter, Animal Waste Disposal	PEP Element G - Waste Management Assistance	PEP Element H- Septic System Maintenance	PEP Element I - Benefits of Green Infrastructure LID	PEP Element J - Mgt. of Riparian Lands	PEP Element K - Commercial, Industrial, Institutional Education				
	Watershed Wide Activities																		
A-C,I,J	Regional Stormwater Summit	This annual event, which debuted in 2013, features presentations on stormwater and watershed initiatives in the southeast Michigan and the Great Lakes region that are relevant in helping communities work together and gain insight into addressing the region's stormwater and watershed management challenges.	YES	Citizens including the general public and county and municipal employees	x	x	x			x		x	x	x	Annually in the Fall (September/O ctober)	Annually	Oakland County	-Date event held and number of participants -Featured speakers and speaker topics	
A,I	Michigan Green Schools Program	This program was signed into law at the state level in 2006. The program encourages public and private schools to participate in energy savings and environmental activities to be designated as "Michigan Green Schools".	YES	K-12th grade students and teachers	x	x	x		x	x	x		x	x	Annually	Annually	Oakland Macomb CRWC	Number of Macomb and Oakland County schools in program, Number of presentations by CRWC Staff	
A-G, I,J	River Day	CRWC will recruit, host and promote events. Macomb County will sponsor River Day events. Oakland County will host and/or participate in Clean Up Events as staff time allows. All parties including MS4 permittees will promote River Day events.	YES	Citizens including the general public and county and municipal employees	x	x	x		x	x	x		x	x	Annually	Annually	Oakland Macomb CRWC SEMCOG	Number of participants, projects results (varies by event)	
A,B,C,J, K	Clinton Cleanup	CRWC will recruit, host and promote events. Macomb County will sponsor Clinton Clean Up events. All parties including MS4 permittees will promote Clinton Clean Up events. Recruitment of volunteers is targeted to commerical, industrial and corporate partners.	YES	Citizens including the general public and county and municipal employees	x	x	x						x	x	Annually	Annually	Oakland Macomb CRWC	Number of participants, projects results (varies by event)	
A,B,C,J, K	Weekly Clean	CRWC will recruit, host and promote weekly clean up in the watershed. Recruitment of volunteers is targeted to commerical, industrial and corporate partners.	YES	Citizens including the general public and corporate and employees	x	x	x						x	x	Weekly	Weekly	CRWC	Number of Participants and number of lbs of trash collected	
A-G, I,J	School Program - Clinton River Water Festival at Oakland University	Participate in the Clinton River Water Festival at Oakland University, providing staff for event planning, registration, volunteer guiding and presentations as funding and staff time permits. This water festival educates students in the Oakland County portion of the Clinton River watershed.	YES	4th-5th grade students, teachers, and chaperones	x	x	x		x	x	x		x	x	Annually	Annually in May	Oakland Macomb CRWC	Number of schools/students participating: post event teacher and student surveys.	
A-G, I,J	School Program - Lake St. Clair Water Festival at Macomb Community College	Participate in the Lake St. Clair Water Festival, providing staff for presentations as funding and staff time permits. This water festival educates students in the the Clinton River, Lake. St. Clair Anchot Bay watersheds. Macomb County and CRWC will co-sponsor the Lake St. Clair Water Festival.	YES	4th-5th grade students, teachers, and chaperones	x	x	x		x	x	x		x	x	Annually	Annually in May	Oakland Macomb CRWC	Number of schools/students participating: post event teacher and student surveys.	
A-J	Subwatershed Advisory Group Participation	Attend subwatershed advisory group (SWAG) meetings in support of local watershed planning and implementation efforts. CRWC facilitates the Upper, Main and Stony/Paint SWAGS. Macomb County facilitates the Lake St. Clair, North Branch, Clinton River East and Red Run SWAGS. WRC staff facilitates the Upper Huron/Kent Lake SWAG.	YES	County and Municipal Employees and NGO Staff, all MS4 permittees	x	x	x	x	x	x	x	x	x	x	Annually	3-4times per year	Oakland Macomb CRWC SEMCOG	Refer to meeting minutes from each SWAG for participation and agenda items addressed	

Lake St. Clair Direct Drainage

PEP Priority Table 2

PEP TOPIC	BMP IDENTIFIER	BMP DESCRIPTOR	PARTNER COLLOBORATION	Target Audience	PEP Element A - Personal Watershed Stewardship	PEP Element B - Ultimate Storm Water Discharge Locations and Potential Impacts	PEP Element C - Public Reporting of Illicit Discharges	PEP Element D - Car, Pavement Power/Washing	PEP Element E- Pesticides, Herbicides, Fertilizer Education	PEP Element F-Grass Clippings, Leaf Litter, Animal Waste Disposal	PEP Element G - Waste Management Assistance	PEP Element H- Septic System Maintenance	PEP Element I - Benefits of Green Infrastructure LID	PEP Element J - Mgt. of Riparian Lands	PEP Element K - Commercial, Industrial, Institutional Education	YEAR	FREQUENCY	RESPONSIBLE PARTY	MEASURABLE GOAL
A-K	Stormwater Education: Community Presentations and Workshops	Presentation on watersheds, stormwater pollution, and personal actions. (CRWC will host a minimum of 2 in each subwatershed.) Topics will vary and will be based on host subwatershed requests. CRWC will communicate with webmasters and communication staff of the MS4 permittees community to ensure promotion of events.	YES	Citizens including the general public and county and municipal employees	x	x	x	x	x	x	x		x	x	x	Annually	Minimum 12 per year(2 per subwatershed)	Oakland Macomb CRWC	Date, time and location of presentation, number of participants, participant's zip code of residence, post presentation survey, 60-90 day follow up online survey
A,B,C,J	Adopt-A-Stream Training Workshops	Adopt A Stream training includes one 3-hour workshop on watersheds, stormwater pollution, personal actions, and training in volunteer monitoring procedures including macroinvertebrate collection and physical assessment. (Minimum of one 3 hr workshop per subwatershed) Bug Identification Workshops are also held in ensure that each team has at least one bug certified member . A minimum of 2 bug ID trainings held per year.	YES	Citizens including the general public and county and municipal employees	x	x	x							x		Annually	Annually	CRWC	Date, time and location of presentation, number of participants, participant's zip code of residence, post presentation survey, 60-90 dayfollow up online survey
A,B,C,J	Adopt-A-Stream Volunteer Water Quality Monitoring Program	Coordination of volunteer monitoring teams at pre-selected sites. Twice yearly volunteer appreciation picnic.	YES	Citizens including the general public and county and municipal employees	x	x	x							x		Annually	Annually	CRWC	Location of monitoring sites, number of participants, participant's zip code of residence, post monitoring survey, Monitoring results made avaiable annually.
A-J	Subwatershed Website	Hosted by CRWC website; features subwatershed map, photos, description, events and links to education resources.	YES	Citizens including the general public and county and municipal employees	x	x	x	x	x	x	x	x	x	x		The website is in place and is continuous	The website is in place and is continuous	CRWC	Will use page counter to report number of hits
A,B,C,E,F,I, K	Stream Leaders Student River Monitoring Program	Program is coordinated and implemented by CRWC following similar protocols as Adopt-A-Stream (also includes chemical analysis).	YES	K-12th grade students, teachers and chaperones	x	x	x		x	x			x	x		Program is continous however actual monitoring is in May and Oct of each year.	Program is continous however actual monitoring is in May and Oct of each year.	CRWC	location of monitoring sites, number of participants, water quality data results
	Macomb County Specific Activities																		
A-K	MCPWO Student Presentations	Macomb County Public Works Office offers <i>Recycle Macomb!</i> , <i>Pollution Solutions!</i> and <i>Water & the Urban Environment!</i> 3rd-12th grade students and adult groups. These presentations educate citizens on pollution prevention, recycling, proper hazardous waste disposal, environmental stewardship, functions of wells, septic systems, and storm drains.	YES	Adult groups and Macomb County 2nd-12th grade students	x	x	x	x	x	x	x	x	x	x	x	30 presentations per year	30 presentations per year	Macomb	Number of schools/students participating: pre- and post students surveys.
A-K	MCPWO On-Site Water Quality Presentation	Macomb County Public Works Office sponsors presentations on watershed management challenges of the Clinton River and Lake St. Clair Watersheds, what communities are doing to address the problems and what individuals can do. Presentations are held at the property surrounding the MCPWO building.	YES	General Public within the Watershed	x	x	x	x	x	x	x	x	x	x	x	Annually	Annually	Macomb,	Number of attendees.
A,B,C,G	Household Hazardous Waste Collection Days	Macomb County will promote proper hazardous waste disposal and sponsor collection drop-off sites.	YES	Macomb County Residents	x	x	x				x					6 events per year	6 events per year	Macomb	Number of residents and total pounds collected.
A-G, J	Environmental Education Calendar	Macomb County will promote & sponsor a 3rd grade drawing/calendar contest.	YES	Macomb County Residents, business owners, students, educators	x	x	x	x	x	x	x	x	x	x		Annually	Annually	Macomb	Number of calendars distributed.
A,B,G	<i>Imagine The Possibilities</i> Recycling Contest	Macomb County will promote and sponsor, "Imagine the Possibilities Contest", a 4th grade recycling contest.	YES	Elementary students, educators, and residents	x	x					x					Annually	Annually	Macomb	Number of student entries.

Lake St. Clair Direct Drainage

PEP Priority Table 2

PEP TOPIC	BMP IDENTIFIER	BMP DESCRIPTOR	PARTNER COLLABORATION	Target Audience	PEP Element A - Personal Watershed Stewardship	PEP Element B - Ultimate Storm Water Discharge Locations and Potential Impacts	PEP Element C - Public Reporting of Illicit Discharges	PEP Element D - Car, Pavement Power/Washing	PEP Element E- Pesticides, Herbicides, Fertilizer Education	PEP Element F-Grass Clippings, Leaf Litter, Animal Waste Disposal	PEP Element G - Waste Management Assistance	PEP Element H- Septic System Maintenance	PEP Element I - Benefits of Green Infrastructure LID	PEP Element J - Mgt. of Riparian Lands	PEP Element K - Commercial, Industrial, Institutional Education	YEAR	FREQUENCY	RESPONSIBLE PARTY	MEASURABLE GOAL
A,B,J	Tributary Signage at Road and River Crossings	Macomb County will promote Report-A-Polluter hotline with hotline phone number posted on signs placed at roadway/waterway crossings.	YES	Homeowners, visitors, and business owners within Macomb	x	x								x		10 signs per year	10 signs per year	Macomb	Number of signs installed.
	Community Specific Activites	These items are to be reported by the communities in the SWPPI not all items will be implented by each community.																	
A-J	Presentations and Displays	Provide displays and presentations for water quality-related events upon request and availability of staff time display to public at least once in the next 5 years.		Citizens including the general public and county and municipal employees	x	x	x	x	x	x	x	x	x	x		Annually	Annually	MS4 Permittees	Date , time location and name of event attended
A-K	Regional Public Education Efforts	Continue to participate in the Southeast Michigan Partners for Clean Water group facilitated by SEMCOG and support/share the resources available from this group, including: Seven Simple Steps to Clean Water brochures, tip cards and kids activity sheets. Topics include: fertilizer, car care, pet care, household hazardous waste disposal, earth-friendly landscaping, water conservation and storm drain awareness. Materials from the "Our Water. Our Future. Ours to Protect" campaign materials are distributed to MS4 permittees on an ongoing basis.		Citizens including the general public and county and municipal employees	x	x	x	x	x	x	x	x	x	x	x	Annually	Annually	MS4 Permittees	Track the number and type of materials distributed
A-J	Subwatershed Website	Hosted by CRWC website; features subwatershed map, photos, description, events and links to education resources. MS4 permittees will provide links to the CRWC website of their own websites.		Citizens including the general public and county and municipal employees	x	x	x	x	x	x	x	x	x	x		The website is in place and is continuous	The website is in place and is continuous	MS4 Permittees	Will use page counter to report number of hits
A-J	Newsletter Articles	Write articles about watersheds, stormwater pollution personal action for publication into existing municipal newsletters and websites; Four articles per year will be given to MS4 permittees from CRWC for publication in newsletters and other publications. MS4 permittees will distribute these article to the public each year via print or digital media.		Citizens including the general public and county and municipal employees	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		4 articles per year one for each season	4 articles per year one for each season	MS4 Permittees	Ms4 will report where and when these are published in their SWPPI.
A,C,G	Household Hazardous Waste Information	Continue to publicize information on the NO HAZ, Resource Recovery and Recycling Authority of Southwest Oakland County (RRRASOC) and Southeastern Oakland County Resource Recovery Authority (SOCRRA) programs to citizens and employees of Oakland County on WRMD's Web site (www.oakgov.com/waste/nohaz). NO HAZ, RRRASOC and SOCRRA provide safe disposal of household hazardous waste to Oakland County municipalities to the maximum extent practicable (as budget allows). Oakland County MS4 permittees will also promote.		Residents	x		x				x					Annually	Annually	MS4 Permittees	Report annually: Provide working links to Web sites Number of Web site hits Number of brochures distributed Pounds of waste collected through recycling programs
A,G	Recreational Vehicle Waste Dumpsites	Post links and/or locations to recreational vehicle (RV) waste dumpsites in the region on Southeast Michigan Council of Government's (SEMCOG) Ours to Protect Web site at: www.semco.org/OursToProtect_HouseholdWaste.aspx or provide a link to Michigan RV dump sites (www.rvdumps.com/mi.htm) on Oakland County Waste Resource Management Division's Web site at: www.oakgov.com/waste/. MS4 may add this to thier SWPPI		Residents, visitors to the area	x						x					Annually	Annually	MS4 Permittees	Provide working links to Web sites
A-J	Riparian Information Distribution	Distribute riparian landowner educational material (i.e. Waterfront Wisdom brochure) make available to their public via mailings or through their website. events, meetings, and through mailings. MS4 may add this to thier SWPPI		General Public, Riparian Landowners	x	x	x	x	x	x	x	x	x	x		Annually	Annually	MS4 Permittees	Number of brochures/other materials distributed -Number of riparian Web site hits

Prioritization Procedure for Communities within Lake St. Clair Direct Drainage

NPDES Permit Application Question 5 Public Education Plan Topic Prioritization

A watershed wide Public Education Plan (PEP) was developed to inform the public within the Clinton River Watershed and Lake St. Clair direct drainage (LSCDD) areas about their role in protecting water quality and preventing storm water pollution. The watershed approach allows the partners to share information and resources to address stormwater concerns at their source. Similarly, developing and implementing a public education program on a watershed basis provides a consistent and effective mechanism for protecting water resources across the region, while leveraging financial resources in each community.

The LSCDD Subwatershed Advisory group prioritized the key messages that the PEP would cover for the 2015-2020 permit cycle. A representative from each community rated the 11 permit topics as low, medium or high for their individual community. The ratings were based on local knowledge of each community's characteristics and the attitudes of residents. Table 1 below provides the results from the poll.

Table 1. Public Education Topic Ranking Results

Community	Stewardship	MS4/Waterbodies Education	Public Reporting of Illicit Discharges	Car, Pavement, Power Washing	Pesticides, Herbicides, Fertilizer Education	Grass Clippings, Leaf Litter, Animal Waste Disposal	HHW, RV Waste, Chemical/ Yard Wastes	On Site Disposal System Education	Green Infrastructure	Riparian Mgt Education	Commercial Industrial, Institutional Education
Charter Township of Clinton	HIGH	MEDIUM	MEDIUM	LOW	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
City of Grosse Pointe	HIGH	HIGH	MEDIUM	LOW	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	LOW
City of Grosse Pointe Park	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	HIGH	LOW	LOW	MEDIUM	LOW	LOW
City of Grosse Pointe Farms	HIGH	HIGH	MEDIUM	LOW	HIGH	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	LOW
City of St. Clair Shores	HIGH	HIGH	LOW	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	HIGH	HIGH
Macomb County	HIGH	HIGH	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	HIGH	HIGH	LOW
Village of Grosse Pointe Shores	HIGH	HIGH	HIGH	LOW	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	HIGH	LOW
Wayne County	MEDIUM	HIGH	MEDIUM	LOW	MEDIUM	HIGH	LOW	LOW	HIGH	LOW	MEDIUM
City of Roseville	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM
City of Eastpointe	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM
Majority	HIGH	HIGH	Medium	LOW	HIGH	HIGH	MEDIUM	LOW	MEDIUM	MEDIUM	LOW

Once the table was assembled, feedback from the communities was sought on how best to implement the PEP key messages based on the prioritization table.

The following consensus was reached:

Low Priority Topics

On Site Disposal System Education

- Information will still be made available on the Clinton River Watershed Council website (<http://www.crwcc.org/stormwater-protection/>)
- Included as a topic in the Macomb County Annual Environmental Calendar.

Car Washing

- Covered in Stormwater Presentations (minimum 2 per year within the LSCDD) facilitated by the Clinton River Watershed Council.
- One news article (if applicable) over the course of the permit cycle.

Commercial Industrial, Institutional Education

- Clinton River Watershed Council to facilitate a minimum 3 Clean Ups with Commercial Industrial, Institutional partners over the course of the permit cycle.

Medium and High Priority topics are covered in a variety of ways. Each medium and high priority will include a minimum of 3 presentations or workshops, 2 news articles (if applicable) over the course of the permit. All information will be made available on the Clinton River Watershed Council website (<http://www.crwcc.org/stormwater-protection/>). Please see Table 2 for more details and additional delivery methods.

City of Grosse Pointe Shores

Certificate of Coverage # MIG610318

Illicit Discharge Elimination Plan



*Village of
Grosse Pointe
Shores*

Revised December 2015

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Exhibits

Exhibit A – Watershed Map

Exhibit B – Outfall Maps

City of Grosse Pointe Shores Contact

Contact: Brett Smith, Storm Water Program Manager
Title: Director of Public Works
Telephone: 313-886-0020
Fax: 313-881-5417

Section I - Plan Objectives

Illicit Discharge Elimination Plan (IDEP) Objectives

This document describes the City of Grosse Pointe Shores' plan for identifying and eliminating illicit connections and discharges to Waters of the State in its jurisdiction.

This plan has been developed to fulfill the requirements for Part I. Section A.3.a. of the State of Michigan's National Pollutant Discharge Elimination System (NPDES) General Permit (MIG610000) for Storm Water Discharges from Separate Storm Water Drainage Systems (MS4s) with Watershed Plans and the Certificate of Coverage, No. MIG610318, issued to the City of Grosse Pointe Shores on June 30, 2009 under the General Permit.

The City of Grosse Pointe Shores is participating in the Lake St. Clair Direct Drainage Subwatershed Group. The group is being facilitated by the Macomb County Public Works Office. A watershed management plan was developed in October 2006 in collaboration with the other subwatershed partners including: the communities of St. Clair Shores, Roseville, Eastpointe, Clinton Township, Harrison Township, Lake Township, Grosse Pointe, Grosse Pointe Park, Grosse Pointe Farms, Grosse Pointe Woods, and Harper Woods; Macomb and Wayne counties; the Clinton River Watershed Council (CRWC); the Southeast Michigan Council of Governments (SEMCOG); and various school districts.

The purpose of the IDEP is to develop a program to prohibit and effectively eliminate illicit discharges and connections to storm water conveyances within the City of Grosse Pointe Shores. The Federal Phase II storm water regulations define "illicit discharge" and "illicit connection" as follows:

Illicit discharge – the discharge of untreated sanitary wastewater (including industrial and commercial wastewater) or other polluting materials into a river, stream or other water body from: improper sewage connections – such as sources of sanitary sewage which should be connected to the sanitary sewer but are inappropriately connected to the storm sewer; effluent from improperly designed and/or operated septic systems; sanitary sewer overflows; improper disposal of waste products – such as emptying a mobile home holding tank into a catch basin or pouring used motor oil into a catch basin; other discharges not composed entirely of storm water (except as specified in the permit).

Illicit connection – an improper physical connection of illicit discharges to the storm water drainage system, or other connections not authorized by the local authority (where required), to the storm water drainage system. Examples of illicit connections are: a) a floor drain in an automobile repair shop that is connected to the storm sewer rather than the sanitary sewer; and b) a septic tank discharge line that has been connected to the storm sewer. An improper connection of a source of storm water to the sanitary sewer would also be considered an illicit connection, for example, a parking lot catch basin that is tapped into the sanitary sewer. Illicit connections refer to a physical connection to the drainage system that either: Primarily conveys illicit discharges into the storm sewer system, or is not authorized or permitted by the local authority, if required.

The City of Grosse Pointe Shores has MS4s under its jurisdiction and as such, the objectives of this IDEP are to:

- 1) **Train** appropriate City staff on the investigation of illicit connections and discharges with emphasis on outfall observations/screenings, safety issues and natural occurring phenomenon,
- 2) Implement a system for **identifying and eliminating illicit discharges** and connections to the MS4s including outfall observations and follow-up sampling (when necessary),
- 3) Development of **adequate legal authority** to eliminate illicit discharges and connections to MS4s and provide for inspections of any MS4s that may be constructed in the City in the future,
- 4) **Locate and accurately map** the storm water conveyances and outfalls owned and operated by the City and update the map as necessary, and
- 5) **Coordinate** the City of Grosse Pointe Shores' IDEP efforts with other local communities and impacted County agencies as appropriate to maximize effectiveness and minimize duplication of efforts.

Section II - Community Background

A. General Information

The City of Grosse Pointe Shores covers approximately 1.5 square miles in northeast Wayne County, and forms a narrow strip – approximately 2.5 miles long and 0.6 miles wide - along the shore of Lake St. Clair.

Grosse Pointe Shores is a small community with approximately 2,900 residents and 1,100 households. The City is largely residential, with no retail or commercial properties. The entire City falls within the “urbanized area” and thus the storm water regulations apply to all the public separate storm sewer systems within the City limits.

Exhibit A is a map of the Lake St. Clair Direct Drainage Subwatershed showing the location and jurisdictional boundaries of the City of Grosse Pointe Shores.

Brett Smith, Director of Public Works, has been appointed as Storm Water Program Manager by the City of Grosse Pointe Shores and is responsible for implementation of this plan and compliance with the General Permit and COC.

B. Nested Jurisdictions

There are no schools in the City of Grosse Pointe Shores. There are no other public entities with regulated separate storm sewer systems within the City jurisdictional boundaries.

C. Storm Water Drainage and Sanitary Waste Disposal

The City’s entire sewer system – which was previously a combined sewer system – was separated approximately six (6) years ago.

The majority of the land use in Grosse Pointe Shores is residential. There is no retail or commercial businesses in the City. The City operates a harbor/marina as well as a park. In addition, there is a private yacht club in the City. There are only two (2) known on-site sewage disposal systems (OSDS) in the City.

Grosse Pointe Shores knows of 24 outfalls under its jurisdiction. They all discharge to Lake St. Clair.

Section III - Planned Efforts

The following subsections summarize the four required elements of an IDEP as specified in Part I, Section A.4.3) of the MDEQ Watershed Option General Storm Water Permit (MIG610000) and the City of Grosse Pointe Shores' plans for addressing each element. The City is committed to implementing the IDEP upon MDEQ approval or within 90 days of final submittal, and to completing activities to meet each of the required elements within five years of COC issuance. The actions completed will comply with the regulations and meet plan objectives. The planned actions are summarized and tabulated in Section IV of this plan. The City of Grosse Pointe Shores' IDEP will be reviewed during preparation of the progress reports to the MDEQ to determine if modifications are needed. The MDEQ will be advised of any changes in the plan.

For the purposes of this program “**outfall**” and “**point source**” are defined as a location where the storm water from a separate storm water conveyance under the jurisdiction of the City passes into a water body, wetland, upland or into a conveyance or property under the ownership or jurisdiction of an entity other than the City of Grosse Pointe Shores. “**Significant Illicit Discharge**” is a discharge that shows evidence of impairing water quality in the receiving water.

The City of Grosse Pointe Shores believes that adequate public education and resident involvement is essential for protection and enhancement of our natural resources. For an IDEP to be effective there needs to be an ongoing Public Education Plan that meets the objectives for the community. The City of Grosse Pointe Shores plans to coordinate its IDEP with its Public Education Plan to develop target audiences and messages.

1. Develop an ordinance or other regulatory mechanism where an ordinance is not feasible or appropriate, to effectively prohibit illicit discharges into the MS4 owned or operated by the permittee, and to implement enforcement actions.

Task 1.1: Review existing legal authority to implement the IDEP.

Description: The City of Grosse Pointe Shores has reviewed its ordinances and standards in 2005 and 2014. An IDEP Ordinance was enacted in November 2005. This ordinance will be evaluated and revised as needed.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Documentation of review and written recommendations

Schedule: Completed; Ongoing

Task 1.2: Develop adequate legal authority (if necessary).

Description: Based on recommendations from Task 1.1, adequate legal authority was developed to allow the City to implement the IDEP within its jurisdiction. The City developed an ordinance to ensure that:

- the ordinance adequately defines illicit connections and discharges;
- the ordinance prohibits illicit connections and discharges;
- the City has adequate legal authority to investigate suspected illicit connections and discharges;
- the City has adequate legal authority to require elimination of illicit connections and discharges;
- the City has adequate enforcement capability.

Responsibility: Grosse Pointe Shores Department of Public Works, Administration and Legal Department

Measure: Documentation of adoption

Schedule: Completed; Ongoing

- Task 1.3:** **Use and encourage public use of complaint receipt and response system.**
Description: The City encourages the use of a County-wide system to receive and track complaints regarding stormwater, construction site, illicit discharges/connections, and OSDS issues. The City posts the Wayne County Hotline information on their website. The City will continue to track complaints from City residents as they come in. We utilize a Spill Response & Complaint Form to track all IDEP related issues.
Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Records of complaints and responses. Media outlets used.
Schedule: Ongoing; As-Needed
- Task 1.4:** **Develop an inspection schedule for all City Drains and Outfalls.**
Description: Visual inspections of all outfalls are conducted every five (5) years by DPW Staff. All City-owned outfalls were field verified and dry weather screened in 2005 and 2010. These outfalls will be re-inspected by October 2014.
Responsibility: City of Grosse Pointe Shores Department of Public Works
Measure: Documentation of findings and observations. Number of possible illicit connections or discharges discovered. Number of outfalls inspected annually.
Schedule: Ongoing. Visual inspections of all outfalls are conducted every 5 years by DPW Staff.
- Task 1.5:** **Perform visual inspections and dry weather screenings of City-owned and/or operated storm water conveyance outfalls.**
Description: Dry weather visual inspections are conducted at each of the City's known outfalls every 5 years. Periodic inspections of known 'trouble areas/outfalls' are also conducted by DPW staff. In instances where the outfall is submerged, directed to another enclosed sewer, or is otherwise inaccessible, the City visually inspects the nearest upstream accessible location. In instances where a previously unknown outfall is located, dry weather visual inspections and an inventory will be conducted and follow-up to confirm ownership of the outfall will be completed. Dry weather inspections are defined as those conducted when no rain/precipitation event has occurred for a minimum of 48 hours. If flow is observed in the sewer at that time, it will be determined if the flow is natural base flow or a possible illicit discharge.
- The focus of the field inspection shall be to observe the following:
- Presence/absence of flow
 - Deposits/stains on the discharge structure or bank
 - Vegetation condition
 - Structural condition
 - Biology, such as bacterial sheens, algae, and slimes
 - Water clarity
 - Color
 - Odor
 - Floatable materials
- Responsibility:** City of Grosse Pointe Shores Department of Public Works
Measure: Documentation of findings and observations. Number of possible illicit connections or discharges discovered.
Schedule: Ongoing. Visual inspections of all outfalls are conducted every 5 years by DPW Staff.
- Task 1.6:** **Trace Illicit Connections and Owner Notification**
Description: Trace suspected illicit connections found in Task 1.5 to their source(s) using the techniques described below, and notify the owner or responsible jurisdiction of the problem in writing. If the illicit connection or discharge is a direct discharge to a City-owned conveyance, then the City directs the owner of the source to eliminate the illicit connection/discharge within a specified timeframe and require a notification of correction. If the illicit discharge is to another jurisdiction's storm water conveyance and reaches a City of Grosse Pointe Shores conveyance indirectly, then the City requires the owner of the system to provide updates on its investigations and inform Grosse Pointe Shores when the connection has been eliminated. Upon notification the

City re-inspects the outfall or by some other means confirms that the correction was completed. The timeframe for eliminating the connection/discharge will depend on the type and significance of the illicit connection/discharge, and the expense and difficulty of repair. Those, if any, causing a significant discharge is a priority for correction. The goal of the plan is to have most illicit connections/discharges eliminated within 90 days of notification. Illicit connections/discharges that are more complex may take longer than 90 days to eliminate.

Tracing techniques - All storm outfalls that are discharging during dry weather are investigated further. The City of Grosse Pointe Shores may be able to locate the source of an illicit connection/discharge solely through visual observation. Odor, color, turbidity, bacteria growth, quantity of flow, and the presence of foam, oil sheen, trash and/or floatable materials may lead to the source of a problem without additional sampling. As needed, sampling, dye and/or smoke testing, as-built plan review, or other investigative techniques will be used to determine the nature and source of the flow.

1. Sampling – Investigation of dry weather discharges will be prioritized based on the number of discharges identified, as well as other factors including location, volume of flow, and suspected contaminants based on color, turbidity, or odor. If flow is observed during the dry weather outfall inspections but visual observations do not lead to a source, the City of Grosse Pointe Shores may decide to sample the flow for pollutant parameters typically found in illicit connections. Sampling can rule out some dry weather discharges such as groundwater. The sampling will typically begin at the outfall and continue upstream from access site to access site until a source is found. The choice of sampling parameters will depend on several factors including:
 - Location of the storm outfall (i.e., in residential or commercial area);
 - Turbidity and color of discharge which could distinguish between an illicit discharge from a commercial establishment versus a residence;
 - Odor associated with discharge such as petroleum, or raw sewage.

Grosse Pointe Shores may choose to analyze the samples for some or all of the following parameters:

- Escherichia Coli
 - Total Residual Chlorine
 - Fluoride
 - Turbidity
 - Ammonia
 - Surfactants
 - Temperature (meter)
 - pH (meter)
 - Conductivity (meter)
 - Dissolved Oxygen (meter)
2. Indicator parameters (pH, temperature, ammonia, and detergents) will be utilized if the source is not identified during the field observation.
 3. As-built plan review – Where available, the City of Grosse Pointe Shores utilizes as-built pipe schematic drawings as a tool to determine the source of an illicit connection/discharge.
 4. Dye or smoke testing – The City of Grosse Pointe Shores conducts physical inspection of commercial and/or residential facilities as needed to verify suspected illicit connections that are detected through visual observations/sampling of yards,

outfalls and manholes. As necessary, facility inspections will include dye or smoke testing of suspect facility plumbing fixtures to determine if the fixture discharges to the sanitary system or to the storm sewer. All facility inspections will be documented. The City recognizes that written approval must be received from the MDEQ WB staff before using any tracer dyes to confirm any potential illicit discharges/connections.

5. Televising – The City of Grosse Pointe Shores may elect to televise those enclosed storm sewers that have suspicious flows to identify pollutant sources that cannot be located through simple visual observation and/or sampling. For example, the City may determine through visual observation and/or sampling that an illicit connection exists between two specific manholes. Video inspection of the stretch of storm sewer between these two manholes could be used to isolate the exact source of the connection/discharge.
6. The City of Grosse Pointe Shores may elect to conduct wet weather observations of some outfalls to determine if runoff from certain areas is contaminated. For instance, oil sheen at the outfall may indicate illicit disposal of oils or grease upstream in the service area. All outfall inspections are documented.

Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Number of illicit connections/discharges traced and documentation of notification and elimination.
Schedule: Ongoing; As-Needed. The City will initiate tracing of illicit connections as they are detected in Task 1.5.

Task 1.7: **Follow-up Enforcement for Non-correction**
Description: The City of Grosse Pointe Shores follows up with the owner of the source of an illicit discharge that is going directly to a City-owned drain to ensure that the connection/discharge has been eliminated. Visual inspections during a successive dry weather screening are conducted to verify elimination of the connection/discharge. If the illicit discharge has not been eliminated, the City of Grosse Pointe Shores uses its legal authority to obtain compliance. If the illicit discharge is an indirect source, the City coordinates follow-up and enforcement with the jurisdiction in which the discharge originates.

Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Documentation of enforcement actions. Number of illicit connections/discharges found vs. number eliminated.
Schedule: Ongoing; As-Needed. Begin as illicit discharges are detected and continue as needed.

Task 1.8: **Coordination with the MDEQ**
Description: The City of Grosse Pointe Shores will submit a biennial progress report to MDEQ summarizing the activities completed including illicit connections and discharges identified and corrected. If a significant problem arises, the City will contact MDEQ within 24 hours of discovery the potential illicit discharge or connection.

Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Program updates in Progress Report.
Schedule: Ongoing; As-Needed

Task 1.9: **Notify proper jurisdictions of illicit discharges or connections found by City staff.**
Description: During the course of normal business, Grosse Pointe Shores Staff may observe illicit connections or discharges that are not under the City's jurisdiction. When this occurs, the City notifies the owner or agency with jurisdiction of the problem in writing.

Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Documentation of the notification. Updates in Progress Report.
Schedule: Ongoing; As-Needed

2. *Develop a program to find and eliminate illicit connections and discharges to the MS4 from commercial, industrial, private educational, public, and residential resources.*

Task 2.1: Identify and report failed OSDS within the City.

Description: There are two (2) known OSDS within the City. The City will continue to work with Wayne County to report problems and address residential complaints as they are received. Wayne County has a county-wide ordinance requiring inspection of OSDS at time-of sale.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Complaint and referral records. Updates in Progress Report.

Schedule: Completed; Ongoing

Task 2.2.: Review tax and water billing records to identify properties served by OSDS.

Description: Tax and water billing records were reviewed to ensure that all other properties aside from the one OSDS identified in the City are not serviced by OSDS. The City will re-evaluate as needed.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Records of reviews.

Schedule: Completed; Ongoing

Task 2.3: Evaluate the integrity of the City of Grosse Pointe Shores sanitary systems.

Description: The City of Grosse Pointe Shores will continue to evaluate sanitary and/or storm sewer systems to insure that seepage into the groundwater and surface water is minimized. All sewer systems within the City have been televised and relined. Routine inspections are performed as needed.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Report of findings, corrections, recommendations, and repairs.

Schedule: Completed; Ongoing

Task 2.4: Continue existing City program for televising storm and/or sanitary sewers.

Description: The City of Grosse Pointe Shores will continue to televise its existing storm and/or sanitary sewers in the following circumstances: to evaluate sewer structural integrity before the City constructs road repairs, to evaluate structural integrity of old sewers which may need replacement; as part of City's Rear Yard Drain relining program. This televising is conducted as needed. All sewer systems within the City have been televised and relined. Routine inspections are performed as needed.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Report of findings, corrections, recommendations, and repairs.

Schedule: Completed; Ongoing

Task 2.5: Televis storm sewers as needed to detect illicit connections.

Description: On an as-needed basis, the City of Grosse Pointe Shores will televise those separate storm sewers under its jurisdiction to determine if illicit connections that were not detected during outfall inspections/sampling exist. The need to televise storm sewers for this purpose are based on referrals and/or inquiries from agencies such as other communities, the County Health Department or Wayne County Department of Public Works and/or other information that suggests illicit discharge(s) originating from the City.

Responsibility: Grosse Pointe Shores Department of Public Works

Measure: Report of findings, corrections, recommendations, and repairs.

Schedule: Completed; Ongoing

Task 2.6: **Develop and implement a procedure to identify and record, map and inspect outfalls from new construction and update the outfall map as needed.**
Description: The GIS storm sewer mapping is complete and is updated as new records and/or outfalls are found. The City is completely built-out, but there are opportunities for re-development.
Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Procedure documented and implemented. New outfalls mapped and inspected.
Schedule: Completed; Ongoing

Task 2.7: **Update drainage system map based on field observations.**
Description: See Task 2.6.
Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Procedure documented and implemented. New outfalls mapped and inspected.
Schedule: Ongoing

3. *Develop a program to train staff employed by the permittee who are involved in illicit discharge-related activities, or who have field jobs with the potential for witnessing illicit discharges and connections.*

Task 3.1: **Provide training to appropriate Grosse Pointe Shores Staff on illicit connections and discharges, safety issues, failed OSDS, how to identify and respond to a potential illicit discharge, and natural occurring phenomenon. Determine the feasibility of coordinating this training with the other agencies and the local communities in the County.**
Description: The City will continue to provide training on illicit connections and discharges to appropriate City Staff. The City of Grosse Pointe Shores will attempt to coordinate IDEP training with the other local communities and the WCDPH, WCDPW, MCHD, etc. All relevant field staff will be trained every 3 years as needed.
Responsibility: Grosse Pointe Shores Department of Public Works
Measure: Training records and certificates. Training provided to all relevant field employees.
Schedule: Every 3 years; Ongoing

4. *Develop a method for determining the effectiveness of the illicit discharge elimination activities that shall, at a minimum, result in the inspection of each storm water point source every five years unless an alternative schedule is approved by the MDEQ.*

Task 4.1: **The City will establish a tracking system to monitor progress in implementing the IDEP.**
Description: As established in the COC, the City will continue to provide IDEP updates in the Progress Report, submitted to the MDEQ. The report summarizes the following:

- illicit connections/discharges identified through citizen complaints, Wayne County referral, inspections, sampling and/or sewer television and the corrective actions taken, including follow up inspections and sampling;
- results of inspections and sampling (including pollutant, estimated volume and load and location for significant illicit discharges);
- dry/wet weather storm water outfall inspections conducted;
- OSDS found to be improperly functioning and the actions taken to correct the problems;
- schedules for the elimination of unresolved problems/discharges;

- the annual CSO/SSO report required by Section 324.3112a of Part 31 of Public Act 451 of 1994, as amended, if appropriate;
- storm sewers televised in the past two (2) years (if any) as well as the findings;
- corrective actions taken as a result of storm sewer televising (if any);
- the anticipated schedule for televising storm sewers in the upcoming year;
- sanitary sewers televised in the two (2) years (if any) as well as the findings;
- corrective actions taken as a result of sanitary sewer televising (if any);
- the anticipated schedule for televising the sanitary sewers in upcoming years.

Responsibility: Grosse Pointe Shores Department of Public Works, Consultant
Measure: Updates in Progress Reports.
Schedule: Biennially; Ongoing

Task 4.2: Develop a procedure to identify the overall effectiveness of the IDEP.

Description: The City will work with its consultant and Lake St. Clair Direct Drainage Subwatershed Advisory Group to identify the best way(s) at measuring effectiveness. Biennially, the City will prepare and submit a report summarizing its illicit discharge elimination efforts to MDEQ.

Responsibility: Grosse Pointe Shores Department of Public Works, Consultant
Measure: Documentation of evaluation and decisions made.
Schedule: Ongoing throughout the Permit Cycle

Evaluation Methods

- Staff Training frequency
- Number of illicit discharges eliminated over the permit cycle
- IDEP Notification successes/failures
- Number of resident/business/staff complaints received over the permit cycle
- Evaluation of program efficiency
- Changes in receiving water quality data over time

Evaluation methods will be re-evaluated biennially during the progress report submittal process.

Section IV - Summary of Planned Efforts

The City of Grosse Pointe Shores' IDEP is summarized in the tables that follow. The first table lists the IDEP tasks by the associated General Permit (MIG610000) requirement (Part I, Section A.4.3) and it provides the implementation schedule and measure for each task.

Summary of IDEP tasks, implementation schedules and measures:

PERMIT REQUIREMENT	TASK #	TASK DESCRIPTION	SCHEDULE	MEASURE
<i>1. Develop an ordinance or other regulatory mechanism where an ordinance is not feasible or appropriate, to effectively prohibit illicit discharges into the MS4 owned or operated by the permittee, and to implement enforcement actions.</i>	1.1	Review existing legal authority	Completed; Ongoing	Documentation of review and recommendations.
	1.2	Develop adequate legal authority (if necessary)	Completed; Ongoing	Documentation of adoption.
	1.3	Implement complaint system	Ongoing; As-Needed	Records of complaints and responses. Media outlets used.
	1.4	Develop an inspection schedule	Every 5 years; Ongoing	Documentation of findings and observations. Number of possible illicit connections or discharges discovered. Number of outfalls inspected annually.
	1.5	Perform visual inspections	Every 5 years; Ongoing	Documentation of findings and observations. Number of possible illicit connections or discharges discovered.
	1.6	Trace illicit connections	Ongoing; As-Needed	Number of illicit connections/discharges traced and documentation of notification and elimination.
	1.7	Follow-up enforcement	Ongoing	Documentation of enforcement actions. Number of illicit connections/discharges found vs. number eliminated.
	1.8	Coordination w/ MDEQ	Ongoing	Program updates in Progress Report.
	1.9	Notify proper jurisdictions of illicit discharges	Ongoing; As-Needed	Documentation of notification. Updates in Progress Report.

PERMIT REQUIREMENT	TASK #	TASK DESCRIPTION	SCHEDULE	MEASURE
2. <i>Develop a program to find and eliminate illicit connections and discharges to the MS4 from commercial, industrial, private educational, public, and residential resources.</i>	2.1	Identify and report failed OSDS within the City	Completed; Ongoing	Complaint and referral records. Updates in Progress Report.
	2.2	Review tax and water billing records to identify properties served by OSDS	Completed; Ongoing	Records of reviews.
	2.3	Evaluate the integrity of City sanitary systems	Completed; Ongoing	Report of findings, corrections, recommendations, and repairs.
	2.4	Continue existing program for televising sanitary and/or storm sewers	Completed; Ongoing	Report of findings, corrections, and repairs.
	2.5	Televis storm sewers	Completed; Ongoing	Report of findings, corrections, and repairs.
	2.6	Develop procedure to identify and map outfalls from new construction	Completed; Ongoing	Procedure documented and implemented. New outfalls mapped and inspected.
	2.7	Update drainage system map	Ongoing	Procedure documented and implemented. New outfalls mapped and inspected.
3. <i>Develop a program to train staff employed by the permittee who are involved in illicit discharge-related activities, or who have field jobs with the potential for witnessing illicit discharges and connections.</i>	3.1	Provide training to appropriate staff	Ongoing	Training records and certificates. Training provided to all relevant field employees.
4. <i>Develop a method for determining the effectiveness of the illicit discharge elimination activities that shall, at a minimum, result in the inspection of each storm water point source every five years unless an alternative schedule is approved by the MDEQ.</i>	4.1	Establish a tracking system to monitor progress	Biennially; Ongoing	Updates in Progress Reports.
	4.2	Develop a procedure to identify the overall effectiveness of the IDEP	Ongoing throughout Permit Cycle	Documentation of evaluation and decisions made.

Appendix I
Spill Notification & Complaint Reporting Form
Illicit Discharge Elimination Program
Village of Grosse Pointe Shores, Wayne County

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: _____

Initial Contact made to:

- 911
- Fire Dept. (313) 881-5500
- Police Dept. (313) 881-6565
- WCDPS (313) 224-8249
- WCDPS (IDEP) (734) 326-4483
- PEAS Hotline (State) 1-800-292-4706
- WCHD 24-Hour Hotline (888) 223-2363

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:

Spill Notification & Complaint Reporting Form
Illicit Discharge Elimination Program
Village of Grosse Pointe Shores, Wayne County

Compliance Information & Schedule:

Date Violation Was Resolved: _____

1. Take down complaint information.
2. Fill out the Spill Notification form for the Illicit Discharge Elimination Reporting System.
3. Inform the caller that the problem will be further investigated and thank him/her for calling in.
4. If the problems are related to sanitary please contact the Oakland County Water Resources Commission at (248) 858-5248.
5. If the problem is related to oil please phone 911.
6. If the Problem is related to a construction site and there is sediment leaving that site please call Oakland County Water Resources Commission at: (248) 858-5389.
7. Please fax completed form to:
 - (i) Michigan Department of Environmental Quality (MDEQ)
Southeast Michigan District Office
Industrial and Storm Water Unit
Fax #: (586) 753-3751
Phone #: (586) 753-3700
 - (ii) Hubbell, Roth & Clark, Inc.
Environmental Engineering Department
Fax #: (248) 338-2592
Phone #: (248) 454-6300

OAKLAND COUNTY WATER RESOURCES COMMISSIONER ENGINEERING DESIGN STANDARDS FOR STORM WATER FACILITIES

**Requirements, Rules and Design Criteria for
Storm Water Management**



**January 1, 2006
Revised April 24, 2012**

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- Act 288 of the Public Acts of 1967, as amended, is known as the Subdivision Control Act of 1967 (the "Plat Act"). All subdivision plats to be recorded with the County Register of Deeds must conform to this Act. Under the Plat Act, the Water Resources Commissioner is required to review and approve the storm water drainage for the plat.
- The provisions of Section 192 of the Plat Act include:
 - a. That the Proprietor provides for adequate storm water facilities within the lands proposed for platting and outlets thereto.
 - b. That the Proprietor provide adequate storm water retention basins where deemed necessary.
- The rules presented herein, with the authority provided for in Section 105, sub-section (c) of the Plat Act, are issued to guide land developers, engineers and surveyors interested in developing land in Oakland County and to provide for a uniform method of preparing plats and construction plans submitted to the office of the Oakland County Water Resources Commissioner for review and approval.
- The Plat Act gives the Water Resources Commissioner the authority to require that County Drains and natural water courses, both inside and outside the plat boundaries, be improved to the standards established by the Water Resources Commissioner when deemed necessary.
- The Water Resources Commissioner will also require that an appropriate entity be responsible for the perpetual maintenance of all storm water drainage facilities within the plat or the storm drainage system may be established as a County Drain, at the Proprietor's expense, to insure adequate maintenance.
- The rules presented herein will also apply to:
 - Mobile home development plans submitted to the Water Resources Commissioner under Act 96 of the Public Acts of 1987
 - Site development plans that require review and approval by the Water Resources Commissioner's office
 - Site condominium development plans prepared under Act 59 of the Public Acts of 1978 that require review and approval by the Water Resources Commissioner's office
 - Private storm drain systems that are to be established as a County Drain under Chapter 18 of the Drain Code.
 - Any other storm drainage system review requested to be performed by the Water Resources Commissioner's office.
- These rules are the minimum design standard accepted by this office. In addition to the rules herein, the Proprietor must also abide by the rules, standards, specifications and master plan of the municipality where the site is located. In the case where conflicting standards arise, the more stringent requirements will govern.
- These rules will be revised as necessary with the most recently dated sheets being applicable.
- These storm water standards are intended to generally comply with the requirements of the Phase II National Pollutant Discharge Elimination System Storm Water Regulations, however, more stringent storm water standards may be required to meet the goals and objectives of State of Michigan approved Watershed Management Plans. Storm water Best Management Practices should be incorporated to the maximum extent practicable as required.

BMP-Best Management Practice – Structural device, measure, facility or activity that helps to achieve storm water management control objectives at a designated site. Ex: A detention basin is a BMP.

Commissioner - The Water Resources Commissioner of the County of Oakland, State of Michigan.

County Drain- The Water Resources Commissioner of Oakland County, through legislative enactment, has acquired jurisdiction over a storm water conveyance system. Ex: An enclosed drain or an open watercourse.

Design Storm- The rain storm used as the basis of design for storm water drainage facilities.

Detention Basin- A reservoir or structure that stores storm water and releases it at a controlled rate.

Drainage Area- The area of land that has runoff tributary to a specific point.

Drainage System- All storm drainage facilities within a site, including storm drains, detention basins, swales and channels.

Easement- A right afforded to a person or entity to make limited use of another's real property.

Engineer - The Engineer of the Office of the Oakland County Water Resources Commissioner.

Forebay- A pond-like structure that pre-treats storm water runoff to remove pollutants, predominantly sand, dirt and silt, before discharging into an adjacent storm water pond.

Freeboard- The space between the high water elevation and the top of bank of a storm water pond or storage structure.

Gabion- A large wire mesh box which holds large rocks and boulders.

Hydrograph- A graph of discharge or flow rate as a function of time.

Infiltration- A process whereby precipitation seeps into the ground.

In-line Basin- A storm water reservoir constructed within a watercourse.

Low-Flow Channel- A small swale within a basin designed to convey the runoff from a small rain event through the basin in a manner that will facilitate infiltration.

Precipitation- Any water or ice with sufficient mass that it falls to the earth.

Proprietor - Any person, firm, association, partnership, corporation, or combination of any one of them.

Retention Basin- A reservoir that stores storm water without releasing it. The storm water ultimately evaporates or infiltrates into the ground.

Runoff- Precipitation that flows over land.

Storm Drain- A pipe, conduit or open watercourse that conveys storm water.

Surcharge- A condition in which the water level in a storm drain rises above the crown of the conduit.

Swale- A natural or constructed wide, shallow ditch that conveys storm water.

Watercourse- A natural or artificial channel for flowing water.

Watershed- Area of land that drains to a single outlet and is separated from other watersheds by a divide.

100-yr Storm- A rainstorm that has a 1% chance of occurring in a year.

10-yr Storm- A rainstorm that has a 10% chance of occurring in a year.

I. APPLICATION FOR REVIEW

An application for review must accompany all plans submitted to WRC for review. The application shall be submitted by the Owner/Developer or the Design Engineer on behalf of the Owner/Developer. Application for review shall be made prior to the start of any work requiring a permit from WRC.

For project sites that will be developed in phases an application is required for the initial work and new applications will be required for additional work not indicated on the original application.

A minimum, non-refundable, up-front application fee is required for certain developments. The total review and permit fees will be determined upon completion of the review.

The review period begins upon the receipt of a completed application, plans and fees.

II. SUBDIVISIONS- Sites to be platted under Act 288

A. Preliminary Plat

1. General Requirements

A preliminary or tentative plan showing the layout of the area intended to be platted shall be submitted by the Proprietor. This plan shall be prepared under the direction of and sealed by a registered professional engineer or a registered land surveyor. The plan shall be drawn to a standard engineering scale no smaller than 1" = 100' and the sheet(s) of paper must not be larger than 24" x 36". This preliminary plan is what the Subdivision Control Act of 1967 refers to in Section 111 as a "preliminary plat".

Section 114, Sub-section (3) of the Subdivision Control Act of 1967 requires that the Water Resources Commissioner approve or reject preliminary plats within 30 days of their receipt.

Three copies of the preliminary plat, prepared in accordance with the following requirements, shall be submitted with a letter of transmittal requesting that the preliminary plan be reviewed and, if found satisfactory, approved. The names of the Proprietor and engineering or surveying firm with mailing addresses, telephone and fax numbers for each shall be included with the transmittal.

The preliminary plat shall include:

- a. The location of the proposed subdivision with reference to the section and part of section in which the parcel is situated, the name of the township, city or village, a proposed legal description of the site, the number of acres proposed to be platted and a location map with north arrow.
- b. The proposed street and alley layout and approximate lot and plat dimensions.
- c. All on-site and off-site pertinent factors, the existence and description of which might be of value in determining the overall requirements for the subdivision, such as:
 - Adjoining roads, subdivisions and parcels
 - Railroads
 - High-tension tower lines, under ground transmission lines and gas pipelines
 - Cemeteries and parks
 - Rivers, natural water courses, county drains, lagoons, slips, waterways, streams, lakes, bays, canals, wetlands, wetland boundaries and floodplains
 - Existing utilities; storm drains, sanitary sewers, water main, telephone, cable or fiber optic lines
 - Existing and proposed easements

Appendix J

- d. Contour information in two-foot intervals with North American Vertical Datum of 1988 (NAVD 88), or most current national datum, shall be shown on the same plan, otherwise it shall be submitted on a separate sheet.
- e. A drainage map, using a United States Geological Survey (USGS) topographic map, or equivalent, that shows the existing drainage area and flow patterns and indicates the proposed drainage pattern.

Inasmuch as improper utility easement location can result in a change in plat layout, the Proprietor is advised to consult with the respective utility companies before presentation of the preliminary plan for approval.

In the case where the Proprietor wishes to subdivide a given area but wishes to begin with only a portion of the total area, the original plan shall include the proposed general layout for the entire area. The part that is proposed to be subdivided first shall be clearly superimposed upon the overall plan in order to illustrate clearly the method of development which the Proprietor intends to follow. Each subsequent plat shall follow the same procedure until the entire area controlled by the Proprietor is subdivided. The final acceptance of a subdivision that is a partial development of a larger general layout does not automatically insure the final acceptance of the overall layout. The intent is to permit some flexibility in the overall layout if future conditions make it desirable or necessary to make any changes.

If the proposed preliminary plan as submitted meets with all the requirements, one approved copy of the preliminary plan will be returned. Approval of the preliminary plan is recommended before proceeding with the preparation of final construction plans. If the proposed plan is not approved as originally submitted, the Commissioner notifies the Proprietor in writing setting forth the reasons for withholding approval and requests that the necessary changes be made and the revised layout resubmitted.

In accordance with Section 560.120 of Act 288, the preliminary plat approval is valid for two years. If construction plans have not been submitted within that time, a new preliminary plat must be submitted and approved. The two-year period may be extended if applied for by the proprietor and approved by the Water Resources Commissioner in writing.

2. *Drainage Requirements*

The preliminary plan must include the general drainage scheme for the proposed subdivision, or the plan will be rejected. The general drainage scheme shall indicate how storm drainage will be provided and where it will outlet. Preliminary calculations for detention and contributing off-site flow must be included on the plan.

Drainage proposed for subdivisions shall conform to established County Drain districts, existing natural drainage patterns and community master plans. The design shall consider the effect that the drainage proposed in the subdivision has upon the entire drainage basin.

The preliminary plan shall indicate in general, on a USGS topographic map, any drainage originating outside of the subdivision limits which has previously flowed onto or across the subdivision, as well as any natural watercourses and County Drains that traverse or abut the subdivision.

The preliminary plan shall indicate in general any proposed onsite and/or offsite facilities, proposed or existing, required to conduct the drainage to an adequate outlet.

The Water Resources Commissioner's office is not responsible for roadside ditches. Road drainage ditches are under the jurisdiction of the Road Commission for Oakland County (RCOC) or other authority. Any drainage plan that proposes to outlet storm water to a road ditch must be approved by the RCOC or authority that has jurisdiction.

The Water Resources Commissioner shall require that the developer provide assurance of adequate maintenance and inspection of the installation of both the external and internal storm drainage facilities.

3. *Easement Requirements*

The following minimum easement widths are required for all storm drainage facilities within the boundaries of the subdivision:

a. Open drains and watercourses-

The extreme width of the drain or watercourse plus 15 feet from top of bank on both sides of the channel.

b. Enclosed drains-

A minimum of twenty (20) feet centered on the centerline of the pipe . However, larger pipe size, certain soil conditions, or depth of pipe may require larger easements.

c. Rear yard drains-

For pipe sizes less than 12 inches in diameter, a minimum of twelve (12) feet centered on the centerline of the pipe.

d. Pump stations, detention/retention basins and other storm drainage facilities-

Sufficient easement area to allow for operation and maintenance of the entire facility, including freeboard area, the banks and any berms at the top of the banks.

Easement widths for legally established County Drains shall be sized by the Oakland County Water Resources Commissioner's office. In general these will conform to the above referenced requirements. Additional easements may be required by the Water Resources Commissioner's office should soil, construction conditions or other circumstances so warrant.

Easement information shall be shown on the preliminary plan, final construction plans and final "Mylar" plat.

The wording relative to easement information shown on the final plat shall be as specifically required by the Water Resources Commissioner's office. All County Drain easements shall be labeled as follows: "Permanent private easement for the NAME County Drain".

The Oakland County Water Resources Commissioner's office reserves the right to modify easement requirements at its discretion.

B. Construction Plans

The Proprietor will submit final construction plans that have been prepared under the direction of, and sealed by, a Registered Professional Engineer with a completed application form. The Water Resources Commissioner's Office will review the plans for adequacy of storm water management design to ensure that the proposed storm water drainage system has the capacity to handle all contributing flow without diminution of the existing off-site natural drainage patterns.

Two complete sets of final construction plans shall be submitted. The plans must be drawn to a scale not smaller than 1"= 50' on sheets no larger than 24" x 36" and designed in accordance with the design criteria presented herein.

1. *Required Information*

The plans should include, at minimum, the following:

- a. A cover sheet which includes a site legal description and location map with north arrow and the number of acres proposed to be platted. For phased developments, indicate clearly the phase limits and the number of acres in each phase.
- b. Subdivision layout of lots, roads and all existing and proposed easements.

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- c. Plans, profiles and details of all roads.
- d. Plans, profiles and details of all enclosed storm drains, open ditch drains, drainage swales and drainage structures.
- e. Plans and details of the soil erosion and sedimentation control measures. Indicate which measures are temporary or permanent and the party responsible for maintaining the control measures.
- f. Plans, cross-section views and details of the detention or retention basins and the outlet. If an existing basin on or off-site will be used then as-built information must be provided.
- g. A drainage breakup sheet indicating the number of acres, calculated to the nearest tenth, contributing to each specific drainage structure.
- h. Topographic map or maps at two foot contour intervals with North American Vertical Datum of 1988 (NAVD 88), or most current national datum, showing existing topography and proposed grades of the entire area to be subdivided, as well as the topography of all adjacent property to the extent that off-site contributing flow can be determined. All off-site contributing flow must be accommodated. This map or maps shall also show all existing watercourses, lakes and swamps.
- i. Design data and criteria used for sizing all drainage structures, channels and detention/ retention basins.
- j. Storm drain hydraulic, detention/ retention and runoff coefficient calculations as well as design calculations for all drainage swales and overflow structures. Overflow structures must be sized to pass all contributing off-site flow.
- k. Specifications governing construction, i.e. material specifications, pipe bedding, construction notes, compaction requirements, etc.
- l. A plan and a proposed schedule for the perpetual maintenance of the complete storm drainage system. Indicate who will be responsible (i.e. municipality or homeowners' association) for the maintenance. If the homeowners' association will be responsible for the system, the subdivision deed restrictions must have a section indicating such responsibility and a copy must be submitted to the Water Resources Commissioner. If there is a maintenance agreement with the City, Village or Township, a copy of the agreement must be submitted to the Water Resources Commissioner. The maintenance plan must be submitted prior to plan approval.

2. *Review Time*

The Water Resources Commissioner's office will attempt to review these plans in the shortest possible time. A preliminary plan must be submitted and approved prior to submitting the final construction plans, so that no time is wasted on a drainage design that would be unacceptable. The construction plan approval is valid for one (1) year. The one-year period may be extended if applied for by the proprietor and approved by the Water Resources Commissioner in writing.

3. *Changes To The Plans*

Approval of the final construction plans is intended to be final approval, and the actual signing of the "Mylar" plat is only a formality, as long as there are no changes in the final construction plans from what was approved. If either the Proprietor or the Commissioner find it advantageous to make changes before the "Mylar" plat is presented to the Commissioner for signature, such changes can be made, provided that the same procedures outlined above are repeated with each change in the layout. The Proprietor is reminded that approval of the proposed subdivision by the local governing body is also required under the Plat Act. Such changes shall be incorporated in the layout and revised construction plans shall be resubmitted even though the original layout may have already been approved by the Commissioner. If the Proprietor does not present his "Mylar" plat to the Commissioner for approval within a period of one year after receiving approval of the final construction plans, it may be necessary that he resubmit the layout for review in the light of new information which may have become available during the interim.

C. Final Plat

The Proprietor shall submit the final "Mylar" plat to the Water Resources Commissioner for certification. The plat will be reviewed for accurate drainage easements and equivalence with the approved construction plans. If the Commissioner approves the plat, he will affix his signature to it and the plat will be executed. If the Commissioner rejects the plat, written notice of such rejection and the reasons therefore are given to the Proprietor within ten days.

Prior to the Proprietor submitting the final "Mylar" plat for certification, the following is required:

- ✓ Approval of the preliminary plat.
- ✓ Approval of the final construction plans.
- ✓ Assurance of adequate maintenance and inspection of the installation of both the external and internal storm drainage facilities.
- ✓ A soil erosion and sedimentation control permit under Part 91 of Act 451 of the Public Acts of 1994 as amended.
- ✓ Payment by the Proprietor of the plat review fee, according to the latest schedule posted on the Oakland County Water Resources Commissioner's website www.co.oakland.mi.us/drain .
- ✓ A minimum, non-refundable application fee is required upon submittal of the preliminary plat and the construction plans.

III. MOBILE HOME DEVELOPMENTS

Public Act 96 of 1987, The Mobile Home Commission Act, requires a developer of a Mobile Home Park to submit a preliminary plan to the Water Resources Commissioner.

A. Preliminary Plan

The preliminary plan shall include the location, layout, general design and a general description of the project. The preliminary plan does not include detailed construction plans.

B. Outlet Drainage

The Water Resources Commissioner must review and may approve the outlet drainage for the park. The design standards covered in Section II of Design Criteria and Engineering Methods will be used for this review. All pertinent design calculations must be submitted. The interior drainage within the park will not be reviewed unless the park storm drain system is to be established as a County Drain under Chapter 18 of the Drain Code.

The Water Resources Commissioner may approve or reject preliminary plans within 60 days of their receipt, otherwise the plan is considered approved.

Mobile home park construction plans are reviewed by the Mobile Home Commission.

IV. DRAINS UNDER THE JURISDICTION OF THE WATER RESOURCES COMMISSIONER

A. Permits

A permit shall be required from the Water Resources Commissioner prior to performing any work to a County Drain or it's appurtenances. The following are examples of work:

- a. Connecting to any part of an open ditch, enclosed drain or manhole or drainage structure. A tap can be a direct connection or a pipe outlet.
- b. Crossing any part of an open ditch or enclosed pipe. Examples of crossings are utility lines, driveways, culverts and bridges. A minimum clearance of five (5) feet for an open ditch drain and eighteen (18) inches for an enclosed drain must be maintained between the drain and any proposed utility or other underground crossings of the drain.
- c. Relocating any part of a County Drain.
- d. Enclosing any portion of an existing open ditch drain.
- e. Performing work within a County Drain easement.
- f. When the installation of a fence, driveway, patio, pool or other structure that does not have a foundation, encroaches into the County Drain easement.

The following requirements of the permit must be met:

- Construction plans must be submitted to this office for review. The plans shall include design calculations for storm water storage volume and allowable outflow. A drainage area map must be included with the plans.
- The review application and application fee, appropriate permit fee and inspection deposit must be submitted before a permit is issued. Permit fees are determined on a site-specific basis.
- A notice of 48 hours must be given to the Oakland County Water Resources Commissioner's Inspection Department prior to any construction affecting the drain. In the event that our Inspection Department is not notified as stipulated herein the entire inspection deposit will be forfeited.
- Flow shall be maintained in the drain at all times during construction.
- All work must be completed in accordance with the plans and specifications submitted by the Owner/Developer and approved by this office.
- Work performed on the County Drain or it's appurtenances must be performed in accordance with the Oakland County Water Resources Commissioner's Storm Drain Notes and Details Sheet.
- A drain permit issued by the Water Resources Commissioner's Office will not relieve the applicant and/or his contractor of the responsibility of obtaining permits, approvals or clearances as may be required from federal, state or local authorities, the public utilities and private property owners.
- An as-built plan of the drain involvement must be submitted.
- The Water Resources Commissioner shall be notified in writing within ten days of the completion of a project. A final inspection will be performed and a letter of permit closure may be issued.
- A letter of permit closure must be issued by the Water Resources Commissioner before any remaining deposit money is refunded.

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- A permit shall expire when work has not commenced within one year of the date of issuance. The Water Resources Commissioner may extend the permit for a period of time upon the request of the Owner/Developer in writing.
- The Water Resources Commissioner may revoke a permit if there is a violation of the conditions of the permit or if there is a misrepresentation or failure to disclose relevant facts in the application.

☞ A drain permit is separate from a Soil Erosion Control permit.

B. Construction Plans

Any development that will outlet storm water directly to a County Drain will be reviewed by the Water Resources Commissioner for adequate storm water storage volume and outlet drainage. The standards covered in the Design Criteria and Engineering Methods section will be used for this review. All other involvements will have a drainage review performed relevant to the work proposed.

The Proprietor shall submit three (3) sets of construction plans with a transmittal requesting plan review. The plans must be prepared in accordance with the design standards presented herein and sealed by a Registered Professional Engineer or Land Surveyor. All pertinent design calculations must be submitted with the final construction plans. Preliminary plans may be submitted, but are not required.

Certain County Drains have limited capacity. The allowable discharge to these drains will be dictated by the Water Resources Commissioner and may be more stringent than these design requirements.

C. Drainage Districts and Easements

County Drain Drainage District limits must be adhered to when designing the site. Drainage Districts do not necessarily conform to existing topography. If drainage originating outside of a certain district is discharged within the district, a drainage district enlargement will be required. Contact the Water Resources Commissioner's office regarding this process.

Drains constructed prior to 1956 may not have a recorded easement, however the easement exists in the permanent records at the Water Resources Commissioner's office. At that time easements for drainage purposes were not required to be recorded with the County Clerk; it was legally sufficient to have them on file at the drain office. Therefore, it may be necessary to record a new County Drain easement, depending upon the work that is proposed and the County Drain involved. If a new easement is required, contact the Water Resources Commissioner's Office regarding this process.

V. CHAPTER 18 DRAINS

Chapter 18 drains are new developments within Oakland County where the local municipality has passed an ordinance that requires all residential and certain commercial drainage systems to be established as County Drains in accordance with the provisions of Section 433, Chapter 18 of the Public Acts of 1956, as amended, the Michigan Drain Code. At present, Oakland and West Bloomfield Townships each have such an ordinance.

A. Construction Plans

Plan submittal must be in accordance with the regulations of the municipality where the development is located. It is the responsibility of the Developer to contact the municipality and ascertain whether plans should be submitted directly to WRC or to the Municipality first.

When submitting plans directly to WRC, the Developer must submit three (3) complete sets of construction plans prepared according to the same specifications as a platted subdivision along with a letter from the Developer requesting that the storm drainage facilities be established as a County Drain. In the case where the Chapter 18 Drain development will be platted, the procedures for a preliminary and final plat must also be adhered to.

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Final construction plan approval will not be granted until all required documents and fees have been received. Construction of the storm drain system may not begin until the construction plans have been approved. This office will provide full time construction inspection of the storm drain system. Drainage facilities constructed without appropriate inspection by this office or its designated representative may not be accepted by this office as a County Drain.

After the construction plans have been approved, this office will process the final subdivision plat as set forth in the Subdivision Control Act of 1967, as amended.

B. Required Documents and Information

- A letter from the Developer requesting that the storm drainage facilities be established as a County Drain.
- A certificate from the design engineer certifying the adequacy of the storm drainage outlet. The Developer's Engineer must certify that the outlet for the proposed drain is adequate and will not cause detriment or diminution of the drainage service presently provided. An Engineer's Certificate must be sealed.
- A copy of the Title Policy or other proof of land ownership.
- A metes and bounds property description with proof of survey closure.
- Sidwell number(s) of all property proposed to be included in the drainage district.
- An estimate of the construction cost of the drainage facilities.
- The Developer and/or Landowner of Record must enter into an Agreement to establish the new County Drain or Branch Drain of an existing Chapter 18 County Drain. The Agreement will be prepared by the Water Resources Commissioner.
- Company name and address and name and professional title of individuals who will execute the Agreement.
- Payment of fees and contingency deposit. The Developer must pay administrative, inspection and maintenance fund fees and deposit a construction contingency amount.
- A copy of the recorded deed restrictions which includes the appropriate County Drain easement language.

C. Final Acceptance

Following construction, submittal of all required documents and final as-built mylars of the storm drain system, the drain may be conditionally accepted for operation and maintenance if the site is substantially vegetated and stabilized.

One year after conditional acceptance of the Drain the Developer may request, in writing, a refund of the contingency deposit. Our Maintenance Unit will perform a final walk through inspection of the Drain and the project file will be reviewed by this office. If all requirements have been met, then a final accounting will be made and a letter of final acceptance will be issued along with any remaining refundable amounts of the contingency deposit.

Chapter 18 Drain requirements are explained in further detail in Section IV of "Design Criteria and Engineering Standards".

I. SITE DRAINAGE

The standards and design criteria set forth herein are intended to guide designers to develop a storm water management system that controls the quantity and quality of storm water discharge from a site. The internal drainage for a site as well as the downstream conditions will be reviewed. Every site is part of an overall watershed and the system should be designed with this in mind. The system should conform to natural drainage patterns both on and off-site. These standards are the minimum requirements of the Oakland County Water Resources Commissioner and should not be construed as all-inclusive. The design engineer should consider many factors when planning the storm water management system. In particular, Federal, State and Local standards may be more strict than these standards. In the case where conflicting standards arise, the more stringent requirements will govern. Exceptions will be considered when conforming to a local community master plan or storm water management plan is required.

A. General Information

The County Water Resources Commissioner has been given the responsibility of determining the adequacy of the proposed storm drainage, and therefore the engineering unit will review the final construction plans for conformance with the following general drainage standards.

- An adequate outlet for the storm water must be demonstrated. The designer must show that the outlet has the capacity to handle the discharge from the site. *In no case will the discharge be allowed to exceed the site's pro-rata share of the capacity of the outlet.* There shall be no diminution of the drainage service presently provided by the outlet for the area that it serves. The site's pro-rata equitable share of the outlet capacity should be calculated and shown on the construction plans.
- There may be cases where the existing outlet has limitations due to downstream conditions. In this situation the discharge from the site will be restricted to conform to the governing downstream conditions.
- There may also be cases where the outlet has already reached capacity. The burden is on the proprietor to design and construct, at his expense, any necessary improvements to the downstream outlet. Such designs will be reviewed by the Water Resources Commissioner's office for adequacy. Additional controls may be required in these cases in order to protect downstream properties.
- The discharge from a site should outlet within the watershed, drainage sub-basin or county drain drainage district where it originated. The drainage should not be diverted to another sub-basin.
- Storm water detention or retention shall be provided. The detention basin shall be designed for a 100-year storm event and include a sediment fore bay or manufactured storm water treatment system.

B. Lot Grading

The Water Resources Commissioner will review the grading plan for sites that will be platted under Act 288 and a subdivision or site included in the Chapter 18 Drain program. Positive drainage is required. Final lot grading inspection is under the jurisdiction of the local municipality. The minimum requirements are as follows:

- The grading of the lot shall be such that surface runoff is directed away from homes and towards swales, ditches or drainage structures. Provision for drainage either by filling and grading or by providing some type of outlet shall be made for all areas within the proposed subdivision.
- A proposed finished floor grade and proposed lot grading must be shown for each home or structure. A minimum of ½ foot of fall is required away from the home and between lots. Proposed grades may be indicated with spot grades or contours. A distinction between existing and proposed should be evident.

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- Where a walkout or daylight basement is proposed, sufficient grades should be shown at the location of the walkout to indicate positive drainage away from the walkout. Additional spot grades at the house corners and rear yard should be shown.
- Where finished grades indicate a substantial amount of drainage across adjoining lots, a drainage swale of sufficient width, depth and slope shall be provided on the lot line to intercept this drainage.
- Sufficient off-site topography must be shown to determine the extent of contributing runoff. Provisions must be made to accommodate the off-site contributing flow.
- Lots that lie within a flood plain shall satisfy the Michigan Department of Environmental Quality and FEMA requirements for subdivisions within a flood plain. In no case will the filling of a lot be permitted if the flood plain is so restricted as to cause possible flooding or back up of the stream.

Examples of correct lot grading are included in Appendix 1.

C. Determination of Surface Runoff

1. Rational Method

For small areas, such as sizing swales, channels and culverts, the “Rational Method” will be used to determine surface runoff. Because the “Rational Method” assumes a uniform rainfall intensity, it is best suited for small areas. The “Rational Method” is defined as follows:

$$Q = C \times I \times A$$

Where,

Q	=	peak runoff (cfs)
C	=	runoff coefficient, a composite for the drainage area shall be used
I	=	average rainfall intensity (inches/ hour)
		100-yr storm will be used and $I = 275 / (T_c + 25)$
T_c	=	Time of Concentration, in minutes
A	=	drainage area in acres

Larger sites should use a more appropriate method of determining flow. For watersheds up to 20 square miles, the suggested method for determining surface runoff is the Soil Conservation Service (SCS) Methodology. The computations should be based on the Type II rainfall distribution, 100-year, 24-hr storm. It is the responsibility of the design engineer to determine the best method to use for the site.

2. Coefficient of Runoff

A realistic coefficient of runoff will be used based upon the imperviousness of the contributing acreage. The range of this coefficient may vary from 0.15 for completely grassed areas to 0.90 for impervious areas and 1.0 for open water. The runoff coefficient calculation must be included with plan submittal.

Certain calculations require a composite runoff coefficient value. A composite runoff coefficient is calculated as follows:

$$\bar{C} = \frac{\sum_{i=1}^n (A_i \times C_i)}{\sum_{i=1}^n A_i}$$

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Where, C_i = runoff coefficient for each sub-area
 n = total number of sub-areas
 A_i = drainage area in acres for each sub-area

3. *Time of Concentration*

An initial time of concentration of 20 minutes will be used on residential subdivisions. The time of concentration must be calculated for commercial and industrial subdivisions.

The design engineer may also use a calculated time of concentration if desired. The methodology and computations must be submitted for review. The time of concentration for unimproved, pre-development lands will be checked using the following formulas:

$$\text{Small tributary-} \quad T_c (\text{min}) = \frac{L'}{2.1 * \sqrt{S_o * 60}}$$

$$\text{Waterway-} \quad T_c (\text{min}) = \frac{L'}{1.2 * \sqrt{S_o * 60}}$$

$$\text{Sheet Flow-} \quad T_c (\text{min}) = \frac{L'}{.48 * \sqrt{S_o * 60}}$$

Where, L' = flow length, in feet
 S_o = slope, in %

When more than one type of flow exists, the individual flows should be summed up to find the total time of concentration.

These equations were taken from: Richard C. Sorrell, SCS Methodology, Michigan Department of Natural Resources, May, 1977

4. *Allowable Discharge Rate*

The allowable discharge rate from a site shall be restricted to agricultural runoff, which is defined by this office as a maximum of 0.20 cfs per acre.

There may be cases where the existing outlet has limitations due to downstream conditions. In this situation the discharge from the site will be restricted to conform to the governing downstream conditions. For example, if there is an existing culvert downstream, then the allowable outflow from the proposed site will be limited to the pro-rata share of the capacity of the culvert. The site's pro-rata equitable share of the outlet capacity should be calculated and shown on the construction plans.

Certain established Oakland County Drains have limited capacity and the allowable discharge will be less than agricultural rate.

II. **Storm Water Storage Facilities**

On-site storage of storm water runoff is required for all sites. Cases where the outlet or community master plan allows for undetained storm water discharge will be evaluated on an individual basis.

A. Determining Storm Water Storage Volume Required

1. Detention Basin

a. General Requirements

Following are the minimum requirements for a detention facility:

- A sediment fore bay, or equivalent structure, designed to capture the runoff from a 1 year storm is required for all sites. The fore bay should be a separate cell from the main detention basin and designed such that it will dewater within 48 hours. The volume of detention within the fore bay, above any proposed permanent pool of water, can be considered when calculating total detention volume required for a site.
- A manufactured storm water treatment system may be used in lieu of a sediment fore bay.
- The volume of detention provided must be equal to or in excess of that required by the Oakland County Water Resources Commissioner's "A Simple Method Of Retention Basin Design" for a 100-year frequency storm, included in Appendix 4.
- Detention volume must be provided for all on-site acreage contributing to the detention basin. All offsite tributary acreage must be accommodated by sizing the basin overflow structure to pass the off-site flow.
- Detention volume on a gravity outflow detention basin is defined by this office as the volume of detention provided above the invert of the outflow pipe. Any volume provided below the invert of the outflow pipe is considered a permanent pool of water and will not be considered as detention volume.
- All detention basins must have a positive method by which to be de-watered. Use of a pumped outlet is discouraged. If a permanent pool of water is proposed, the basin must completely de-water to the elevation of the permanent pool.
- The velocity of storm water entering the storage facility should be a non-erosive velocity. This velocity is generally between 2.5 fps and 5 fps.
- Detention basin side slopes may not exceed 1foot vertical to 6 feet horizontal for a wet basin and 1 foot vertical to 4 feet horizontal for a dry basin unless fencing is provided. Requirements regarding fencing will be evaluated on a case by case basis.
- The basin shape should be such that flow entering the basin is evenly distributed and no stagnant zones can develop. An irregularly shaped basin is best. The inlet and the outlet should be at opposite ends with the maximum distance possible between them. For dry basins, use of swales or berms on the bottom of the basin to maximize travel distance during periods of low flow are encouraged.
- When there is no permanent pool of water, the bottom of all detention basins shall be graded in such a manner as to provide positive flow to the pump or pipe outlet.
- All detention basins must have an internal overflow.
- One foot of freeboard shall be provided above the 100-year storm water elevation.
- Fencing will be required as needed, depending upon basin depth, steepness of side slopes, depth of permanent pool, etc. Requirements regarding fencing will be evaluated on a case by case basis.
- All detention basins must be permanently stabilized to prevent erosion.
- Detention basins constructed by building up on existing grade must have berms with a clay core keyed into native ground.

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Provisions for maintenance of the detention basin shall be made by the developer with the subdivision association or the local municipality. Evidence of such provisions must be submitted. This office will not accept the responsibility for the maintenance of any detention basin unless it is being constructed as a Chapter 18 County Drain.

b. Design Procedure

When calculating the volume of an irregularly shaped basin or lake, the Oakland County Water Resources Commissioner will use the formula for calculating the volume of a frustum of a circular cone. This formula is:

$$V = \frac{H}{3} (A_1 + A_2 + \sqrt{A_1 \times A_2})$$

Where:

V	=	volume
H	=	difference in depth between two successive depth contours
A_1	=	area of the basin within the outer depth contour being considered
A_2	=	area of the basin within the inner depth contour line under consideration

The procedure consists of determining the volumes of successive layers of water (frustums), and then summing these volumes to obtain the total volume of the basin.

Taken from: Clarence M. Taube., Chapter 12: Three Methods for Computing the Volume of a Lake, Manual of Fisheries Survey Methods II, Michigan Department of Natural Resources, 2000

An example calculation is included in Appendix 2. The following procedure will be used to review detention basin volume calculations:

- 1) Using the Oakland County Water Resources Commissioner's "A Simple Method Of Retention Basin Design" for a 100-year frequency storm, calculate the total volume of storage required for the entire site. This is the volume required (V_t).
- 2) Using the formula for computing the volume of an irregularly shaped basin, calculate the total volume of the proposed detention basin by summing the volumes of successive contour elevations. This is the actual volume provided (V_{prov}). The volume provided must be equal to or greater than the total volume required.
- 3) Calculate the actual discharge rate from the basin at each of the successive elevations used to compute the volume provided. This is the actual flow rate out of the basin (Q_{act}) at each elevation.
- 4) Using the calculated discharge rates (Q_{act}) calculate the volume required (V_{req}) at each of the elevations used to compute a volume provided. The elevation at which the required volume and provided volume are approximately equal will be the 100-year storage level in the detention basin. The actual flow rate out of the basin at the 100-year storage level must be equal to or less than the allowable outflow ($Q_{allowable}$) for the basin.

2. Retention Basin

A "no-outlet" retention basin is only permissible subject to certain conditions that include, but are not limited to, the following:

- There is no other available positive outlet for the storm water runoff from the property. Every effort should be made to provide a means to de-water the basin, including a pump outlet and possible downstream improvements.
- The permeability of the existing soils must be demonstrated such that percolation of the retained storm water is possible. Soil boring logs must be submitted for review. The borings must be taken within the proposed basin bottom area to a distance of 20 feet below the proposed basin bottom elevation. Calculations performed by a professional geotechnical engineer must be submitted. The calculations must indicate the percolation rates for the soils encountered during soil boring.

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- An infiltration trench is not considered an acceptable substitution for permeable soils.

The proposed storage volume of the retention basin is calculated on the basis of total contributing acreage, including all offsite areas that flow onto the property. Sufficient storage capacity must be provided for two consecutive 100-year storm events, which WRC defines by the following formula:

$$V = 2 \times 16,500 \times A \times C$$

Where, V = volume Required (ft.³)
 A = contributing acreage
 C = composite runoff coefficient

- The retention storage is calculated as volume provided in the basin above the existing ground water elevation.
- The side slopes of the proposed retention basin can be no steeper than one foot vertical to six foot horizontal.
- An overflow facility from the retention basin must be provided. Elevations of surrounding buildings, development or other features that would be impacted by a basin overflow must be indicated. If an overflow structure cannot be constructed a defined overflow route must be indicated. The overflow route may not endanger any existing structures or features. Downstream drainage easements may be required for the overflow route.
- One foot of freeboard must be provided above the proposed storage elevation.

3. *Sediment Forebay*

All detention and retention basins shall have a sediment forebay. A forebay must be installed at all incoming discharge points to the basin. The purpose of the forebay is to capture sediment in one area and prevent sediment buildup in the main basin. The forebay shall be a separate basin, which can be formed within the main basin by creating a separation with an earthen berm, gabion wall, riprap berm or rock or concrete retaining wall. A manufactured storm water treatment system can be used in lieu of a sediment forebay.

- The sediment forebay shall be sized to accommodate a one-year storm event. This office will use the "Detention Time" method of design from the WRC Erosion Control Manual to check the forebay design calculations. An example calculation is included in Appendix 2.
- The forebay may be included as part of the total required basin volume, above any permanent pool of water. The forebay cannot be included as available storage if it remains full of water.
- The side slopes cannot exceed 1 foot vertical to 4 feet horizontal.
- The forebay should have a sump a minimum of 2 feet deep to capture sediment and prevent resuspension of sediment. The bottom of the basin should slope toward the sump area to capture the sediment.
- The outlet shall be designed to capture the one-year storm event and dewater the basin within 48 hours. An outlet structure with restricted discharge may also be used within the separation.
- An outlet (overflow) spillway should be constructed on the separation which allows water to exit the forebay at non-erosive velocities.
- An access road should be provided for forebay maintenance. An access road is required for all facilities that will be established as a Chapter 18 County Drain.

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- The forebay should also have a fixed sediment depth marker to measure the amount of sediment that has accumulated. The sediment should be removed when half of the sediment storage capacity has filled in.

4. *Manufactured Storm Water Treatment Systems*

Manufactured storm water treatment systems may be used in lieu of a sediment forebay. These devices are used to remove sediment and other particulate matter from storm water runoff. *Stormceptor* and *Vortechs* are two brand name devices for such purposes. The Oakland County Water Resources Commissioner does not specify either of the brand name devices be used for a project, unless the project will be ultimately operated and maintained by this office. Other similar devices may be substituted providing that proper supporting data is submitted to this office for review. The supporting data must indicate that the system meets the removal standards referenced herein.

- Manufactured treatment systems must be installed upstream of the storm water detention system. If the site is not required to provide storm water detention, a manufactured treatment system must be installed upstream of the connection to a County Drain.
- The system must treat up to the peak flow rate for the 10-year storm event.
- The system must remove a minimum of 80% of the Total Suspended Solids (TSS), based on a 75-micron particle size.
- The system must remove 90% of the floatable free oil.

5. *Underground Detention Facilities*

Generally, underground detention facilities are discouraged because of difficulty in maintaining them. However, underground detention facilities may be allowed on sites where traditional storm water management measures are infeasible, such as sites less than 1 acre in size or renovation of an existing site that originally did not have a basin. Each site will be evaluated on an individual basis.

Complete details, calculations and specifications must be submitted for the facility. The underground facility must comply with all standards imposed on traditional facilities; Including, but not limited to, a restricted outlet, overflow structure and a perpetual maintenance plan.

Underground detention facilities are prohibited in developments where the storm water detention facilities are under the jurisdiction of this office.

6. *Infiltration Trench*

An infiltration trench is not considered a preferred means of discharging storm water. Routing storm water runoff directly to an infiltration trench could contaminate ground water. Storm water must be routed through a facility or structure that filters the storm water prior to discharging to the trench. No outflow credit will be given for detention basins with an infiltration trench that is intended to function as a basin outlet.

7. *Leaching Basin*

A leaching basin is not an effective means of controlling and treating storm water runoff. A leaching basin must be used in conjunction with other drainage facilities.

8. *Innovative BMP's*

Non-traditional storm drainage facilities that improve the quality and reduce the quantity of storm water runoff are encouraged as long as the required detention volume and allowable outflow are achieved.

Complete details and specifications for the proposed storm drainage facilities must be submitted. There should be sufficient information provided such that a comprehensive review can be performed. Each case will be evaluated on a site-specific basis.

B. Utilizing Wetlands, Waterbodies and Natural Low Areas for Storage

Prior to approval of any proposed plan to use existing wetlands or waterbodies for detention purposes, permits from the appropriate state and local agencies must be applied for. Proof of such application must be submitted.

Direct discharge of storm water runoff to a wetland or waterbody is not allowed. The runoff must be routed through a facility that is specially designed to remove silt, sediment, trash, oil, grease and other debris and pollutants before discharging.

The minimum design requirements are as follows:

- Calculations must be submitted that indicate the stage rise of the wetland or waterbody due to the runoff. Each site is entitled to their pro-rata share of the capacity of the wetlands.
- A freeboard elevation must be established at one foot above the calculated stage rise.
- The stage rise should be calculated from the ordinary high water elevation.
- There shall not be point discharge of storm water to wetlands. The discharge must be routed through a level spreader or through stones, on the wetland fringe, prior to discharging to the wetlands to avoid erosion.
- A natural buffer strip is recommended around the perimeter. A drainage easement that encompasses the entire area on site, including freeboard and buffer strip, will be required. In addition, off site easements may be necessary.
- The character of the wetlands must not be altered by the addition of the storm water. A control structure must be constructed at the outflow of the wetland area to release storm water at a restricted rate as determined in Section 1. The wetland must return to its normal water level within 24 to 48 hours.

☞ In no case will retention of storm water within a wetland area be allowed.

- Storm water runoff directed to natural low areas will be considered the same as retention. The area must have the capacity to hold two consecutive 100-yr storm events and have a designated overflow route. Each site is entitled to their pro-rata share of the capacity of the depression for the land area tributary to it. A drainage easement that includes the entire area up to the freeboard elevation will be required.

C. Detention Basin Outlet Design and Overflow Structure Design

If an adequate outlet for the site's storm water has been demonstrated, the allowable outflow from a detention basin is a maximum 0.20 cfs per acre. The allowable discharge calculations must be submitted.

☞ There may be cases where the existing outlet has limitations due to downstream conditions. In this situation the discharge from the site will be restricted to conform to the governing downstream conditions. For example, if there is an existing culvert downstream, then the allowable outflow from the proposed site will be limited to the pro-rata share of the capacity of the culvert. The site's pro-rata equitable share of the outlet capacity should be calculated and shown on the construction plans.

☞ There may also be cases where the outlet has already reached capacity. The burden is on the proprietor to design and construct, at his expense, any necessary improvements to the downstream outlet. Such designs will be reviewed by the Water Resources Commissioner's office for adequacy.

Additional controls may be required in these cases in order to protect downstream properties.

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- The basin outlet must control the runoff from the 100-year storm event. The actual outflow from the basin at the design storm water level may not exceed the allowable outflow.
- The outlet pipe or drainage path must be designed to carry the flow from all on-site and off-site contributing acreage.
- A cut-off collar or anti-seep diaphragm may be required to be installed around the outlet pipe within the bank of the basin, depending on the depth of storage in the basin.

The standard orifice equation will be used to check restrictor sizing calculations:

$$Q = C \times A \sqrt{2gh}$$

Where,

Q	=	allowable outflow (cfs)
C	=	orifice coefficient
A	=	orifice area (ft ²)
g	=	gravity constant, 32.2 ft/s ²
h	=	total head on orifice measured from the design water level (feet)

- The minimum restrictor size is 3" diameter. If a 3" diameter restrictor permits discharge in excess of the allowable outflow then a different restricted outlet design may be required, such as a weir. For storm drain systems being established as Chapter 18 Drains, the restrictive orifice outlet must be grouted inside a minimum 12" diameter pipe with an end section, at the upstream end of the pipe. The restrictor must be sized for the on-site flow that is tributary to the basin. The basin overflow structure shall be sized to pass the on-site flow and the off-site tributary flow.

The following equations will be used to check weir design:

Sharp-Crested Weir-

$$Q = C \times L \times h^{3/2}$$

Where,

Q	=	Discharge over the weir (cfs)
C	=	Discharge coefficient, 3.33
L	=	Length of weir crest (ft)
h	=	Head above the weir crest (ft)

Triangular Sharp-Crested Weir-

$$Q = C \times h^{5/2}$$

Where,

Q	=	Discharge over the weir (cfs)
C	=	Discharge coefficient for a 90° triangular weir, 2.5
h	=	Head above the weir notch bottom (ft)

Broad-Crested Weir-

$$Q = C \times L \times h^{3/2}$$

Where,

Q	=	Discharge over the weir (cfs)
C	=	Discharge coefficient, 3.0
L	=	Length of weir crest (ft)
h	=	Head above the weir crest (ft)

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Trapezoidal Weir-

$$Q = C \times L \times h^{3/2}$$

Where,

Q	=	Discharge over the weir (cfs)
C	=	Discharge coefficient, 3.367
L	=	Length of weir crest (ft)
h	=	Head above the weir crest (ft)

Equations taken from: Michael R. Lindeburg, P.E., Civil Engineering Reference Manual, Professional Publications, Inc., CA, 1999

- All detention basins must have an internal overflow structure located at the design water level. This is a structure that will discharge the storm water by by-passing the restrictor in emergency situations. The overflow must have the capacity to pass the on-site flow as well as the off-site tributary flow and have a bar screen or trash hood.

Examples of basin outlet and overflow calculations are included in Appendix 2.

III. STORM WATER CONVEYANCE

Storm water drainage systems may consist of open ditch drains, swales, closed conduits or a combination of methods to convey storm water. Drainage facilities shall be constructed in accordance with these WRC minimum specifications. Other standards such as: Michigan Department of Transportation, Road Commission for Oakland County, City or Township, which may be more stringent shall also be adhered to. WRC construction standards for enclosed storm drains are available from the WRC office.

A. Enclosed Storm Drains

An enclosed storm drain system must be designed to accommodate the storm water runoff from a 10-year storm from the entire contributing watershed. The "Manning" formula will be used to check the pipe size:

$$Q = \frac{1.486}{n} \times A \times R^{\frac{2}{3}} \times S^{\frac{1}{2}}$$

where,

- Q = flow capacity (cfs)
- n = Manning coefficient of roughness
- A = cross-sectional area of pipe (ft²)
- R = hydraulic radius of pipe, A/P (ft)
- P = wetted perimeter of pipe (ft)
- S = pipe slope (ft/ft)

The following values will be used for "n":

<i>pipe material</i>	<i>n</i>
smooth concrete pipe, approved flexible pipe	0.013
unlined cmp	0.025

- The hydraulic grade line must be calculated for the entire system. The hydraulic grade will be assumed to start at the elevation of 0.80 x pipe diameter of the outlet pipe or the permanent pool elevation, whichever is higher. The hydraulic gradient should be kept below the top of the pipe; in no case shall it be higher than the rim elevation of any structure.
- The minimum pipe size for storm drains accepting surface runoff is 12" diameter. Rear yard pipes may be smaller, but must be used in conjunction with a drainage swale that directs runoff to a minimum 12" diameter pipe structure.
- Pipe joints must prevent excessive infiltration.
- Storm drains shall be designed to have a minimum velocity flowing full of 2.5 ft/sec and a maximum velocity of 10 ft/sec. The velocity at a pipe outfall should be between 2.5 to 5 ft/sec to prevent scouring at the outlet.
- Riprap shall be installed at all outlets according to the Oakland County Water Resources Commissioner's Storm Drain Notes and Details Sheet. Riprap may consist of minimum 8" diameter to 15" diameter fragmented limestone or other suitable rock underlain with geotextile fabric. Cobblestone, broken concrete or grouted riprap is not preferred. Larger diameter outlets may require larger riprap as velocity and flow conditions dictate.
- A bar screen is required for all pipe outlets and inlets 18" diameter and larger.

A sample calculation for enclosed drains is included in Appendix 2.

B. Drainage Structures

The flows to specific catch basin or inlet covers shall conform to the following:

1. Combination curb and gutter inlet (MDOT Cover K, or equivalent):
A maximum of 3.1 cfs at 0% grade (sump condition), and then decreasing as grade increases.
2. Gutter inlet (MDOT Cover D, or equivalent):
A maximum of 3.2 cfs as 0% grade (sump condition), and then decreasing as grade increases.
3. Rear yard or ditch inlet (MDOT Beehive Cover E, or equivalent):
In general, a maximum of 2.5 cfs at 0% grade (sump condition), and then decreasing as grade increases. However, a smaller or larger maximum inflow may be allowed as is warranted by surrounding finished grading.

See Appendix 3 for MDOT cover specifications. Calculations for grate inlet capacities must be submitted if different inlets are used.

Drainage inlets shall be located as follows:

1. To assure complete positive drainage of all areas of the site.
2. At all low points of streets and rear yards.
3. Such that there is a maximum of 600 feet of drainage from any particular point on the site to a structure.

C. Open Watercourses

Appropriate permits from agencies such as the Michigan Department of Environmental Quality must be applied for and a copy of such application must be submitted.

The "Rational Method", SCS method or other prior approved method will be used to determine the amount of flow contributing to the watercourse. All watercourses must be sized to accommodate the runoff from a 10-yr storm event. The "Manning" formula will be used to check the capacity of the watercourse. Appropriate values will be used for "n".

Examples of Manning "*n*" values for open channels

surface	<i>n</i>
maintained grass channel, rear yard swales, earth channel with stones and weeds	0.025
natural channels, somewhat irregular side slopes; fairly even, clean and regular bottom, very little variation in cross-section	0.035
dredge channel, irregular sideslopes and bottom, sides covered with some saplings and brush, slight and gradual variations in cross-section	0.045

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- Open channel flow velocities shall be neither siltative nor erosive. In general the minimum acceptable non-siltative velocity will be 2.5 ft/sec. Every effort should be made to reduce the velocity of flow as much as possible at all storm drain outlets. The outlet velocity should be at maximum 2.5 to 5 feet/second.
- Outlets to channels shall be placed at the bottom of the channel with headwalls or flared end sections with erosion protection as required. Natural stabilization shall be provided where necessary to prevent erosion.
- Erosion protection shall be placed at bends, drain inlets and outlets, and other locations as required in all open ditches.
- Back slopes of channels shall be no steeper than 1 foot vertical to 3 feet horizontal, unless fencing is provided. Ditches with steep grades shall be protected by sod, vegetation or other means to prevent scour.
- A minimum of 5-foot clearance shall generally be between open ditch inverts and underground utilities.
- All bridges shall be designed to provide a 2 foot minimum flood stage freeboard to the underside of the bridge. The bridge footings shall be deep enough to be below the frost line and to allow a 3 foot channel deepening and may not be located within the open channel.
- Areas within open drain rights-of-way, which have been cleaned, re-shaped or in any manner disturbed shall be seeded and mulched or vegetated in some manner.
- A manhole sump or catch basin should be provided at the last structure prior to a storm drain outletting to an open drain as a minimum method of erosion protection.

D. Determination of Culvert Size

All culvert design calculations must be submitted to this office for review. Calculations must be sealed by a Professional Engineer and must include:

1. Delineation on a topographic map of the area contributing to the culvert.
 2. Hydrologic calculations to determine the amount of flow.
 3. Hydraulic calculations used to determine the size of the culvert.
 4. Calculations for height of cover, gage size and expected loads.
 5. When an existing culvert is proposed to be modified, backwater calculations and/ or downstream calculations may also be submitted.
- This office will use the "Rational Method", the SCS Method or other prior approved method to determine the flow contributing to the culvert. Culverts shall be sized to pass a minimum 10-year storm event or the governing design storm of the watercourse, which may be higher.
 - The velocity within the culvert shall be neither siltative nor erosive.
 - The "Manning" formula or inlet headwater control or outlet tailwater control nomographs will be used to check the culvert design.

Construction requirements and end section treatments are as stated on the Oakland County Water Resources Commissioner's Storm Drain Notes and Details Sheet.

E. Easements

Easement provisions shall conform to the widths indicated in the "Preliminary Plat" section (Part 3, "Easement Requirements").

All drainage easements, including freeboard and buffer strip, shall be so designated on the plans as well as on the "Mylar" plat.

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All existing easements are to be shown and identified on the mylar including the Liber and Page.

Existing County Drain easements shall be indicated on the plans as well as the "mylar" plat and shall be designated as 'XX feet wide easement for the "Name" (County) Drain as recorded in Liber___ Page___'.

In cases where storm water is discharged to a drain or watercourse on adjoining private property, an improvement to the drain and an agreement with the property owner may be necessary. An off-site drainage easement will be required if:

- a. The watercourse is not depicted as a blue line on a USGS map.
- b. It is not indicated on the MIRIS map.
- c. The watercourse is not considered wetlands by the governing municipality.

F. Drains Under The Jurisdiction Of The Water Resources Commissioner

When a County Drain is the proposed outlet for a site's storm drainage system, the standards outlined herein regarding storm water storage volume and allowable outflow must be complied with. There may be cases where the existing outlet has limitations due to downstream conditions. In this situation the discharge from the site will be restricted to conform to the governing downstream conditions. The allowable outflow from the proposed site will be limited to the pro-rata share of the capacity of the drain. The site's pro-rata equitable share of the outlet capacity should be calculated and shown on the construction plans.

There may also be cases where the outlet has already reached capacity. The burden is on the proprietor to design and construct, at his expense, any necessary improvements to the downstream outlet. Such designs will be reviewed by the Water Resources Commissioner's office for adequacy.

Locations, easements and drainage service area boundaries for County Drains are available from the Water Resources Commissioner's Office. Permanent structures may not be constructed within the easement of a County Drain. This includes storm water storage facilities. All basins must be located entirely outside of the permanent easement.

1. Easements

Prior to 1956, County Drain easements were not required by statute to be recorded with the County Clerk; it was legally sufficient to have them on file at the drain office. Therefore, it is necessary to check the permanent records of the Water Resources Commissioner's Office to see if a drain easement is in existence on the subject property.

It may be necessary to record a new easement for that part of the County Drain that traverses the site. The existing easement may be abandoned in consideration for the granting of the new easement.

For open ditch drains, the easement must be at minimum, wide enough to include the extreme width of the open ditch drain plus 15' on each side measured from the top of bank. In addition, a vegetated buffer strip may be required. For enclosed drains, the easement must be a minimum of twenty (20) feet centered on the centerline of the pipe. However, larger pipe size, certain soil conditions, or depth of pipe may require larger easements.

The proposed easement must be submitted to this office for review. Upon completion of the project the owner's engineer will be required to provide the Oakland County Water Resources Commissioner's Right-of-Way Department with an existing or "as-built" metes and bounds centerline description of the entire length of the drain through the referenced property. Upon submittal of the description, along with proof of property ownership, WRC Right-of-Way Department will prepare the necessary documents for execution by the owner(s).

This office must also be provided with one set of "As-Built" mylars reproduced from the original engineering drawings, cleaned of all background debris, showing plan, profile and the new easement of the drain. A digital version of the "As-Built" plans must also be submitted.

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Proposed County Drain easements shall be indicated on the plans as well as the "mylar" plat and shall be designated as 'permanent private easement for the "Name" (County) Drain'. In addition the following note must be added to the mylar:

"Use of the word "private" does not limit in any way the scope of the easement granted to the "Name" (County) Drain Drainage District"

2. *Drainage Service Areas (Districts)*

A Drainage Service Area and Special Assessment District are each a legally established boundary for the area served by a County Drain. Drainage Service Areas do not always match the topographical area tributary to a County Drain. Drainage Service Areas shall not be violated when designing a drainage system.

Alterations to a Drainage Service Area and/or a Special Assessment District may be made by following the procedure established in the Drain Code. Approval must be granted by the Water Resources Commissioner or the Drainage Board.

G. **Soil Erosion and Sediment Control**

Soil erosion and sediment control devices shall be installed as required by the Oakland County Water Resources Commissioner's "Erosion Control Manual" within municipalities where the Soil Erosion and Sedimentation Control Program is administered by the Oakland County Water Resources Commissioner. The following points should be kept in mind when designing an erosion control plan for a site:

- Areas within open drain rights-of-way, which have been cleaned, re-shaped or in any manner disturbed shall be seeded and mulched or otherwise vegetated.
- The smallest practical area of raw land should be exposed at one time during development.
- When raw land is exposed during development, the exposure should be kept to the shortest practical period of time.
- Temporary vegetation and/or mulching should be used to protect critical areas exposed during development.
- The permanent final vegetation and structures should be installed as soon as practicable in the development.
- The development plan should be fitted to the topography and soil so as to create the least erosion potential.
- Wherever feasible, natural vegetation should be retained and protected.

IV. **CHAPTER 18 DRAINS**

Chapter 18 drains are new developments within Oakland County where the local municipality has passed an ordinance that requires all residential and certain commercial drainage systems to be established as County drains in accordance with the provisions of Section 433, Chapter 18 of the Public Acts of 1956, as amended, the Michigan Drain Code. At present, Oakland and West Bloomfield Townships each have such an ordinance.

Following are the specific requirements of the Oakland County Water Resources Commissioner in accordance with the provisions of the Drain Code.

A. **Request To Establish a County Drain**

The Developer must submit three (3) complete sets of construction plans prepared and sealed by a Registered Professional Engineer or Professional Surveyor. A letter from the Developer requesting that the storm drainage facilities be established as a County Drain and a certificate from the design engineer

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certifying the adequacy of the storm drainage outlet must accompany the construction plans. An Engineer's Certificate must be sealed.

B. Agreement to Establish a County Drain

The Developer and/or Land Owner of Record must enter into an Agreement to establish the proposed drainage system as a County Drain or Branch Drain of an existing legally established County Drain. A district enlargement may be necessary for Branch Drain establishment. The Developer and/or Land Owner must provide this office with the following items for Agreement preparation:

- A copy of the Title Policy or other proof of land ownership
- A metes and bounds property description with proof of closure
- Sidwell number(s) of all property proposed to be included in the drainage district
- An estimate of the construction cost of the drainage facilities
- Company name and address and name and title of individuals who will execute the Agreement.

Once this office has received all of the above information, the Agreement will be prepared. The Agreement must be executed prior to construction plan final approval.

After the Agreement has been signed by all parties and notarized the Water Resources Commissioner will have the Agreement recorded with the County Clerk's Office.

C. Construction Plans

The construction plans must be prepared according to the design standards and specifications presented herein. If the local municipality has more stringent standards then the municipality standards will govern.

In the case where the Chapter 18 Drain development will be platted, the procedures for a preliminary and final plat must also be adhered to.

Final construction plan approval will not be granted until all required documents and fees have been received. Construction of the storm drain system may not begin until the construction plans have been approved. After the construction plans have been approved, this office will process the final subdivision plat as set forth in the Subdivision Control Act of 1967, as amended.

This office will provide full time construction inspection of the storm drain system. Drainage facilities constructed without appropriate inspection by this office or its designated representative may not be accepted by this office as a County Drain.

D. Easement Requirements

The Developer and/or Land Owner shall provide easements for the proposed drainage facilities. Easement requirements vary with the type of site being developed. If the site is a platted subdivision, the easements must be shown on the plat mylar and the standard WRC easement language must be included in the deed restrictions. If the site is a condominium development, the easements must be shown on the "Exhibit B" drawings and the standard WRC easement language must be included in the deed restrictions. A copy of the proposed deed restrictions must be submitted to this office for review. A recorded copy must be on file at this office prior to the final inspection.

Easement widths are to be in accordance with Part F of Section III of these standards.

E. Inspections

This office or its designated representative will perform daily inspection of the construction of the storm drainage facilities. Full time inspection is required for all aspects of storm drain construction. This is to ensure that the storm drainage system is constructed according to the plans and specifications approved by this office.

The Developer and/or Land Owner is responsible for the liability and maintenance of the storm drainage system until it is accepted for service by the Water Resources Commissioner.

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The WRC Inspection Department must be notified **2 WORKING DAYS** prior to commencing construction and for all acceptance inspections.

All field changes must be **PRE-APPROVED** by the Oakland County Water Resources Commissioner prior to installation.

1. *First Inspection*

The purpose of the first (Construction) inspection approval is to release the underground contractor from responsibility of damage to the underground drainage system by others during future construction on the project site. The requirements of the first inspection are as follows:

- a. All pipes and structures must be free of dirt and debris.
- b. Structures must be complete, plastered or pointed with channels, benches and castings in place.
- c. All inlets and outlets must be completed with riprap in place.
- d. The storm water storage facility is constructed and stabilized.
- e. The storm drainage system must be completed and fully functional.
- f. All erosion control measures in place and all outstanding soil erosion violation addressed.

2. *Second Inspection*

The second inspection will be performed after the completion of the road paving to insure that the drainage system has not been damaged by the paving process. The purpose of the second inspection is to relieve the Pavement Contractor from responsibility for future damage to the storm drainage system.

3. *Third Inspection*

The purpose of the third inspection is to conditionally accept the drainage system for maintenance and operation by the Oakland County Water Resources Commissioner and to relieve the Developer and/or Land Owner from the responsibility of maintenance of the storm drainage system. The Developer and/or Land Owner is still responsible for the integrity of the system until the completion of the final accounting and final acceptance by the Oakland County Water Resources Commissioner.

The third inspection will consist of a thorough and complete inspection of the entire storm drain system. A punch list of outstanding construction items will be generated and forwarded to the Developer and/or Developer's representative for resolution. Once these punch list items have been addressed and corrected, then a third inspection approval may be issued.

The third inspection can be scheduled after the following requirements have been met:

- a. All disturbed areas must be vegetated. Right-of-ways, easement areas, detention ponds and swales must be sodden or vegetated with an approved plant material.
- b. As-built drawings have been submitted to the Oakland County Water Resources Commissioner.
- c. The local governing body has no objections
- d. There are no outstanding soil erosion issues and no history of poor soil erosion practices by the Developer and/or Land Owner.
- e. All required documents and fees have been submitted and approved, including "Exhibit B" drawings, offsite drainage easements and recorded Deed Restrictions or a Master Deed with the appropriate drain easement language.

F. As-built Plans and Mylar Requirements

Immediately following the completion of construction, the Developer and/or Land Owner shall furnish this office with a set of drawings corrected to indicate as-built conditions. Upon approval of these "As-Built" drawings, the Developer and/or Land Owner shall submit one (1) set of reproducible "Mylar" as-built construction drawings. A digital version of the "As-Built" plans must also be submitted.

G. Final Acceptance and Final Accounting

One year from the date of the third inspection approval (conditional acceptance) the Developer may request, in writing, a final accounting of the project. The project file will be reviewed and a final walk through inspection of the Drain will be performed to ensure that the integrity of the system is intact. The final inspection can be scheduled after the following requirements have been met:

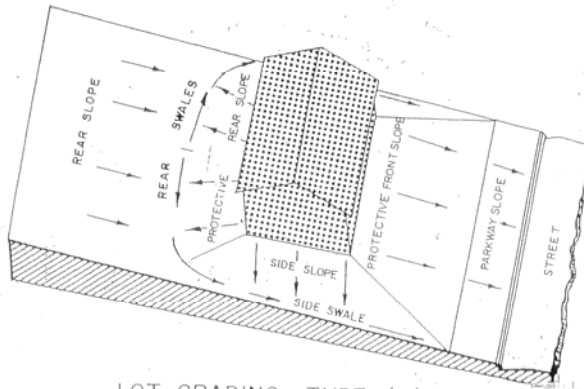
- 1) All conditions of the Agreement are satisfied,
- 2) The drain is functional and serviceable,
- 3) There are no outstanding liens or judgments against the storm drainage system,
- 4) A Developer's Declaration and Developer's affidavit are on file at this office.

If all requirements are met and the final inspection approval has been issued, a final accounting will be made of the project fund. A letter of final acceptance will be issued along with the remaining refundable amount of the deposit.

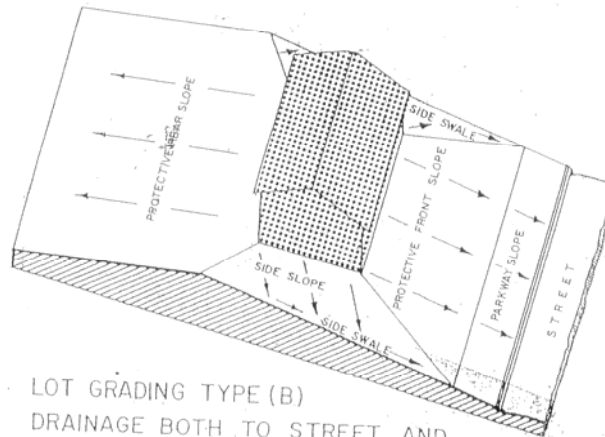
Appendix 1



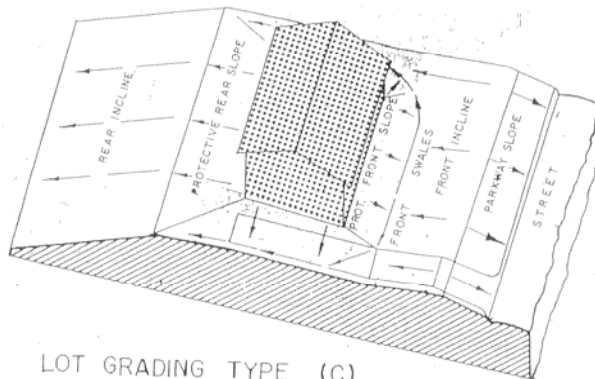
Lot Grading Sketches



LOT GRADING TYPE (A)
ALL DRAINAGE TO STREET



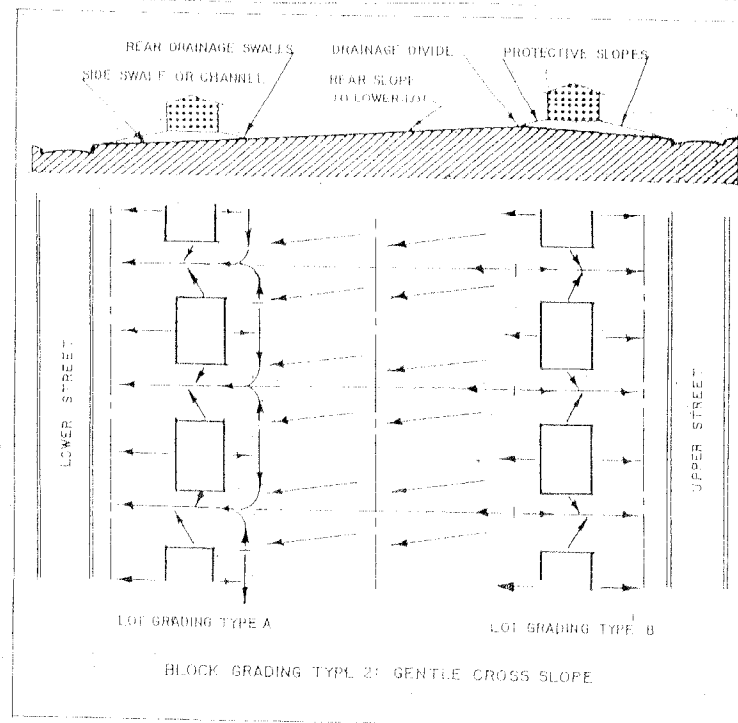
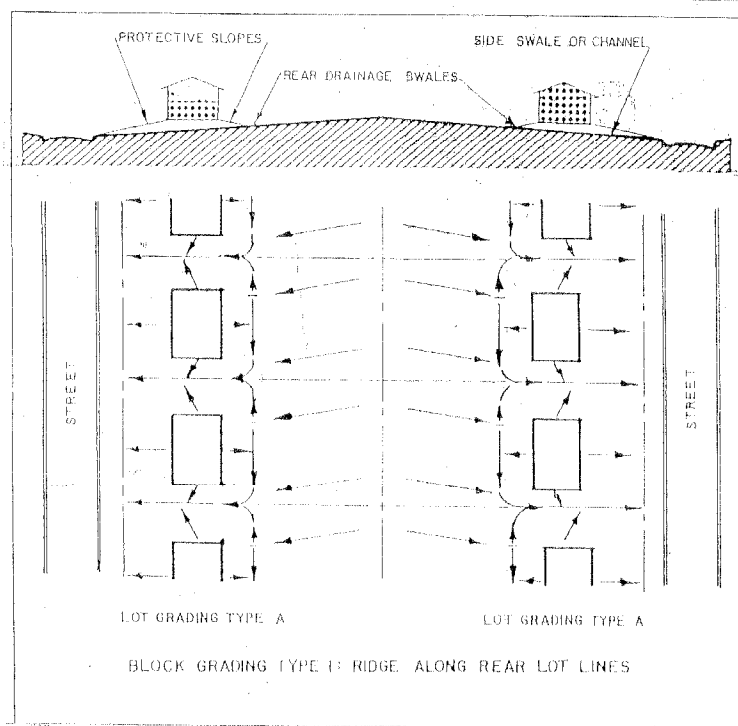
LOT GRADING TYPE (B)
DRAINAGE BOTH TO STREET AND
TO REAR LOT LINE



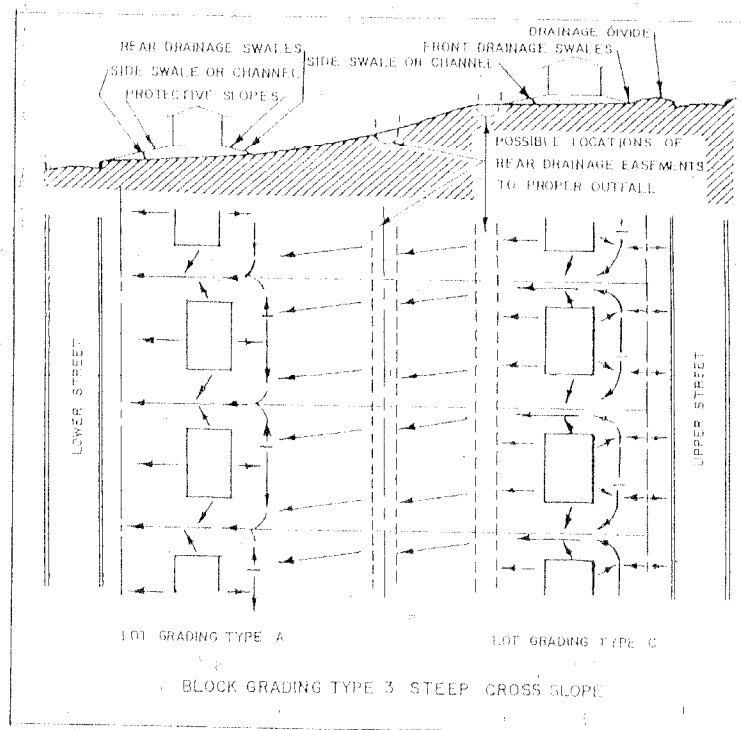
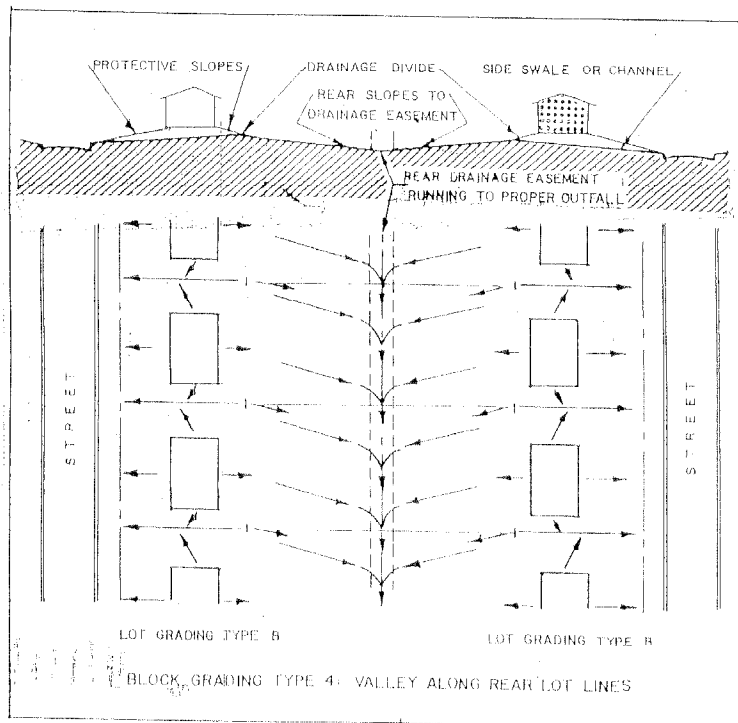
LOT GRADING TYPE (C)
ALL DRAINAGE TO REAR LOT LINE

(LEAST DESIRABLE: CHECK WITH COMMUNITY BUILDING CODE)

Appendix J



Appendix J



Appendix 2

+

Sample Calculations

SAMPLE CALCULATIONS

Example Problem:

The proposed project is a 20 acre subdivision with a composite runoff coefficient of 0.35. There are 5 acres of off-site contributing acreage. The basin will have a permanent pool of water up to elevation 100.00' and the depth of storage will be approximately four feet. The proposed invert of the discharge pipe into the basin is 101.00'. The proposed invert of the restrictor is 99.50'. The outlet pipe for the basin is 24" diameter. Determine the following:

- 1) The volume required for the forebay, the median surface area and the size of the outlet, in order to dewater the forebay within 48 hrs.
- 2) The volume required for the detention basin and the size of the restricted outlet pipe.
- 3) The elevation and size of the basin overflow structure and the size of the overflow outlet pipe.
- 4) The size of a portion of storm drain on the site and the hydraulic grade line of the pipe run.

Solution:

1)

Volume of storage $V_r = 4,320 (0.35) (20ac)$
 $V_r = 30,240 \text{ cuft}$

Median surface area $A_m = V_r / 5 \text{ ft}$
 $A_m = 6,048 \text{ sqft}$

Size of outlet $a = (0.3988 (6,048) \sqrt{5}) / 172,800$
 $a = 0.0312 \text{ sqft}$

- 2) The volume provided for the forebay can be counted as part of the volume required for the detention basin.

Calculate volume required

$Q_{allow} = 4.00 \text{ cfs}$
 $Q_o = 0.57$
 $T = 109.51$
 $V_s = 10936.49$
 $V_t = 76555 \text{ cf}$
 $V_{adj} = 76555 \text{ cf}$

Estimate restrictor size using the orifice equation. The restrictor should be sized using on-site area only.

outlet inv. = 99.50
springline = 99.83
 $h = 4.17 \text{ ft.}$
 $a = 0.39 \text{ sf}$
 $d = 6.67 \text{ in.}$
try outlet size = 8.00 in.

Make a chart to calculate the volume provided in the basin. The volume should be calculated in one foot increments starting at the permanent pool elevation. Calculate the actual outflow from the basin at each elevation.

elevation	Area	h	sum Vprov	ha	Qact
100.00	10000	0.00	0	0.17	0.709
101.00	20000	1.00	14714	1.17	1.876
102.00	30000	1.00	39546	2.17	2.556
103.00	40000	1.00	74426	3.17	3.091
103.15	41500	0.15	80538	3.32	3.163
104.00	50000	0.85	112597	4.17	3.545
105.00	freeboard	1.00			

Appendix J

Using the value for **Qact** at each elevation, calculate the volume required at each elevation. The elevation at which **Vreq** and **sum Vprov** are approximately equal is the storage elevation. Interpolate between elevations to find the values that are approximately equal.

elevation	Qo	T	Vs	Vreq
100.00	0.10	294.08	14016	98110
101.00	0.27	171.17	12562	87937
102.00	0.37	143.04	11956	83690
103.00	0.44	127.83	11543	80804
103.15	0.45	126.07	11491	80436
104.00	0.51	117.70	11225	78575
105.00	freeboard			

The overflow rim should be set at the 100-year storage elevation **103.15'**. At this elevation the actual flow out is less than the flow allowed, 4.00 cfs. Therefore, an 8" diameter restrictor is adequate.

3) Try a four foot diameter structure to start. The overflow structure will act as a weir. If the structure is near the bank of the basin, only approximately 50% of it's perimeter will be utilized. If the structure were located in the center of the basin, 100% of the perimeter would be used. The off-site contributing acreage is assumed to be undeveloped.

Sizing Overflow Structure-

size of overflow manhole:	<u>4.00</u> ft
% of MH that can be used as a weir:	<u>50.00</u> %
calculated length of weir =	<u>6.28</u> ft
acreage tributary to overflow (on + off site):	<u>25.00</u> ac
composite runoff coefficient =	<u>0.31</u>
longest time of flow to basin:	<u>25.00</u> min
(from pipe flow calculations)	
sum of all flow into basin (on + off-site):	<u>30.15</u> cfs
volume of basin (Vprov from detention calc's):	<u>80538</u> cf
storage elevation:	<u>103.15</u> ft
freeboard elevation:	<u>105.00</u> ft
time to fill basin= Vprov / flow into basin =	<u>44.52</u> min
I =	<u>1.85</u>
Qexp = CIA =	<u>14.35</u> cfs
Qweir=	3.33 (L) h ^{1.5}
calculate how high the water will rise above the overflow structure to pass the expected flow:	
h=	<u>0.78</u> ft
elevation of water during overflow conditions=	<u>103.93</u> ft

Is this elevation less than the freeboard elevation?

If yes, then the four foot diameter structure is large enough.

Sizing Overflow Outlet Pipe-

size of pipe:	<u>24.00</u> in
area =	<u>3.14</u> sf
invert of pipe:	<u>99.50</u> ft
springline=	<u>100.50</u> ft
h=	<u>2.65</u> ft
capacity, Q = 0.62* a* sqrt(64.4* h) =	<u>25.45</u> cfs

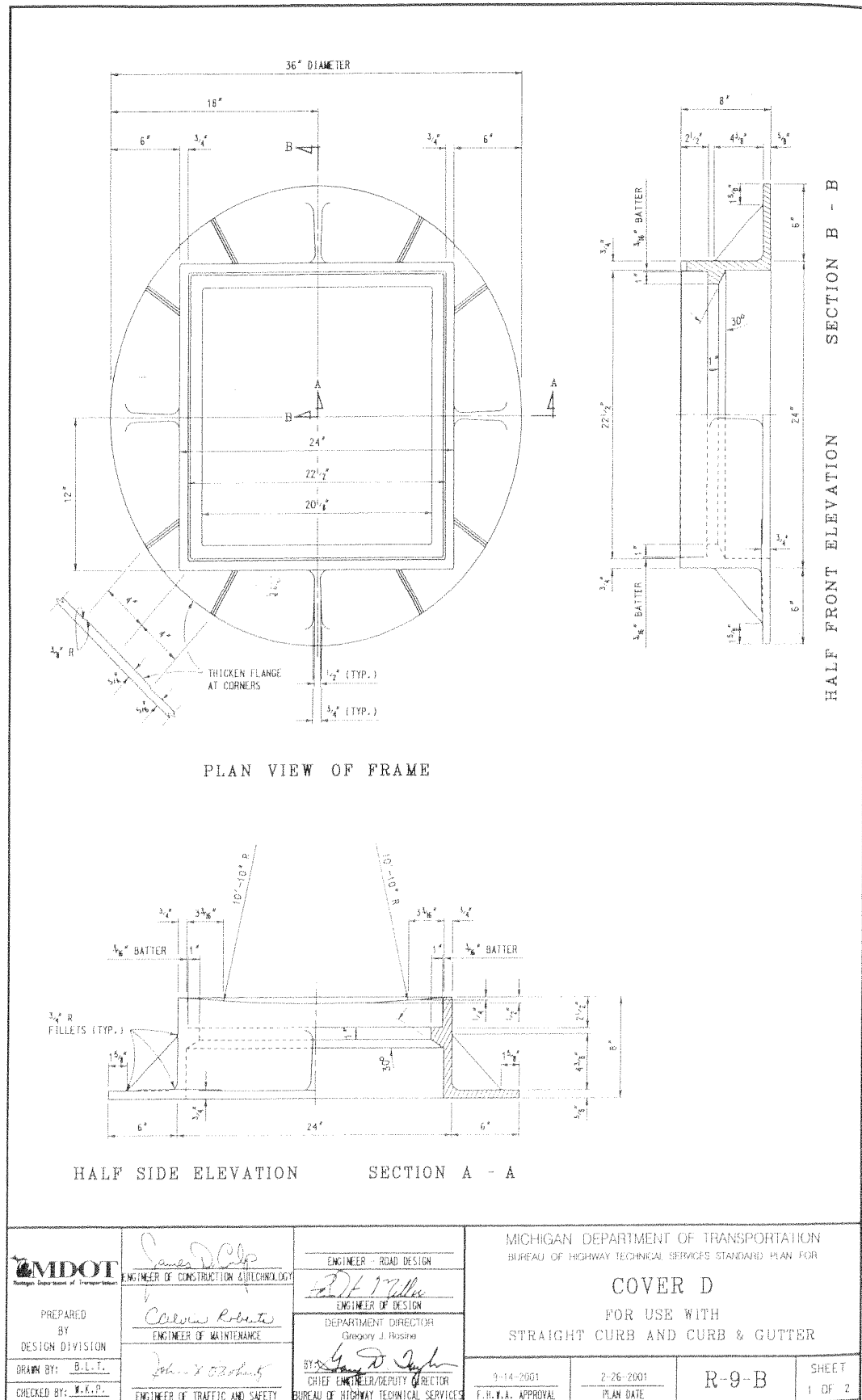
Is capacity of pipe greater than Qexp?

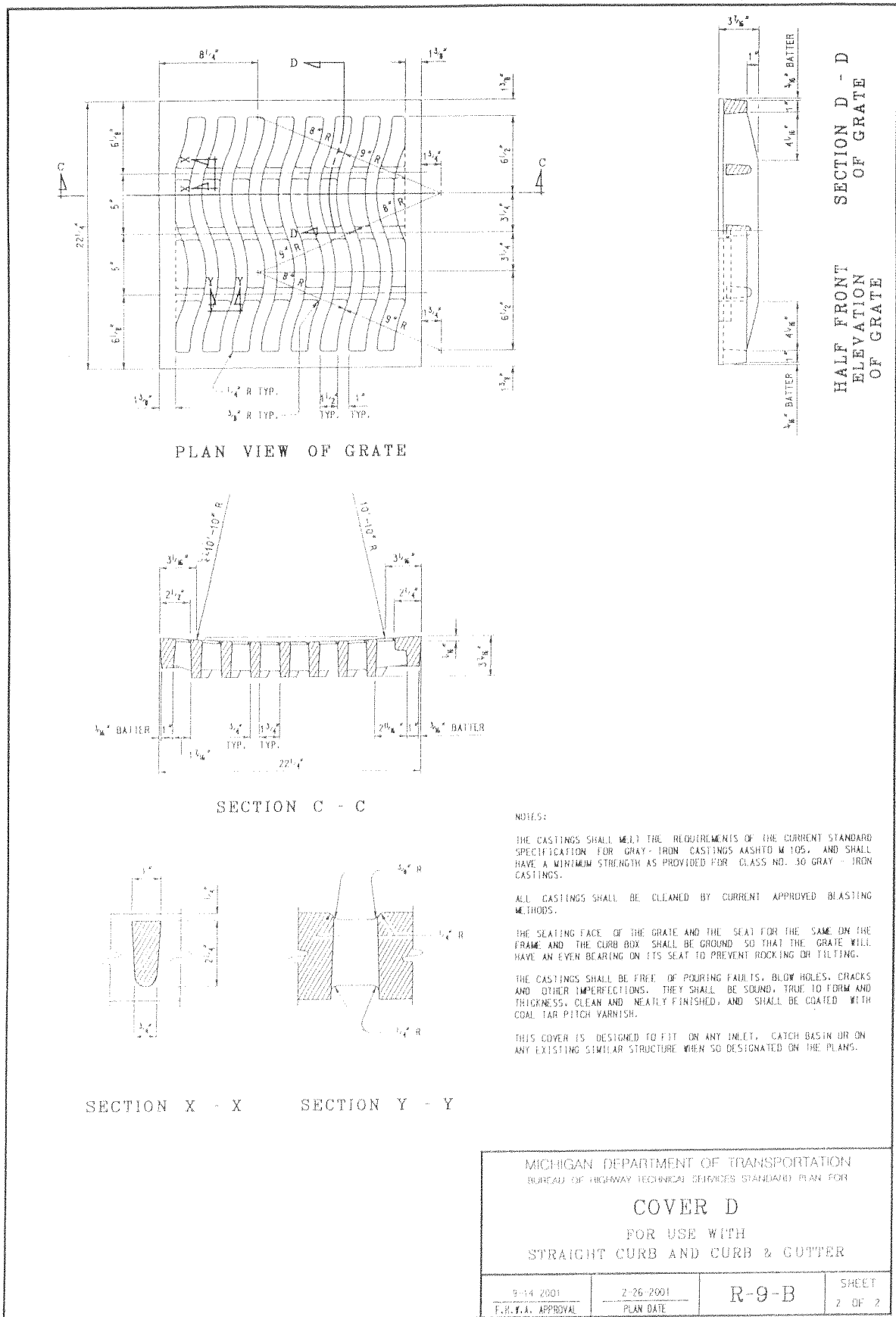
If no, then outflow pipe is not large enough.

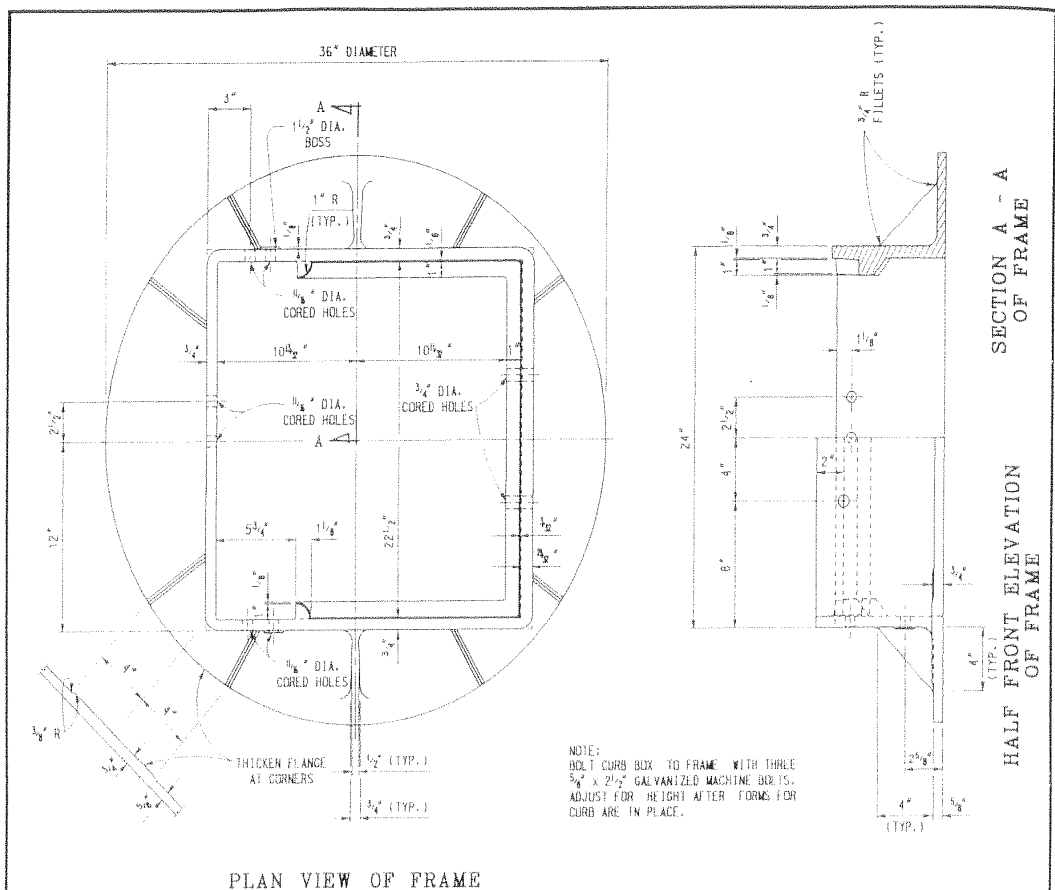
Appendix 3



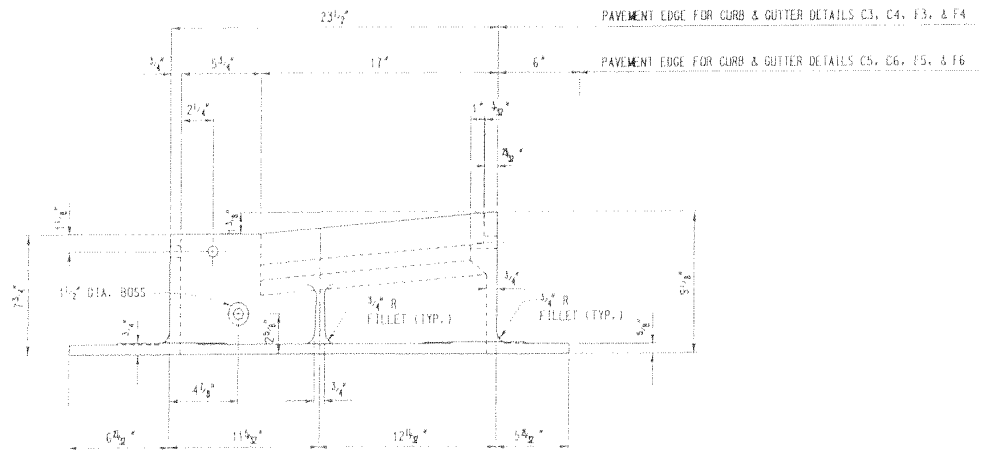
MDOT Inlet Covers





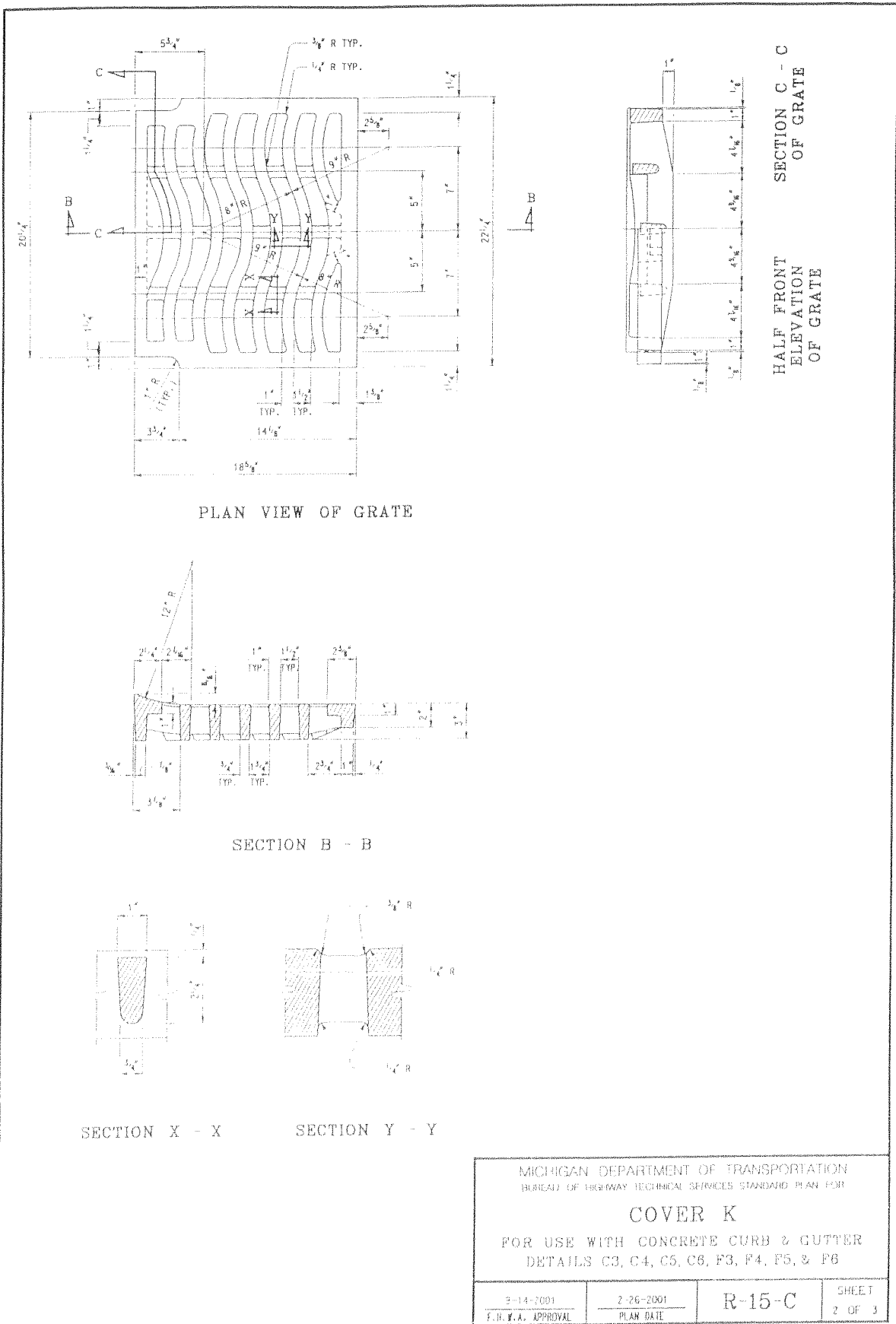


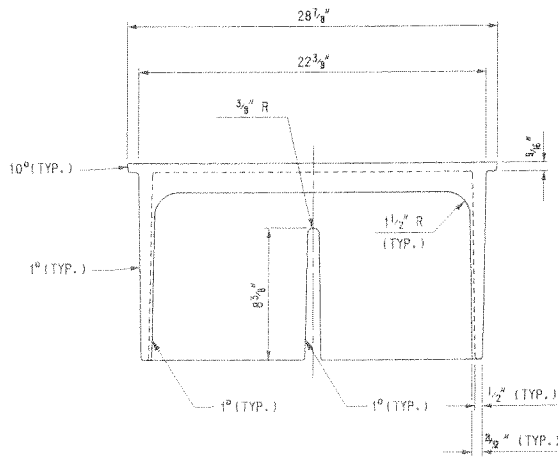
PLAN VIEW OF FRAME



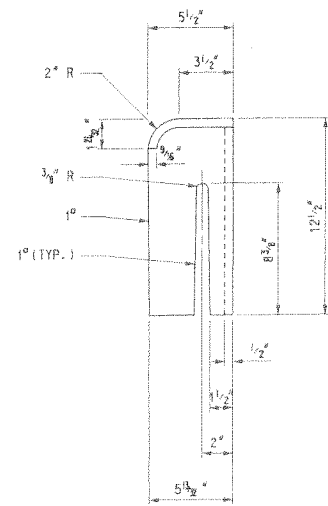
SIDE ELEVATION OF FRAME

 MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR	JAMES D. CURP ENGINEER OF CONSTRUCTION & TECHNOLOGY	ENGINEER - ROAD DESIGN	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR			
	PREPARED BY DESIGN DIVISION	JAMES D. CURP ENGINEER OF CONSTRUCTION & TECHNOLOGY	JAMES D. CURP ENGINEER OF DESIGN	COVER K FOR USE WITH CONCRETE CURB & GUTTER DETAILS C3, C4, C5, C6, F3, F4, F5, & F6		
DRAWN BY: B.L.T.	CRAWFORD ROBERTS ENGINEER OF MAINTENANCE	DEPARTMENT DIRECTOR (Gregory J. Rossini)	9-14-2001	2-26-2001	R-15-C	SHEET 1 OF 3
CHECKED BY: C.A.E.	ENGINEER OF TRAFFIC AND SAFETY	BRYAN D. STAYLER CHIEF ENGINEER/DEPUTY DIRECTOR BUREAU OF HIGHWAY TECHNICAL SERVICES	(S.H.A.) APPROVAL	PLAN DATE		





FRONT VIEW OF CURB BOX



SIDE VIEW

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY - IRON CASTINGS AASHTO M 105, AND SHALL HAVE A MINIMUM STRENGTH AS PROVIDED FOR CLASS NO. 30 GRAY - IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GRIND OR MACHINED SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CURB BOX AND FRAME SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

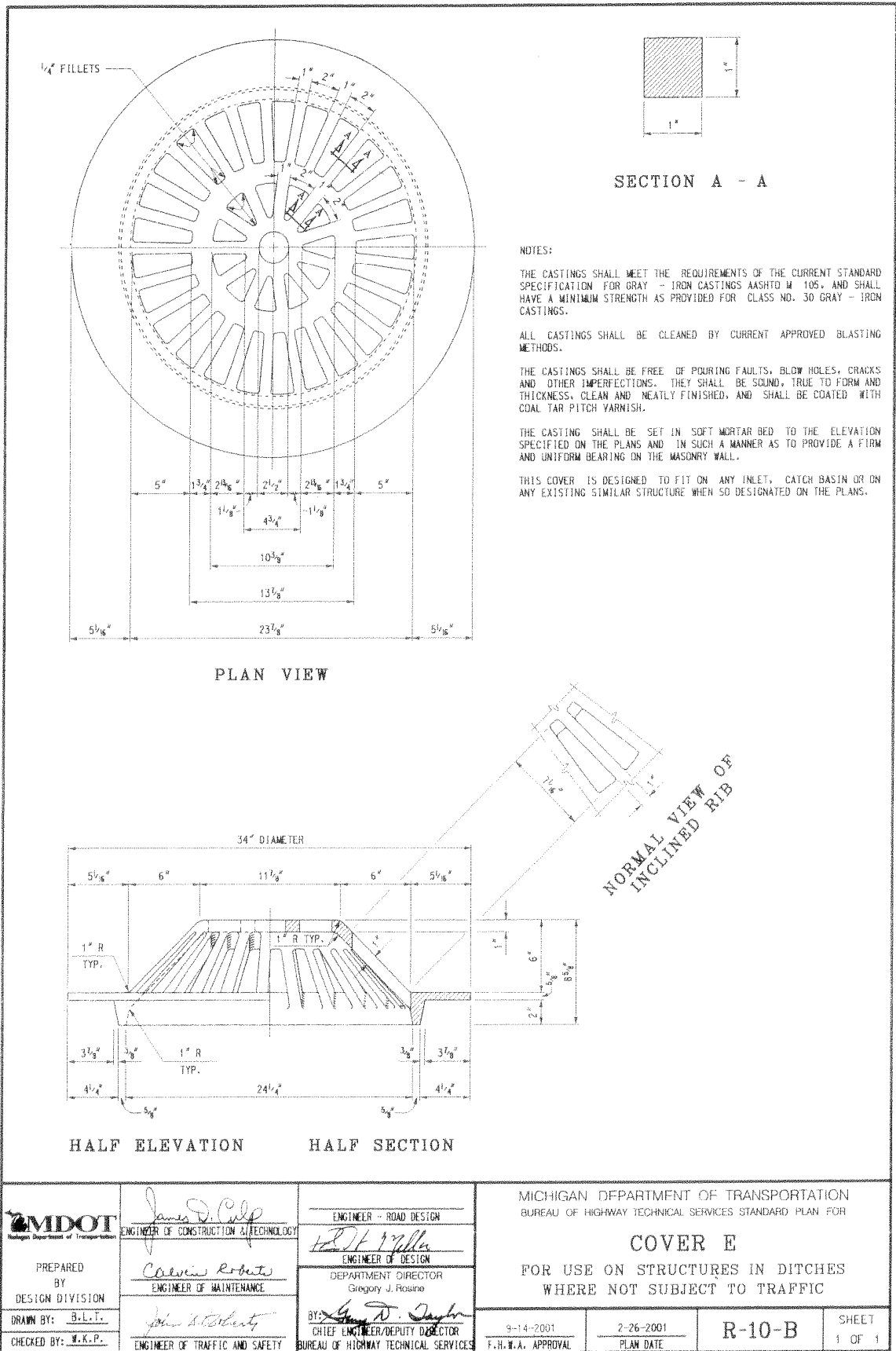
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR

COVER K

FOR USE WITH CONCRETE CURB & GUTTER
DETAILS C3, C4, C5, C6, F3, F4, F5, & F6

9-14-2001 F.H.W.A. APPROVAL	2-26-2001 PLAN DATE	R-15-C	SHEET 3 OF 3
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Appendix L



Appendix 4

“A Simple Method of Detention Basin Design”

VII. A SIMPLE METHOD OF DETENTION BASIN DESIGN

(By Glen Yrjanainen, P.E., Civil Engineer and Alan W. Warren, Engineering Technician)

A. INTRODUCTION

Because development of land from agrarian to residential, commercial or industrial use continues to increase, the temporary storage of storm runoff in an onsite detention basin has become essential, due to inadequate outlets for the increased storm runoff created by development. In most cases, and primarily for economic reasons, adequately designed collector storm water systems (capable of handling the storm runoff from ultimate development) lag behind the development increases. Because of ever increasing construction costs and the infeasibility of installing large diameter storm drains, the concept of ultimate design or improvement of collector storm water systems is impractical. The detention basin that meters or restricts flow is here to stay.

B. THE USE OF CALCULUS

If a detention basin were to have no outlet, all of the storm runoff would have to be stored. However, most detention basins do have an outlet, with the outflow depending upon the amount of water that is ponded and the depth of detention. The outflow is instantaneously changing as the head varies. This type of outlet can be analyzed by applying basic calculus to the controlling outflow equation. If the outflow is at a constant rate, i.e., a pump, the analysis is easier. The volume of storm water into the detention basin can be determined by the rational formula. The required storage volume is the volume of runoff that flows into the basin minus that which flows out.

An equation can be obtained that relates volume of storage to allowable outflow using the storage time as a parameter. This equation can then be maximized by basic calculus to find the peak storage time, which in turn can be used to calculate the maximum volume of storage required. The one assumption in this method is that storm water rises in the detention basin at a constant rate to fill the basin to the peak volume, and that the maximum allowable outflow is reached only at this peak volume, and then begins to recede.

The derivations of detention equations for detention basins with a gravity flow, changing rate orifice outlet, and a constant rate pump outlet follow. These derivations are for a ten-year frequency storm in the Oakland County, Michigan area. Detention equations for different year frequency storms and other areas can be obtained in the same manner.

C. DERIVATION FOR AN ORIFICE OUTLET**1. OUTFLOW**

$$Q_i = ca \sqrt{2gh} \quad (\text{Orifice Formula})$$

Assume that the storm that fills the basin to the peak volume causes the water level to rise at a constant rate. ($h = K_1 t$)

$$\begin{aligned} Q_i &= ca \sqrt{2gK_1 t} \\ \text{Let } K_2 &= ca \sqrt{2gK_1} \\ Q_i &= K_2 t^{1/2} \\ V_o &= 60 \int_0^T Q_i dt \end{aligned}$$

A conversion factor of 60 sec./min. is required because Q_i is in cfs and t is in minutes.

$$\begin{aligned} V_o &= 60K_2 \int_0^T t^{1/2} dt \\ V_o &= 60K_2 T^{3/2} (2/3) \\ V_o &= 40K_2 T^{1/2} (T) \end{aligned}$$

Assume the maximum outflow occurs only at the time of peak storage, such that $Q_o = K_2 T^{1/2}$

$$V_o = 40Q_o T$$

2. INFLOW

$$\begin{aligned} Q_n &= \text{CIA (Rational Formula)} \\ \text{Let } C &= 100\% \\ A &= 1 \text{ Acre} \\ I &= \frac{175}{T + 25} \\ Q_n &= (100\%) \frac{175}{T + 25} \quad (1) \\ Q_n &= \frac{175}{T + 25} \\ V_n &= Q_n (T) (60 \text{ sec./min.}) \\ V_n &= \frac{10,500 T}{T + 25} \end{aligned}$$

3. STORAGE

$$V_s = V_n - V_o$$

$$V_s = \frac{10,500 T}{T + 25} - 40Q_o T$$

Since Q_o is a fixed maximum outflow that will only occur at peak storage, it is necessary to find the time from the instant the storage begins until the instant the peak storage is attained. This can be done by taking the first derivative of the storage volume equation and setting it equal to zero.

$$\frac{dV_s}{dT} = \frac{\frac{10,500 T}{T + 25} - \frac{d(40Q_o T)}{dT}}$$

$$\frac{dV_s}{dT} = \frac{(T + 25)(10,500) - (10,500 T)(1)}{(T + 25)^2} - 40Q_o$$

$$\frac{dV_s}{dT} = \frac{262,500}{T^2 + 50T + 625} - 40Q_o = 0$$

$$T^2 = 50T + 625 - \frac{262,500}{40Q_o} = 0$$

This is a quadratic equation that may be reduced to the form:

$$ax^2 + bx + c = 0$$

$$\text{Where } x \text{ is } T, a = 1, b = 50 \text{ and } c = 625 - \frac{262,500}{40Q_o}$$

The general solution is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$T = \frac{-50 \pm \sqrt{(50)^2 - 4(1)(625 - \frac{262,500}{40Q_o})}}{2(1)}$$

$$T = \frac{-50 \pm \sqrt{2,500 - 2,500 + \frac{26,250}{40Q_o}}}{2}$$

$$T = \frac{-25 \pm \sqrt{\frac{6,562.5}{Q_o}}}{1}$$

D. DERIVATION FOR A CONSTANT RATE OUTLET

A basin with a constant outflow device, such as a pump, is simpler to derive. The constant outlet rate implies that the total outflow is merely the rate multiplied by the storage time.

$$V_o = 60Q_oT$$

$$V_s = V_n - V_o$$

$$V_s = \frac{10,500 T}{T + 25} - 60Q_oT$$

$$\frac{dV_s}{dT} = \frac{(T + 25)(10,500) - 10,500 T(1)}{(T + 25)^2} - 60 Q_o$$

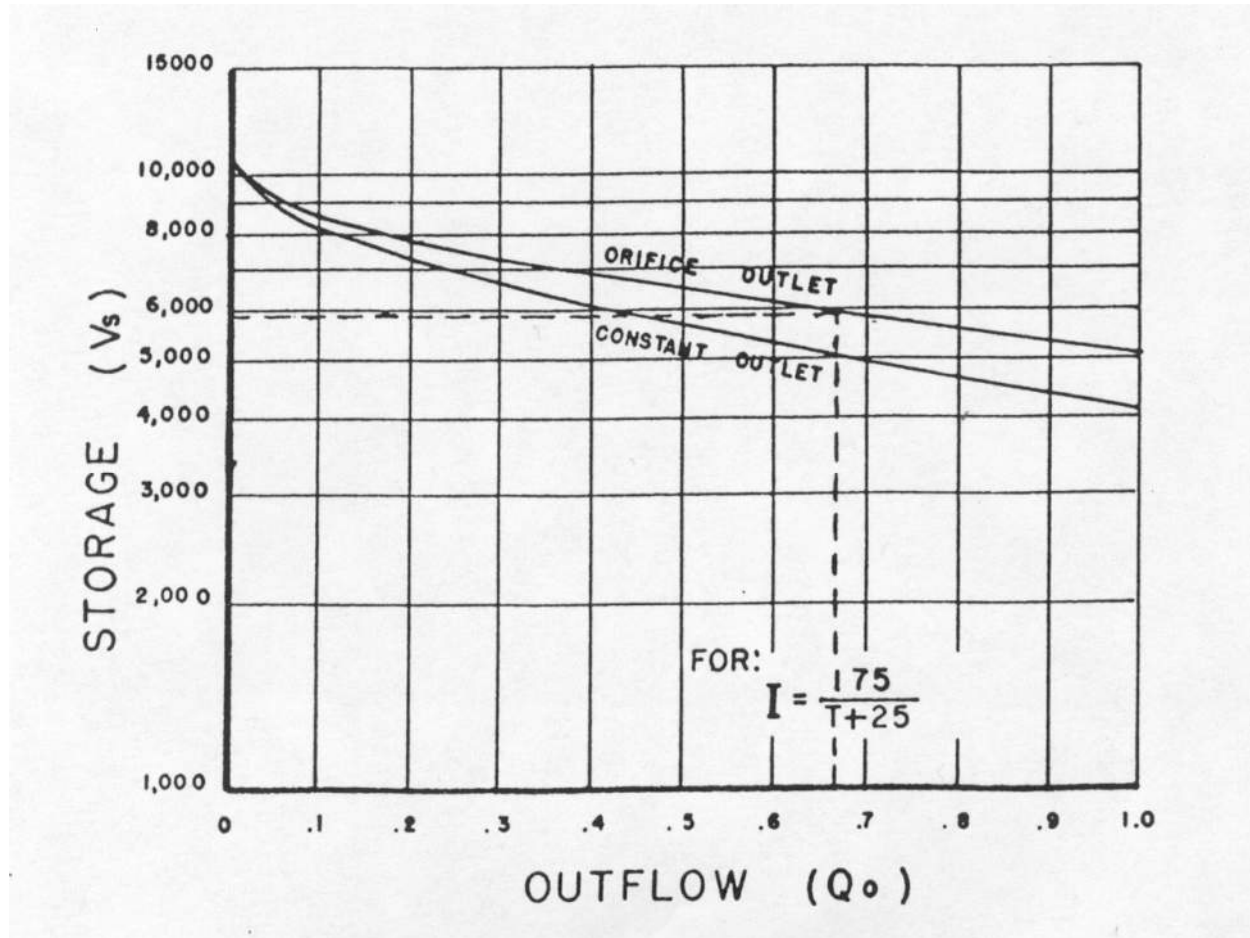
$$\frac{dV_s}{dT} = \frac{262,500}{T^2 + 50T + 625} - 60Q_o$$

$$T^2 + 50T + 625 - \frac{262,500}{60Q_o} = 0$$

$$T = -25 + \sqrt{\frac{4,375}{Q_o}}$$

E. GRAPHING THE DERIVATIONS

In both outlet situations the storage time to fill the basin to its maximum can be found as a function of the maximum outflow. The peak storage volume can then be found by substituting the storage time into the storage volume equation, reducing the storage volume equation to an equation with only one independent variable. This makes it possible to draw a graph of storage volume as a function of the maximum outflow rate. The included graph shows that as the outlet gets larger, the required storage volume decreases. The ideal basin will fall at a point on its respective curve. A basin that is oversized will fall at a point above its respective curve, and as a result, it will not reach its maximum outflow rate during the storm. An inadequate basin will fall at a point below its curve, and will rise above the design depth, producing more than the design outflow and possibly causing flooding. It should be pointed out that the constant rate system allows the least storage for a given size outlet. This is due to the fact that it functions at the maximum rate throughout the storm, while a gravity system has to head up before it will reach the maximum rate.



F. TIME OF CONCENTRATION

It should be noted that no mention has been made of the time of concentration, which is defined as the flow time, in minutes, from the most remote point in the drainage area to the point in question. The reason for this is because it is assumed that runoff from the entire drainage area contributes to the detention basin immediately, and that the time of concentration is zero. This is a reasonable assumption that can be made for developments with relatively short times of concentration, such as subdivisions, multiples and parking lots. This assumption also makes this method of design conservative, since in actuality a certain volume of runoff will have already flowed out of the detention basin before the runoff from the most remote point of the drainage area arrives. As the time of concentration increases, this method of design becomes more conservative.

G. DETENTION BASIN DESIGN PROCEDURE

1. Determine the amount of acreage (A) contributing runoff to the detention basin and its runoff coefficient (C).
2. Determine the maximum allowable outflow, Q_a , in CFS from the local municipal government regulations and/or the existing outlet conditions.
3. Calculate $Q_o = \frac{\text{allowable outflow, } Q_a}{(\text{acreage}) (\text{runoff coefficient})}$
4. Determine the type of outlet that will be used. (orifice or pump)
5. Calculate the maximum storage time (T) from the storage time equation corresponding to the type of outlet selected in step 4.
6. Calculate the maximum storage (Vs) from the storage equation corresponding to the type of outlet selected in step 4. (Vs will be in $\text{ft}^3 / (\text{acres}) (\text{runoff coefficient})$)
7. Calculate the total volume of storage required for the entire site. ($V_t = (V_s) (C) (A)$)
- 8a. If the outlet is to be a pump, select a depth of detention and a pump that will yield an outflow in CFS equal to the maximum allowable as determined in step 2.
- 8b. If the outlet is to be an orifice operating under a head, select a depth of detention and then use the orifice equation to calculate the cross-sectional area of outflow pipe required to outlet the allowable outflow, as determined in step 2, operating under a head equal to the depth of detention. After obtaining this cross-sectional area, the pipe diameter can be obtained.

Please be advised that the size of this outflow pipe may have to be increased if the outflow operates according to a Bernoulli analysis instead of as an orifice. If this is the case, then the outflow should be either (1) sized by the Bernoulli equation to yield the allowable outflow for the design depth or (2) the orifice condition should be created by selecting a larger size pipe than is calculated by the orifice equation, and then installing within this pipe a restriction plate containing an opening equal to the original cross-sectional calculated.

H. EXAMPLE PROBLEM

In order to illustrate the use of the equations and graphs derived in this article, an example problem will be worked.

1. DESIGN CRITERIA

A 50-acre parcel of land is to be developed into a residential subdivision with a developed runoff coefficient of 0.30. An open ditch drain is available adjacent to this 50 acre parcel of land and can accept storm runoff at a rate of no greater than 10 CFS from the proposed subdivision. Sufficient grade is available to allow 6.5 feet depth of detention and a gravity flow orifice outlet. Determine (1) the volume of detention required, and (2) the size of outflow pipe required.

2. SOLUTION

- a. From the design criteria, calculate Q_o

$$Q_o = \frac{\text{allowable outflow, } Q_a}{(\text{acreage}) (\text{runoff coefficient})}$$

$$Q_o = \frac{10 \text{ CFS}}{(50 \text{ ac}) (0.30)} = 0.667 \frac{\text{CFS}}{\text{acre imperviousness}}$$

- b. Calculate the storage time, T , in minutes, from the orifice outlet storage time equation.

$$T = -25 + \sqrt{\frac{6,562.5}{Q_o}}$$

$$T = -25 + \sqrt{\frac{6,562.5}{0.667}}$$

$$T = 74.22 \text{ min.}$$

- c. Calculate the maximum volume of storage per acre imperviousness, V_s , from the orifice outlet storage equation.

$$V_s = \frac{10,500 T}{T + 25} - 40 Q_o T$$

$$V_s = \frac{10,500 (74.22)}{74.22 + 25} - 40 (0.667) (74.22)$$

$$V_s = 5,875.18 \text{ ft}^3 / \text{acre imperviousness}$$

- d. Calculate the total volume of storage, V_t , required for the entire site.

$$V_t = (V_s) (\# \text{ acres}) (\text{runoff coefficient})$$

$$V_t = 5,875.18 (50) (0.30)$$

$$V_t = 88,127.76 \text{ ft}^3$$

Appendix L

- e. Because of sufficient grade available, the design depth of detention is 6.5 feet. Now select an outflow pipe from the orifice formula that will yield the allowable outflow of 10 CFS operating under a head of 6.5 feet.

$$Q = 0.62 a \sqrt{2gh}$$

$$\text{Area} = \frac{Q}{0.62 \sqrt{2gh}} = \frac{10 \text{ CFS}}{0.62 \sqrt{64.4 \frac{\text{feet}}{\text{sec}^2} (6.5 \text{ feet})}}$$

$$\text{Area} = 0.785 \text{ ft}^2$$

Select a 12" diameter outflow pipe

- f. Plot the storage required per acre imperviousness (Vs) versus the outflow per acre imperviousness (Qo) on the orifice outlet graph. One will see that it falls exactly on the curve.

Appendix L
DETENTION BASIN DESIGN FORMULAS

(Pump Outlet)

Frequency Of Storm	Rainfall Intensity	Storage Time Equation	Storage Volume Equation
1 Year	$\frac{72}{T+25}$	$T = -25 + \sqrt{\frac{1800}{Q_0}}$	$V_s = \frac{4320T}{T+25} - 60Q_0T$
5 Year	$\frac{145}{T+25}$	$T = -25 + \sqrt{\frac{3625}{Q_0}}$	$V_s = \frac{8700T}{T+25} - 60Q_0T$
10 Year	$\frac{175}{T+25}$	$T = -25 + \sqrt{\frac{4375}{Q_0}}$	$V_s = \frac{10500T}{T+25} - 60Q_0T$
25 Year	$\frac{215}{T+25}$	$T = -25 + \sqrt{\frac{5375}{Q_0}}$	$V_s = \frac{12900T}{T+25} - 60Q_0T$
50 Year	$\frac{245}{T+25}$	$T = -25 + \sqrt{\frac{6125}{Q_0}}$	$V_s = \frac{14700T}{T+25} - 60Q_0T$
100 Year	$\frac{275}{T+25}$	$T = -25 + \sqrt{\frac{6875}{Q_0}}$	$V_s = \frac{16500T}{T+25} - 60Q_0T$

(Orifice Outlet)

Frequency Of Storm	Rainfall Intensity	Storage Time Equation	Storage Volume Equation
1 Year	$\frac{72}{T+25}$	$T = -25 + \sqrt{\frac{2700.0}{Q_0}}$	$V_s = \frac{4320T}{T+25} - 40Q_0T$
5 Year	$\frac{145}{T+25}$	$T = -25 + \sqrt{\frac{5437.5}{Q_0}}$	$V_s = \frac{8700T}{T+25} - 40Q_0T$
10 Year	$\frac{175}{T+25}$	$T = -25 + \sqrt{\frac{6562.5}{Q_0}}$	$V_s = \frac{10500T}{T+25} - 40Q_0T$
25 Year	$\frac{215}{T+25}$	$T = -25 + \sqrt{\frac{8062.5}{Q_0}}$	$V_s = \frac{12900T}{T+25} - 40Q_0T$
50 Year	$\frac{245}{T+25}$	$T = -25 + \sqrt{\frac{9187.5}{Q_0}}$	$V_s = \frac{14700T}{T+25} - 40Q_0T$
100 Year	$\frac{275}{T+25}$	$T = -25 + \sqrt{\frac{10312.5}{Q_0}}$	$V_s = \frac{16500T}{T+25} - 40Q_0T$

CHAPTER 6: GENERAL DESIGN STANDARDS



Designing storm water management systems to meet the performance standards in the Wayne County Storm Water Management Standards is the responsibility of the applicant or its designee. Wayne County maintains the right to require applicants to modify storm water management system designs to ensure that the performance standards are satisfied. Applicants must evaluate the project's impact over the long-term and on a watershed scale. Taking these factors into account, the following sections describe general design standards for storm water management systems.

Additional design standards for storm water management systems may be found in Chapters 7 and 8.

6.1 Determination of Peak Flow Rate

6.1.1 Rational Method

The Rational Method for calculating storm water runoff is generally acceptable for calculating peak flow rate at a particular location within a storm water management system. Alternative methods may be required when the County determines that another method is necessary to satisfy the requirements of the Standards (see Section 6.1.2).

To calculate peak flow rate using the Rational Method, an applicant must use the following Rational Method Formula:

$$Q = C \times I \times A$$

where: Q = peak flow rate (cfs)
 C = runoff coefficient
 I = rainfall intensity (in/hr)
 A = drainage area (acres)

The peak flow rate for each component of a storm water management system must be calculated using a composite runoff coefficient, the entire tributary drainage area, and a design rainfall intensity adjusted based on time of concentration. Values for the various terms used in the Rational Method Formula in determining peak flow at a particular location must be determined as follows:

- Drainage area (A) means the entire upstream land area that drains to that location, including any off-site drainage area. (In general, drainage from off-site should not be passed through on-site storm water management facilities. However, there are situations where this is unavoidable.)
- Peak flow rate (Q) must be calculated with the assumption that off-site drainage areas are developed consistent with any applicable master land use plan, storm water standards and storm water master plan enacted by the local community in which the storm water management system is located, and the Wayne County Storm Water Management Standards.
- The composite runoff coefficient (C) must be based on the percentage of surface types in the drainage area upstream of that location. Surface types to be used are shown in the following table.
- Applicable rainfall formulas for calculating rainfall intensity (I) are provided in the table below for several design storms. Calculation of rainfall intensity

MINIMUM ACCEPTABLE RUNOFF COEFFICIENTS

Type of Surface	Runoff Coefficient (C)		
Water Surfaces	1.00		
Roofs	0.95		
Asphalt or concrete pavements	0.95		
Gravel, brick, or macadam surfaces	0.85		
Semi-pervious: lawns, parks, playgrounds			
	Slope ≤4%	Slope 4-8%	Slope ≥8%
Hydrologic Soil Group A	0.15	0.20	0.25
Hydrologic Soil Group B	0.25	0.30	0.35
Hydrologic Soil Group C	0.30	0.35	0.40
Hydrologic Soil Group D	0.45	0.50	0.55

Adapted from "Rules of the Washtenaw County Drain Commissioner, Procedures and Design Criteria for Storm Water Management Systems", May 2000.

depends on the time of concentration (t), which is the time duration (in minutes) that is required for runoff from the most remote area of the watershed to reach the storm water management system component being designed.

DESIGN RAINFALL INTENSITIES

Design Storm	Intensity (in/hr) for t < 60 min.	Intensity (in/hr) for t > 60 min.
10-year	151.8/(t+19.9)	162.3/(t+25.4)
50-year	212.5/(t+23.3)	230.3/(t+30.3)
100-year	233.7/(t+23.5)	294.0/(t+45.0)

t = time of concentration: the time duration (minutes) required for runoff from the most remote area of the watershed to reach the point of study.

Data from U.S. Weather Service Station Records for Detroit, 1896 - 1942

- The time of concentration for a particular design storm varies with slope, surface cover, and the length of the surface flow path. Other variables, including anticipated rainfall intensity and infiltration capacity of the soil and surface cover, also affect the time of concentration.

- For the most upstream end of the storm water management system, the time of concentration is referred to as the initial time of concentration and is determined in accordance with the following table.

For all other downstream locations in the storm water management system, the time of concentration (t) is the sum of (1) the initial time of concentration and (2) the travel time from the upstream end to the location being analyzed.

INITIAL TIME OF CONCENTRATION

Type of Land Use	Time of Conc. (t ₀) (min)
Multiple Units	15
Commercial/Industrial	15
Single family residential	20
Unimproved land	t ₀ = L / (60 x V) and V = 0.48 x S ^{1/2}

where

- t₀ = initial time of concentration (minutes)
- L = length of overland sheet flow (feet)
- S = slope of overland sheet flow (%)
- V = velocity of overland sheet flow (ft/sec)

6.1.2 Alternative Methods

The Rational Method Formula may not be an adequate design tool for calculating storm water runoff from large drainage systems. Alternative runoff hydrograph prediction methods are widely available and may be required by the Permit Office for sizing the drainage systems on large sites and/or smaller sites that present unique flood control or water resources protection issues.

Acceptable alternative methods are:

- Corps of Engineers HEC-RAS or HEC-HMS;
- Soil Conservation Service UD-21, TR-20 or TR-55; and
- U.S. EPA's Storm Water Management Model (SWMM).

These methods must be based on the SCS Type II, 24-hour rainfall distribution and assume a conservative wet weather antecedent conditions.

6.2 General Design Standards for Flood Control

Storm water management systems designed to satisfy the flood control performance standards described in Section 5.1 must include a detention system and/or retention basin that is designed and constructed in accordance with this Section.

6.2.1 Detention Systems

Generally, two types of detention systems are most often designed in Wayne County: open detention basins and underground detention systems.

Open detention basins are man-made surface waters designed to temporarily detain storm water runoff to control peak flow rates and provide for pollutant removal through settling and plant uptake. There are two types of open detention basins traditionally used in Wayne County:

- Traditional detention basins, which detain storm water runoff for an extended period of time in a permanent pool and remove sediment and other pollutants via settling. The permanent pool in a traditional detention basin must be a minimum of 4 feet deep.
- Constructed wetlands, where over 50% of the surface area typically is covered by wetland vegetation. Permanent wetland pool depths vary between 0.5 and 3.0 feet depending on vegetation type.

Underground detention systems consist of one or more underground pipes or structures designed to provide the required storage volumes (both the bank full flood and flood control volumes) for a development project. Just as with any above ground means of storm water detention, underground detention systems must have a restricted outlet that limits outflow for the bank full flood and for the maximum allowable release rate from the development site.

Additional design standards for open detention basins and underground detention systems is presented in Chapter 8.

Flood Control Storage Volume

Detention systems that are designed to meet the flood control performance standards described in Section 5.1

must provide enough flood control storage volume so as not to exceed the maximum allowable runoff rate for the site. Equations used to determine the required storage volume are shown in the box below.

Detention Systems: Flood Control Storage Volume Requirements

Drainage Areas Greater Than Five Acres

Detention of the 100-year storm is required to control flooding events. Volume required should be based on the following relationships:

$$Q_a = 0.15 \text{ cfs/acre} \times A$$

$$Q_o = \frac{Q_a}{A \times C}$$

$$T_{100} = -45 + \sqrt{\frac{19845}{Q_o}}$$

$$V_{s100} = \frac{17649 \times T_{100}}{(T_{100} + 45)} - 40 \times Q_o \times T_{100}$$

$$V_{t100} = V_{s100} \times A \times C$$

Drainage Areas Five Acres or Less

Detention of the 10-year storm is required for flood control purposes. Volume required should be based on the following relationships:

$$Q_a = 0.15 \text{ cfs/acre} \times A$$

$$Q_o = \frac{Q_a}{A \times C}$$

$$T_{10} = -19.9 + \sqrt{\frac{4530}{Q_o}}$$

$$V_{s10} = \frac{9108 \times T_{10}}{(T_{10} + 19.9)} - 40 \times Q_o \times T_{10}$$

$$V_{t10} = V_{s10} \times A \times C$$

where:

Q_a = Maximum allowable outflow rate from the detention system (cfs)

Q_o = Maximum allowable outflow rate per acre imperviousness (cfs /acre imperviousness)

T = Storage time defined as the instant storage begins until peak storage is attained (minutes)

V_s = Maximum volume of water stored in the detention system per acre imperviousness (ft³/acre imperviousness)

V_t = Maximum volume of water stored in the detention system (ft³)
 A = Drainage area (acres)
 C = Runoff coefficient

6.2.2 Retention Basins

Retention basins are man-made surface waters designed to store storm water runoff and provide gravity settling of pollutants. Retention basins infiltrate storm water into the soil rather than discharging it to a surface water or closed conduit.

Flood Control Storage Volume

Retention basins that are designed to meet the flood control performance standards described in Section 5.1 must provide enough flood control storage volume to retain the volume of storm water equal to the runoff from two consecutive 100-year storm events. The equation used to determine the required storage volume is shown in the box below.

Retention Basins: Flood Control Storage Volume Requirements

Retention basins are required to retain the volume of storm water equal to the runoff from two consecutive 100-year storm events. Volume required should be based on the following relationship:

$$V_r = 2 \times 16500 \times A \times C$$

where:

V_r = Flood control storage volume of retention basin (ft³)
 A = Drainage area (acres)
 C = Runoff coefficient

6.2.3 Adequate Outlet

Storm water management systems must have an adequate storm water outlet. At a minimum, the capacity of the outlet must not exceed the discharge's reasonable share of the maximum capacity of the downstream closed conduit or watercourse, as determined by the County.

If the County determines that a proposed detention system does not have an adequate outlet, the applicant may be required to design and construct improvements to the downstream County Drain, watercourse, or closed conduit.

The County will determine the extent to which downstream improvements are required.

6.2.4 Flood Plain Restrictions

Storm water management systems may not be constructed within a 100-year floodplain unless the storm water management system satisfies the requirements listed below. Construction within a 100-year floodplain must be approved by MDEQ as well as the County.

- The storm water management system must not diminish the net storage capacity of the floodplain. Compensatory storage is required for any reduction in floodplain storage capacity.
- The storm water management system must not negatively alter the conveyance of the watercourse.
- During a design storm event, the storage capacity of the storm water management system must remain available for detention of storm water runoff from the development site.
- The storm water management system must minimize disruption to the riparian habitat of the floodplain by developing and implementing a plan for minimizing disturbance that is acceptable to the County.

6.2.5 Additional Requirements

To the fullest extent possible, storm water management systems must follow the natural drainage patterns within the development site and within the watershed in which it is located.

Storm water management systems that include surface water components cannot be located within pre-existing surface waters.

6.3 General Design Standards for Water Resources Protection

6.3.1 Pretreatment Systems

Storm water management systems must include a pretreatment system at each inlet to each detention system

and/or retention basin. The pretreatment system must either:

- (1) Be designed and constructed such that the storm water management system achieves the pollutant removal rate (80% or more of the annual average total suspended solids load) specified by the water resources protection performance standard (see Section 5.2); and/or
- (2) Be designed and constructed to capture the first flush and release it gradually to the detention system and/or retention basin over a period of twenty-four (24) hours.

If an applicant designs a system to capture and release the first flush (as described above in option 2), the storage volume required to capture the first flush for the area tributary to the pretreatment system must be calculated based on the following relationship:

$$V_{t\text{ ff}} = 1815 \times A \times C$$

where:

$V_{t\text{ ff}}$ = first flush storage volume (ft³)
 A = drainage area tributary to inlet (acres)
 C = runoff coefficient

Additionally, for option 2, the pretreatment system must have a flow restrictor designed to gradually release the first flush storage volume over a period of twenty-four (24) hours. The 24-hour average allowable release rate must be determined in accordance with the following relationship:

$$Q_{\text{avg ff}} = V_{t\text{ ff}} / 86400$$

where:

$Q_{\text{avg ff}}$ = 24-hour average allowable outflow rate (cfs)
 $V_{t\text{ ff}}$ = first flush storage volume (ft³)

If one or more forebays are used as pretreatment system(s), the volume of the forebays above any permanent pool may be used to satisfy a portion of the flood control storage volume (described in Section 6.2.1) and the bank full flood storage volume (described in Section 6.3.2). If a permanent pool is provided, the

volume of the permanent pool may not be used to satisfy these other storage volume requirements.

6.3.2 Bank Full Flood Requirements

Soil erosion from stream banks and channels is of special concern in Wayne County. As development activity increases impervious surface area, the frequency and duration of bank full flow conditions increases. As a result, streams naturally attempt to become wider and deeper to convey the increased flows. This process can lead to channel and bank erosion and the destruction of aquatic habitat.

To address this concern, each storm water management system (except for retention basins), must capture runoff from the bank full flood and release it gradually over a period of forty (40) hours. The storage volume necessary to capture and treat runoff from the bank full flood must be calculated based on the following relationship:

$$V_{t\text{ bf}} = 5160 \times A \times C$$

where:

$V_{t\text{ bf}}$ = bank full flood storage volume (ft³)
 A = drainage area (acres)
 C = runoff coefficient

Additionally, the pretreatment system must have a flow restrictor designed to gradually release the bank full flood storage volume over a period of forty (40) hours. The 40-hour average allowable release rate must be determined in accordance with the following relationship:

$$Q_{\text{avg bf}} = V_{t\text{ bf}} / 144000$$

where:

$Q_{\text{avg bf}}$ = 40-hour average allowable outflow rate (cfs)
 $V_{t\text{ bf}}$ = bank full flood storage volume (ft³)

For detention systems that are intended to meet both the flood control and water resources protection performance standard, the lower portion of the flood control storage volume can also be used to capture the bank full flood. With this approach, the total volume required is equal to

the flood control storage volume, not the sum of the flood control and bank full storage volumes.

The volume of the permanent pool within an open detention system does not satisfy any of the flood control or bank full storage volume requirements.

6.3.3 Additional Requirements

To protect water resources, Wayne County has adopted the following additional requirements to minimize pollutants in storm water runoff from development projects.

Buffer Strip

A buffer strip is a zone that is used for filtering direct storm water runoff into a storm water management system and for providing maintenance access to a storm water management system. A buffer strip, minimum 25 feet wide, must be established and/or preserved along the edge of any surface water in the development site (except for bioretention areas and vegetated swales).

- Along watercourses, the width of a buffer strip must be measured from the top of bank of the watercourse. Around other surface waters, the width of the buffer strip must be measured from the minimum freeboard elevation of the surface water. Additional requirements for buffer strips associated with open detention basins and retention basins are described in Section 8.1.
- The ground slope of a buffer strip should not be steeper than 1:6.
- Construction activities, paving, and chemical application, except for construction activities needed to create or establish the buffer strip, are prohibited in the buffer strip.

Landscape Plan

Because vegetation is an important part of many components of storm water management systems, a landscaping plan must be submitted to the County.

- The plan must depict landscaping elements that function as part of the storm water management system, including the buffer strip.
- The landscape plan must include (at a minimum) specifications for the soils and plant materials that the applicant proposes to include in the landscape; and a description of the methods and planting techniques

that the applicant proposes to utilize during landscape installation.

- The installation and maintenance of the landscaping described in the landscape plan is included as regulated construction activity for which the County may require financial assurance.

Guidance and requirements for landscaping plans are described in Chapter 8.

Other

Healthy streams have natural temperatures that are cooler than that of stormwater runoff. Applicants should consider incorporating landscaping or other features to minimize the temperature of storm water runoff, and the adverse effect that high water temperatures may have on the receiving water quality. For example:

- Provide trees or other means to shade open detention basins and certain other storm water management components.
- Provide an outlet structure for open detention basins which draws water from the (cooler) bottom of the basin.

CHAPTER 7: ADDITIONAL REQUIREMENTS

This chapter presents additional requirements that may apply to storm water management systems in Wayne County.

7.1 Storm Water Conveyances

Storm water management systems may use watercourses or structures such as closed conduits, culverts, or bridges as a means of conveying stormwater runoff. Watercourses and closed conduits must be designed to standards described in this section. Storm water runoff conveyed within or under County Roads must also meet the additional requirements described in Section 7.3.

7.1.1 Watercourses

Natural watercourses should be preserved whenever possible. The Permit Office will not approve modifications to natural watercourses (e.g., installing a concrete channel or enclosure) unless the modification is necessary to address a demonstrated public safety, health or welfare issue. When such modifications are deemed necessary, the appropriate governmental agencies must be contacted for review and approval.

The flow capacity of each reach of a watercourse that is part of a storm water management system must be equal to or greater than the peak flow rate for a 10-year storm. The flow capacity of a watercourse must be calculated in accordance with the "Manning Formula" as follows:

$$Q = \frac{1.486 \times A \times R^{2/3} \times S^{1/2}}{n}$$

where:

- Q = flow capacity (cfs)
- A = cross sectional flow area (ft²)
- n = Manning's coefficient of roughness
- P = wetted perimeter (feet)
- R = hydraulic radius = (A/P in feet)
- S = hydraulic gradient (ft/ft)

In general, a minimum "n" of 0.035 will be used for the roughness coefficient unless special treatment is given to the bottom and side slopes, such as sodding, riprap or paving.



7.1.2 Closed Conduits

The flow capacity of each reach of a closed conduit that is part of a storm water management system must be equal to or greater than the peak flow rate for a 10-year storm. The Manning Formula (shown above) must be used to determine the flow capacity of a closed conduit.

The invert elevation of each closed conduit entering a forebay with a permanent pool must be equal to or greater than the permanent pool elevation.

The hydraulic grade lines (HGLs) of closed conduits must meet both of the following requirements:

- The hydraulic grade line must be calculated based on 10-year storm flows, starting with the crown elevation at the outlet. This gradient must not be higher than 2.5 feet below the rim elevation at any upstream manhole location. However, exceptions may be granted in special circumstances such as for managing storm water in and around truck docks.
 - o For systems with forebays: The HGL starts at the crown of the pipe entering the forebay.
 - o For systems with underground detention systems: The HGL starts at the crown of the pipe entering the manufactured treatment structure.
- The rim elevation at any manhole location along the closed conduit upstream of a detention system must be at least one (1) foot above the design water level of the detention system.

The minimum and maximum allowable closed conduit velocities are 2.5 and 8.0 feet per second, respectively. The maximum allowable velocity within the conduit may only be exceeded where special provisions have been made to dissipate energy.

The maximum distance between manholes, catch basins, and inlets may not exceed 300 feet plus 100 additional feet for every 1 foot of diameter for closed conduits over 36 inches in diameter.

Manholes or junction chambers must be constructed at all closed conduit junctions and angle points and at all changes in conduit size and/or slope.

The inlets and outlets for all closed conduits require an end treatment and soil stabilization measures, and some closed conduits may also require a grate to prevent entry into the conduit by children and animals. The specific requirements, which depend on the size of the conduit and the location/configuration of the inlet or outlet, are provided in Section 8.3.1.

7.1.3 County Road Culverts and Bridges

Under separate requirements administered by the Wayne County Permit Office, special provisions apply to culverts and bridges that convey a watercourse under a County Road, whether the culvert or bridge will be newly constructed or will be constructed to replace an existing culvert or bridge. If the watercourse is a County Drain, see Sections 7.4 and 7.5 for additional requirements that may apply.

The hydraulic capacities of culverts and bridges must be calculated using a method approved by the County. All bridges and culverts also must be designed with adequate soil erosion protection.

Bridges that convey a watercourse under a County Road must be designed to pass the peak flow rate for a 100-year storm with no harmful increase in backwater elevations. The 100-year storm elevation upstream of a bridge also must be at least one (1) foot below the lowest elevation of either the bridge deck or the approach pavements to the structure.

Culverts that convey a watercourse under a County Road must be designed to convey at least the peak flow rate for a 10-year storm, as determined using the methods described in Section 6.1.1. Culverts that will be inundated by storms larger than the design storm established by the Michigan Department of Transportation or the Michigan Department of Environmental

Quality must be designed with soil erosion protection that is adequate for the inundated condition.

7.2 Downstream Improvements

If the County determines that a proposed storm water management system does not include an adequate storm water outlet, the Applicant may be required to design and construct improvements to the downstream drain, watercourse or closed conduit. The County determines the extent to which downstream improvements may be required to provide an adequate storm water outlet.

7.3 County Roads

The County may establish additional or alternative requirements for storm water management systems in County Roads. Three such requirements are described below. Contact the Wayne County Permit Office for more information on these and other requirements.

1. The minimum diameter of closed conduits in County road rights-of-way is 12 inches.
2. As a general policy, Wayne County does not permit the discharge of storm water runoff from improved property abutting a County Road into the County Road storm drainage system. Exceptions to this policy can be made on the basis of economic hardship if (1) there are no other cost-feasible storm outlets available and (2) there is adjudged sufficient capacity in the Road storm drainage system. When exceptions are granted, the permitted storm discharge into the County Road storm drainage system is restricted to a discharge rate equal to the lesser of the following criteria based on a 10-year storm:
 - 0.103 cfs per station (100 feet) of County Road frontage available to the site;
 - 0.15 cfs per acre of area proposed to drain into the County Road drainage system.
3. Required design standards and construction specifications for storm water management systems in the County Road right-of-way must conform to Wayne County's most current standards. Information regarding these standards can be obtained from the Permit Office.

7.4 Easements

Pursuant to the Drain Code, Wayne County generally requires the following minimum easement widths for established County Drains and other watercourses.

1. An open County Drain or watercourse with a maximum bank to bank width that is 30 feet or greater must have an easement to the extreme width of the drain, plus 30 feet. The easement must be centered on the centerline of the drain or watercourse.
2. An open County Drain or watercourse with a maximum bank to bank width that is less than 30 feet must have an easement equal to the extreme width of the drain, plus 24 feet. The easement must be centered on centerline of the drain or watercourse.
3. Enclosed County Drains with an internal diameter of 8 feet or less must have an easement of 20 feet centered on the centerline of the enclosure.
4. Enclosed County Drains with an internal diameter that exceeds 8 feet must have an easement of 25 feet centered on the centerline of the enclosure.

The easement widths described above govern generally. The County may require an alternative width if the County determines that additional easement is required for proper construction, or because of special circumstances. Note that Wayne County does not allow any buffer strips required under the Storm Water Management Standards to overlap with County Drain easements. Exceptions to the easement requirements described above are within the County's sole discretion.

7.5 County Drains

Applicants who propose projects that would modify an established County Drain or an established drainage district may be subject to additional requirements. The Wayne County Drains Office is located within the Wayne County Department of Environment.

7.6 County Park Property

The County may establish additional or alternative requirements for storm water management systems in County park property or which outlet within County park property. For example, special provisions apply to inlets/outlets on County park property as described in Section 8.3.1 and Appendix E-1. Specific requirements for restoration of County Park property disturbed by construction are presented in Appendix E-4.

7.7 Wetlands

The natural drainage pattern of the land within a development site must not be altered in any way that may cause adverse

affects to existing wetland areas. Untreated storm water will not be permitted to outlet directly into a natural or mitigation wetland area. The level of treatment required to discharge storm water runoff to a natural or mitigation wetland area is determined by MDEQ. However, at a minimum, storm water discharged into a natural or mitigation wetland must pass through a pretreatment system. The pretreatment system must be designed in accordance with the requirements described in Section 6.3.1.

In addition to Wayne County approval of the storm water management system for a development project, the design of any wetland created for mitigation must also be approved by MDEQ.

7.8 Temporary Measures during Construction

As described in Chapter 3, projects that involve earth change activities may need to implement temporary storm water management measures to comply with additional federal NPDES requirements that apply to construction activity that disturbs one or more acres of land. More information about the NPDES requirements is available from MDEQ's Water Bureau; see Chapter 12 for contact information.

Projects that involve earth change activities also may need to implement temporary storm water management measures under the state Soil Erosion and Sedimentation Control (SESC) program and Wayne County's Soil Erosion and Sedimentation Control Ordinance, Chapter 94 of the Code of Ordinances of Wayne County (2001). More information about these programs and the types of projects that require a permit under these programs is available in Chapter 3.

Projects within Wayne County that must obtain a SESC permit from WCDOE must comply with the measures described in this section. An overview of the permit process is shown in Figure 7-1. WCDOE will not issue a SESC permit for a project that requires a storm water construction approval from the Permit Office until storm water construction approval has been obtained. Additional information about Wayne County's SESC program, and a downloadable copy of the permit application package, is available from the County's website (http://waynecounty.wc/mygovt/doe/depts/lrmd/Programs/sesc/permit_info.aspx).

7.8.1 General Earth Change Requirements

In conformance with the state SESC program and the SESC Ordinance, Wayne County generally requires the following temporary measures during construction:

- The proposed work shall be carried out in accordance with approved earth change plans and in compliance with all requirements of the permit and state laws and regulations.
- Earth changes must be conducted in a manner that effectively reduces accelerated soil erosion and resulting sedimentation.
- Persons engaged in earth change activities must, in conformance with state law, implement and maintain acceptable soil erosion and sedimentation control measures that effectively reduce accelerated soil erosion.
- Earth changes must be scheduled and completed in a manner that will limit the exposed area of any disturbed land for the shortest possible period of time, as determined by WCDOE.
- Sediment caused by accelerated soil erosion must be removed from runoff water before it leaves the site of the earth change.
- Temporary or permanent facilities designed and constructed for the conveyance of water around, through or from the earth change area must be designed to limit the water flow to a non-erosive velocity.
- Temporary soil erosion control measures must be maintained until permanent soil erosion measures are installed and approved. Permanent soil erosion control measures must be maintained for a minimum of one year after the project passes WCDOE's "completion inspection."
- Permanent soil erosion control measures for all slopes, channels, ditches, or any other disturbed land area must be completed within five calendar days after final grading or earth moving activity has been completed.
- Soil tracked, spilled, dumped or deposited onto public streets, highways, sidewalks, or other public thoroughfares must be removed promptly.
- Permittees shall notify the WCDOE as to when the "project completion" inspection can be made.

7.8.2 General Plan Requirements

Under state law and the SESC Ordinance, three sets of earth change plans must be submitted before regulated earth changes may commence. The plans must be sealed by a

Professional Engineer or Landscape Architect registered in the State of Michigan.

Each set of earth change plans must include drawings of the earth change at a scale not more than 100 feet to the inch, including a legal description; a site location map which includes the proximity of any proposed earth change to lakes, streams or wetlands; existing structures; existing contour intervals which clearly show the character of the land; proposed contour intervals which clearly show the future character of the land; and a description of the existing vegetation on the site.

Each set of earth change plans must also include details for the proposed earth changes, including:

- Location of the physical limits of each proposed earth change including the location of temporary soil stockpile areas. If soil is to be removed from the site, the location of the offsite disposal area must be identified.
- A description and location of all existing and proposed on-site drainage facilities, including detailed storm sewer plans, drainage arrows for surface drainage, and the ultimate drainage outlet for the site.
- Time and sequence of each proposed earth change with approximate dates for major grading activities, including site stripping, rough grading and cut and fill; construction of detention basin, roads and underground utilities, digging basements and backfilling lots; final grading, landscaping paving. This sequence must include a description of temporary erosion control measures to prevent sediment from leaving the project site during each of the proposed earth change activities. A description and location of all proposed temporary and permanent soil erosion control measures.
- Approved standard details of all temporary and permanent soil erosion control measures.

7.8.3 Wayne County Plan Requirements

Wayne County imposes additional requirements for earth change plans. In addition to the general plan requirements discussed above, the following design and maintenance features must be shown on the plan and included in the construction sequence:

- A perforated riser pipe with stone filter must be installed on all open detention basins and sediment basins on projects five acres or more in size.
- A temporary crushed rock tracking pad must be installed at the construction entrance and exit. This tracking pad must be maintained with fresh stone periodically. Construction traffic must be limited to designated entrance and exit.
- Street scraping and cleaning (sweeping) must be conducted on a regular schedule. At a minimum, one sweeping must occur each week, and one scraping must occur at the end of each workday.
- Paved storm sewer inlets must be protected by a single sheet of filter fabric conforming to Geotex
- III P as manufactured by Synthetic Industries, Inc. or equivalent woven monofilament filter fabric (ASTM flow rate = 110 gallons per minute/per square foot).
- Catch-all type inlet filters are required at all low points in the paved roads of multi-family housing projects.
- Rear yard (beehive-type) storm sewer inlets must be protected by a woven geotextile filter fence 24 inches in height securely fixed with lath and staples to hardwood stakes spaced no more than four feet on center. The silt fence must be trenched in a minimum of six inches into the ground.
- All catch basins and inlets in areas that are determined to be susceptible to flooding must have catch-all type inlet filters.
- All exposed earth must be stabilized with seed and mulch or sod within five days of final grade. Sediment basins must be stabilized with seed and straw mulch blankets. Straw blankets must be staked into the ground five days after the construction of the sediment basin.
- An undisturbed, vegetative buffer strip of at least 25 feet must be retained around rivers, creeks, streams, wetlands, drains, and other sensitive areas.
- Straw mulch blankets must be used on 3:1 slopes or greater. (Three foot horizontal, one foot vertical)
- Ditches, swales, and other areas that will channel concentrated runoff must be stabilized within five days of construction. Temporary rock check dams must be installed to slow water to non-erosive velocities in areas of concentrated flow.
- Road rights-of way must be stabilized with seed and mulch within five days of completing utility work in the right of way.
- Areas of earth change that are disturbed beyond the fall seeding deadline (November 1) may require dormant seeding and straw mulch securely anchored to the ground.
- Single family lots, during construction, must have a silt fence barrier and a temporary crushed rock tracking pad installed as per the approved plan.
- A single family residence, prior to receiving a Certificate of Occupancy, must have a silt fence barrier, or 15 feet of mulch blanket installed back of the curb across the entire front of the lot. The silt fence must be trenched in a minimum of six inches into the ground
- Rip rap must be immediately installed after construction of outlets and culverts.

7.8.4 Performance Deposit

WCDOE does not issue SESC permits for an earth change unless the permittee first posts with Wayne County a bond, certified check, or irrevocable bank letter of credit in the amount equal to that which would be required for the surety bond. If a bond is used, it must be executed by the permittee and a corporate surety with authority to do business in this state as a surety. The bond must be in the amount of the established total cost of the earth change work authorized by the permit, but in no case may the bond amount be for less than \$1,500.00 per acre of earth change.

Each bond must provide assurance for the maintenance of the finished project for a period of one year after the "project completion" inspection is made. Deposits or bonds shall be submitted to the WCDOE with the permit application. Upon permit issuance, the bond will be posted with the County Clerk by the WCDOE.

No performance deposit is required for a permit classified as a single-family residence.

7.8.5 Inspections and Enforcement

Once an application for a permit is received by WCDOE and before a permit is issued, an initial site investigation is made in the field. After permit issuance, earth change inspections are made periodically to assure compliance with the permit, state law, and the SESC Ordinance. When all grading is complete and all permanent erosion control measures are installed, a project completion inspection is made prior to permit expiration. Finally, one year after the completion inspection, a final inspection is made to ensure that permanent erosion control measures are still functioning effectively.

NOTE: No earth change work (grading, excavation, fill, topsoil, stripping, etc.) within 500 feet of a lake, stream, or drain or that disturbs more than one acre of land may begin until a permit is issued under state law. Such earthwork which begins without a permit is violation of the law and subject to legal proceedings.

7.8.6 Extension of Permit

If the permittee is unable to complete the work within the 30 month permit period, he must present in writing to the WCDOE, a request for an extension of the permit. Requests for extension shall be made at least ten (10) days before permit expiration. If, in the opinion of the WCDOE, such an extension is warranted, additional time may be granted for the completion of the work. An additional permit and inspection fee is required to extend the permit.

7.8.7 Modifications of Approved Plans

All proposed modifications of the approved earth change plans must be submitted to and approved by the WCDOE. All necessary specifications and related reports shall be submitted with any proposal to modify the approved earth change plan. No earthwork in connection with any proposed modifications is permitted without the approval of the WCDOE.

CHAPTER 8:

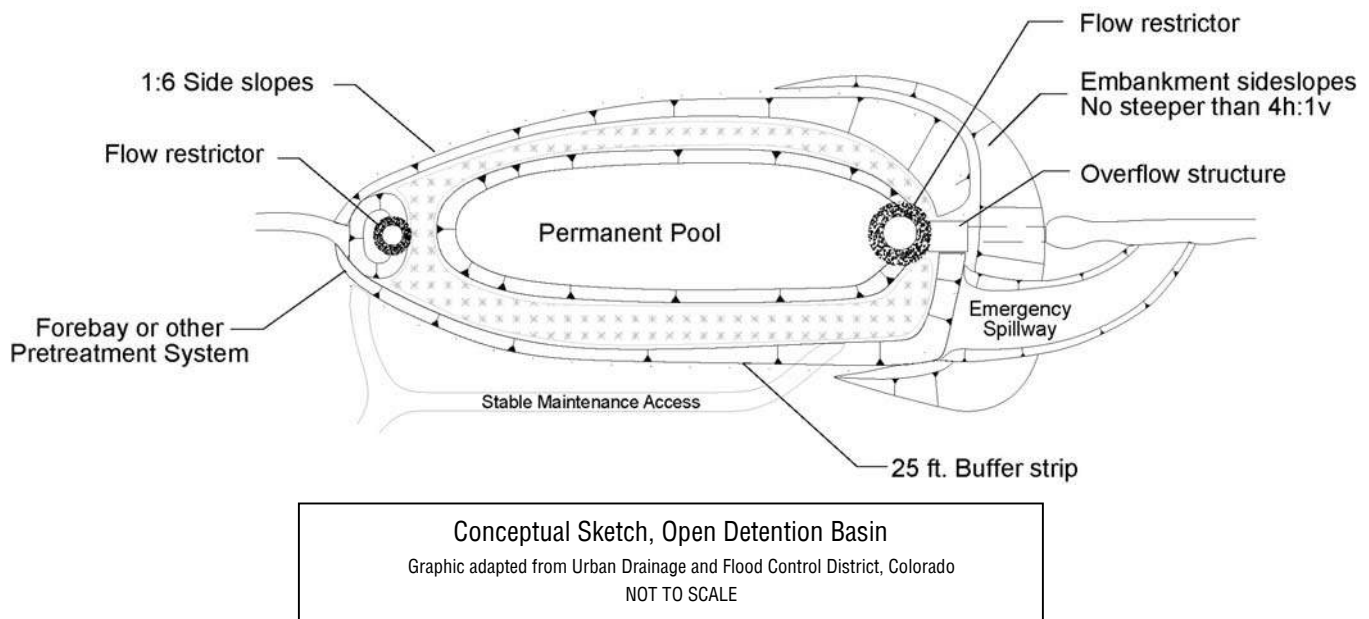
BEST MANAGEMENT PRACTICES

This chapter describes some of the most common Best Management Practices (BMPs) which may be used in designing a storm water management system. The information provided for each BMP includes a description

of the BMP and its purpose along with design criteria and guidelines, specifications and maintenance requirements. The type of applications for the BMPs in this section are summarized in the table below.

Best Management Practice	Use For					To Control									
	Paved Areas	Vegetated Areas	Unstable Soils	Waterways	Development Projects	Increased Flow Variability	Floatable Materials	Particulate Matter	Organic Matter	Dissolved Nutrients	Water-soluble Materials	Toxic Materials	Oil/Petroleum Products	Soil Erosion	Riparian Corridor and Habitat Loss
Detention and Retention (Section 8.1)															
Open Detention Basins	X	X			X	X	X	X	X	X	X	X	X	X	X
Retention Basins	X	X			X	X	X	X	X	X	X	X	X	X	X
Underground Detention Systems	X	X			X	X	X	X							
Outlets for Forebays and Detention Systems															
Pretreatment Systems (Section 8.2)															
Forebays	X	X			X		X	X	X						
Bioretention Areas	X	X					X	X					X		
Manufactured Treatment Systems	X	X		X	X	X		X							
Conveyance (Section 8.3)															
Closed Conduit Inlet/Outlet Design															
Vegetated Swales		X	X		X	X	X		X						
Streambank Stabilization (Section 8.4)															
Live Stakes		X	X	X	X			X						X	X
Live Fascines		X	X	X	X			X						X	X
Vegetated Geogrids		X	X	X	X			X						X	X
Live Cribwall		X	X	X	X			X						X	X
Brushmattress		X	X	X	X			X						X	X
Log Placements		X	X	X	X			X						X	X
Vegetation and Riparian Corridor Management (Section 8.5)															
Vegetation		X	X	X	X	X		X						X	X
Riparian Buffers		X	X	X	X	X		X						X	X
No-Mow Zones		X	X	X	X	X		X						X	X
Woody Debris Management		X	X	X	X	X		X						X	X

8.1.1 Open Detention Basins



Open detention basins are man-made surface waters designed to temporarily detain storm water runoff to control peak flow rates and provide for pollutant removal through settling and plant uptake. There are two types of open detention basins traditionally used in Wayne County:

- Traditional detention basins, which detain storm water runoff for an extended period of time in a permanent pool and remove sediment and other pollutants via settling.
- Constructed wetlands, where over 50% of the surface area typically is covered by wetland vegetation. Permanent wetland pool depths vary between 0.5 and 3.0 feet depending on vegetation type.

Design Standards

Open detention basins must be sized to detain the required storage volumes (both the bank full and flood control volumes). Design standards specific to open detention basins include the following:

- A forebay or other pretreatment system is required at each inlet to the detention basin. Pretreatment systems trap sediment before entering the detention basin, reduce the incoming runoff velocities, and spread runoff evenly over the detention basin to create sheet flow conditions. Section 8.2 of this manual provides detailed information and design criteria for pretreatment systems.

All closed conduits entering or exiting an open detention system should have an end treatment and adequate soil erosion protection, as described in Section 8.3.1. Some enclosures should also be covered with a grate to prevent children and animals from entering the enclosure.

- Open detention basins must have a restricted outlet that limits outflow for the bank full flood and for the maximum allowable release rate from the development site.
- Flow restrictors, overflow structures, and emergency spillways are required for all open detention basins. Section 8.1.4 provides design criteria for outlet structures associated with forebays and open detention basins. Flow restrictors must be placed near or within the embankment of the detention basin to provide ready maintenance access.
- Open detention basins must include a minimum four (4) foot deep permanent pool that allows for removal of urban pollutants through settling and biological uptake. Permanent pools are not required for constructed wetlands except when the County determines that a permanent pool is necessary to satisfy the flood control or water quality performance standards. The volume of the permanent pool does not satisfy any portion of the required flood control storage volume.

- The design water level of an open detention basin must not exceed five (5) feet above the permanent pool water level.
- A minimum of one (1) foot of freeboard is required above the design water level of an open detention basin.
- Providing a safe design is a primary consideration for all storm water management systems. Side slopes for open detention basins may not be steeper than 1:6. Further safety measures (e.g., aquatic benches or safety shelves, vegetative and barrier plantings) may be warranted depending on the type of development.
- Although use of terraced side slopes generally is discouraged when other alternatives exist, terraced side slopes may be approved for open detention basins in certain, limited circumstances at the discretion of Wayne County. The overall slope of a terraced side of an open detention basin should not be steeper than 1:3. An example detail for terraced side slopes is provided in Appendix E-3.



Photo courtesy Environmental Consulting & Technology (ECT)

- Open detention basins may not be located within pre-existing surface waters.
- Plant vegetation is required for all types of open detention basins to control erosion and enhance sediment entrapment. A landscaping plan is required for open detention basins, due to the importance of the vegetation to the function of the entire system. Use of a registered landscape architect with experience in storm water management system design and native landscaping is encouraged.
- In constructed wetlands, a diversity of depth zones throughout the basin should be used to meet the unique growing requirements of divergent wetland plants. Use of a qualified professional with specific expertise in hydrology and wetland plant ecology is recommended for design and construction of these systems.
- A buffer strip must be provided around all surface waters such as open detention basins. The buffer strip must be at least 25 feet wide measured from the minimum freeboard elevation of the basin. Of the minimum 25 ft width, a minimum of 15 feet of the buffer strip should be exterior to the pond perimeter defined by the top of bank. The slope of the buffer strip should be 1:6 or flatter. These provisions ensure that there is sufficient room along the top of the basin to provide access to the basin for maintenance.

Preferred Design Elements

- Open detention basins should be designed to maximize sheet flow across the open water portion of the facility.
- The shape and configuration of open detention basins will vary considerably based on detention type and storage requirements, local topography, land availability, hydraulic considerations, and other site-specific constraints. Generally, a rectangular configuration is preferable, with an approximate length to width ratio of 3:1. Inlet and outlet pipes should be placed at opposite ends.
- If a terraced side slope is approved for use in a detention basin, the materials proposed for use in its construction should be approved by the local community.
- Baffles may be used to increase the flow path and maintain the topography.
- If aerating devices are used as part of a storm water management system, they should be designed to minimize disturbance of bottom sediments. For example, open detention basins may need to have a deeper permanent pool if an aerating device is used. Bubbler systems are the preferred type of aerating device as they have been found to be more efficient at providing aeration. The manufacturer's recommendations should be followed in regards to design and maintenance.
- When discharge is within a watershed where thermal impacts are a primary concern, deep wet ponds with bottom draw or dry ponds may be preferred.

Vegetation Specifications

- A landscaping plan is required for open detention basins, due to the importance of the vegetation to the function of the entire system. Vegetation should be specified for each zone within the detention basin as follows:
- Pond zone (permanent water depths from 0 to 3 ft deep): Vegetation in the pond zone is entirely or partially submerged and should consist of a combination of native plant plugs and bare-root stock.
- Edge zone (permanent water elevation to bank full elevation): Vegetation in the edge zone must withstand periods of inundation and drought. This vegetation also stabilizes the side slopes of the facility.
- Upland zone (bank full elevation to 100-year flood elevation and beyond): Vegetation in the upland zone may have little or no inundation by storm water, and must withstand periods of drought. This vegetation also stabilizes the side slopes of the system. Note that the buffer strip lies within the upland zone.

The landscaping plan for open detention basins should identify the following items:

- Existing site conditions and vegetation (e.g., trees 6-in caliper and larger) that may be affected by the project;
- Plan view of the open detention basin, including one foot grading contours;
- Elevations in the open detention basin, including detention basin bottom elevation, permanent water elevation, bank full storm elevation, 100-year storm elevation, and freeboard elevation;
- Area in square feet of each of the three planting zones (pond zone, edge zone, and upland zone);
- Seed mixes and wetland plugs/bare root stock in each of the three planting zones;
- Plant spacing and applicable depths, based on industry standards; and
- Any above ground mechanical structures necessary for pond operation should be identified on the landscape plan and should be screened with evergreen trees or other trees/shrubs recommended for the appropriate pond zone.



Bulrush
(Photo courtesy ECT)

All plant material and planting applications should meet all guidelines set by the American Standard of Nursery Stock . All plant stock should be grown by suppliers or nurseries certified by the Michigan Native Plant Producers Association (see “References” on page 8-5).

The type of vegetation used for open detention basins is dependant on site-specific conditions, such as soil types, amount of sunlight, and other factors. Vegetation for open detention basins should be composed of a mixture of species that will provide temporary cover (e.g., quick growing species such as annual rye grass (*Lolium multiflorum*)) and species which will provide the permanent cover (e.g., seed oats).

Use of native plants and “no mow zones” is encouraged. Native plants are adapted to the local climate and conditions, and have numerous short-term and long-term advantages.

Vegetation for open detention basins should be specified in the following categories:

- Seed mixes – Many species can be successfully established from seed mixes, including grasses, sedges and rushes; and forbs (herbaceous plants, other than grasses, that commonly grow in fields or meadows). Forbs are used for re-vegetation, wild flower gardens, prairie and detention basin planting and roadside plantings.
- Bare-root stock – Plants received with very little, if any, soil around the roots. Bare-root stock generally is wrapped in Hessian cloth or plastic to prevent the roots from drying out.
- Plugs – Plants raised as individual plants, each in a small container about the size of an ice cube. The cube of greenhouse soil (“plug”) can be pried from the tray, containing an individual plant up to 6 inches tall. Using a digging stick, the plants are plugged into the soil.

Additional specifications for designing the planting areas in each zone of an open detention basin are appended to the end of this section as Attachment A. The specifications recommend native plant species for each zone of open detention systems built in Wayne County.

Local requirements for vegetation should also be consulted.



Photo courtesy Environmental Consulting & Technology (ECT)

Construction

Proper construction techniques, particularly installation of vegetation, are important to the successful functioning of open detention basins, especially for constructed wetland type open detention basins in order to establish a dense and diverse emergent wetland plant community. General guidelines for vegetation installation include:

- If emergent plant stock is proposed in the pond zone, the supplied plug material must have sufficient vegetative growth extending out of the water once planted.
- Seed must be planted above the permanent water elevation.
- All seeded areas should be properly stabilized with a much blanket pegged in place.
- Depending on the type of vegetation, barriers may be required for one year to protect the plantings (e.g., snow fence or netting to deter wildlife, prevent mowing).
- Additional guidance on seed and sod specifications and installation is provided in Section 8.5.1 of this manual.

For constructed wetland-type open detention basins, preparation of the wetland bed prior to planting is crucial to success. Good results can be achieved through the five-step process shown in Attachment B to this section.

Maintenance

Maintenance activities for open detention basins are listed below. These activities must be identified in the maintenance plan that the applicant must submit with an application for storm water construction approval. Additionally, provision for maintenance access should be shown on the plan; it is recommended that the maintenance access to the storm water management system be a minimum of 15-feet wide. The landscape plan should be designed to prevent obstruction of the access by trees and shrubs.

- Inspect and clean the storm sewer system and catch basins upstream from the detention basin (every five years or as needed).
- Inspect for sediment accumulation at the inlet pipes and remove sediment which may be impeding flow (semiannually and after rain events).
- Inspect inlets, outlets, and appurtenances (e.g., grates) annually for structural integrity.
- Check the outlets regularly for clogging and clean when necessary, especially after large storm events.
- Inspect the stone around riser-type outlet structures semiannually and after rain events. If stone has accumulated sediment, vegetation and/or debris to an extent that water is not flowing through the stone and out of the pond as originally designed, then the stone should be replaced.
- Check for floatables and debris and remove as necessary.
- Remove dead vegetation that obstructs flow (early spring).
- Check banks and bottom for erosion and correct as necessary (annually).
- Remove sediment when accumulation reaches six to twelve inches or if resuspension is observed.
- Reseed banks near inlet/outlet and stabilize eroded banks as necessary.
- Ensure that no mowing, chemical application, or construction has occurred in the buffer strip (annually).
- Inspect detention basin and buffer strip zone for invasive species such as purple loosestrife, phragmites, buckthorn (common & glossy),

honeysuckle and autumn olive that out-compete native vegetation (annually - July).

- Have a professional selectively remove invasive species (annually, July-August). Purple loosestrife flower heads can be clipped off to reduce seed production until plant removal may be achieved. If woody debris is cut, the cut should be four inches above the ground surface and the stumps should be treated with herbicide immediately after cutting. Monitor for sucker growth.
- Planting must be monitored for two years after establishment. Replacement will be necessary as determined by the agency having jurisdiction over the system.
- During the first two growing seasons, all areas planted with native prairie seed mix should be mowed three times at a height of 6-8 inches in order to control weeds. Beginning in the third year, a burning or mowing regimen should be instituted, either burning or mowing once in spring, or once in the fall.



Invasive Species: Purple Loosestrife
(Photo courtesy ECT)

If the outlet is pumped, then only a licensed electrician or company that provided the pump system should conduct maintenance. Chemicals should not be applied to any aspect of the open detention basin, including the bottom, side slopes or buffer strip.

References

- American Standard of Nursery Stock, American Nursery & Landscape Association, <http://www.anla.org/applications/Documents/Docs/ANLStandard2004.pdf>
(Also document ANSI Z60.1-2004 of the American National Standards Institute (ANSI). www.ansi.org)
- Article 5.02.1, "General Landscaping Requirement, Storm Water Detention Basins", Zoning of the Code of Laws and Ordinances, Charter Township of Canton, July 11, 2006.

- Maintaining Your Detention Basin: A Guidebook for Private Owners in Southeast Michigan, Alliance of Rouge Communities, 2005.
- Rules of the Washtenaw County Drain Commissioner, May 15, 2000.

Additional Resources

- "Local Storm Water and Watershed Management Practices Constructed/Implemented in Southeast Michigan", available at <http://www.waynecounty.com/doe/watershed/mgmtPractices.htm>
Project summaries, photos, location and contact information, weblinks, and other information for a variety of storm water and watershed management practices in the categories :
 - o Bioretention / Low Impact Development / Native Landscaping
 - o Manufactured Treatment Systems and Underground Detention
 - o Detention Ponds/Constructed Wetlands
 - o Streambank Stabilization
 - o Woody Debris Management
 - o Green Buildings
- Michigan Association of Conservation Districts. "Gateway to Michigan's Native Plants." <http://www.macd.org/rollovers/nativeplants/nphome.html>
- United States Environmental Protection Agency www.epa.gov/greenacres/
- Wild Ones Organization. Landscaping with Native Plants. www.for-wild.org

Resources For Native Plant Material

- Michigan Native Plant Producers Association, "Plants and Seeds Source Guide" and "List of Member Nurseries." <http://www.MNPPA.org>

**ATTACHMENT A: SPECIFICATIONS FOR PLANTING ZONES
FOR OPEN DETENTION BASINS**

All material in this appendix is adapted from “General Landscaping Requirement, Storm Water Detention Basins”, Zoning of the Code of Laws and Ordinances, Charter Township of Canton, July 11, 2006 and used courtesy of Canton Township, Municipal Services Division.

OPEN DETENTION BASINS: POND ZONE VEGETATION

A combination of native plant plugs and bare-root stock should be planted in the pond zone (0 to 3 feet deep). The tables below identify native plants recommended for the pond zone of an open detention basin. Alternate species or genus from those recommended in the following tables may be specified if they meet the criteria for successful establishment in each pond zone.

Additional factors for design of vegetation within the pond zone of an open detention basin include:

- Plants should be selected based on whether they will be submerged, emergent, or wetland edge.
- A minimum of four plant species is recommended for the pond zone, planted in equal numbers of species, scattered in groupings of similar species throughout the entire zone.
- Initial plantings should cover a minimum of 25% of the outer 15 foot perimeter of the pond zone.
- For constructed wetlands, rooted wetland species, such as cattails, bulrush and sedges, are placed throughout the majority of the wetland area.
 - o A mixture of wetland plants should be used in the shallow pool that extends laterally across the basin.
 - o A diversity of depth zones should be used throughout the system to meet the unique growing requirements of divergent wetland plants.
- Planting of purple loosestrife is not permitted as this invasive plant forms dense colonies which out-compete the native environment.

Alternately, the pond zone may be seeded with a suitable mix if it is demonstrated that the pond hydrology will be controlled for the establishment of the proposed mix.

Native Plants for Pond Zone (minimum 4 species)

<i>Scientific Name</i>	<i>Common Name</i>	<i>Spacing (inches on center)</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Spacing (inches on center)</i>
<i>Acorus calamus</i>	Sweet flag	24	<i>Polygonum amphibium</i>	Water knotweed	36
<i>Carex lacustris</i>	Common lake sedge	24	<i>Pontederia cordata</i>	Pickereel weed	24
<i>Cephalanthus occidentalis</i>	Buttonbush	5 feet	<i>Potamogeton natans</i>	Common pondweed	36
<i>Decodon verticillatus</i>	Swamp Loosestrife	24	<i>Potamogeton pectinatus</i>	Sago pondweed	36
<i>Elodea canadensis</i>	Common waterweed	36	<i>Sagittaria latifolia</i>	Common arrowhead	24
<i>Hibiscus laevis</i>	Halberd-leaved rose mallow	24	<i>Scirpus acutus</i>	Hard-stemmed bulrush	18
<i>Hibiscus palustris</i>	Swamp rose mallow	24	<i>Scirpus atrovirens</i>	Dark green rush	18
<i>Iris virginica shrevei</i>	Blue flag iris	18	<i>Scirpus cyperinus</i>	Wool grass	24
<i>Justicia americana</i>	Water willow	5 feet	<i>Scirpus fluviatilis</i>	River bulrush	18
<i>Nelumbo lutea</i>	Lotus	48	<i>Scirpus validus creber</i>	Great bulrush	18
<i>Nuphar advena</i>	Yellow pond lily	36	<i>Sparganium americanum</i>	American bur reed	18
<i>Nymphaea tuberosa</i>	White water lily	36	<i>Sparganium eurycarpum</i>	Common bur reed	18
<i>Peltandra virginica</i>	Arrow arum	18	<i>Vallisneria Americana</i>	Tape grass	36

Note: Plant species selected should cover 25% of the pond zone and should also cover the range of water depths within the pond zone (0" to 3"). (For example, 4 plant species may not all be placed at an 18" water depth covering 25% of the pond zone.)

OPEN DETENTION BASINS: EDGE ZONE VEGETATION

A variety of trees, shrubs, wildflowers, and grasses may be planted in the edge zone along the banks of detention basins. A native wetland edge or native sedge meadow seed mix is recommended.

Edge Zone: Native Seed Mixes

Grasses/Sedges/Rushes (Minimum 5 species)

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Carex `lurida</i>	Bottlebrush sedge	<i>Juncus effusus</i>	Common rush
<i>Carex vulpinoidea</i>	Brown fox sedge	<i>Leersia oryzoides</i>	Rice cut grass
<i>Echinochloa crusgalli</i>	Barnyard grass	<i>Scirpus acutus</i>	Hard-stemmed bulrush
<i>Elymus Canadensis</i>	Canada wild rye	<i>Scirpus atrovirens</i>	Dark green rush
<i>Glyceria striata</i>	Fowl manna grass	<i>Scirpus pungens</i>	Chairmaker's rush
		<i>Scirpus validus creber</i>	Great bulrush (softstem)

Native Forbs (Minimum 9 species)

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Acorus calamus</i>	Sweet flag		
<i>Actinomeris alternifolia</i>	Wingstem	<i>Mimulus ringens</i>	Monkey flower
<i>Alisma subcordatum</i>	Common water plantain	<i>Peltandra virginica</i>	Arrow arrum
<i>Asclepias incarnate</i>	Swamp milkweed	<i>Polygonum pensylvanicum</i>	Pinkweed
<i>Aster simplex</i>	Panicked aster	<i>Pontederia cordata</i>	Pickrel weed
<i>Bidens spp.</i>	Bidens, various	<i>Rosa palustris</i>	Swamp rose
<i>Cassia hebecarpa</i>	Wild senna	<i>Rudbeckia laciniata</i>	Wild golden glow
<i>Eupatorium perfoliatum</i>	Common boneset	<i>Sagittaria latifolia</i>	Common arrowhead
<i>Helenium autumnale</i>	Sneezeweed	<i>Spiraea alba</i>	Meadowsweet
<i>Iris virginica shrevei</i>	Blue flag iris	<i>Verbena hastata</i>	Blue vervain
<i>Ludwigia alternifolia</i>	Seedbox	<i>Vernonia fasciculata</i>	Common ironweed

Note: A quick growing species such as annual rye grass (*lillium multiflorum*) and species which will provide the permanent cover (e.g., seed oats) should also be included in all Edge Zone seed mixes.

Edge Zone: Native Shrubs

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Alnus rugosa</i>	Speckled alder	<i>Ilex verticillata</i>	Winterberry (MI Holly)
<i>Aronia melanocarpa</i>	Black chokeberry	<i>Potentilla fruticosa</i>	Shrubby cinquefoil
<i>Betula pumila</i>	Bog birch	<i>Sambucus Canadensis</i>	Elderberry
<i>Cephalanthus occidentalis</i>	Buttonbush (plant in min. 6" water)	<i>Spiraea alba</i>	Meadowsweet
<i>Cornus amomum</i>	Silky dogwood	<i>Viburnum lentago</i>	Nannyberry
<i>Cornus stolonifera</i>	Red-oiser dogwood	<i>Viburnum trilobum</i>	American highbush cranberry

Edge Zone: Native Trees

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Acer saccharinum</i>	Silver maple	<i>Quercus bicolor</i>	Swamp white oak
<i>Betula nigra</i>	River birch	<i>Liquidambar styraciflua</i>	Sweetgum
<i>Carpinus caroliniana</i>	American hornbeam	<i>Liriodendron tulipifera</i>	Tuliptree
<i>Nyssa sylvatica</i>	Black gum	<i>Quercus palustris</i>	Pin oak
<i>Platanus occidentalis</i>	Sycamore	<i>Salix nigra</i>	Black willow

OPEN DETENTION BASINS: UPLAND ZONE VEGETATION

A variety of trees, shrubs, wildflowers, and grasses may be planted in the edge zone in the upland zone of open detention basins. Depending on the location and function of a detention basin within a development, vegetation within the Upland Zone may vary. Native plants recommended for the upland zone of an open detention basin are shown in the following tables.

For detention basins located at development entrances, adjacent to primary or secondary roads, adjacent to or directly behind proposed homes or are located within more formally landscaped areas in the proposed development: It is recommended that the seed mix for the Upland Zone extend from the upper boundary of the Edge Zone to the top of bank or slope. The area beyond the top of bank or slope of the basin should be sodded with an approved sod material. Section 8.5.1 provides additional specifications for sod installed as part of storm water management systems.

For detention basins adjacent to natural areas (forested areas, creeks/streams, wetlands), in remote areas, within interior areas of the development, adjacent to or directly behind proposed homes and terraced basins: seed mix appropriate for the areas extending beyond the 100-year flood elevation and top of bank or slope and functioning as a buffer for the pond should be a mesic-to-dry prairie mix, consisting of a broad-spectrum of prairie grasses and wildflowers with species that vary in height profile and also offer a variety of cover and food options for wildlife. The natural area seeded with prairie mix should be a minimum of fifteen (15) feet wide.

Upland Zone: Seed Mixes ***Grasses/Sedges/Rushes (Minimum 5 species)***

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Calamagrostis canadensis</i>	Blue joint grass	<i>Glyceria striata</i>	Fowl manna grass
<i>Carex comosa</i>	Bristly sedge	<i>Juncus effusus</i>	Common rush
<i>Carex hystericina</i>	Porcupine sedge	<i>Leersia oryzoides</i>	Rice cut grass
<i>Carex stricta</i>	Common tussock sedge	<i>Panicum virgatum</i>	Switch grass
<i>Carex vulpinoidea</i>	Brown fox sedge	<i>Scirpus atrovirens</i>	Dark green rush
<i>Echinochloa crusgalli</i>	Barnyard grass	<i>Scirpus validus creber</i>	Great bulrush
<i>Elymus canadensis</i>	Canada wild rye	<i>Spartina pectinata</i>	Prairie cord grass

Upland Zone: Native Forbs (Minimum 9 species)

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Agalinis tenuifolia</i>	Slender false foxglove	<i>Juncus effusus</i>	Common rush
<i>Alisma subcordatum</i>	Common water plantain	<i>Liatris spicata</i>	Marsh blazing star
<i>Angelica atropurpurea</i>	Great angelica	<i>Lobelia cardinalis</i>	Cardinal flower
<i>Asclepias incarnata</i>	Swamp milkweed	<i>Lobelia siphilitica</i>	Great blue lobelia
<i>Aster novae-angliae</i>	New England aster	<i>Ludwigia alternifolia</i>	Seedbox
<i>Aster puniceus</i>	Bristly aster	<i>Peltandra virginica</i>	Arrow arrum
<i>Aster simplex</i>	Panicked aster	<i>Physostegia virginiana</i> Obedient plant	
<i>Aster umbellatus</i>	Flat-top aster	<i>Pycnanthemum virginianum</i>	Common mountain mint
<i>Bidens cernua</i>	Nodding Burr marigold	<i>Sagittaria latifolia</i>	Common arrowhead
<i>Cassia hebecarpa</i>	Wild senna	<i>Silphium perfoliatum</i>	Cup plant
<i>Coreopsis tripteris</i>	Tall coreopsis	<i>Solidago rugosa</i>	Rough goldenrod
<i>Eupatorium maculatum</i>	Spotted joe-pye weed	<i>Sparganium eurycarpum</i>	Common bur reed
<i>Eupatorium perfoliatum</i>	Common boneset	<i>Spiraea alba</i>	Meadowsweet
<i>Gentiana andrewsii</i>	Bottle gentian	<i>Verbena hastata</i>	Blue vervain
<i>Helenium autumnale</i>	Snееzeweed	<i>Vernonia fasciculata</i>	Common ironweed
<i>Iris virginica shrevei</i>	Blue flag iris	<i>Zizia aurea</i>	Golden alexanders

Notes:

- An quick growing species such as annual rye grass (*Lillium multiflorum*)) and species which will provide the permanent cover (e.g., seed oats) should also be included in all Upland Zone seed mixes.
- These native plants are appropriate for the Upland Zone; from the bank full elevation to the 100-year flood elevation and beyond. This seed selection consists of sedge meadow, wet-to-mesic prairie, and dry-to-mesic prairie plant species.

Upland Zone: Native Shrubs

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Ceanothus americanus</i>	New Jersey tea (dry-mesic)	<i>Lindera benzoin</i>	Spicebush (mesic)
<i>Cornus foemina</i>	Gray dogwood	<i>Physocarpus opulifolius</i>	Ninebark (dry or mesic)
(<i>C. racemosa</i>)	(dry to wet-mesic)	<i>Rhus aromatica</i>	Fragrant sumac (dry)
<i>Corylus americana</i>	American filbert (dry or mesic)	<i>Sambucus canadensis</i>	Elderberry (wet-mesic)
<i>Hamamelis virginiana</i>	Witch-hazel (dry-mesic)	<i>Viburnum dentatum</i>	Arrowwood (dry-mesic)

Upland Zone: Native Trees

<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>
<i>Acer rubrum</i>	Red maple (mesic)	<i>Cercis Canadensis</i>	Redbud (mesic)
<i>Acer saccharum</i>	Sugar maple (mesic)	<i>Crataegus crusgalli</i>	Cockspur hawthorn (dry)
<i>Amelanchier arborea</i>	Serviceberry (Juneberry)(dry or mesic)	<i>Gymnocladis dioicus</i>	Kentucky coffeetree (mesic)
<i>Betula alleghaniensis</i>	Yellow birch (mesic)	<i>Ostrya virginiana</i>	Hip-hornbeam Ironwood (dry-mesic)
<i>Carya cordiformis</i>	Bitternut hickory (mesic)	<i>Quercus alba</i>	White oak (mesic)
<i>Carya glabra</i>	Pignut hickory (dry)	<i>Quercus imbricaria</i>	Shingle oak (mesic)
<i>Carya lacinosa</i>	Shellbark hickory (mesic)	<i>Quercus macrocarpa</i>	Bur oak (dry or mesic)
<i>Carya ovata</i>	Shagbark hickory (dry-mesic)	<i>Quercus muehlenbergii</i>	Chinkapin oak (dry or mesic)
<i>Celtis occidentalis</i>	Hackberry (mesic)	<i>Quercus prinoides</i>	Dwarf chinkapin oak (dry)
<i>Celtis tenuifolia</i>	Dwarf hackberry (dry-mesic)	<i>Quercus rubra</i>	Red Oak (mesic)
		<i>Tilia americana</i>	American basswood (mesic)

Note: These plants range from dry to mesic according to the moisture conditions in the Upland Zone. Small sizes of native trees and shrubs may be proposed to increase plant diversity. The total tree caliper inches must equal the calculated caliper inches of required trees.

Natural Basin: Dry Upland Zone: Permanent Grasses (Minimum 5 species)

Scientific Name	Common Name	Scientific Name	Common Name
<i>Andropogon gerardii</i>	Big bluestem grass	<i>Koeleria cristata</i>	June grass
<i>Andropogon scoparius</i>	Little bluestem grass	<i>Panicum virgatum</i>	Switch grass
<i>Bouteloua curtipendula</i>	Side-oats gramma	<i>Sorghastrum nutans</i>	Indian grass
<i>Elymus canadensis</i>	Canada wild rye	<i>Sporobolus heterolepis</i>	Prairie dropseed

Natural Basin: Dry Upland Zone: Native Forbs (Minimum 9 species)

Scientific Name	Common Name	Scientific Name	Common Name
<i>Amorpha canescens</i>	Lead plant	<i>Lupinus perennis</i>	Wild lupine
<i>Anemone cylindrica</i>	Thimbleweed	<i>Monarda fistulosa</i>	Wild bergamot
<i>Aquilegia canadensis</i>	Wild columbine	<i>Parthenium integrifolium</i>	Wild quinine
<i>Asclepias tuberosa</i>	Butterfly weed	<i>Petalostemum purpureum</i>	Purple prairie clover
<i>Aster ericoides</i>	Heath aster	<i>Physostegia virginiana arenaria</i>	Prairie obedient plant
<i>Aster laevis</i>	Smooth blue aster	<i>Pycnanthemum virginianum</i>	Common mountain mint
<i>Aster novae-angliae</i>	New England aster	<i>Ratibida pinnata</i>	Yellow coneflower
<i>Baptista leucantha</i>	White wild indigo	<i>Rudbeckia hirta</i>	Black-eyed susan
<i>Cassia fasciculata</i>	Partridge pea	<i>Rudbeckia subtomentosa</i>	Sweet black-eyed susan
<i>Coreopsis lanceolata</i>	Sand coreopsis	<i>Silphium laciniatum</i>	Compass plant
<i>Coreopsis tripteris</i>	Tall coreopsis	<i>Solidago juncea</i>	Early goldenrod
<i>Echinacea purpurea</i>	Broad-leaved purple coneflower	<i>Solidago nemoralis</i>	Old-field goldenrod
<i>Eryngium yuccifolium</i>	Rattlesnake master	<i>Solidago rigida</i>	Stiff goldenrod
<i>Helianthus mollis</i>	Downy sunflower	<i>Tradescantia ohiensis</i>	Common spiderwort
<i>Heliopsis helianthoides</i>	False sunflower	<i>Vernonia altissima taeniotricha</i>	Hairy tall ironweed
<i>Lespedeza capitata</i>	Round-headed bush clover	<i>Veronicastrum virginicum</i>	Culver's root
<i>Liatris aspera</i>	Rough blazing star		

Note: These native plants are appropriate for areas surrounding basins categorized as natural basins and recommended within areas that have elevations higher than the 100-year flood elevation. This seed selection consists of dry-to-mesic prairie, basic prairie, and low-profile prairie plant species.

ATTACHMENT B: WETLANDS CONSTRUCTION TECHNIQUES



Photo courtesy E CT

- *Step 1 - Prepare the Final Pondscaping and Grading Plans for the Wetland:* At this stage the engineer, landscape architect, and wetland expert work jointly to prepare a pondscaping and grading plan for the wetland. It is also an appropriate time to order the wetland plant stock from aquatic nurseries, since up to six to nine months lead time may be needed to fill orders.
- *Step 2 - Grade the Wetland to Interim Elevations:* Once the basic excavation of the storm water wetland has been completed, it is time to create the major topographic features within the wetland, such as wedges, benches, and deep water channels. A skid loader or other excavator can be used to form the internal complexity within the wetland. These topographic features can only be added while working in the “dry.” Spot surveys should be made to ensure that the interim elevations are 3 to 6 inches below the final elevations for the wetland.
- *Step 3 - Add Topsoil/Wetland Mulch Amendments:* Since most storm water wetlands are excavated to deep subsoils, they often lack the nutrients and organic matter needed to support vigorous growth of wetland plants. It is therefore essential to add 3 to 6 inches of topsoil or wetland mulch to all depth zones in the wetland from 1 foot below the normal pool to 6 inches above. Topsoil can be stockpiled during construction of the wetland or can be scavenged from

elsewhere at the development site. Wetland mulch is preferable to topsoil if it is available.

- The importance of soil amendments in excavated wetlands cannot be overstressed; poor survival and future wetland coverage are likely if these soils are not added (Bowers, 1992). Fertilizers and other soil amendments are not needed if topsoil or wetland mulch are used.
- *Step 4 - Grade the Wetland to Final Elevations:* After topsoil or wetland mulch has been added to the storm water wetland, the wetland can be graded to its final elevations. This is normally done by “roughing up” the interim elevations with a skid loader or other equipment to achieve the desired micro topography across the wetland. All wetland features above the normal pool should be temporarily stabilized by hydroseeding or seeding over straw.
- *Step 5 - Measure and Stake Planting Depths:* The storm water wetland is surveyed and staked at the onset of the planting season. Depths in the wetland should be measured to the nearest inch to confirm the original planting depths of the planting zone. At this time, it may be necessary to modify the pondscape plan to reflect altered depths or the availability of wetland plant stock. Surveyed planting zones should be marked on the as-built or design plan, and also located in the field using stakes or flags.

For constructed wetlands, plant plugs or container-grown wetland plant stock should be planted. The transplanting window extends from early April to mid-June. Planting after these dates is quite chancy, as emergent wetland plants need a full growing season to build the root reserves needed to get through the winter. If at all possible, plants should be ordered at least six months in advance to ensure the availability of desired species.

It is not necessary to plant more than half the wetland surface area. If the appropriate planting depths are

achieved, the entire wetland should be colonized within three years. The wetland area should be subdivided into separate planting zones of more or less constant depth. One plant species should be planted within each flagged planting zone based on its approximate depth requirements. Individual plants should be planted 18 inches on center within each single species “clump.”

Post-nursery care of wetland plants is very important during the interval between delivery of the plants and subsequent planting, as they are prone to desiccation. Stock should be frequently watered and shaded while on-site.

After the second growing season, reinforcement plantings may be needed to expand the spatial coverage of the wetland.

8.1.2 Retention Basins

Description

Retention basins are man-made surface waters designed to provide gravity settling of pollutants and to promote infiltration into the soil rather than discharging the storm water runoff to a surface water or closed conduit. The soils beneath a proposed retention basin must be sufficiently permeable to allow the infiltration of storm water.

Design Standards

Design standards for retention basins include the following:

- A registered Professional Engineer must certify that the soils beneath a proposed retention basin are sufficiently permeable to allow the infiltration of storm water and storm water runoff. Calculations showing the percolation rate of soils below the proposed retention basin must be provided.
- A forebay or other pretreatment system is required at each inlet to the retention basin. Pretreatment systems trap sediment before entering the retention basin, reduce the incoming runoff velocities, and spread runoff evenly over the retention basin to create sheet flow conditions. Section 8.2 of this manual provides detailed information and design criteria for pretreatment systems.
- All closed conduits entering retention basins should have an end treatment and adequate soil erosion protection, as described in Section 8.3.1. Some enclosures should also be covered with a grate to prevent children and animals from entering the enclosure.
- Retention basins must be designed to retain the volume of storm water equal to the runoff from two consecutive 100-year storm events as described in Section 6.2.2. The design storage volume in a retention basin must be provided above the existing ground water elevation.
- A minimum of one (1) foot of freeboard is required above the design water level of a retention basin.
- Providing a safe design is a primary consideration for all storm water management basins. Side slopes for retention basins may not be steeper than 1:6. Further safety measures (e.g., safety shelves, vegetative and barrier plantings) may be warranted depending on the type of development.
- Although use of terraced side slopes generally is discouraged when other alternatives exist, terraced side slopes may be approved for retention basins in certain, limited circumstances at the discretion of Wayne County. The overall slope of a terraced side of a retention basin should not be steeper than 1:3. An example detail for terraced side slopes is provided in Appendix E-3.
- An emergency spillway is required for all retention basins. The applicant must demonstrate that there exists a defined drainage path downstream from the emergency spillway to allow discharge when flows exceed the design water level. Design criteria for emergency spillways are the same as those for open detention basins as described in Section 8.1.4.
- Retention basins may not be located within pre-existing surface waters.
- A buffer strip must be provided around all retention basins and other surface waters. The buffer strip must be at least 25 feet wide measured from the minimum freeboard elevation of the basin. Of the minimum 25 ft width, a minimum of 15 feet of the buffer strip should be exterior to the pond perimeter defined by the top of bank. The slope of the buffer strip should be 1:6 or flatter. These provisions ensure that there is sufficient room along the top of the basin to provide access to the basin for maintenance.
- Plant vegetation, such as along the side slopes of retention basins, is necessary to control erosion and enhance sediment entrapment. A landscaping plan is required for retention basins, due to the importance of the vegetation to the function of the entire system. Use of a professional landscape architect with experience in storm water management system design and native landscaping is encouraged.

Preferred Design Elements

- Calculations showing the percolation rate of soils should be based on soil borings. Wayne County generally requires soil borings to be taken as follows:
 - o Minimum four soil borings per retention basin.
 - o Borings should be taken every 200 feet within the perimeter of the basin.
 - o Borings should be at least 10 feet deep, measured from the bottom elevation of the proposed basin.
- Soil samples collected from borings should be collected every five vertical feet. Soil analysis should include:
 - o Sieve analysis
 - o Hydrometer reading
 - o Soil classification
 - o Standard penetration numbers
 - o The shape and configuration of retention basins may vary, depending on storage requirements, local topography, land availability, hydraulic considerations, and other site-specific constraints.
- Retention basins should be designed to maximize sheet flow across the open water portion of the facility.
- If aerating devices are used as part of a storm water management system, they should be designed to minimize disturbance of bottom sediments. For example, retention basins may need to have a deeper permanent pool if an aerating device is used. Bubbler systems are the preferred type of aerating device as they have been found to be more efficient at providing aeration. The manufacturer's recommendations should be followed in regards to design and maintenance.
- If a terraced side slope is approved for use in a retention basin, the materials proposed for use in its construction should be approved by the local community.

Vegetation Specifications

The type of vegetation used is dependant on site-specific conditions, such as soil types, amount of sunlight, and other factors. Vegetation specifications for retention basins are the same as those for open detention basins (see Section 8.1.1).

Maintenance

Required maintenance activities for retention basins are the same as those for open detention basins (see Section 8.1.1). These activities must be identified in the submitted maintenance plan. Additionally, provision for maintenance access should be shown on the plan; it is recommended that the maintenance access be a minimum of 15 feet wide.

References

- Oakland County Drain Commissioner, Engineering Design Standards for Storm Water Facilities, January 1, 2006.
- Rules of the Washtenaw County Drain Commissioner, May 15, 2000.

8.1.3 Underground Detention Systems

Description

Underground detention systems consist of one or more underground pipes or structures designed to provide the required storage volumes (both the bankfull flood and flood control volumes) for a development project. Just as with any above ground means of storm water detention, underground detention systems must have a restricted outlet that limits outflow for the bankfull flood and for the maximum allowable release rate from the development site.

Underground detention systems are the least preferred method of detention and generally are allowable only when an open detention system is not feasible for a given site.

Design Criteria

General Design Elements

Before entering an underground detention system, storm water runoff must pass through a pretreatment system as described in Section 6.3.1.

Underground detention systems must confine storm water runoff to the interior of the detention system, and may discharge storm water only through a restricted outlet. Examples of two types of restricted outlets are shown on the following pages. Example A, a restricted outlet with no overflow, is appropriate for underground detention systems that discharge to a storm water management system within a Wayne County road right-of-way or to any other storm water management system with restrictions on the allowed inflow. Example B, a restricted outlet with overflow, is appropriate for underground detention systems that discharge to surface waters or other storm water management systems. Note that the designs for a restricted outlet for underground detention systems shown in Examples A and B illustrate acceptable designs; other designs also may be acceptable.

If a manufactured treatment system is installed upstream of the underground detention system, the underground detention system should be designed, to the extent possible, such that the flood control design water elevation within the underground detention system is equal to or

below the controlling water surface elevation in the manufactured treatment system. This design consideration is necessary to maximize the performance of this type of pretreatment system and to minimize the resuspension of collected sediment.

Materials

Wayne County is authorized to restrict the types of materials that may be used to construct underground detention systems. Generally, underground detention systems should be constructed from pre-cast or cast-in-place concrete, corrugated metal pipe (CMP), polymer-coated corrugated steel pipe, reinforced concrete pipe, or smooth-lined corrugated plastic pipe (CPE). Unless otherwise indicated in this section, materials used for underground detention systems should meet the requirements of the current MDOT specification for their fabrication.

Underground detention systems made of reinforced concrete pipe should conform to ASTM C76. Storm water detention systems made of pre-cast or cast-in-place reinforced concrete structures should conform to current Wayne County Specifications for Structural Concrete with the wall thickness not less than the minimum thickness necessary to sustain HS20 loading requirements, as determined by a registered Professional Engineer. Pipe openings should be sized to accept pipes of the specified size(s) and material(s) and should be sealed with hydraulic cement conforming to ASTM C595M.

Circular CMP should conform to AASHTO M36 (ASTM A760) and should be made from aluminum coated sheet conforming to AASHTO M274. The use of the continuous welded seam process in the fabricating of pipe is not permitted.

Polymer coated corrugated steel pipe should conform to AASHTO M246 (ASTM A742) and be made of aluminum coated sheet conforming to AASHTO M275 (ASTM762). The use of the continuous welded seam process in the fabricating of pipe is not permitted.

Smooth-lined corrugated plastic pipe should conform to AASHTO M294, Type S and should be limited to a maximum size of 48 inches.

For systems made of pre-cast concrete or pipes, the manufacturer should contact the Wayne County Testing Office (734-326-3936) at least three working days prior to fabrication to schedule inspection during fabrication of the concrete or piping. Wayne County inspects the material fabrication process to ensure that the manufacturer's testing of the product occurs at the applicable AASHTO or ASTM standards. Testing of pipe materials should occur at the following frequencies:

- CMP should be tested at a frequency of one test per 200 pieces per size per day.
- Steel pipe should be tested at a frequency of one test per 200 lineal feet per heat number.
- CPE should be tested at a frequency of one test per 1000 straight length of pipe per diameter per lot number.

Installation

Wayne County is authorized to restrict the methods used to construct underground detention systems. At a minimum, unless otherwise directed by the County, installation of underground detention systems constructed of pipes should conform to the current MDOT specification(s) for installation of the specific pipe material used.

A stable foundation should be provided. For underground detention systems consisting of pipes, a stable foundation is necessary to insure that the proper line and grade is maintained. Unstable foundations may be undercut and replaced with MDOT Class I granular bedding material placed in 6 inch lifts. Other methods of stabilization can be used if approved by the engineer.

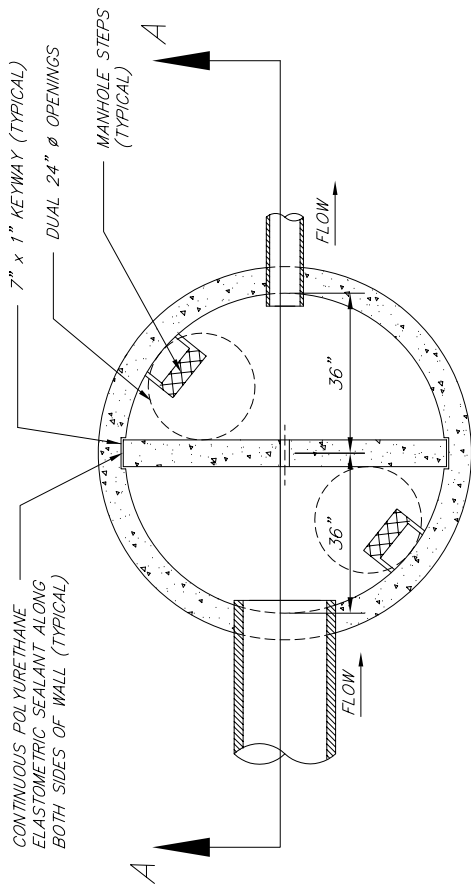
For underground detention systems consisting of CPE, proper haunching provides a major portion of the pipe's strength and stability. Embedment materials should be worked under the haunches by hand for larger pipes (30-inches and above).

When installing underground pipe as part of a underground detention system, backfill should conform to Wayne County Trench "A" backfill and Trench "B" backfill

specifications, except when CPE pipe is used. When CPE pipe is used, the dimensions of the trench backfill are the same as Trench "A" and "B"; however, 21AA stone or gravel aggregate shall be used as backfill to a minimum of 6 inches above the top of pipe for both trench details. Additionally, underground pipe detention systems made of CPE should be backfilled to 6 - 12 inches above the pipe to provide protection for the pipe from construction operations during placement of the final backfill.

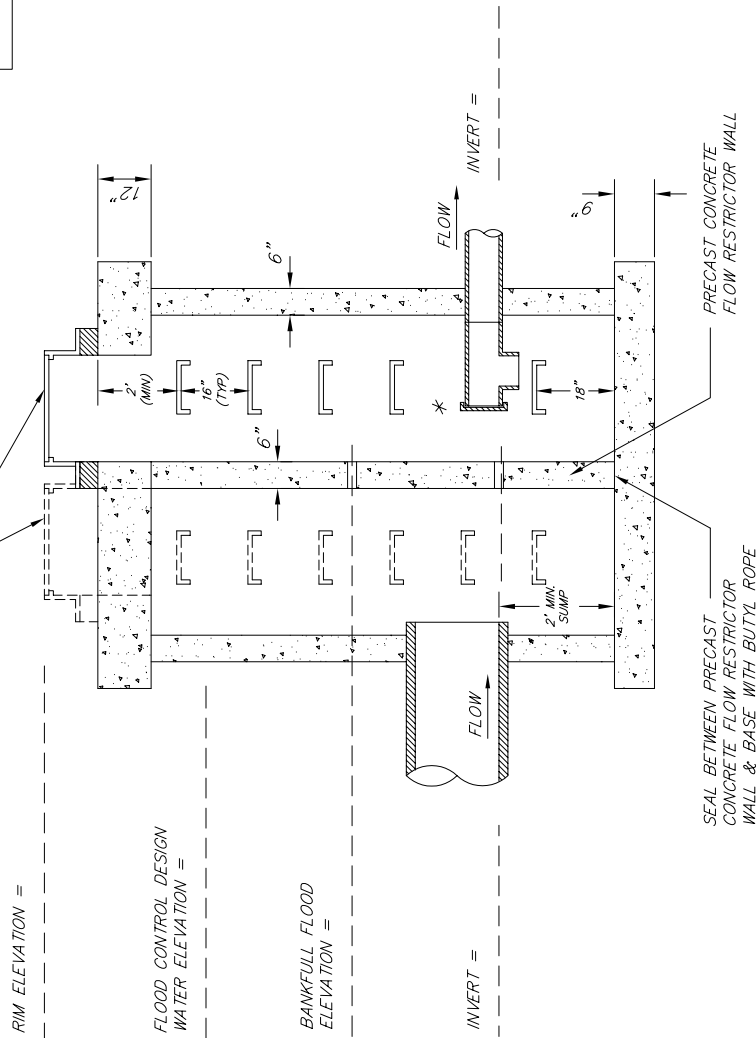
Maintenance

Underground detention systems should be inspected every 6 months to verify proper operation, and to identify and perform any necessary maintenance. As a general rule, the detention system requires cleaning if its volume is reduced by more than 10 percent due to the accumulation of silt and sediment.



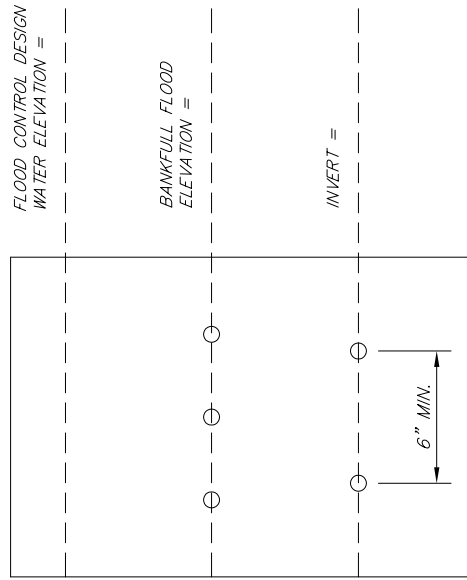
* OIL/WATER SEPARATOR SHALL BE REQUIRED FOR OUTFLOW PIPE LESS THAN 12" DIA.

WAYNE COUNTY FRAME AND COVER TYPE "A":



SECTION "A-A"

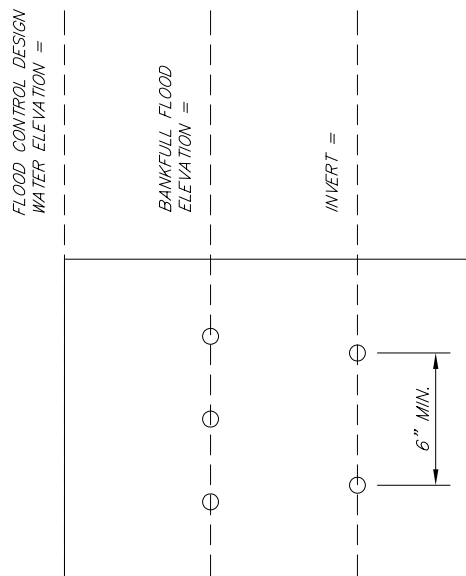
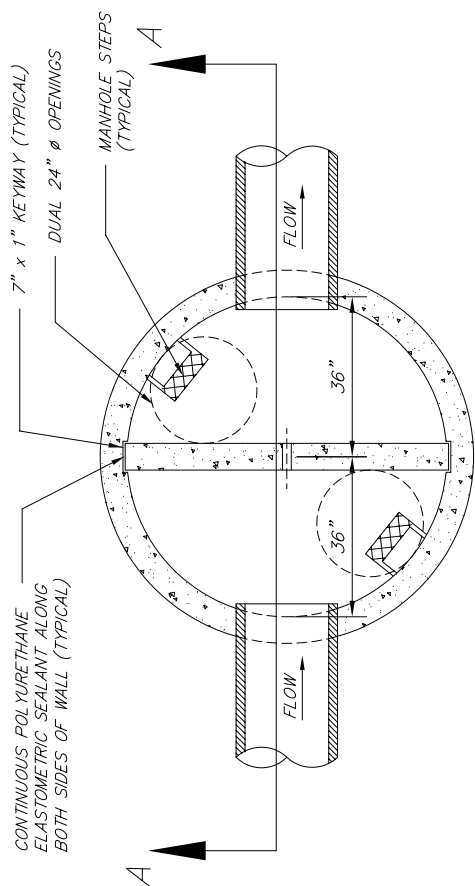
1. THIS TYPE OF FLOW RESTRICTOR STRUCTURE TO BE USED ONLY WITH UNDERGROUND DETENTION SYSTEMS.
2. OVERFLOW IS NOT ALLOWED TO A WAYNE COUNTY ROAD STORM SYSTEM.
3. THE PRECAST REINFORCED FLOW RESTRICTOR STRUCTURE SHALL BE MANUFACTURED PER ASTM C-478 SPECIFICATIONS.



FLOW RESTRICTOR WALL
FRONT VIEW

NUMBER AND SIZE OF HOLES AS PER DESIGN. MINIMUM 1" DIA.

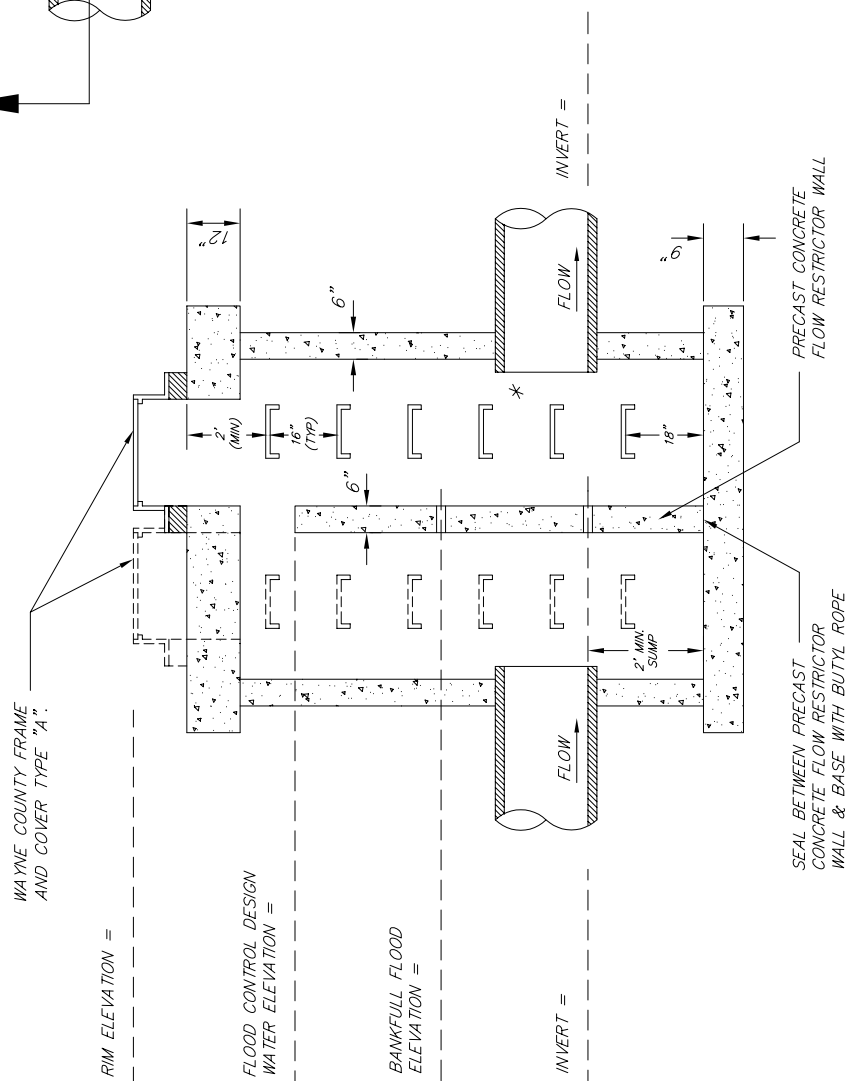
EXAMPLE A: FLOW RESTRICTOR WITHOUT OVERFLOW NOT TO SCALE



FLOW RESTRICTOR WALL
FRONT VIEW

NUMBER AND SIZE OF HOLES AS PER
DESIGN. MINIMUM 1" DIA.

* OIL/WATER SEPARATOR SHALL BE
REQUIRED FOR OUTFLOW PIPE LESS
THAN 12" DIA.



SECTION "A-A"

1. THIS TYPE OF FLOW RESTRICTOR STRUCTURE TO BE USED ONLY WITH UNDERGROUND DETENTION SYSTEMS.
2. OVERFLOW IS NOT ALLOWED TO A WAYNE COUNTY ROAD STORM SYSTEM.
3. THE PRECAST REINFORCED FLOW RESTRICTOR STRUCTURE SHALL BE MANUFACTURED PER ASTM C-478 SPECIFICATIONS.

EXAMPLE B: FLOW RESTRICTOR WITH OVERFLOW NOT TO SCALE

8.1.4 Outlets for Forebays and Open Detention Basins

Description

Forebay outlets convey flow from a forebay into detention systems and retention basins. Forebay outlets must include a flow restrictor, which conveys restricted flow, and a weir, which conveys unrestricted flow.

Outlets from open detention basins convey flow from the detention basin into a surface water or off-site closed conduit. Required outlets from open detention basins include a flow restrictor to convey restricted flow, an overflow structure to discharge when the water level exceeds the design water level, and an emergency spillway to convey unrestricted flow. An example of a storm water management system with forebay and open detention basin outlets is shown in the detail at the end of this section.

Design Standards for Forebay Outlets

Outlets for forebays must be designed as follows:

- Flow restrictors in forebays must be placed near or within the embankment of the forebay to provide ready maintenance access and must be constructed of materials that minimize future maintenance requirements.
- Flow restrictors must be designed to gradually release the first flush storage volume over a period of twenty-four (24) hours, as described in Section 6.3.1.
- Forebays must include a weir to allow discharge from the forebay into the detention system or retention basin when the forebay water level exceeds the top of the forebay storage volume. The weir must be designed to convey the peak flow rate tributary to the forebay for the 10-year design storm.

Design Standards for Open Detention Basin Outlets

Outlets for open detention basins must be designed as follows:

- A flow restrictor is required in each detention basin. Depending on which performance standard(s) the system is being designed to meet, the flow restrictor

may be designed to meet the flood control outflow requirements, the bank full flood outflow requirements, or both.

- For flood control, the flow restrictor must be designed such that the maximum outflow rate at the design water level does not exceed the maximum allowable outflow rate for flood control as determined by the equations described in Section 6.2.1.
- For water resources protection, the flow restrictor must be designed to gradually release the bank full flood storage volume over a period of forty (40) hours as described in Section 6.3.2.
- Flow restrictors in open detention basins must be placed near or within the embankment of the basin to provide ready maintenance access. Flow restrictors must be constructed of materials that minimize future maintenance requirements.
- An overflow structure must be provided to allow discharge when the basin water level exceeds the design water level. The overflow structure and its outlet pipe must be designed to convey the peak flow rate tributary to the basin for the 10-year design storm.
- An emergency spillway with a defined downstream drainage path must be provided to allow discharge from the basin when flows exceed the capacity of the overflow structure. The emergency spillway elevation must be 6 inches below the top of freeboard elevation. The spillway must be armored to prevent erosion of the berm.

Preferred Design Elements and Materials

- Wayne County prefers gravity outlets versus pumped outlets from open detention basins. If an open detention basin is designed to include a pumped outlet, the pumps should be located downstream of the detention basin's flow restrictor and the pumping capacity should not exceed the maximum allowable

release rate from the flood control storage volume (Q_a).

- Risers and overflow structures should be constructed of 12-gage corrugated metal pipe (CMP) conforming to ASTM A760, and should have a minimum diameter of 36-inches.
- Riser holes should be 1 inch minimum diameter but no larger in size than the surrounding stone. The holes should be spaced a minimum of 4 inches apart, on center, both vertically and horizontally. The holes should be pre-drilled prior to galvanizing.
- Any field modifications to risers, overflow structures, or other outlet pipes should be performed in accordance with ASTM A780-01.
- Risers and overflow structures should have a 2-foot deep sump and a concrete base of 6-inch minimum thickness. The concrete base should be constructed of either pre-cast concrete meeting ASTM C478, or cast-in-place concrete with a 28-day strength requirement of 3,500 psi.
- Risers and overflow structures should be securely attached to the base. They may be embedded in concrete or affixed by an approved fastening method.
- The top of risers and overflow structures should be equipped with a steel grate. Openings should be a minimum of 3 inches square and a maximum of 4 inches square.
- Stone filter backfill around risers should consist of 3-inch diameter washed stone, with an outer blanket of MDOT 6A stone. The side slope of the stone blanket is typically 1:4.
- The berm on which an emergency spillway rests should be made of approved material free of debris, organic material and large rocks (over 4 inches in diameter). The approved material should be placed and compacted as roadway embankment per the current MDOT standard specifications for roadway embankment construction.
- Suggested options for armoring spillways include riprap, tri-lock, geoweb with infill material, and reinforced turf.
- The outlet “Tee” should be equipped with a removable cap in the horizontal direction; the vertical leg should serve as an oil separator. The horizontal leg often is used as a clean out.

- The minimum preferred outlet pipe diameter is 4 inches.
- An anti-seepage collar should be provided on each outlet pipe.



Maintenance

Inlets and outlets should be checked regularly for clogging and the system should be cleaned as necessary. Sediment should be removed if accumulation reaches 6 inches or if re-suspension is observed. Pipe inspections should be made to verify that the pipe is not crumbling or broken.

8.2.1 Forebays

Description

Forebays are man-made surface waters used as pretreatment systems. Forebays are designed to temporarily store the first flush of runoff from a storm event and provide for pollutant removal through settling. A forebay or other pretreatment system is required at each inlet to a detention system or retention basin.

Design Standards

Forebays must capture the first flush and release it gradually to the detention system and/or retention basin over a period of twenty-four (24) hours. Section 6.3.1 provides detailed information regarding how to calculate the storage volume required to capture the first flush for the area tributary to each forebay, and how to calculate the average allowable release rate from the forebay.

Design standards specific to forebays include the following:

- The volume of the forebay above any permanent pool may be used to satisfy a portion of the flood control storage volume (described in Section 6.2.1) and the bank full flood storage volume (described in Section 6.3.2). If a permanent pool is provided, the volume of the permanent pool may not be used to satisfy these other storage volume requirements.
- All closed conduits entering or exiting a forebay should have an end treatment and adequate soil erosion protection, as described in Section 8.3.1. Some enclosures should also be covered with a grate to prevent children and animals from entering the enclosure.
- A buffer strip must be provided around all surface waters such as forebays. The buffer strip must be at least 25 feet wide measured from the minimum freeboard elevation of the forebay. Of the minimum 25 ft width, a minimum of 15 feet of the buffer strip should be exterior to the forebay perimeter defined by the top of bank. The slope of the buffer strip should be 1:6 or flatter. These provisions ensure that there is sufficient room to provide access to the forebay for maintenance.

- Plant vegetation, such as along the side slopes of retention basins, is necessary to control erosion and enhance sediment entrapment. A landscaping plan is required for retention basins, due to the importance of the vegetation to the function of the entire system. Use of a professional landscape architect with experience in storm water management system design and native landscaping is encouraged.
- Forebays may not be located within pre-existing surface waters.
- Design standards for outlet structures associated with forebays are described in Section 8.1.4.

Wayne County generally requires forebays to have side slopes no steeper than 1:6. However, earthen berms used as a weir between the forebay and an open detention basin have no minimum side slope requirement.

Vegetation Specifications

The type of vegetation used is dependant on site-specific conditions, such as soil types, amount of sunlight, and other factors. Vegetation specifications for forebays are the same as those for open detention basins (see Section 8.1.1).

Maintenance

Maintenance activities for forebays are the same as those for open detention basins (see Section 8.1.1). These activities must be identified in the submitted maintenance plan.

8.2.2 Bioretention Areas



Use of Bioretention within a Parking Lot: Wayne City Hall (Photo courtesy of Alicia Askwith, Ayres Lewis Norris and May)

Bioretention areas are designed to use soil and plant material to mimic natural processes and store, filter and infiltrate storm water into the ground. Bioretention areas may be used anywhere to achieve a degree of stormwater treatment; the location depends in part on the type of facility employed. Common applications include:

- Pretreatment system for detention systems and retention basins.
- Within parking lots: bioretention areas are recessed and the pavement is graded to these areas, where storm water is captured and treated (see figure above). Traditional parking lots typically have curbed, elevated islands of vegetation.
- On new residential subdivision lots or commercial lots, near the source of the runoff generated from impervious surfaces.



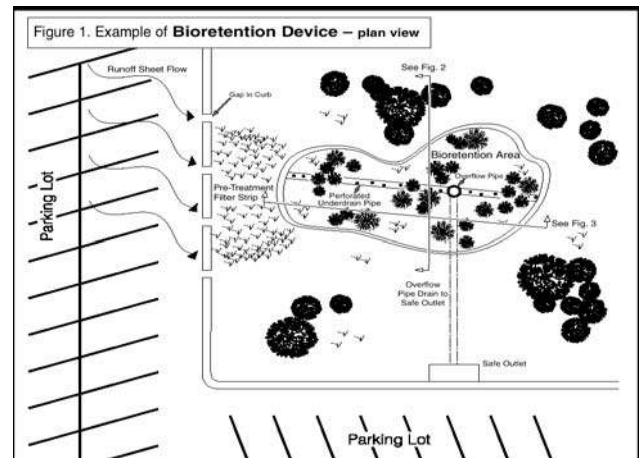
Use of Bioretention within a Residential Development

- Areas upland from inlets or outfalls that receive sheet flow from graded areas.
- Areas of the site that are planned to be excavated or cut.
- In stormwater management retrofit and redevelopment situations, the addition of bioretention facilities will provide some improvement in the amount of runoff and in water quality.

Benefits of Use

Potential benefits for the incorporation of bioretention facilities as part of storm water management systems include:

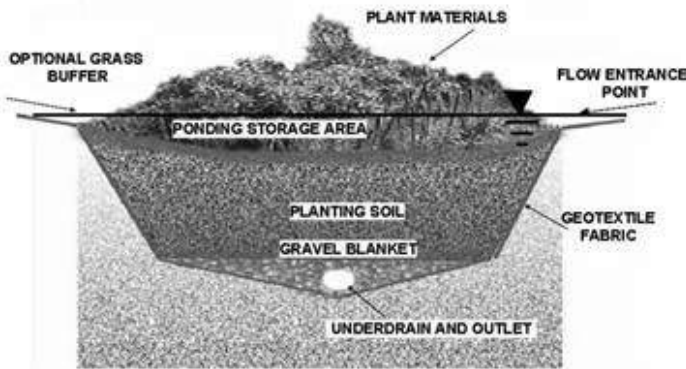
- Assist with compliance with Wayne County Storm Water Standards
- Reduces impervious surfaces and increases the amount of disconnected impervious areas, which reduces the amount of storm water runoff that must be managed.
- Potential reductions in the need for and size of traditional storm sewers and storm water management systems.
- The above ground pooled water and some of the below ground storage volume can be counted toward meeting the water resources protection requirements described in Chapters 5 and 6.
- Greater lot yields.



Schematic showing example Bioretention Area (Photo (left) and Figure (above) from Wisconsin Department of Natural Resources, Post Construction Stormwater Management presentations)

- May count as both part of the required stormwater management system and toward local landscape and/or green space requirements.
- Increases natural habitats within a development.
- Construction and maintenance of bioretention facilities can be less costly than detention ponds.

Components of a Typical Bioretention Area (Figure from *Bioretention*)



Manual. Prince George's County, Maryland)

Features of Bioretention Areas

Bioretention areas typically have the following features:

- Grass buffer strips reduce runoff velocity and filter particulate matter.
- Sand bed provides aeration and drainage of the planting soil and assists in the flushing of pollutants from soil materials.
- Ponding area provides storage of excess runoff and facilitates the settling of particulates and evaporation of excess water.
- Organic layer performs the function of decomposition of organic material by providing a medium for biological growth (such as microorganisms) to degrade petroleum-based pollutants. It also filters pollutants and prevents soil erosion.
- Planting soil provides the area for storm water storage and nutrient uptake by plants. The planting soils contain clays, which adsorb pollutants such as hydrocarbons, heavy metals and nutrients.
- Vegetation functions in the removal of water through evapotranspiration and pollutant removal through nutrient cycling.

Design Standards

Bioretention areas must be designed as follows:

- The depth of the ponding area in a bioretention area cannot exceed 6 inches. A maximum of 3 inches to 4 inches is preferred for areas that receive high hydraulic loading or have soils with low infiltration rates. This should be done in combination with a smaller drainage area.
- Bioretention areas must include an underdrain, unless the applicant demonstrates that the infiltration rate of soil within the bioretention area is sufficient to prevent excess ponding. Underdrains must satisfy the following requirements:
 - o Underdrains must have a hydraulic capacity greater than the infiltration rate of the soil in the bioretention area.
 - o The underdrain must be perforated along its entire length. The location of the perforations (invert of pipe or elsewhere) depends upon the design of the facility. Typically, the perforations are placed closest to the invert of the pipe to achieve maximum potential for draining the facility. The perforations can be placed near the top of the pipe if an anaerobic zone is intended. Water below the perforated portion of the underdrain will have a tendency to accumulate during periods of saturation. Otherwise, water will have a tendency to infiltrate into the surrounding in-situ soils.
 - o Underdrains cannot be perforated within 5 feet of where the underdrain system connects to a storm sewer structure.
 - o Underdrains must include an adequate outlet into a detention system, retention basin, storm sewer or watercourse to achieve positive flow.
 - o A 6-inch gravel bed is required to protect underdrain pipes and to reduce clogging. A gravel blanket around the underdrain helps keep it free of possible soil transport.
 - o The underdrain system must include a cleanout well to provide access for cleaning the system.
- Bioretention areas may not be located within pre-existing surface waters.

Grading and Landscape Plans

Applicants that propose to include one or more bioretention areas as components of a storm water management system must submit a grading plan for the development project. The grading plan must clearly identify

bioretention areas in relation to the topography and physical location. In addition, the grading plan must clearly identify routes for construction traffic that direct traffic around the bioretention areas. Allowing construction traffic to traverse a bioretention area may compact the soils or other subsurface media.

Applicants that propose to include one or more bioretention areas as components of a storm water management system also must submit a landscape plan for the development project. At a minimum, the landscape plan must specify soils and plant materials that the applicant proposes to include in a landscape, and describe the methods and planting techniques that the applicant proposes to utilize. Landscaping is included as regulated construction activity for which financial assurance must be provided.

Preferred Design Elements

- Distributed placement of bioretention areas across a development site results in smaller, more manageable subwatersheds within the development site.
- The drainage area to each bioretention area should be smaller than 5 acres and preferably less than 1 acre. Note that there can be multiple bioretention areas within a given development site.
- On new residential subdivision lots or commercial lots, bioretention areas should be located near the source of the runoff generated from impervious surfaces. Facilities should be located near the perimeters and edges to maintain typical use of the property. Bioretention areas should not be located near building areas unless the building design incorporates adequate waterproofing measures, or near wellheads or septic systems.
- To minimize excess ponding, excess runoff should be diverted away from the bioretention by grading the elevation of maximum surface ponding equivalent to the elevation at which runoff is discharging into the bioretention area.
- A safe overland flow path for the excess runoff is recommended.
- Bioretention areas should be designed as off-line systems whenever possible. This is to prevent erosive flow of water within the facility.

- Sloped areas exceeding 20% should not be used for bioretention unless “weep-garden” designs are employed.
- Bioretention areas should not be built where wooded areas would need to be cleared, to make room for the facility.
- Bioretention areas should be located away from traveled areas such as public pathways to avoid compaction.
- In parking lot applications, bumper blocks or gapped curbing should be used to prevent entry of vehicles into the bioretention area.
- A raised underdrain has the effect of providing a storage area below the invert of the underdrain discharge pipe. The storage area is equal to the void space of the material used.



Rain Garden at Lathrup Village Offices (Photo courtesy of Lillian Dean, Southeastern Oakland County Water Authority)

Filters

Filter material should be used between the gravel blanket around the underdrain and the planting soil above.

- A pea gravel diaphragm to filter water and soil before passing through to the underdrain gravel blanket is recommended. It should have a minimum thickness of 3-4 inches and a maximum thickness of 8 inches. Where situations permit, a greater depth may be appropriate, although the depth generally should not exceed 12 inches.
- A permeable filter fabric should be placed between the underdrain gravel blanket and the pea gravel diaphragm where the underdrain is located. The filter fabric should extend 2 ft to either side.
- Filter fabric may be placed along the “walls” of the bioretention area to help direct the water flow

downward and to reduce lateral flows. For example, to prevent lateral flow under roads and parking lot pavement, filter fabric can be placed along the sidewalls of a bioretention area that is installed in the median strip or parking lot landscape island. The fabric should extend from the subgrade over the stone.

Planting Soil

- The planting soil should have sufficient depth to provide adequate moisture capacity and to create space for root systems. There is a preferred mixture for planting soil used in bioretention facilities (see “Material Specifications” below).
- Planting soil should be 4 inches deeper than the bottom of the largest root ball.

Plants

- Select plant materials that can tolerate extreme hydrologic changes, pollutant loading, and highly variable soil mixture conditions. Use of native plants is highly recommended. The material specification section below presents plant species recommended for bioretention areas.
- The minimum recommended caliper size for trees planted within a bioretention facility is 1 inch.
- Plant material and planting applications should meet guidelines set by the American Standard of Nursery Stock). Plant stock should be grown by suppliers or nurseries certified by the Michigan Native Plant Producers Association (see “References” for this section).

Material Specifications

- Planting Soil: Planting soil should have a sandy loam, loamy sand, or loam texture per USDA textural triangle. Maximum clay content is <5%. The soil mixture should have pH between 5.5 and 6.5 with an organic content of 1.5 – 3.0 %. The soil mixture should have an infiltration rate greater than 0.5 in/hour. The soil should be a uniform mix, free of stones, stumps, roots, or other similar objects larger than two inches. No other materials or substances should be mixed or dumped within the bioretention that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations.

The planting soil should be free of Bermuda Grass, Quackgrass, Johnson Grass, Mugwort, Nutsedge, Poison Ivy, Canadian Thistle, Tearthub, or other noxious weeds.

- Sand: Sand should be clean and free of deleterious materials. For planting soil, MDOT Class II clean sand is recommended.
- Mulch: Mulch should consist of raw hardwood, MDOT Quality Product List (QPL). Grass clippings are unsuitable for mulch, primarily due to the excessive quantities of nitrogen built up in the materials.
- Geotextile fabric: Geotextile fabric should maintain a flow rate of 125 GPM per square foot. MDOT specifications are recommended (Table 910-1).
- Underdrain gravel blanket: The gravel blanket should be double washed, 1-1/2 inches in size. MDOT Class I porous material is recommended.
- Pea Gravel: Pea gravel should be washed, river-run, round diameter, ¼ - ½ inches in size.
- Underdrain piping: A variety of materials can be used for underdrain piping, including heavy-duty PVC pipe and corrugated metal pipe. Other pipe materials may be used.
- Vegetation: The following is a partial listing of plants native to southeast Michigan that may be suitable for bioretention areas. The plants listed here are excellent for moist organic gardens that are “dry” within 48 hours of a rain. Check sun/shade conditions before planning and planting.

Wildflowers, sedges, and grasses

Beardtongue (*Penstemon digitalis*)
Bergamot (Bee-Balm) (*Monarda fistulosa*)
Black-Eyed Susan (*Rudbeckia hirta*)
Blue Flag Iris (*Iris Virginica*)
Blue Vervain (*Verbena hastata*)
Boneset (*Eupatorium perfoliatum*)
Canada Anemone (*Anemone canadensis*)
Columbine (*Aquilegia canadensis*)
Culver’s Root (*Veronicastrum virginicum*)
Indian Grass (*Sorghastrum nutans*)
Joe-Pye Weed (*Eupatorium Maculatum*)
Marsh Blazing Star (*Liatris spicata*)
Missouri Ironweed (*Vernonia missurica*)
New England Aster (*Aster novae-angliae*)
Old-Field Cinquefoil (*Potentilla simplex*)

Porcupine Sedge (*Carex hystericina*)
 Sneezeweed (*Helenium autumnale*)
 Spiderwort (*Tradescantia Ohiensis*)
 Swamp Goldenrod (*Solidago patula*)
 Swamp Milkweed (*Asclepias incarnata*)
 Tall or Green-Headed Coneflower (*Rudbeckia trilobum*)
 Tall Tickseed (*Coreopsis verticillata*)
 White Turtlehead (*Chelone glabra*)
 White Vervain (*Verbena urticifolia*)
 Wild Strawberry (*Fragaria virginiana*)

Shrubs

American Cranberrybush Viburnum (*Viburnum trilobum*)
 Black Chokeberry (*Aronia prunifolia*)
 Common Buttonbush (*Cephalanthus occidentalis*)
 Meadowsweet (*Spiraea alba*)
 Ninebark (*Physocarpus opulifolius*)
 Redosier Dogwood (*Cornus stolonifera*)
 Shrubby Cinquefoil (*Potentilla fruticosa*)
 Shrubby St. John's-Wort (*Hypericum prolificum*)
 Spicebush (*Lindera benzoin*)
 Steeplebush (*Spiraea tomentosa*)

Construction

Proper construction techniques (including proper grading), adequate landscaping, suitable soil mixtures, and approved materials are critical to the success of bioretention areas.

- The grading plan for the entire development project must clearly identify the bioretention areas. Grading of or construction traffic over those areas should be avoided.
- The area surrounding the bioretention areas should be stabilized prior to construction of the bioretention areas to minimize compaction and contamination of the bioretention site.
- Placement of the gravel over the underdrain must be done with care. Avoid dropping the gravel high levels from a backhoe or front-end loader bucket. Spill directly over underdrain and spread manually.
- Placement of the planting soil in the bioretention area should be in lifts of 12 to 18 inches and lightly compacted. Minimal compaction effort can be applied to the soil by tamping with a bucket from a dozer or backhoe. Do not use heavy equipment within the

bioretention facility. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

- Compaction will significantly contribute to design failure. Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to re-fracture the soil profile through the 12-inch compaction zone. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.
- Rototill 2 to 3 inches of sand into the base of the bioretention facility before back filling the facility and placement of underdrain. Pump any ponded water before preparing (rototilling) base.



Construction of Rain Garden at Lathrup Village Offices (Photo courtesy of Lillian Dean, Southeastern Oakland County Water Authority)

- In order to speed up the *natural* compaction process, presoaking the placed soil may be performed. Significant settlement can occur after the first presoak, and additional settlement may occur subsequent to the initial wetting. If time and construction scheduling permits, it is preferable to allow natural settlement to occur with the help of rain events to presoak the soil medium.

Maintenance

Proper maintenance will not only increase the expected life span of the facility, but will also improve aesthetics. Annual maintenance of plant material, soil layer and the mulch layer is required for the overall success of bioretention systems.

- Mulch should be re-applied once every six months, to maximize nitrogen uptake by the facility and to help control growth of unwanted plants. The mulch layer should be removed and replaced every 2 years.
- Mulch should be uniformly applied approximately 2 to 3 inches in depth. Piling mulch around the base of the tree is not recommended as the tree may become infested with pests and diseases. Mulch applied any deeper than three inches reduces proper oxygen and carbon dioxide cycling between the soil and the atmosphere, and keeps roots from making good contact with the soil.
- Soils begin filtering pollutants immediately but can lose their ability to function in this capacity over time. Evaluation of soil fertility is important in maintaining an effective bioretention system. It is recommended that soils be tested annually and replaced when soil fertility is lost. Depending on environmental factors, this usually occurs within 5-10 years of construction.
- As with any garden, bioretention requires weeding to control growth of unwanted plants that can be invasive, consuming the intended planting, and destroying the aesthetic appeal. Weeding should be accomplished routinely and at least monthly.
- Water in the facility should infiltrate the system within 4-6 hours or less. Clogging or blockage of either the surface layer or fines obstructing the filter fabric used between the gravel bed/underdrain and the surrounding planting soil usually causes pooling water. Including a clean out pipe in the underdrain system will provide access for cleaning the system. Removing the mulch layer and raking the surface may correct the surface blockage problem. For blocked filter fabric, use lengths of small reinforcing bar (e.g., 2-3 ft of #4 rebar) to puncture the fabric with holes every 1-foot on center. If the soils themselves are causing the problem, punch holes in the soil or optionally, install a "sand window" at least 1 foot wide running vertically to the underdrain system elevation.
- If plants wilt during the heat of the day, but recover in the evening, watering is not necessary. The plants are simply conserving moisture. If they do not recover, watering is indicated. Another good rule of thumb is to stick a pencil or screwdriver about four inches into the soil. If the soil is moist at that depth, watering is not needed. If the soil is dry, and the shrubs or trees were

planted within the last three years, watering is necessary.

- If any of the plants do not perform well, become diseased or die, they should be replaced.
- For trimming and harvesting, the current practice is to leave ornamental grasses and perennial seed heads standing to provide winter interest, wildlife forage, and homes for beneficial insects. Plants should not be cut back until spring when new growth commences, and even then it is only done for neatness; it does not impact growth. Plants may be pinched, pruned, sheared or deadheaded during the growing season to encourage more flowering, a bushier plant, or a fresh set of leaves. Diseased or damaged plant parts should be pruned as they occur. If a plant is pest-infested, perform cleanup in fall to deny the pest a winter home. Trees and shrubs may be pruned for shape or to maximize fruit production.
- The properly designed bioretention area should thrive and allow planting materials to expand and propagate, eventually becoming overcrowded. If this occurs, perennial plants should be divided in spring or fall.
- By design, bioretention facilities are located in areas where nutrients (especially nitrogen) are significantly elevated above natural levels. Fertilization in such areas usually is unnecessary, because it is unlikely that soil fertility will be the limiting factor in plant growth. If soil fertility is in doubt, a simple soil test can resolve the question. If fertilization should become necessary, an organic fertilizer will provide nutrients as needed without disrupting soil life.
- Runoff flowing into bioretention facilities may carry trash and debris with it, particularly in commercial settings. Trash and debris should be removed regularly both to ensure that inlets do not become blocked and to keep the area from becoming unsightly.

References

- American Standard of Nursery Stock, American Nursery & Landscape Association, <http://www.anla.org/applications/Documents/Docs/ANLStandard2004.pdf>
(Also document ANSI Z60.1-2004 of the American National Standards Institute (ANSI). www.ansi.org)

- City of Wayne (MI), “City Hall Storm Water Quality Improvements Project Fact Sheet” and project summary, Clean Michigan Initiative Nonpoint Source Grant “City Hall Storm Water Quality Improvements”. Contact: Ramzi El-Gharib, City Engineer. Additional project information provided by Michelle West; Ayres, Lewis, Norris & May, Inc.
- Office of the Washtenaw County Drain Commissioner, Janis Bobrin. Low Impact Development Fact Sheets. Funded by the United States Environmental Protection Agency; administered by the Michigan Department of Environmental Quality. Ann Arbor, MI. August 2004. www.ewashtenaw.org/government/drain_commissioner/dc_lid.html
- Programs and Planning Division, Department of Environmental Resources, Prince George’s County. Bioretention Manual. Prince George’s County, Maryland. November 2001. www.goprincegeorgescounty.com/government/agency_index/DER/PPD/LID/bioretention.asp?h=20&s=&n=50&n
- Southeastern Oakland County Water Authority. Rain Gardens for the Rouge River: A Citizen’s Guide to Planning, Design, & Maintenance for Small Site Rain Gardens. Funded through a grant from the Rouge River National Wet Weather Demonstration Project. www.socwa.org.
- United States Environmental Protection Agency, Office of Water. Storm Water Technology Fact Sheet: Bioretention. EPA-832-F-99-012. Washington, DC. September 1999. www.epa.gov/npdes/pubs/biortn.pdf
- United States Environmental Protection Agency, Office of Water. Low Impact Development (LID): A Literature Review (4203). EPA-841-B-00-005. Washington, DC. October 2000. <http://www.epa.gov/owow/nps/lid/lid.pdf>
- Wisconsin Department of Natural Resources (WDNR). <http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm>
- WDNR “Post Construction Stormwater Management”. <http://dnr.wi.gov/org/water/wm/nps/stormwater/post-constr/index.htm>

Additional Resources

- “Local Storm Water and Watershed Management Practices Constructed/Implemented in Southeast Michigan”, available at <http://www.waynecounty.com/doe/watershed/mgmtPractices.htm>
Project summaries, photos, location and contact information, web links, and other information for a variety of storm water and watershed management practices in the categories:
 - o Bioretention / Low Impact Development / Native Landscaping
 - o Manufactured Treatment Systems and Underground Detention
 - o Detention Ponds/Constructed Wetlands
 - o Streambank Stabilization
 - o Woody Debris Management
 - o Green Buildings
- Low Impact Development Center www.lowimpactdevelopment.org
- Center for Watershed Protection www.cwp.org
www.stormwatercenter.net

Resources For Native Plant Material

- Michigan Native Plant Producers Association, “Plants and Seeds Source Guide” and “List of Member Nurseries”. <http://www.MNPPA.org>
- Michigan Association of Conservation Districts. “Gateway to Michigan’s Native Plants.” <http://www.macd.org/rollovers/nativeplants/nphome.html>
- United States Environmental Protection Agency www.epa.gov/greenacres/
- Wild Ones Organization. Landscaping with Native Plants. www.for-wild.org

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8.2.3 Manufactured Treatment Systems

Description

Manufactured treatment systems are manmade devices or structures that are used to remove sediment and other particulate matter from storm water runoff. Manufactured treatment systems may be used at the inlets to underground detention systems, open detention basins, or retention basins. By removing settleable materials, pretreatment systems reduce the amount of material that accumulates in detention/retention systems, and the frequency at which accumulated materials must be removed. Manufactured treatment systems are particularly applicable in small development sites for meeting the water resources protection performance standard of the Wayne County Storm Water Management Standards.

Design Standards

- Manufactured treatment systems must include a chamber or other device to accumulate and store settleable solids in a manner and a location that will prevent re-suspension of previously captured particulates.
- Annual TSS removal efficiency estimates or models must be based on documented removal efficiency performance from full-scale independent studies (for example, laboratory tests) over a range of storm sizes. Generally, annual TSS removal efficiency models should be corroborated by field tests performed by an independent third party using influent and effluent composite samples from a minimum of ten storms at one location.
- A water-lock feature must be incorporated into the design of the storm water treatment system to prevent the introduction of trapped oil and floatable contaminants to the downstream piping during routine maintenance and to ensure that no oil escapes the system during the ensuing rain event.

Preferred Design Elements

Due to the potential for manufactured treatment systems to malfunction and/or create maintenance problems, Wayne County strongly prefers that manufactured treatment systems incorporate the following design elements:

- Manufactured treatment systems should be designed to treat up to the peak flow rate for the 10-year storm event.
- Manufactured treatment systems should be designed so that they do not re-suspend trapped sediments or re-entrain floating contaminants at flow rates up to or exceeding those for the 10-year storm event.
- Manufactured treatment systems should be placed off-line, so that flows in excess of those from hydraulic grade line for a 10-year storm event may be bypassed external to the system.
- The system pump-out volume should be less than $\frac{1}{2}$ of the total system volume.
- The system should not create backwater in the upstream piping network during dry weather conditions.
- Direct access should be provided to the sediment and floatable contaminant storage chambers to facilitate maintenance. There should be no appurtenances or restrictions within these chambers.

Materials Specifications

Manufactured treatment systems may be constructed from pre-cast or cast-in-place concrete and should meet the following specifications

- Wall thicknesses should not be less than 6 inches or as shown on the dimensional drawings, and in any event should be no less than the minimum thickness necessary to sustain HS20 loading requirements as determined by a Professional Engineer licensed in the State of Michigan.
- Pipe openings should be sized to accept pipes of the specified size(s) and material(s), and should be sealed by the contractor with hydraulic cement conforming to ASTM C 595M.
- Internal aluminum plate components should be aluminum alloy 5052-H32 in accordance with ASTM B 209.
- A bitumen sealant in conformance with ASTM C 990 should be utilized in affixing the aluminum swirl chamber to the concrete vault.

Manufactured treatment systems constructed from pre-cast concrete should meet the following additional specifications:

- Concrete for pre-cast manufactured treatment systems should conform to ASTM C 857 and C 858.
- Sections should have tongue and groove or ship-lap joints with a butyl mastic sealant conforming to ASTM C 990.
- Cement should be Type II Portland cement conforming to ASTM C 150.
- Treatment systems constructed from pre-cast concrete should be manufactured in accordance with ASTM C 478.
- The manufacturer of the system should contact the Wayne County Testing Office (734-326-3936) a minimum of 3 working days prior to fabrication to schedule inspection during fabrication of the manufactured treatment system.
- Sections should be cured by an approved method and should not be shipped until (1) at least 5 days have passed since fabrication and/or repair, and (2) the concrete has attained a compressive strength of 4,000 psi.

Manufactured treatment systems constructed from cast-in-place concrete or reinforced concrete should conform to current Wayne County specifications for structural concrete.

Installation

Manufactured treatment systems must be constructed to serve the capacity shown on the drawings and as specified in the approved permit plans. The system must be installed at elevations and locations shown on the approved plans, or as otherwise directed by the County.

For concrete systems, the following installation procedures should be followed:

- Installation of manufactured treatment systems should conform to ASTM specification C 891 "Standard Practice for Installation of Underground Precast Utility Structures." Cast-in-place installation should follow Wayne County specifications for structural concrete. Installation procedures recommended by the manufacturer, if any, should also be consulted.
- The pre-cast base unit should be placed on a subbase consisting of MDOT Class II granular material of a

minimum thickness of six inches, or greater after compaction by the "Controlled Density Method" to 95% of the Maximum Unit Weight. The granular subbase should be checked for level prior to setting and the pre-cast base section of the trap should be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5%, the base section should be removed and the granular subbase material re-leveled.

- Prior to setting subsequent sections, a bitumen sealant that conforms to ASTM C 990 should be placed along the construction joint in the section that is already in place. Pre-cast sections should be set in a manner that will result in a watertight joint.
- Holes made in the concrete sections for handling or other purposes should be plugged with a nonshrink grout or by using grout in combination with concrete plugs.
- Where holes must be cut in the pre-cast sections to accommodate pipes, cutting should be completed before the sections are set in place, to prevent any subsequent jarring which may loosen the mortar joints.

Maintenance

Manufactured treatment systems should be maintained in accordance with the manufacturer's recommended schedule.

Appendix L

City of Grosse Pointe Shores Facilities & Structural Controls

Facility Name	Address/Crossroads	Located in MS4 or Combined System	Proximity to Waterbodies	Potential for Pollutant Runoff (High, Medium, Low)	Discharge of Pollutants of Concern to Impaired Waters	Priority Cleaning Schedule
Administration Building	795 Lake Shore Road	MS4	< 1,000 ft to Lake St. Clair	Medium	Salt, Sediment, Fertilizers/Pesticides runoff to storm sewer system	Medium
Public Works Building Complex	795 Lake Shore Road	MS4	< 1,000 ft to Lake St. Clair	High	Salt, Chlorine, Sediment runoff to storm sewer system	High
Police Station	795 Lake Shore Road	MS4	< 1,000 ft to Lake St. Clair	Low	Salt, Sediment runoff to storm sewer system	Low
Fire Station	795 Lake Shore Road	MS4	< 1,000 ft to Lake St. Clair	Low	Salt, Sediment runoff to storm sewer system	Low
Osius Municipal Park & Marina	800 Lake Shore Road	MS4	Adjacent to Lake St. Clair	Low	Road salt, sediment runoff to Lake St. Clair	Low
Ford-Schroeder Ball/Soccer Field	795 Lake Shore Road	MS4	> 1,000 ft to Lake St. Clair	Medium	Salt, Sediment, Fertilizers/Pesticides runoff to storm sewer system	Medium
542 Catch Basins	Throughout City	MS4	Varies	N/A	Salt, Sediment, Oils, Leaves, Fertilizers/Pesticides runoff to storm sewer system	High
City Streets & Parking Lots (curbed areas are prioritized)	Throughout City	MS4	Varies	High	Salt, Sediment, Oils, Leaves, Fertilizers/Pesticides runoff to storm sewer system	Medium
24 City-Owned Outfalls	Throughout City	MS4	Drains to Lake St. Clair	N/A	Salt, Sediment, Oils, Leaves, Fertilizers/Pesticides	High
2 OSDS (Privately Owned)	Throughout City	MS4	Varies	Medium	E. coli	Medium
2 Underground Storage Tanks	795 Lake Shore Road - DPW	MS4	< 1,000 ft to Lake St. Clair	High	Fuel	High

MUNICIPAL SEPARATE STORM SEWER SYSTEM ENFORCEMENT RESPONSE PROCEDURE

City of Grosse Pointe Shores

I. POLICY:

This policy is to establish the City of Grosse Pointe Shores Enforcement Response Procedure.

II. BACKGROUND:

The MDEQ NPDES Phase II Stormwater Discharge Permit Application requires a procedure for Enforcement Response to address violations of the ordinances or regulatory mechanism identified in the Stormwater Management Program.

III. PROCEDURE:

Each ordinance/regulatory mechanism referenced in the application includes an enforcement response to violations of the ordinance. The ordinances referenced in this application include:

- Chapter 28 – *Solid Waste* (a)

As ordinances are completed and passed by the governing body, the enforcement mechanism will be conveyed to the MDEQ NPDES Permit Contact.

See Appendix D for a copy of the cited ordinances.

In addition to the enforcement mechanisms noted in ordinance, additional tracking of instances of noncompliance occurs and includes the following information (identified in the Spill Notification/Complaint/Outfall Investigation Reporting Form – see attached with this application):

- Responsible Party
- Date of Violation
- Location of Violation (address, cross streets, etc.,)
- Business/Agency/Organization (as appropriate)
- Description of Violation
- Description of Enforcement Response
- Schedule for Returning to Compliance
- Date Violation was Resolved.

If necessary, illicit discharges and connections are traced to their source and eliminated within 120 days of notification.

IV. OTHER:

Any questions on this policy and procedure should be directed to the Storm Water Manager. Additional enforcement response procedure information can be found in the Storm Water Pollution Prevention Plan-Pollution Incident Prevention Plan (SWPPP-PIPP), Appendix N.

V. PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Stormwater Manager for any updates to streamline the requirements. The City of Grosse Pointe Shores will retain an electronic copy of the enforcement tracking file at the Public Works Building (overseen by DPW Director).

Catch Basin Cleaning/Wastes Disposal SOP

City of Grosse Pointe Shores

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Approach

Protocols

Catch Basins/Inlet Structures

- Public Works staff inspect facilities to ensure the following:
 - Immediate repair of any deterioration threatening structural integrity.
 - Cleaning before the sump is 50% full. Catch basins are cleaned as frequently as needed to meet this standard.
- Problem areas (as identified while cleaning) are addressed periodically throughout the year, or as needed.
- Inspections are conducted by the Contractor more frequently during the wet season for problem areas where sediment or trash accumulates more often. All catch basins are cleaned and inspected every year by Public Works staff. Approximately 1/3 of all City-owned catch basins are cleaned annually, with priority given to curbed streets. Priority is given to curbed areas.
- Throughout the year, City staff may identify additional areas that need repairs or cleaning. These areas are then added to the cleaning and/or repairs schedule.
- We keep accurate logs of the number of catch basins cleaned and any rehabilitation performed.
- The amount of waste is collected and recorded by the City. This information is relayed to us for reference.
- Catch basin wastes are hauled to the Grosse Pointe Woods Treatment Plant for proper disposal.

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	✓
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓
Oxygen Demanding	✓

- Mechanical cleaners such as eductors, vacuums, or bucket loaders are utilized for waste collection.

Storm Drain Conveyance System

- We locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Wastes are hauled to a landfill for proper disposal.

Maintenance

- Two-person teams are typically required to clean catch basins with vector trucks.
- Identifying illicit discharges requires teams of at least two people, plus administrative personnel, depending on the complexity of the storm sewer system.
- Arrangements are made for proper disposal of collected wastes.

Illicit Connections and Discharges

- During routine dry-weather screening investigations, staff look for evidence of illegal discharges or illicit connections, as well as accumulation of sediments in the system, erosion areas, etc.
- This information is then added to the priority list as needed.

Training

- Crews are trained in proper maintenance activities, including record keeping and disposal.
- Crews are trained regarding non-stormwater discharges.
- Only properly trained individuals are allowed to handle hazardous materials/wastes.
- All field staff are trained to recognize and report illegal dumping.
- Our construction project contracts require proper soil erosion and sedimentation control measures during the duration of the project.
- Invitations to Bid language require stormwater management training for prospective bidders.

Street and Parking Lot Maintenance SOP

City of Grosse Pointe Shores

Description

Streets, roads, and highways are significant sources of pollutants in stormwater discharges, and operation and maintenance (O&M) practices, if not conducted properly, can contribute to the problem. Stormwater pollution from roadway and bridge maintenance should be addressed on a site-specific basis. Use of the procedures outlined below, that address street sweeping, and repair, bridge and structure maintenance, and unpaved roads will reduce pollutants in stormwater. Street and parking lot cleaning and repairs are performed by City DPW staff.

Approach

Street Sweeping and Cleaning

- We maintain a consistent sweeping schedule – monthly for streets and parking lots.
- Our Public Works staff performs street cleaning during dry weather if possible. Priority is given to curbed areas.
- We consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc. For example:
 - High pollutant loadings areas
 - Areas identified by staff with sediment accumulation
 - High litter or erosion areas
- Accurate logs are kept of the number of curb-miles swept and the amount of waste collected.
- Street sweeping debris and dirt are disposed of at Grosse Pointe Woods Wastewater Treatment Plant.

Street Repair and Maintenance

Concrete and Asphalt Installation and Repair

- We schedule asphalt and concrete activities for dry weather.
- We take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place sand bags around inlets or work areas).

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓
Oxygen Demanding	✓

- We do not wash sweepings from exposed aggregate concrete into the street or storm drain.
- Concrete trucks are washed in designated areas on site designed to preclude discharge of wash water to drainage system.

Patching, resurfacing, and surface sealing

- We schedule patching, resurfacing and surface sealing for dry weather.
- Materials are stockpiled away from streets, gutter areas, storm drain inlets or watercourses.
- Where applicable, nearby storm drain inlets are covered (with waterproof material or mesh) before applying seal coat, slurry seal, etc. We leave covers in place until the job is complete and until all water from emulsified oil sealants has drained or evaporated. Debris from covered maintenance holes and storm drain inlets is cleaned when the job is complete.
- Streets are swept, never hosed down to clean up tracked dirt.

Training

- We provide contract language for prospective bidders regarding proper street sweeping operation and street repair and maintenance.
- We instruct employees and subcontractors to ensure that measures to reduce the stormwater impacts of roadway/bridge maintenance are being followed.
- We maintain a training log for all field employees.
- We train employees on proper spill containment and clean up, and in identifying non-stormwater discharges.

Spill Response and Prevention

- The Storm Water Pollution Prevention-Pollution Incident Prevention Plan is kept up to date.
- Spill kits are readily accessible for spill cleanup.

Underground Storage Tank: Vehicle & Equipment Fueling SOP

City of Grosse Pointe Shores

Description

Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals to stormwater runoff. Implementing the following management practices can help prevent fuel spills and leaks.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives. Fueling tanks are located at the Public Works Complex.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓
Oxygen Demanding	

Pollution Prevention

- Employees are educated about pollution prevention measures and goals and a few employees have Class A, B, and C State Certification for inspections and spill prevention.
- We focus on pollution prevention activities on containment of spills and leaks, most of which may occur during liquid transfers.

General

- Leaks and drips are spot cleaned as needed. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Signs are posted to remind employees not to top off the fuel tank when filling and signs that ban employees from changing engine oil or other fluids at that location.
- We report leaking vehicles to fleet maintenance for repair.
- We ensure the following safeguards are in place:
 - Overflow protection devices on tank systems to warn the operator to automatically shut down transfer pumps when the tank reaches full capacity.
 - Protective guards around tanks and piping to prevent vehicle or forklift damage.
 - Clearly tagging or labeling all valves to reduce human error.

- Automatic shut off for severed fuel hoses.

Fuel Dispensing Areas

- A spill kit is readily available adjacent to the fueling dispensing areas for spills. These areas are not hosed down with water.
- Underground storage tanks are provided with underground spill containment and overfill prevention systems meeting the requirements of the State.
- Fuel dispensing nozzles have "hold-open latches" (automatic shutoffs) except where prohibited by local fire departments.
- Signs are posted to remind employees not to top off the fuel tank when filling and signs that ban employees from changing engine oil or other fluids at that location.
- Post "no littering" signs.

Inspection

- We contract out Class A and Class B monthly and quarterly inspections.
- Aboveground Tank Leak and Spill Control:
Weekly and quarterly inspections are performed to identify the following:
 - We check fill and monitoring ports.
 - We inspect emergency spill response supplies.
 - We inspect dispenser hoses, nozzles, and breakaways.
 - We inspect dispenser and dispenser sumps.
 - We visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
 - We inspect all visible piping, fittings, and couplings for any signs of leakage.
 - Quarterly integrity testing is conducted by a qualified professional.

Training

- Employees are trained upon hiring and annually thereafter on proper methods for handling and disposing of waste. All Public Works staff, including bus drivers understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.
- Employees are trained on proper fueling and cleanup procedures.
- Training logs are kept on file.
- Some staff have UST State Certifications.

Spill Response and Prevention

- Our Storm Water Pollution Prevention Plan-Pollution Incident Prevention Plan is kept up to date.
- Spill kits are readily accessible throughout the Transportation & Grounds complex.
- Spills are reported promptly.

Maintenance

- The oil/water separator is inspected and cleaned at least annually.
- We keep ample supplies of spill cleanup materials onsite.
- We inspect fueling areas, storage tanks, catch basin inserts, containment areas, and drip pans monthly and bi-annually.

**CITY OF GROSSE POINTE SHORES
MUNICIPAL-OWNED STORMWATER SYSTEM
Contractor Requirements and Oversight**

DATE: MARCH 2014

I. POLICY:

This policy is to establish procedures for requiring contractors hired by the City of Grosse Pointe Shores to comply with pollution prevention and good housekeeping BMPs and provide oversight to ensure compliance.

II. BACKGROUND:

The MDEQ NPDES Phase II Stormwater Discharge Permit Application requires a procedure for requiring contractors hired by the applicant to perform municipal operation and maintenance activities comply with all pollution prevention and good housekeeping BMPs as appropriate. This procedure also identifies how the applicant provides oversight of contractor activities to ensure compliance (Stormwater Permit Application # 84).

III. CONTRACTOR REQUIREMENTS AND OVERSIGHT

The contractors hired by The City of Grosse Pointe Shores to perform municipal operations that potentially impact stormwater are required to follow appropriate pollution prevention BMPs and are listed in the following table (example included):

Contractor	Activity	Stormwater BMP	Procedure	Oversight
Marshall Landscape Company	Apply fertilizer and pesticides to municipal properties	Blow fertilizers and pesticides bask on grass, maintain a buffer along waterways, utilize earth-friendly fertilizers	MGIA provided Endorsement information (Marshall Landscape is an endorsed MGIA Lawn Care Provider) – see attached	DPW staff provide monthly spot checks of fertilizing/weed control activities



HEALTHY LAWN CARE PROGRAM FOR WATERSHED PROTECTION

A Guide to Selecting a Lawn Service for Watershed Protection

Why Be Concerned?

Rain and melting snow carry small amounts of oil, grease, soil, debris and other pollutants to rivers, lakes and wetlands. Lawn fertilizer and pesticides are among the pollutants that have been found in storm water runoff.

The Michigan Green Industry Association (MGIA) offers an endorsement program for lawn care professionals interested in offering an alternative lawn care program to their customers.

Program Components Include:

- An initial on-site consultation/assessment
- Soil nutrient tests offered to new customers
- Low-phosphorus or no-phosphorus fertilizer
- Slow-release nitrogen fertilizer (40% in slow-release form)
- Advice to the customer on proper maintenance practices such as mowing and irrigation
- Fertilizer quantities of two, three, or four pounds per 1000 square feet, applied over the growing season
- Weed control options:
 - Zero pesticides
 - Spot-treatment for weeds and/or
 - One-time rescue operation for weed control
- Insect control only after identification of problem on site

Participating lawn care companies typically offer the "Healthy Lawn Care Program" as an option for their customers. Some companies offer natural organic fertilizers, while others use coated, synthetic products which slowly release nutrients. If you would like an "organic fertilizer" program, ask for it specifically.

For a list of the endorsed companies, please see reverse side of this card or visit www.landscape.org. For further information, contact the MGIA at (248) 646-4992.



Funded in part through a grant from the Michigan Department of Environmental Quality, 2009.



HEALTHY LAWN CARE PROGRAM FOR WATERSHED PROTECTION

Endorsed MGA Lawn Care Professionals

(as of January 2011)

Jim Berns
Berns Landscaping Services Inc.
23500 Blackstone Ave.
Warren, MI 48089
(586) 756-1145
www.bernslandscape.com

Tom Korth
Classic Turf LLC (A Division of Westside Forestry)
22510 Hoover Rd.
Warren, MI 48089
(586) 757-7700
www.classic-turf.com

Steve Martinko
Contender's Tree & Lawn Specialists, Inc.
9532 Shelby Drive
White Lake, MI 48386
(248) 698-4470
www.contenders-mi.com

Chris Fox
Custom Greenery Lawn Care, Inc.
28252 Grand River Ave.
Farmington Hills, MI 48336
(248) 471-1776

W. George Jackson
D & G Natures Way, Inc.
P.O. Box 88
South Lyon, MI 48178
(248) 437-3759

David Alexander
D.A. Alexander & Company
12711 Farmington Rd.
Livonia, MI 48150
(734) 427-0030
www.daalexander.com

Matt Nihranz
Fertilizer Plus
31190 Dequindre
Warren, MI 48092
1-877-FERT-PLUS
www.fertplus.com

Brett Marshall
Marshall Landscape
24343 Gibson
Warren, MI 48089
(313) 885-7272
www.marshalllandscape.com

Pete Schultz
Metro Lawn Spray, Inc.
P.O. Box 317
New Baltimore, MI 48047
(586) 463-1010
www.metrolawnspray.com

Marty Blaszkowski
Michigan Greens-Keeper, Inc.
P.O. Box 202
Clarkston, MI 48347
(248) 393-0973
www.michigangreenskeeper.com

Gary Eichen
Mike's Tree Surgeons, Inc.
263 Park Street
Troy, MI 48084
(248) 588-0202
www.mikestree.com

Ruth Pianga
Mr. Green Lawn Care
9200 General Dr.
Plymouth, MI 48170
(800) 25-GRASS
www.mrgreenlawncare.com

Tom Bergschwenger
Natural Approach Lawn & Tree, Inc.
P.O. Box 201032
Ferndale, MI 48220
(248) 761-2677

Tom Morgan
Owen Tree Service
225 N. Lake George Rd.
Attica, MI 48412
(800) 724-6680
www.owentree.com

Paul Peacock
Peacock Landscaping, LLC
4066 Harris Rd.
Burtchville, MI 48059
(810) 327-2684

Dave Stevens
Signature Lawn Care (A Division of Westside Forestry)
48600 Eleven Mile Rd.
Novi, MI 48374
(248) 449-4949
www.westsideforestry.com

Dana Davis
Smith Tree & Landscape Service, Inc.
6270 W. Grand River Ave.
Lansing, MI 48906
(517) 321-3553
www.smithtree.com

Michelle Zatorski
Soulliere Landscaping, Inc.
23919 Little Mack
St. Clair Shores, MI 48080
(586) 776-2811
www.soullieregardens.com

Bill Udell
Total Lawn Care, Inc.
424 W. Houstonia
Royal Oak, MI 48073
(248) 588-1694
www.totallawncareinc.com

For further information about
environmental lawn care visit
www.socwa.org/lawn_and_garden.htm
or <http://www.turf.msu.edu>



LocalMotionGreen

Natural Lawn and Garden Services

A-1 Organic Lawns

Install and service complete landscapes, using only environmentally safe products. No pesticides. Food-grade, mineral fertilizers, deep-root feeding, ponds & waterfalls, more.
(248) 889-7200 chemicalfreelawns.com

A Southern Gardener

Design, install, and maintain landscapes using natural and organic processes.
(313) 881-2223 asoutherngardener.com

***Berns Landscaping Service**

Organic Approach: Programs for lawns, trees, shrubs: organic deep root feeding, organic fertilizing, and core aeration. Pesticides used for weed and insect control.
(586) 756-1145 bernslandscape.com

Bio-Turf

Organic-based fertilizer programs. Services: overseeding, natural dethatching, compost tea, corn gluten, core-aeration, pruning, custom blended fertilizers based on soil tests.
(810) 348-7547 bio-turf.vpweb.com

Custom Gardens Builders

Traditional & edible landscape design. Install and maintain gardens organically. Full outdoor services: lawn care, tree planting and removal.
(248) 910-3351 customgardenbuilders.com

EcoChic Landscape Design

Eco-friendly, sustainable landscape options, such as rain gardens, rain barrels, vegetable, herb, & butterfly gardens, native plants, etc.
(248) 978-2300 ecochiclandscape.com

Eco-Logic Organic Lawn Care

100% Organic Lawn Care: fertilizer, corn gluten, compost, compost tea, nematodes for grub treatment, root feeding, etc.
(313) 886-SAFE (7233) ecologiclawn.com

Eco Services Organic Gardens & Lawns

Lawn: mow, rake, weed, and aerate
Garden: plant & manage beds, organic pest control and fertilization, compost tea, more.
(313) 919-3337

***Lawn World, Inc.** (Organic Program)

Non-phosphorus, organic, granular fertilizers. Non-chemical grub control. Spot treatment of pesticides for weeds and insect pests.
(248) 684-5225 lawnworldinc.com

***Marshall Landscape, Inc.**

Natural Program: All natural, organic fertilizers and pre-emergent weed control. Spot spraying of pesticides for established weeds.
(313) 885-7272 marshalllandscape.com

***Mike's Tree Surgeons, Inc.**

Essential-Turf: organic-based fertilizers, spot spraying of pesticides for weeds.
Organic-Turf: organic fertilizer, no weed control
(248) 588-0202 miketree.com

Natural Organic Landscapes

Design, install, and maintain landscapes using native and ornamental plants. Organic fertilizers. Also pavers, irrigation, and lighting.
(248) 693-0334

Nature and Nurture, LLC

Design, install, and maintain landscapes, using edible, native, ornamental plants. Organic lawn care, with nematodes for grub control.
(734) 368-2610 natureandnurture.org

***Smith Tree & Landscape Service, Inc.**

Organic Lawn Fertilization & Weed Program
(517) 321-3553 smithtree.com

Willow Wood Lawn

BioGreen 100% Organic Lawn Care
(248) 212-7137

*Note: These companies offer organic fertilizer, but still rely on chemical pesticides to treat most weeds and insects.

www.localmotiongreen.org 313.881.2263 contact@localmotiongreen.org 5/12

Exterior Pest Control

We can create a barrier around your home with a clear, odorless product that will keep those creepy, crawling insects such as spiders, earwigs and ants out of your home! Safe for children and pets.

Vegetation Control

Eliminate unwanted growth from driveways, sidewalks, patios and fence lines. Controls poison ivy safely!

Bed Weed Control

Tired of pulling weeds? We can help by preventing various weeds in your flower beds, and return during the summer to keep them out.

Customer Referral Program

Earn a \$20.00 Credit on your services for every customer you refer to us. It's easy, refer us to your friends, family, or associates, and give them the opportunity to work with an environmentally friendly, locally owned company. Give the referral your name or customer number and have them mention it when they contact us. As soon as they sign up for one of our full service programs, we will issue a \$20.00 credit on your account.

Thank you for all of your continued patronage and support.



(586) 427-6577

Macomb County

(313) 885-7272

Wayne County

Visit us at:

www.marshalllandscape.com



- *Lawn Care Programs*
- *Tree & Shrub Care*
- *Exterior Pest Control*



24343 Gibson

Warren, Michigan 48089

(586) 427-6577 Macomb County • (313) 885-7272 Wayne County

About Our Company



Marshall Landscape has been providing superior turf and plant health care to the Grosse Pointe's and surrounding area for over 32 years. We are easily recognized by our distinctive star logo and uniformed employees. Our staff is continually trained to use the safest methods and products to provide you with the healthy and vigorous growing landscape that you desire without doing it yourself. We use phosphorous free, lake-safe fertilizers and offer fully organic turf, tree and shrub programs. We use control products only when and where needed.

Lawn Care Programs

We provide personalized, prompt service using slow release lake safe quality fertilizers and offer weed and pest control according to your needs. We will work with you to create a program to address your concerns, budget, and schedule. Our goal is to give you a great looking lawn while being conscious of the environment around us.

Fertilization Programs - with organic & Lake Safe Fertilizer

Weed/Insect Control - for a pest free lawn

Turf Renovation - when it's time to start over again

Aeration - control thatch and compaction

Slit, Seeding - to fill in & thicken your lawn

Endorsed by LocalMotionGreen and the Michigan Green Industry Association Healthy Lawn Care Program

Tree and Shrub Care



Whether it's a large Elm tree or the smallest of evergreens, our Plant Health Care Programs will keep insects and disease under control and provide you with a safe, healthy, growing landscape. Proper Plant Health Care begins with the identification of your trees and shrubs before any treatments are made. Methods like trunk injections and systemic soil treatments are provided without the unwanted concerns about exposure and drift.

ISA Certified Arborist
Identification /Diagnosis
Organic Fertilization
Insect & Disease treatments
Complete Plant Health Care programs



Visit us at: www.marshalllandscape.com

LAWNCARE TIPS

PEST CONTROL

CULTURAL PRACTICES REDUCE PEST PROBLEMS

Follow the cultural practices of Go Green Lawncare to help reduce pest pressure. Proper mowing height, fertilization, and irrigation will produce a dense, healthy turfgrass that is more resistant to weeds, insects, and diseases and require few if any pesticide applications.



SCOUT THE ENTIRE LAWN

- Make a sketch of your lawn and show infested areas with the percentage of infestation for each area
- Collect weeds, insect and disease samples for identification
- See www.msuturfweeds.net to identify your weed samples
- Evaluate the scope of the problem. Does it require spot treatment, broadcast application or no treatment at all?



IDENTIFY PESTS - CHOOSE TREATMENT

- There are common pests that occur every year in Michigan lawns. Some pests may indicate other problems such as compacted soils, shade, or poor drainage
- For weeds, a small patch may be physically removed or spot treated
- Insect pests such as grubs may be in low numbers and not require any treatment at all
- Some lawn diseases such as red thread may be alleviated with proper fertilization
- Evaluate your cultural practices before looking for a pesticide to correct the problem
- See www.turf.msu.edu and www.pestid.msu.edu for pest identification and treatment options



TREATMENT TIPS

- Once you have identified the pest and determined that a pesticide treatment is necessary, make sure the pesticide you select controls the pest
- Read the label and follow all directions
- Never dispose of pesticides in a the trash, landfill, sewer or on the ground. Contact your County for information regarding local hazardous waste collection sites
- Maintain a NO APPLICATION zone near lakes, rivers, streams and storm drains

REMEMBER: We are a Great Lakes State and your actions impact our water quality!

ON THE WEB - FOR MORE INFORMATION SEE:

www.lawncareu.com
www.miwaterstewardship.org

For FREE Book Go To:
<http://hdl.handle.net/1813/3574>
(click on- Lawn Care Without Pesticides)



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marshalllandscape.com
313.885.7272

FREE

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Green

LAWNCARE TIPS



MOW HIGH - RECYCLE CLIPPINGS

- Mow at least 3" high
- Return clippings to recycle nutrients
- Sweep or blow clippings from walks and driveways onto the lawn
- Taller grass crowds out weeds and promotes deeper roots
- Deeper roots help the lawn survive droughts



FERTILIZE IN FALL FOR BEST RESULTS

- Fall is the best time to fertilize your lawn
- Be patient in the spring - wait until May to fertilize
- Don't fertilize if the ground is frozen or saturated with water
- Don't guess, soil test for proper fertilizer recommendations



CHOOSE LAWN-TYPE FERTILIZERS

- Choose lawn fertilizers with no phosphorus (the middle number) and follow the directions
- It is illegal to apply phosphorus fertilizers to home lawns, unless a soil test indicates phosphorus is required or you are establishing a new lawn (Beginning Jan. 1, 2012).
- Confirm spreader setting before applying



CLEAN UP - AVOID SURFACE WATER

- Maintain a NO APPLICATION zone near lakes, rivers, streams and storm drains
- Never discharge clippings near lakes, rivers, streams or drains
- Sweep fertilizer granules from walks and driveways onto the lawn
- Wash your spreader on the grass



WATER SMART

- Don't soak your lawn and avoid night watering
- Watering should not produce puddles; lighter, more frequent watering is best
- Brown lawns are OK; dormancy is a natural response to drought, however, some water may be necessary during an extended drought of more than a month
- Following Go Green Lawncare Tips will reduce the amount of water your lawn needs

MICHIGAN STATE
UNIVERSITY

Extension

Be Phosphorus Smart!



www.BePhosphorusSmart.msu.edu

For more lawn tips see
www.farmland.com

Michigan State University

LAWNCARE TIPS

PEST CONTROL

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- Maintain a NO APPLICATION zone near lakes, rivers, streams and storm drains

REMEMBER: We are a Great Lakes State and your actions impact our water quality!

ON THE WEB - FOR MORE INFORMATION SEE:

www.lawncareu.com
www.miwaterstewardship.org

For FREE Book Go To:
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(click on- Lawn Care Without Pesticides)



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LAWNCARE TIPS



MOW HIGH - RECYCLE CLIPPINGS

- Mow at least 3" high
- Return clippings to recycle nutrients
- Sweep or blow clippings from walks and driveways onto the lawn
- Taller grass crowds out weeds and promotes deeper roots
- Deeper roots help the lawn survive droughts



FERTILIZE IN FALL FOR BEST RESULTS

- Fall is the best time to fertilize your lawn
- Be patient in the spring - wait until May to fertilize
- Don't fertilize if the ground is frozen or saturated with water
- Don't guess, soil test for proper fertilizer recommendations



CHOOSE LAWN-TYPE FERTILIZERS

- Choose lawn fertilizers with no phosphorus (the middle number) and follow the directions
- It is illegal to apply phosphorus fertilizers to home lawns, unless a soil test indicates phosphorus is required or you are establishing a new lawn (Beginning Jan. 1, 2012).
- Confirm spreader setting before applying



CLEAN UP - AVOID SURFACE WATER

- Maintain a NO APPLICATION zone near lakes, rivers, streams and storm drains
- Never discharge clippings near lakes, rivers, streams or drains
- Sweep fertilizer granules from walks and driveways onto the lawn
- Wash your spreader on the grass



WATER SMART

- Don't soak your lawn and avoid night watering
- Watering should not produce puddles; lighter, more frequent watering is best
- Brown lawns are OK; dormancy is a natural response to drought, however, some water may be necessary during an extended drought of more than a month
- Following Go Green Lawncare Tips will reduce the amount of water your lawn needs

MICHIGAN STATE
UNIVERSITY

Extension

Be Phosphorus Smart!



www.BePhosphorusSmart.msu.edu

For more lawn tips see
www.farmland.com

Michigan State University

Chapter XX Surface Water Drainage City of Grosse Pointe Shores Code of Ordinances

Section 1 - Surface Water Drainage Regulations; Administration

(a) Surface water drainage matters in Grosse Pointe Shores and shall be administered by the City, Wayne County Health Department (herein referred to as WCHD), and the Michigan Department of Environmental Quality (herein referred to as MDEQ). The City Engineer and/or its Engineering Consultant review and comment on said drainage plans.

(b) This Chapter applies to all residential and commercial areas in the City of Grosse Pointe Shores.

Sec. 2 Illicit Discharge Control

(1) Purpose. The purpose of this Chapter is to provide for the health, safety, and general welfare of the citizens of the City of Grosse Pointe Shores and protect all waterbodies within the City and the Great Lakes through the regulation of illicit discharges to the municipal separate storm sewer system as required by federal and state law. This Chapter establishes methods of controlling the discharge of pollutants into the Municipal separate storm sewer system owned or operated by the City of Grosse Pointe Shores in order to comply with the requirements of the Clean Water Act and State of Michigan National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) Permit program. The objectives of this Chapter are: (a) to regulate the contribution of pollutants to the municipal separate storm sewer system associated with discharges from any user of the municipal separate storm sewer system. (b) To prohibit illicit connections and discharges to the municipal separate storm sewer system. (c) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this Chapter.

(2) Definitions. For the purpose of this Chapter, the following definitions are applicable: **(a) Authorized agency** means employees or designees of the director or directors of the municipal agency or agencies of the City of Grosse Pointe Shores designated to administer or enforce this Chapter.

(b) Illicit connection means any drain or conveyance, whether on the surface or subsurface, which allows the discharge of sanitary waste to the municipal separate storm sewer system and any connections to the municipal separate storm sewer system from indoor drains and sinks.

(c) Illicit discharge means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by an NPDES permit or other discharges authorized by the City and MDEQ.

(d) Municipal separate storm sewer or MS4 means a conveyance or systems of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains which meets the following criteria:

(1) Owned or operated by the City of Grosse Pointe Shores.

(2) Designed or used for collecting or conveying storm water.

(3) Which is not a combined sewer conveying both sanitary wastewater and storm water.

(4) Which is not part of publicly owned wastewater treatment works that provides secondary or more stringent treatment.

(e) Non-storm water discharge means any discharge to the municipal separate storm sewer system that is not composed entirely of storm water.

(f) Storm Water means surface runoff and drainage of rainfall and snow or ice melt.

(g) Waters of the State means those portions of Lake St. Clair and the Great Lakes within the boundaries of Michigan, all lakes, bays, rivers, streams, springs, ponds, well, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person.

Sec. 3 Applicability.

This Chapter shall apply to all discharges to the MS4 and to all activities that can reasonably be expected to result in a discharge to the MS4.

Sec. 4 Responsibility for Administration.

The City of Grosse Pointe Shores shall administer, implement, and enforce the provisions of this Chapter. Any powers granted or duties imposed by this Chapter upon the authorized agency may be delegated by the City to persons or entities acting in the beneficial interest of or in the employ of the Town.

Sec. 5 Ultimate Responsibility.

The standards set forth herein and promulgated to this Chapter are minimum standards;

Therefore, this Chapter does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution nor unauthorized discharges.

Sec. 6 Discharge Prohibitions.

(1) Prohibition of Illicit Discharges.

No person shall discharge or cause to be discharged into the MS4 or waters of the State of 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 storm water. The commencement, conduct or continuance of any illicit discharge to the MS4 is prohibited. The following categories are prohibited non-stormwater discharges if identified as significant contributors of pollutants to the City's MS4:

- 1) Water line flushing and discharges from potable water sources
- 2) Landscape irrigation runoff, lawn watering runoff, and irrigation waters
- 3) Diverted stream flows and flows from riparian habitats and wetlands
- 4) Rising groundwaters and springs
- 5) Uncontaminated groundwater infiltration and seepage
- 6) Uncontaminated pumped groundwater, except for groundwater cleanups specifically authorized by NPDES permits
- 7) Foundation drains, water from crawl space pumps, footing drains, and basement sump pumps
- 8) Air conditioning condensation
- 9) Waters from noncommercial car washing
- 10) Street wash water
- 11) Dechlorinated swimming pool water from single, two, or three family residences.

(2) Prohibition of Illicit Connections.

(a) The construction, use maintenance or continued existence of illicit connections to the MS4 is prohibited.

(b) 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.

(c) A person is considered to be in violation of Chapter if the person connects a line conveying sanitary waste in the MS4 or allows such a connection to continue.

(d) If, subsequent to eliminating a connection found to be in violation of this Article, the responsible person can demonstrate that an illegal discharge will no longer occur, said person may request City approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense.

Sec. 7 Waste Disposal Prohibitions.

No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, component of the storm drain system, or waters of the State, any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

Sec. 8 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 reasonably 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. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in order to protect against erosion and degradation of the watercourse originating or contributed from their property.

Sec. 9 Discharges in Violation of Industrial or Construction Activity NPDES Storm Water Discharge Permit.

Any person subject to an industrial or construction activity NPDES storm water 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 Public Works Director prior to or as a condition of a subdivision map, site plan, building permit, or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause.

Sec. 10 Monitoring of Discharges.

Access to Facilities.

The authorized agency shall be permitted to enter and inspect facilities subject to regulation under this Chapter as often as may be necessary to determine compliance with this Chapter. 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 agency. During any inspection as provided herein, the authorized agency may take any samples and perform any testing deemed necessary to aid in the pursuit of the inquiry or to record site activities.

Sec. 11 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 illicit discharges or pollutants discharging into storm water, the MS4, or water of the state, 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 authorized agency 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 authorized agency within three business days of the phone notice.

Sec. 12 Notice of Violation.

Whenever the City finds that a person has violated a prohibition or failed to meet a requirement of this Article, the City 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 storm water 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.

Sec. 13 Requirement to Remediate.

Whenever the City finds that a discharge of pollutants or illicit connection is taking place or has occurred which will result in or has resulted in pollution of storm water, the storm drain system, or water of the U.S., the City may require by written notice to the owner of the property and/or the responsible person that the pollution be remediated and the affected property restored within 120 days of notification.

Sec. 14 Appeal.

Notwithstanding the provisions of Section 15 below, any person receiving a Notice of Violation under Section 12 above may appeal the determination of the City Manager. The notice of appeal must be received by the City Manager within 5 days from the date of the Notice of Violation. Hearing on the appeal before the City Manager or his/her designee shall take place within 15 days from the date of City's receipt of the notice of appeal. The decision of the City Manager or designee shall be final.

Sec. 15 Enforcement, Penalties and Remedies.

(a) **Violations.** It shall be unlawful for any person to violate any provision of this Chapter. Each and every day during which the violation continues shall constitute a separate offense. The City may institute appropriate action of proceedings to enjoin violations of this Chapter.

(b) **Penalties.** Any person who fails to comply with the provisions of this Chapter shall be subject to fines and penalties as prescribed by the City Manager.

Sec. 16 Effective Date.

This ordinance shall take effect the day after passage and posting or publication pursuant to law. **[DATE]**

**Village of Grosse Point Shores Illicit Discharge
Elimination Plan
Outfall Verification Checklist**

Outfall I.D. #: _____

Date: _____ Time: _____ Lat: _____
Crew: _____ Long: _____

1. Site Location:

Land Use: _____

Crossroads: _____

2. Outfall:

% Blockage

- ☐ 100%
- ☐ 75%
- ☐ 50%
- ☐ 25%
- ☐ Clean

Picture #: _____

Condition: _____

Culvert Size: _____

Culvert Type: CMP RCP PVC

Other: _____

- ☐ No Dry Weather Flow Observed
- ☐ Dry Weather Flow Observed, See Outfall Inspection Form

Comments: _____

Village of Grosse Pointe Shores IDEP Outfall Inspection Form

Date: _____

Outfall ID: _____

Time: _____

Crew: _____

Last Date of Rainfall: _____

Roll/Photo #: _____

Photo Description: _____

Field Measurements: pH: _____ Temperature _____ °F TDS _____ ppm Dissolved Oxygen _____

Lab Analysis: Lab Name _____ Fluoride _____ mg/L Chloride _____ mg/L Nitrite as N _____ mg/L

Nitrate as N _____ mg/L Sulfate _____ mg/L E. Coli: _____ fcu per 100 ml

****ND = Not Detected****

Water Color: *brown:* light medium dark
clear *milky/white* green grey black other: _____

Water Turbidity: *clear* slightly moderately highly

Dry Weather Flow: yes no

Estimated Flow Rate: none slow moderate fast

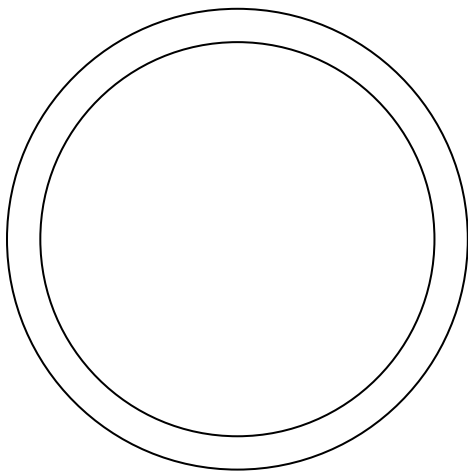
Odor: none/natural musty sewage rotten egg gas oil other: _____

Floatables: none sewage trash green scum oil sheen other: _____

Deposits/Stains: none sediment oily other: _____

Visible Debris: none natural (leaves, limbs, weeds) foam oil film trash sewage

Comments: _____



Size: _____ inches

Material: PVC RCP CMP Other

Depth of Flow: _____ inches



Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

Effective August 31, 2001, the [Part 5 Spillage of Oil and Polluting Materials administrative rules](#) promulgated pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) MCL 324.3101 *et seq.* were revised. The previous rules were rescinded and new rules (R324.2001 through R324.2009) promulgated to address release prevention planning, secondary containment, surveillance, and release reporting requirements. When a rule is referenced in this document, it will list Rule and a number that corresponds with the above citations. For example, Rule 1 is R324.2001. Oversight of these rules was transferred to the Water Division when the Michigan Department of Environmental Quality (DEQ) was reorganized in 2002. This updated informational packet addresses the requirements overseen by the Water Division (WD), clarifications of interpretations regarding oils managed under federal SPCC regulations and submittal of notices and certifications, along with discussion about potential relationships with some other regulations.

- I. Summary of revised rules primary changes
- II. Acronyms used in publication
- III. What facilities are subject to the Part 5 Rules?
- IV. Answers to commonly asked questions
- V. PIPP completeness review checklist
- VI. Additional information to use when preparing a PIPP and completing the checklist
- VII. Websites used in publication

I: SUMMARY OF REVISED RULES PRIMARY CHANGES

1. The Critical Materials Register is no longer referenced in the Part 5 polluting material definition. Polluting materials are salt, oil, any chemical included in Rule 9, and any compound or product that contains 1% or more, by weight, of these materials [based on the material safety data sheet (MSDS) formulation information].
2. The new rules clarify the definition of oils and expand the definition of salt. Salt includes sodium chloride, potassium chloride, calcium chloride, magnesium chloride, and solutions or mixtures of these compounds in either solid or liquid form.
3. The new rules identify threshold management quantities (TMQs) for both indoor and outdoor use, storage, and other management areas. Exceeding these TMQs and meeting facility definitions will determine if a PIPP has to be prepared, if containment is required, and if other Part 5 rules must be met. Previous rules did not have minimum volumes identified.
4. The new rules include descriptive conditions and threshold reporting quantities (TRQs) for polluting materials which if exceeded, or occur, requires spills or releases to be reported. What is considered as a release under these rules is also clarified. Previous rules did not identify minimum reportable quantities.
5. The new rules include facility exemptions from certain requirements if they meet specified conditions or are subject to other identified regulations. Previous rules did not have exemptions listed.

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

6. The new rules require the PIPP to be kept at the facility and available for inspection. Within 30 days of completing the plan, the facility must notify that it is in full compliance with the Part 5 Rules to the WD district office that oversees the area where the facility is located. In addition, the facility must notify the [Local Emergency Planning Committee \(LEPC\)](#) and [local health department](#) that the plan has been completed and available upon request. The facility must submit a copy to a requesting agency within 30 days of receiving a request.
7. The new rules require the plans to be evaluated every three years or after any release that requires implementation of the plan. The plan must be updated whenever there are changes to personnel, processes, or procedures identified in the plan. The facility must re-notify the DEQ and locals and recertify compliance when the plans are updated.
8. The new rules clarify the definition of on-land and oil storage facilities and include exemptions for some types of facilities.
9. The new rules provide clarification about secondary containment requirements. Required holding capacity is now consistent with the hazardous waste regulations, e.g., not less of the total volume of the tanks or containers within the secondary containment structure or provide a capacity of 100% of the largest single tank or container within the secondary containment structure, whichever is larger.

II: ACRONYMS USED IN PUBLICATION

AWR	Annual Wastewater Report	MCL	Michigan Compiled Laws
CAA	Clean Air Act	MIOSHA	Michigan Occupation Safety and Health Act
CAS	Chemical Abstracts Service Number	MSDS	Material Safety Data Sheet
CERCLA	Comprehensive Environmental Response, Compensation and Recovery Act	PE	Professional Engineer
CIS	Michigan Department of Consumer and Industry Services	PEAS	Pollution Emergency Alerting System
DEQ	Michigan Department of Environmental Quality	PIPP	Pollution Incident Prevention Plan
EPA	US Environmental Protection Agency	SPCC	Spill Prevention, Control, and Countermeasure
ICP	Integrated Contingency Plan	TMQ	Threshold Management Quantity
HAZWOPER	Hazardous Waste Operations and Emergency Response	TRI	Toxic Chemical Release Inventory
LEPC	Local Emergency Planning Committee	TRQ	Threshold Reportable Quantity
LQG	Large Quantity Generator	UST	Underground storage tank
		WHMD	Waste and Hazardous Materials Division
		WD	Water Division

III: WHAT FACILITIES ARE SUBJECT TO THE PART 5 RULES?

Review the administrative rules and ask the following questions when determining if the Part 5 requirements for a PIPP, containment, surveillance, and release reporting apply.

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

1. Does the facility meet the definition of an oil storage or on-land facility per Rule 1(f) or (g)?

An oil storage or on-land facility excludes recreational marinas, installations of oil containing electrical equipment, oil storage facilities, oil field petroleum or oil field brine storage facility, and transportation related facilities as defined in 40 CFR Part 112.

- A. Recreational marinas are places where private pleasure boats are located. A commercial marina includes places where commercial boats and ships (commercial charter and fishing boats, freighters, cruise ships, ferries, etc) are located.
- B. The electrical equipment must be in active use to be exempted from the Part 5 rules. The volume of oil in electrical equipment in storage (non-energized electrical equipment) must be counted if it does not meet the small container exemptions in Rule 3(1). Examples of equipment include electrical transformers, capacitors, reclosures, voltage regulators, rectifiers, etc.
- C. Transportation related facilities includes some onshore and offshore facilities and equipment used for handling or transferring oil in bulk from vessels, pipelines, highway vehicles and railroad cars used for interstate and intrastate commerce. Call 312-353-8200 to discuss this transportation related determination with EPA Region V. See the [WD operational guidance](#) regarding railroad and truck unloading areas.

2. Does the facility have polluting materials that meet the small container exemption or are regulated by another program listed in Rule 3?

When looking at the conditional exemptions under Rule 3, keep in mind that a facility may have some polluting materials exempted, and still have other polluting materials in amounts that are subject to the Part 5 rules.

- A. Polluting materials in small containers that:
 - ✓ do not individually exceed 10 gallons, or 100 pounds, AND
 - ✓ are managed indoors, AND
 - ✓ the facility has adequate safeguards to prevent releases.

This would apply to retail stores and facilities that use products in small amounts, or in small containers, and meet all of the rule conditions. This exemption would include small lead acid batteries containing sulfuric acid, and smaller capacitors, ballasts, or other items containing small amounts of oils under storage conditions. Batteries used for fork lifts or hi-lows usually do not meet this exemption because they exceed this size and are often used outdoors.

- B. The conditional exemption in Rule 3(1)(b) is no longer applicable to oils because US EPA revised 40 CFR 112 in 2002 and the Part 5 rules adopt the 1997 Spill Prevention, Control and Countermeasure (SPCC) regulations (40 CFR Part 112) version. See discussion under point 3.B. regarding oil TMQs.
- C. [Flammable and combustible liquids](#) under the Michigan Fire Protection Code regulations overseen by the DEQ Waste and Hazardous Materials Division (WHMD). This would include liquids with flashpoints below 200 degrees Fahrenheit stored in certain aboveground storage tanks and containers and underground storage tanks. See the regulations regarding if the flammable and combustible materials on-site fall under these regulations. If the tank or container is exempted under these regulations, for example process tanks, then it will be necessary to determine if the liquid is a polluting material and the facility meets or exceeds TMQs. Direct questions about storage tank regulations to the WHMD District Office.

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

- D. [Petroleum and hazardous substances](#) under the underground storage tank regulations overseen by the DEQ WHMD. Regulated substances in UST include substances listed in Section 112 of Part A of Title I of the Clean Air Act (CAA), hazardous substances listed in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and petroleum based substances that meet specific conditions and include motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, and petroleum solvents. This would also include delivery pipelines in subdivisions from a large UST that supplies those homes. See the storage tank regulations for more specific definitions and the federal [List of Lists](#) which includes the CERCLA and CAA substances. If the tank or container is exempted under these regulations, for example process tanks, then it is necessary to determine if the liquid is a polluting material that exceeds TMQs. Direct questions about storage tank regulations to the WHMD District Office.
- E. [Hazardous waste](#) managed under regulations overseen by the DEQ WHMD. This would include both federal and Michigan listed and characteristic hazardous wastes managed by generators, transporters, and treatment, storage and disposal facilities. Contact the WHMD District Office regarding questions about hazardous waste regulations.
- F. Polluting materials at [oil and natural gas](#) exploration sites overseen by the DEQ Geological and Land Management Division (GLMD) regulations. This would include materials at well sites that are regulated under Part 615, Supervisor of Wells, of Act 451. Brine and petroleum at oil and gas sites are excluded under the Part 5 facility definition.
- G. Note that [liquid industrial wastes](#) are not specifically exempted in Rule 3, so it will be necessary to determine if the waste is subject to the Part 5 rules. It will depend if the concentration of the waste exceeds 1% of polluting materials and the volume exceeds the TMQ. If the products originally used contained 1% or more of a polluting material, it would be necessary to calculate if the polluting materials concentration in the waste would exceed 1%.
3. Does the facility have polluting materials in regulated TMQs per Rule 2(f)? See Rule (2)(a) for what is, or isn't, a polluting material. Polluting materials include oils, salt, and chemicals listed in Rule 9 and mixtures containing more than 1% of these materials. Rule 2(a)(v) exempts manufactured items from polluting materials and these would not be included in calculating the TMQ. Manufactured item is defined in Rule 1(d). Some common manufactured items that would be excluded would include rolls of steel, formed metal products, and scrap metal.

A good place to start identifying all the polluting materials on-site is by looking at the material safety data sheets (MSDS) the facility must have to meet the MIOSHA regulations. Use the MSDS information to identify if there are polluting materials on-site and to compile the inventory that must be listed in the PIPP (see page 20). Walk through the facility to locate where the materials are stored and used and determine if the storage and use conditions listed on the MSDS are being followed.

A. Salt:

- ✓ [Any location](#) that has 1000 gallons or more of salt in liquid form.
- ✓ [Any location](#) that has 5 tons or more of salt in solid form. This would include salt and sand mixtures that contain 1% or more of salt.

It would be necessary to include salt located anywhere on the contiguous property except for:

- Small containers that meet the exemption in Rule 3(1)(a), or
- Brine storage facilities exempted in Rule 1(f) and (g) because they are part of an oil field petroleum facility.

For more salt storage information, request a copy of the *"Salt and Brine Storage Manual"* by calling the Environmental Assistance Center at 800-662-9278. Note: this document is under revision and will be available on the Internet when completed.

Salt includes:

- Sodium chloride
- Potassium chloride
- Calcium chloride
- Magnesium chloride
- Solutions or mixtures of these compounds

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

B. Oil or fuel storage areas with ABOVEGROUND HOLDING CAPACITY of the following amounts:

- ✓ 660 gallons or larger holding capacity in any single tank or container, or
- ✓ 1,320 gallons or larger total capacity of all oil tanks, drums, and other containers anywhere on-site.

1) Some examples of capacity volumes and materials that need to be included when calculating the TMQ for Part 5 rules:

- a. Capacity of all containers of oil that do not meet the small container exemption would be included when calculating the Part 5 rule TMQ.
- b. Products and liquid industrial waste containing 1% or more regulated oils would be included. Examples of these types of oils that need to be evaluated include facilities with oil water separators and restaurants with grease trap or interceptor vessels with capacity of 660 gallons or more in size, or have capacity to have 1320 gallons or more of all oils on site, and printers with soy based inks containing 1% or more soybean oil. Oils that are below the Part 5 or SPCC oil TMQs and contain 1% or more of other polluting materials, for example zinc, would need to be included in the discrete area TMQ calculations discussed below.
- c. Storage tanks located in a vault would be considered an aboveground tank if it does not come into contact with soil and would need to be counted if meet the TMQ. This is consistent with EPA's position with SPCC.

2) Some examples of oil capacity volumes and materials not included when calculating the TMQ for Part 5 rules:

- a. Molten or liquid asphalt is not considered oil under the Part 5 rules. The federal SPCC regulation does include asphaltic cement (commonly called tar).
- b. Oils that meet the conditional exemptions listed in Rule 3
- c. Oil containing mobile hydraulic devices because it is transportation related.
- d. Installations of oil containing electrical equipment, because the oil is excluded in the definitions in Rule 1(f) and (g), but those oils may be included under SPCC regulations. The volume of oil in electrical equipment in storage (non-energized electrical equipment) must be counted towards Part 5 TMQ if it does not meet the small container exemption in Rule 3(1). Examples of equipment include electrical transformers, capacitors, reclosures, voltage regulators, rectifiers, etc.

Oil in any form or kind includes:

- Animal fats
- Fuel oil
- Gasoline
- Oil mixed with waste
- Oil refuse
- Oily sludges
- Petroleum
- Synthetic oils
- Used oil
- Vegetable oils

NOTE: Due to the language in the definitions of facility in Rule 1 and the changes in federal SPCC requirements, it has been determined that the exemption in Rule 3(1)(b) for oil is no longer applicable. It has been determined that oil storage facilities that meet, or are above, oil TMQ would only be subject to surveillance requirements in Rule 4, use and indoor storage requirements in Rule 5(3), and release reporting as required by Rules 2 and 7. Releases that must be reported under Part 5 rules are different from the federal release reporting requirements. Oil storage facilities are not subject to the requirements for a PIPP in Rule 6 and secondary containment in Rule 5(1) and (2). However, a facility may be required to prepare and implement a SPCC plan, have secondary containment, and meet additional requirements under the federal [SPCC regulations](#) overseen by EPA if a site has 1320 gallons or more storage capacity of all oils on-site and a release could reach navigable waters. It is not necessary to include containers less than 55 gallons when calculating federal TMQ. Per EPA, most Michigan sites would meet the condition regarding releases having the potential of reaching navigable waters. This would include facilities that discharge oil into groundwater or have storm water run-off which may flow into navigable waters. Oils may also be subject to the tank and flammable and combustible liquid regulations as noted previously.

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

C. Materials listed in Rule 9 at in on-land facility's discrete storage or use areas if in the following amounts:

- ✓ 2200 pounds (1000 kilograms) or more in indoor locations
- ✓ 440 pounds (200 kilograms) or more at outdoor locations

Facilities may have separate locations, which would be considered discrete areas, where polluting materials listed in Rule 9 are used or stored in amounts over the TMQ. For example, there could be distinct points on a long process line where polluting materials are used, or there could be both outdoor and indoor storage areas. See Rule 1(c) for the definition of “indoors.” A totally enclosed storage shed would be considered “indoors.” A storage tank located in a vault would be considered an aboveground tank if it does not come into contact with soil. A company should not artificially designate an area as a discrete location to avoid the regulations. When determining if an area is “discrete,” consider if a release from that area would impact a different discrete area. If the answer is yes there would be an impact, then they are not two separate discrete areas.

To find the list of [polluting materials](http://www.michigan.gov/deq/), go to www.michigan.gov/deq/ and click on “Assistance & Support Services,” “Environmental Reporting,” then “Emergency Planning” and select PIPP. Under the Part 5 Rule link, there are two lists of the Rule 9 polluting materials. One is arranged alphabetically, the other is arranged numerically by CAS number. It is recommended to first look for chemicals by the chemical abstracts service (CAS) number since a chemical could have several different synonyms and a particular name may not be included on the list even though the CAS number is listed under a synonym. Also check Rule 9 by the material name since there are polluting materials that do not have a CAS number listed.

When reviewing the materials listed in Rule 9:

- Note the pounds listed in the table are threshold reporting quantities (TRQs) and are NOT used for calculating TMQs. The listed weight is to be used to determine if a release must be reported.
 - It is recommended to first look for chemicals by the chemical abstracts service (CAS) number since a chemical could have several different synonyms and a particular name may not be included on the list even though the CAS number is listed under a synonym.
 - Also check Rule 9 by the material name since there are polluting materials that do not have a CAS number listed.
 - Add the amount of ALL the non exempt polluting materials located in a discrete area, and if applicable, include the weights of polluting materials that are in mixtures as noted in point D below. It is not necessary to include the smaller containers (less than 10 gallons or less than 100 pounds), or other exempted materials in Rule 3 IF all the conditional exemptions are met.
- D. Any compound or product that contains 1% or more by weight, of any of the above listed materials (oils, salts, and chemicals listed in Rule 9) based on material safety data sheet (MSDS) information.

Many facilities have products which are mixtures of different chemicals, oils, or salts. Use the MSDS to identify what polluting materials are in the products/materials on-site that have 1% or more by weight of the listed polluting materials in the formulation. When calculating TMQs, include the total weight of a container's contents if the mixture exceeds 1% or more by weight of polluting materials. If the MSDS lists the information as proprietary, contact the manufacturer and/or supplier to see if they would provide a determination if their product contains listed chemicals and if so, the weight per container so you can calculate the amount you have on-site. In some situations, you may want to contact the supplier to see if it is possible to revise the product formulation to eliminate or reduce the amount of the polluting material. Liquid industrial wastes containing more than 1% of polluting materials would also need to be included when calculating TMQs.

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4. Is there potential for substantial harm to the waters of the state if there's a release? If so, the DEQ may require the facility to comply with the Part 5 rules per Rule 3(2) if it determines there isn't adequate environmental protection at the site. This may apply if the facility has less than the applicable TMQ of polluting materials, or meets one of the conditional exemptions, or the facility does not meet the definition of on-land facility or oil storage facility.

IV: ANSWERS TO COMMONLY ASKED QUESTIONS ABOUT PART 5 RULES

1. When do we have to meet these new Part 5 rule requirements?

A facility has a "grace period" until August 31, 2003 to be in compliance with the secondary containment for storing liquids outdoors and PIPP requirements even if it was subject under the rescinded rules. Requirements for all use and indoor storage areas, storage areas for solid polluting materials, surveillance, and release reporting were effective since August 31, 2001. All facilities subject to the Part 5 rules must be in compliance with all applicable requirements by August 31, 2003. New facilities or renovations after August 31, 2003 need to be in compliance with the Part 5 rules by the time they begin operations.

2. **Can PIPPs be combined with other emergency plans?**

Yes, Rule 6(3) allows development of an Integrated Contingency Plan (ICP), but it must contain ALL the information required by the different planning regulations and it is allowable under the other regulations. It is not mandatory to combine the different plans, but is recommended so a facility has a single point of reference if there is an emergency. See the [ICP plan guidance](#) for combining state and federal planning requirements.

Common environmental plans a facility often combines with a PIPP include:

- Federal SPCC plan if the facility has met federal oil storage conditions discussed previously. If the facility has oil, see note above under Section II, point B. If the facility has both oils and other polluting materials, the ICP can combine the SPCC plan for the oils and the PIPP information which addresses the other polluting materials if those TMQs have been met or exceeded. Go to [EPA's SPCC website](#) or contact [EPA Region 5, Oil Planning and Response Section](#) at 312-353-8200 about SPCC requirements.
- Hazardous waste contingency plan if the facility is a large quantity generator (LQG) of hazardous waste. An LQG must prepare a written contingency plan which can be combined with a PIPP. This combined plan is NOT submitted to the DEQ unless requested, but it must be submitted to other entities as required under the hazardous waste regulations. See the WHMD guidance for ["Contingency Plan and Emergency Procedures for Fully Regulated Generators."](#) Small quantity generators of hazardous waste do not have to prepare a written plan, but are required to post emergency information and have arrangements made with emergency responders. A self adhesive [emergency poster](#) and summary of those requirements is available by calling 800-662-9278 or from a WHMD district office.
- **Storm water pollution prevention plan (SWPPP) if the facility is subject to the storm water discharge regulations.** A sample [storm water pollution prevention plan](#) for industrial facilities is available from the [Water Division district office](#). Also see EPA's storm water publication ["Spill Prevention Planning Fact Sheet"](#) for information.

Look at existing response plans the facility may already have. Even if it is determined the facility is not subject to the Part 5 rules or other environmental planning regulations, it probably still has to have some type of emergency response or action plan under [MIOSHA regulations](#) overseen by the Michigan Department of Consumer and Industry Services (CIS). Information contained in a PIPP and other plans is not only useful to the facility, but information could be used by LEPCs developing community response plans under SARA Title III regulations and by local fire departments meeting their emergency planning requirements. See the Michigan State Police publication ["Critical Incident Protocol — A Public and Private Partnership"](#) for community and facility joint planning information.

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3. Is there a specific format required when preparing a PIPP or ICP, or a template or sample plan available?

DEQ has not prepared a sample PIPP, but there is a checklist available beginning on page 10. If you are combining a PIPP with other state and federal plans, there is cross reference template available in the [ICP guidance](#). You may want to review that guidance even if you are only preparing a PIPP because it provides emergency planning elements to consider. Sample PIPPs are not provided because a PIPP should be specific to the company's processes, materials, facility layout, and capabilities. The Part 5 rules are intended to help a facility prevent releases from occurring, and if an emergency occurs the facility should have the information in the PIPP to respond quickly and thoroughly. An effective plan should reduce cleanup costs if there is a release and the plan is properly developed and implemented.

4. Are we required to hire a professional engineer to prepare a PIPP?

No. The owner or operator is required to ensure a PIPP has been prepared, maintained, and the facility operated in accordance to it. A PIPP may be written by the owner, operator, manager, other employees capable of doing it, or the facility may hire an environmental consultant, engineer, or other personnel. A Professional Engineer (PE) does NOT need to certify a PIPP. However, if a PIPP is combined with a SPCC plan, federal regulations requires a Professional Engineer to certify that the SPCC plan has been prepared in accordance with good engineering practices.

When deciding who will prepare the plan, ask *“Who in-house knows enough about the facility and planning to prepare a PIPP and can they help meet the other Part 5 rule requirements, or do we need outside help?”* Whether the PIPP is developed in-house or by outside resources, review the draft PIPP and ask *“Can our employees understand it?”* and *“Is this what we will REALLY do?”* If the answer is no, then redo the PIPP. Keep the PIPP as simple as possible, yet include all the necessary information.

5. Do past pollution incidents have to be included in the PIPP?

No, but it is good to evaluate past and potential incidents at your business or at similar facilities. Consider the loading and unloading procedures, normal operating processes, monitoring and inspection practices, available spill response equipment and supplies, existing secondary containment structures, and other means to keep releases from reaching surface waters and groundwater and wastewater treatment plants. Consult all employees and develop a list of possible pollution incidents that you should consider when developing the PIPP. Discuss with plant safety personnel how techniques used in accident prevention programs may be useful in identifying potential environmental problems. Develop spill control measures to prevent recurrence of past incidents and which address the most probable types of pollution incidents that could now possibly occur.

6. Are there other Part 5 rule requirements besides preparing a PIPP?

Yes, if you're subject to preparing a PIPP, you are also subject to meeting the other applicable Part 5 rules including containment, surveillance, and release reporting.

7. Are there specific employee training requirements?

Not under the Part 5 rules, but other regulations contain training requirements include the hazardous waste regulations and the CIS Hazardous Waste Operations and Emergency Response (HAZWOPER) standard and federal SPCC regulations. It is recommended the company train employees what their role is under the PIPP and conduct practice drills. Drills can help determine if the plan works as anticipated and to reinforce training. As another reinforcement to training, the facility may want to post a summary of the plan at appropriate places in the facility (e.g. cafeteria, areas with high spill potential, meeting rooms) that lists the designated coordinators and how to contact them, location of spill response kits, evacuation routes, and phone numbers of regulatory agencies that need to be contacted in the event of a reportable spill. Small quantity generators of hazardous waste are required to post emergency information by telephones.

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8. When calculating TMQs and TRQs, are the polluting materials counted the same?

No. When determining TMQs listed in Rule 2(f), count the total pounds of all the pure products and mixtures containing 1% or more of an individual polluting material that is not exempted by a definition in Rule 1 or as a conditional exemption in Rule 3. For oils and salts, it would be the total amount on the contiguous site. For the other polluting materials listed in Rule 9, it would be the total amount of all the containers in the discrete area.

Rules 2 and 9 identify the TRQ in pounds for a particular polluting material. It is not the amount of a release of a mixture containing polluting materials. It is necessary to calculate the TRQs for mixtures containing 1% or more polluting materials in the product or liquid industrial waste (see page 6). Mixtures that contain less than 1% of individual polluting materials, but if added together would be more than 1%, would NOT be included in calculations. For example, a mixture containing ¾% acetone and ¾% benzene for a total of 1.5% would NOT be included.

9. Are secondary containment requirements in the Part 5 rules the same as other regulations?

Not necessarily. A facility needs to determine which regulations apply to the materials on-site. If there are materials that are regulated under more than one regulation, then meet the stricter requirements. If you are unsure of the requirements or interpret a conflict between the regulations, discuss those issues with the regulating agencies.

10. What is considered “adequate surveillance” and a “timely manner” as referenced in Rule 4?

A “timely manner” is intended to mean before a release could reach the waters of the state, be it surface water or groundwater. “Adequate surveillance” would need to be some type of inspection schedule or other means to detect releases before they can reach the waters of the state. If the company is only open Monday through Friday, it does not mean there has to be inspections on weekends, but if a release occurred during that time, then the facility may not meet the time limitations identified in Rule 2 (b) which would relieve them from release reporting requirements contained in Rule 7.

11. What other resources are available to help prepare emergency plans?

Links to numerous resources are listed throughout this publication. Additional planning information is available from the [State Police, Emergency Management Division](#) or call 517-333-5042 for various resources including the “[Site Emergency Planning Workbook](#).” It provides guidance on how to build a site emergency team, conduct a hazard analysis, perform a capability assessment, how to implement a plan, and more. Also see the federal MIOSHA guidance document on “[How to Plan for Workplace Emergencies and Evacuations](#).” The [Office of Regulatory Reform](#) has links to Michigan rules referenced in this packet. The [DEQ Emergency Planning website](#) and [Water Division website](#) may also provide additional resources.

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V: POLLUTION INCIDENT PREVENTION PLAN COMPLETENESS REVIEW CHECKLIST

This checklist is provided to help identify that the minimum requirements included in administrative rule R 324.2006 are addressed in the PIPP along with a few recommended items to include. See the next section which corresponds to these rules for more information and review the Part 5 rules when developing or updating a plan. Include components that are specific to the facility's pollution prevention methods and emergency response. It is not required to provide the information in the order presented. This checklist does not include all requirements if preparing an ICP.

SPECIFIC INFORMATION OUTLINE

Rule 6(1)(a) I: Facility identification information

IN THE PLAN?

- | Yes | No | N/A | Identify the following information about the facility: |
|--------------------------|--------------------------|--------------------------|---|
| ☐ | ☐ | | 1. Facility name |
| ☐ | ☐ | | 2. Facility owner |
| ☐ | ☐ | | 3. Mailing address |
| ☐ | ☐ | | 4. Street address (if different from mailing address) |
| ☐ | ☐ | | 5. Facility telephone number |
| ☐ | ☐ | | 6. 24-Hour emergency telephone number(s) |
| ☐ | ☐ | | 7. Designated spill prevention and control coordinator. It is recommended to also have an alternate contact. |
| ☐ | ☐ | ☐ | 8. Name of person(s) responsible for on-site spill prevention and control (if different from coordinator). It is recommended to also have an alternate contact. |
| ☐ | ☐ | | 9. Procedures that will be used to notify individuals within the facility. It is recommended you include how the following will be alerted of an emergency at the facility: |
| ☐ | ☐ | | a. Spill prevention and control coordinator |
| ☐ | ☐ | ☐ | b. Person(s) responsible for on-site spill prevention and control if different from coordinator, and |
| ☐ | ☐ | | c. Other people in the facility about the emergency |
| ☐ | ☐ | | 10. Map showing facility relative to the surrounding area, include thoroughfares. |

Rule 6(1)(b) II: Notification Procedures to Entities Outside of Facility

IN THE PLAN?

- | Yes | No | N/A | Identify the reporting procedures that will be used to notify entities off-site. At a minimum, include notification to the following: |
|--------------------------|--------------------------|--------------------------|--|
| ☐ | ☐ | | 1. Michigan Department of Environmental Quality |
| ☐ | ☐ | | a. PEAS Hotline 800-292-4706 |
| ☐ | ☐ | ☐ | b. District office during business hours (recommended) |
| ☐ | ☐ | | 2. U.S. Coast Guard - National Response Center 800-424-8802 |
| ☐ | ☐ | | 3. Local emergency planning committee |
| ☐ | ☐ | | 4. Local fire department |
| ☐ | ☐ | | 5. Local law enforcement agency (e.g. police, sheriff's department) |
| ☐ | ☐ | ☐ | 6. Municipal wastewater treatment plant if facility served by that plant |
| ☐ | ☐ | ☐ | 7. Spill clean-up contractor, or consulting firm, or both |
| ☐ | ☐ | ☐ | 8. Other local, state, and/or federal agencies or entities that you may be required to report releases under other regulations (required if preparing an ICP that has additional reporting requirements) |

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Rule 6(1)(c) III: Spill Control and Cleanup Procedures

IN THE PLAN?

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|--|
| | | | Identify information about how the facility will control spills and conduct cleanups of releases: |
| ☐ | ☐ | | 1. Inventory and location of spill control and clean-up equipment (type and quantity) |
| ☐ | ☐ | ☐ | a. Equipment available on-site |
| ☐ | ☐ | | b. Equipment available off-site |
| ☐ | ☐ | | 2. Procedures for response and cleanup |
| ☐ | ☐ | | 3. Procedures for characterization and disposal of recovered materials |

Rule 6(1)(d) IV: Polluting Material Inventory

IN THE PLAN?

- | Yes | No | N/A | |
|--------------------------|--------------------------|-----|---|
| | | | Include information about polluting materials typically on-site in quantities exceeding TMQs during the preceding 12 months: |
| ☐ | ☐ | | 1. Polluting Material(s) by: |
| ☐ | ☐ | | a. Chemical Name(s), and |
| ☐ | ☐ | | b. Product Name (e.g. Trade Name(s)), and |
| ☐ | ☐ | | c. Chemical Abstracts Service (CAS) number |
| ☐ | ☐ | | 2. Location where the Material Safety Data Sheets (MSDS) are kept for these polluting materials |

Rule 6(1)(e) V: Site Plan

IN THE PLAN?

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|---|
| | | | Include information about polluting materials typically on-site in quantities exceeding TMQs during the preceding 12 months: |
| ☐ | ☐ | ☐ | 1. Aboveground and underground storage tanks |
| ☐ | ☐ | ☐ | 2. Floor drains (know where these floor drains lead to) |
| ☐ | ☐ | ☐ | 3. Loading and unloading areas, docks |
| ☐ | ☐ | ☐ | 4. Sumps (sump pumps) |
| ☐ | ☐ | ☐ | 5. On-site water supply |
| ☐ | ☐ | ☐ | 6. Containment structures for solid polluting materials |
| ☐ | ☐ | ☐ | 7. Secondary containment structures for liquid polluting materials |
| ☐ | ☐ | ☐ | 7. Other storage and use areas of polluting materials that do not exceed TMQs (recommended) |
| ☐ | ☐ | ☐ | 8. Other relevant site structures |

Rule 6(1)(f) VI: Outdoor Secondary Containment for Liquid Polluting Materials

IN THE PLAN?

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|---|
| | | | Include information about outdoor secondary containment structures on-site used for liquid polluting materials exceeding TMQs: |
| ☐ | ☐ | ☐ | 1. Location(s) |
| ☐ | ☐ | ☐ | 2. Design and construction data including: |
| ☐ | ☐ | ☐ | a. Dimensions |
| ☐ | ☐ | ☐ | b. Construction materials (and types of coatings) used |
| ☐ | ☐ | ☐ | c. Holding capacity |
| ☐ | ☐ | ☐ | d. Amount of polluting material stored in that structure |
| ☐ | ☐ | ☐ | 3. How spilled polluting materials will be captured and removed |
| ☐ | ☐ | ☐ | 4. Provisions for physical security of secondary containment structure, such as: |
| ☐ | ☐ | ☐ | a. Signage |
| ☐ | ☐ | ☐ | b. Gates & Fences |
| ☐ | ☐ | ☐ | c. Barriers |
| ☐ | ☐ | ☐ | d. Other |

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Rule 6(1)(f) VI: Outdoor Secondary Containment for Liquid Polluting Materials (continued)

IN THE PLAN?

Yes No N/A Include information about outdoor secondary containment structures on-site used for liquid polluting materials exceeding TMQs:

- | | | | |
|--------------------------|--------------------------|--------------------------|--|
| ☐ | ☐ | ☐ | 5. Precipitation management (rain or storm water and snow accumulation) procedures |
| ☐ | ☐ | ☐ | a. Characterization of collected precipitation |
| ☐ | ☐ | ☐ | b. Disposal procedures |
| ☐ | ☐ | ☐ | c. Copies of permits or exemptions authorizing discharge (i.e. from DEQ, local wastewater treatment plant) |
| ☐ | ☐ | ☐ | 6. Inspections and maintenance procedures |

Rule 6(1)(g) & (h) VII: Other Control Mechanisms and Facility Security

IN THE PLAN?

Yes No N/A Include the following information if it has not already been addressed in the plan:

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| ☐ | ☐ | ☐ | 1. Other control mechanisms at facility to prohibit or control releases |
| ☐ | ☐ | ☐ | 2. Provisions for general facility physical security |

Rule 6(2)–(5) VIII: Plan Preparation, Submittal, and Update Requirements

IN THE PLAN?

Yes No N/A Complete PIPP or ICP, review and update as necessary, and submit notifications:

- | | | |
|--------------------------|--------------------------|--|
| ☐ | ☐ | 1. PIPP, or update, is completed by August 31, 2003 |
| ☐ | ☐ | 2. Plan is kept at the facility and available for inspection |
| ☐ | ☐ | 3. Notification that PIPP or ICP has been prepared and certification of compliance with Part 5 rules sent to WD district office within 30 days of completing the PIPP or ICP |
| ☐ | ☐ | 4. Notification sent to LEPC that plan is completed and available upon request |
| ☐ | ☐ | 5. Notification sent to local health department that the plan is completed and available upon request |
| ☐ | ☐ | ☐ 6. Copy of plan submitted to a requesting agency within 30 days after receiving the request |
| ☐ | ☐ | 7. Plan is evaluated every three years and after any release requiring implementation of the plan |
| ☐ | ☐ | ☐ 8. Plan is updated if any facility personnel, processes, or procedures that were included in the plan occur, or other changes are necessary to maintain compliance with rules |
| ☐ | ☐ | ☐ 9. Recertification and re-notification of updates are sent to WD district office, LEPC, and local health department |
| ☐ | ☐ | ☐ 10. Plan is modified within 30 days of receipt, or other DEQ provided response timeframe, of the DEQ's request to modify the plan if found to be incomplete or inadequate; submit re-notification and recertification |

VI: ADDITIONAL INFORMATION TO USE WHEN PREPARING A PIPP AND COMPLETING THE CHECKLIST

Rule 6(1)(a) I: Facility identification information

- 1. thru 6.** Include basic information about the facility location, who owns it, and contact information.
- 7. and 8.** Identify the designated spill prevention and control coordinator and who is responsible for on-site spill prevention and response, if they are different people. It is recommended alternate person(s) be designated for these responsibilities in case the primary people are unavailable. The primary contacts may be gone on vacation, out sick, or have their own personal obligations and not be available to respond to an emergency at work. Consider who will be responsible for notifying people at the facility of

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an emergency. Responsible personnel should have the authority to contract for and obtain any necessary emergency services without delay.

9. Identify how people at the facility will be made aware of the emergency (e.g., alarms, flashing lights, public announcement system, pagers, etc.). If it is necessary to evacuate the building when an emergency occurs, it is recommended that someone be responsible for taking time cards and guest book, if the company uses them, to aid in identifying who was in the building when the emergency occurred. Note that evacuation plans may be required under MIOSHA regulations and large quantity generators must include evacuation routes under the hazardous waste regulations.
10. Include a map of the facility relative to the surrounding area, including thoroughfares. Include information critical to emergency response. It is recommended to include all roads or access routes that emergency responders could use when responding to a release or that may need to be closed to the public if a significant release occurred. Local planning agencies may already have base maps of existing features in your area. Although the following information is not specifically required by the Part 5 rules, you may want to include on the map any sites in the immediate area that could be negatively impacted by releases:
 - Community drinking water wellheads. If your community has a designated wellhead protection program, they will have the area delineated. Contact that program if you don't know if your facility is in the designated area. Outline the protected area on your map. If you don't know your local contact, contact the DEQ Drinking Water and Radiological Protection Division at 517-335-9054 for [wellhead protection program](#) information.
 - Private drinking water wells and their recharge areas located in the immediate vicinity. Contact your [local health department](#) for this type of information. Health departments are usually listed in phone books under the government section.
 - Streams, drainage ditches, lakes, wetlands and other water bodies nearby the facility. Several mapping sites of existing features are available on the Internet. For example, see the [EPA EnviroMapper](#) which includes county maps and data about EPA-regulated sites, US Census demographics, and street-level maps.
 - Local planning agencies also have this type of information available.
 - Other environmental sensitive areas including endangered or protected species. The Michigan Department of Natural Resources has some information on the Internet or call 517-373-1263. Go to www.michigan.gov/dnr and select "Wildlife & Habitat," "Plants and Habitat at Risk" and select "Endangered and Nongame Wildlife" for summaries and lists of Michigan endangered species and links to federal endangered species sites including one for the Great Lakes.
 - Nearby public sites like schools, daycare centers, nursing homes, hospitals, museums, etc., that may need to be notified of releases that could present danger to them. The [local emergency management programs contacts](#) may have this information readily available. If you do not know your LEPC contacts, call Bonnie Fighter, Michigan State Police, Emergency Management Division, at 517-336-2042 or email her at fighterb@michigan.gov.

Rule 6(1)(b) II: Notification Procedures to Entities Outside of Facility

1. thru 8. Include the process of making people outside of the facility aware of an incident whenever there are reportable releases or you need emergency response. When developing the notification procedure, consult with your [LEPC](#) and local responders about the best way to communicate with the local authorities and what information they want reported.

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Identify the following:

- a. Who is notified and how (e.g., phone call, fire alarms, etc.).

Rule 6(1)(b) identifies at a minimum who must be contacted. Calling the Pollution Emergency Alerting System (PEAS) at 1-800-292-4706 will satisfy the notification requirement to the DEQ as required by the Part 5 rules. The PEAS operators during normal office hours will take the information and relay it to the appropriate DEQ staff or they may provide the option of you calling the local DEQ district office that oversees the area where the reportable release occurred. You may want to identify the local district office number for the Water Division as well as the PEAS in case you need to talk to DEQ staff directly for more information.

A listing of the [Michigan State Police posts](#) by the [community and county they serve](#) is available on the Internet.

If you are preparing an ICP and are subject to other release reporting regulations, determine if there are [additional notification requirements](#) than those listed in the Part 5 rules. You will need to review the specific regulations or facility permits for details. Also check if there are any local requirements that require reporting to the wastewater treatment facility, local health department, drinking water department, hospitals, etc. If the company is subject to SARA Title III, remember you will need to notify all LEPCs that may potentially be affected by a release at the facility. Include these additional entities that require reporting information in your ICP.

- b. Timeframe to submit the initial notification and the follow-up written report.

Rule 7 requires reporting as soon as practicable after detection of a release that exceeds the TRQ during any 24 hour period. Rule 4 requires adequate surveillance at a facility so a release can be detected in a “timely manner.” Timely is intended to mean before a release could reach the waters of the state. A follow-up written report is required within 10 days of the release. Submit the written report to the DEQ WD Chief, PO Box 30241, Lansing, MI 48913. If you submitted a written release report under another DEQ requirement, such as a NPDES permit condition, and the report contains the information required in Rule 7(2) it is not necessary to submit an additional report to the WD.

If you are subject to the SPCC regulations and do not have to prepare a PIPP for any other polluting materials, remember that you must report oil releases as required in Rule 7 to the DEQ in addition to meeting the federal reporting requirements per Rule 3(1)(b). The Part 5 Rules reporting criteria are different than federal reporting criteria and need to be included in the SPCC. In addition, if you are subject to SPCC regulations and were required to report an oil release per federal requirements, you are also required to provide the state that information per 40 CFR 112.7(4)(c) within 60 days.

- c. If specific forms are required to be used for reporting releases.

Reporting releases under the Part 5 rules does not require a specific form. A [generic report form](#) is available on the Internet for Part 5 reporting purposes and for meeting other regulations that do not require specific forms. A suggestion is to make copies of the form after filling in the basic facility contact information and then finish completing the form with the applicable information after a release occurs. If you prepared an ICP, some regulations require [specific report forms](#) to be used when initially reporting a release or spill and for follow-up reports. These forms are identified on the reporting summary table referenced above.

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d. When a release would be reportable.

It is recommended the plan identify the conditions when a release is reported as described in Rules 2(b) and (g) to help employees determine when they must report a release. There are two broad steps when determining release reporting under the Part 5 rules:

First, determine when a spill, leak, or discharge at the site would not be considered a “release” per Rule 2(b) and would not require reporting under the Part 5 rules. Remember release reporting may still be required under other planning regulations if doing an ICP, or other regulations or permitting conditions the facility is subject to.

Example 1: a 50 gallon oil spill was cleaned up within 24 hours of the release, AND the oil did not reach the public sewer system or to waters of the state. This would not be reported as a release per Rule 2(b)(ii).

Example 2: 55 pounds of lubricating oil spilled (approximately 6 gallons) onto the ground and it was not cleaned up within 24 hours after the spill. This would require reporting per Rule 2(g).

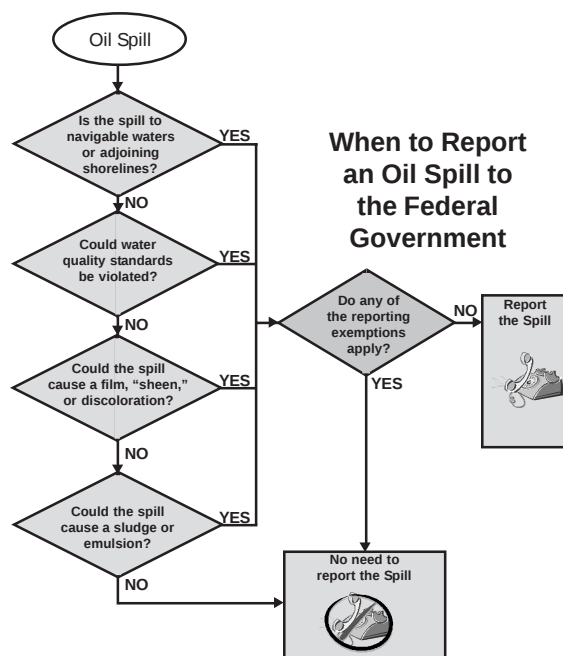
Example 3: polluting materials were discharged into a permitted waste treatment plant with prior approval by the waste treatment authority. This is not considered a release per Rule 2(b)(v). This would apply to wastewater treatment plants issued either a NPDES or Michigan groundwater discharge permit and to federally permitted release as allowed under CERCLA.

Example 4: 30 gallons of oil were released into a river and it was immediately and effectively cleaned up. This would not require reporting per Rule 2(b)(iii) if the effective recovery using containment booms, spill pads, or other means resulted in NO visible oil, film, sheen, or discoloration escaping the containment area. It would be reportable under federal regulations if it meets the flowchart conditions.

Example 5: a release of air contaminants occurred. It would not be considered a Part 5 release per Rule 2(b)(iv) if it meets the definition of air contaminant in Section 324.5501(a) [dust, fume, gas, mist, odor, smoke, vapor, or any combination thereof]. It may be reportable under the air regulations.

Second, determine the amount of a release of polluting materials that would require reporting:

Use your polluting materials inventory that is required by Rule 6(1)(d) and identify TRQ for the polluting materials. See Rule 2(g) for definition of TRQ. Any quantity of oil, or polluting material listed in Rule 9, that is released to waters of the state would require reporting if it caused unnatural turbidity, color, visible sheens, oil films, foams, solids, or deposits in the receiving water body per Rule 2(g). “Waters of the state” include groundwater, lakes, rivers, streams, and other watercourses and waters within the jurisdiction of the state and the Great Lakes bordering Michigan.



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Look up the TRQ listed in Rule 9 to identify the amount of a reportable release for those polluting materials. This TRQ is only the amount of a particular material released that is listed in Rule 9, not the full amount of mixture containing 1% or more of polluting material. This is different than the TMQ which uses the total amount of mixtures that contain 1% or more of polluting materials. Releases of fine mineral fibers do not have to be reported under the Part 5 rules.

When looking at Rule 9:

- ✓ This table of polluting materials is a combination of chemicals contained in the state's Critical Materials Register compiled by the Water Division and the federal CERCLA list. Different regulations refer to different chemical lists. Synonyms of the chemical names may be listed so it is recommended to check lists using both the CAS number in addition to the name since some materials may not have a CAS number listed.
- ✓ Remember a facility may have to meet other regulations that require release reporting in addition to the Part 5 rule requirements. Prior approved releases to the publicly owned treatment plant (POTW) would not be reportable to the DEQ, but if there is a release that exceeds the TRQ that was not approved by the wastewater treatment plant authorities, it would require reporting to both the POTW and DEQ. The facility may also have permit conditions that require releases to be reported.
- ✓ If doing an ICP and you've calculated different reporting amounts as required by the different regulations, you may want to create a table that lists when a specific volume of release has to be reported to a local, state, or federal agency. The TRQ listed in Rule 9 may have a different TRQ than what is listed in other regulations requiring release reporting. For example, xylene (mixed isomers), CAS #1330207, has a 10# TRQ under Rule 9, a 100# RQ under the current federal CERCLA, and 1000# RQ under Part 201. Reporting releases under Part 201 of Act 451 are overseen by the DEQ Remediation and Redevelopment Division. The Michigan Part 201 regulations reference the July 1, 2001 CERCLA Table 302.4 list of hazardous substances and final reportable quantities. There are also EPA reporting requirements based on the RQs listed in the current CERCLA Table 302.4. A regulated substance in underground storage tank also includes hazardous substances on the current CERCLA list. The [List of Lists](#) contains reportable quantities and threshold planning quantities for some federal regulations.

For liquid polluting materials, it would be helpful to calculate the smallest volume (e.g., tablespoons, quarts, gallons) of materials kept on-site that meets the reportable quantities. If you have a mixture of polluting materials, use these basic steps to calculate the reportable amount for each of the polluting materials. Example calculations are available at www.deq.state.mi.us/documents/deq-ess-sara-releasecalcs.pdf.

- ✓ Use the specific gravity or relative density from the MSDS and multiply it by the weight of water (8.33 lb/gal) to equal the weight of the mixture in pounds per gallon. If the MSDS has ranges listed, calculate the reportable amount for the low and high end of the listed ranges.
- ✓ Take the TRQ in pounds from Rule 9 and divide it by the weight of the mixture as calculated in the step above and divide it by the weight % for the individual polluting material (this should be listed on the MSDS or available in a chemical dictionary) to get the volume of the polluting materials that would require reporting if released.
- ✓ If the mixture has additional polluting material ingredients, calculate the reportable quantities for each of them.
- ✓ Results: Report releases of mixtures using the lowest calculated volume.

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- Consider how a release may affect other regulatory requirements.

Although not part of the release reporting requirements under the Part 5 rules and not required to be in a PIPP, a facility should consider how a release may affect other regulations. This may include submitting a [Toxic Chemical Release Inventory \(TRI\) under SARA Title III, Section 313](#), filing an [Annual Wastewater Report \(AWR\)](#) under Part 31 of Act 451 of 1994, as amended, or other requirements such as permit conditions. Call 517-373-8481 for more TRI information. Call 517-373-6565 for more information about the AWR. Call the Division or agency that issued the permit regarding questions about permit requirements.

If a facility is required to submit a written release report to the DEQ under another regulation or permit condition, it is not necessary to submit another duplicative release report to the DEQ Waste Management Division as noted in Rule 7 if the first report contains all the information required by Rule 7(2). Remember, written Part 5 release reports now go to the Water Division.

Rule 6(1)(c) III: Spill Control and Cleanup Procedures

The PIPP must contain information about how the facility will control releases and how it will respond and clean up if a release occurs. This includes the following three broad categories of information:

1. List all spill control and response equipment.

Include an inventory and location of spill control and cleanup equipment available on and off-site in the PIPP that would be used to respond to an incident at the facility.

Use the process of developing a PIPP to look critically at the facility to determine if it has the means to protect the environment and human health from releases. Look at all of the facility's property, including the office areas, storage buildings, process lines, loading/unloading trucking areas, and other indoor and outdoor areas. Identify what control and response equipment and material is already on-site, where it is located, whether or not it is appropriate for the types of materials on-site and the types of releases you may have, whether it has been maintained properly, and consider what else may be needed to respond to an emergency. Contact suppliers and emergency response contractors to determine the availability of any additional response supplies necessary for controlling and removing pollution hazards. Consider the following:

- Are there inventory control methods at the facility that could be used to determine if there is a release? What mechanisms are used to track material from receipt to disposal or shipment of product off-site?
- Who is responsible for product loss reporting to management?
- What would happen to the manufacturing process if there is a power failure? Are protection systems fail-safe upon loss of electrical power? Investigate the possibility of reactant materials being lost during an extended power failure and identify steps that must be taken to provide containment or safe handling of those materials.
- What potential effect is there from floods, employee strikes, and vandalism?
- Have environmental consequences of equipment breakdowns been evaluated? Investigate the availability of spare parts. Consider keeping on hand critical parts that are not readily available. A company with on-site treatment should consider having duplicate treatment units available when it is not feasible to shut down the process lines in the event of treatment equipment failure.

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- Is the facility in compliance with other environmental and health and safety regulations? For example, are product storage tanks properly constructed, installed, and maintained? Do they have proper coatings and corrosion protection? Are special safety devices (pressure relief vents, leak detection monitoring, overfill protection, check valves, etc.) working properly? Do you have tanks properly registered, if required? Discuss tank requirements with the WHMD.

2. Identify the response and cleanup procedures.

Identify in the PIPP how the facility will initially respond when a release is discovered; procedures how to assess the situation including identification of incident type, hazards involved, severity of the problem, and resources threatened; what initial measures need to be taken including discharge/release control, containment, and initial recovery activities; and how releases will be cleaned up. Also consider when would the “emergency” be considered over, and what additional things need to be done (e.g. accident investigation, plan review, response critique, written follow-up reports). Start by reviewing past spills and releases and how they were handled and information from HAZWOPER training. Were previous situations handled appropriately? Consider the following:

- What polluting materials are now on-site?
- What potential causes of spills exist (e.g. containers being ruptured by forklifts, spills from loading/unloading trucks or transfer piping disconnecting, overfilling or leaking tanks, power failures, natural disasters, etc.)?
- What spill pathways exist that could carry a release to another area (e.g. where do floor drain(s) and storm sewers lead to, where do drainage ditches flow to, where does material go from the dock area)?
- What are the best release control and cleanup procedures for the facility's situations based upon what the facility is actually capable of doing in response to a release, and whether or not services from nearby emergency response contractors or local emergency responders are needed? Consider the following control and cleanup methods:
 - ✓ Physical cleanup of dry materials include the use of brooms, shovels, sweepers, or plows;
 - ✓ Mechanical means include vacuum cleaning systems and pumps;
 - ✓ Chemical cleanups can be achieved with the use of sorbents, gels, and foams. Sorbents are compounds that immobilize materials by surface absorption or adsorption in the sorbent bulk. Gelling agents interact with the spilled chemicals by concentrating or congealing to form a rigid or viscous material conducive to a mechanical method. Foams are mixtures of air and aqueous solutions of proteins and surfactant-based foaming agents. The primary purpose of foams is to reduce the vapor concentration above the spill surface, thereby controlling the rate of evaporation.
- Will you have a contractor respond? If a contractor is necessary, make arrangements for prompt performance of contractual services on short notice. Identify potential circumstances when the contractor would be needed at the site and what types of spills can employees handle at the facility. It is recommended that several different companies be interviewed and evaluated to determine if they can assist your company before an emergency occurs. If so, get written documentation of what emergency response arrangements they will provide. Companies servicing an area can often be found in the yellow pages under “Environmental and Ecological Services.”

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- Will employees respond to a spill? Make sure they have adequate training and proper personal protection equipment. Call the CIS [Consultation Education and Training Division](#) at 517-322-1809 for specific requirements for personal protection equipment and HAZWOPER training requirements. They can also provide information about the MIOSHA Hazard Communication and Employee Right-to-Know regulations about hazardous chemicals in the workplace and other [health and safety standards](#).
- Is emergency control and response adequately covered in employee training programs involved with both manufacturing processes and waste handling? Training programs required under other regulations may not provide your employees with what they need to know in responding to an emergency relating to polluting materials. Determine if additional training is necessary and whether training can be conducted by knowledgeable in-house staff. If not, you may need to contract with a training provider outside of your company. Consider how the facility notifies the trainer when a new employee is hired and when an employee is transferred into a position which requires additional training. Programs should address the hazards of accidental spills, the importance of preventative measures, and procedures for notifying supervisory personnel of accidents that might result in discharges of pollutants. Training should also include the prevention of situations where the improper arrangement of valves, physical impact, cross connections, and negligence in routine inspection could cause the loss of pollutants. Consider holding mock drills of pollution incidents and emergency response activities. This will help identify if your plan is adequate and also provide employees an opportunity to practice response measures before a real emergency occurs.

3. Properly characterize and dispose of all recovered materials and generated wastes.

Generators of waste must determine what kind of waste is generated from a release and cleanup activities so they can ensure the waste will be properly handled and disposed. It will be necessary to determine if it is hazardous waste regulated under Part 111 of Act 451, a liquid industrial waste regulated under Part 121, or a solid waste regulated under Part 115. This determination can be done by either knowledge of the waste, where available and appropriate, or by testing samples. Some federal hazardous waste characterization guidance is available at www.clu-in.org, www.epa.gov/epaoswer/hazwaste/ldr/wap330.pdf, and www.epa.gov/epaoswer/hotline/modules.htm. Direct questions about waste characterization, management, or disposal to your consultant or to the WHMD district office.

Consider how a spill cleanup could possibly affect your hazardous waste generator or liquid industrial waste generator status. For facilities that already have site identification numbers, it may be necessary to change the hazardous waste generator status to a different category because of the additional amount of cleanup wastes. If this occurs, the facility will have different regulations they must meet. If there are questions about the requirements, call your WHMD district office for information. If the site does not have a site identification number, one will need to be obtained before shipping hazardous waste, or liquid industrial waste which includes used oil being recycled. Unless it is an emergency situation, it will be necessary to submit the [EQP 5150 "Site Identification Number"](#) form to obtain a site identification number or update a previous notification to the WHMD. Call 517-335-5035 or 800-662-9278 to obtain a printed copy. The WHMD will issue Emergency Site Identification Numbers only when emergency spills require immediate clean up and transportation to protect human health and the environment. Call 517-373-2730 during normal business hours and ask for the Manifest Unit Supervisor. Contact PEAS at 800-292-4706 if an emergency identification number is needed for situations after hours.

Identify [permitted and registered transporters](#) available to transfer or evacuate oil, liquid industrial waste, or hazardous wastes away from the facility site in case of an emergency. Look in the telephone book yellow pages under the headings "Waste Reduction Disposal, and Recycling Services" or "Environmental and Ecological Services" for companies that service your area. A standby working arrangement for

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contracted emergency services would be desirable. Shipments of liquid industrial or hazardous waste off-site will require the use of a waste manifest and subsequent record keeping requirements and [state](#) and [federal hazardous materials transportation](#).

There are other Internet resources available to find information for the above requirements including:

- www.epa.gov/oilspill for information from US EPA about oil spill prevention, response and cleanup
- www.epa.gov/swercepp for information about chemical accident prevention
- response.restoration.noaa.gov/cameo/links.html for numerous links to chemical databases and fact sheets
- es.epa.gov/vendors or use Internet search engines to find different vendors of environmental equipment
- www.tc.gc.ca/canutec/erg_gmu/erg2000_menu.htm for link to the 2000 Emergency Response Guidebook useful for first responders and getting information about responding to chemical related emergencies
- www.epa.gov/iriswebp/iris/index.html to link to a database of human health effects that may result from exposure to various substances found in the environment.

Rule 6(1)(d) IV: Polluting Material Inventory

When determining what chemicals and volumes are on-site for the inventory purposes, note the MSDS information regarding how materials should be stored, along with their general properties such as reactivity, flammability, etc. Use this information when deciding the location of these materials on-site and how this may impact your site plan in the next section.

1. Once you have any kind of polluting material that meets or exceeds the threshold management quantities listed in Rule 2(f) during the preceding 12 months, list those polluting materials in the PIPP. Include oils and salts if their total amounts located anywhere on the site exceed TMQ, and materials listed in Rule 9 that are located in discrete areas that were either individually, or the total volume of different polluting materials located in the same area added together, exceeds either 440 pounds if the discrete area is outdoors or 2200 pounds if stored indoors. Include the polluting material's product name, chemical name, and chemical abstract service (CAS) number.

It is not required to include the small containers that meet the conditional exemption in Rule 3(1), or the amount of polluting materials, but you may want to include them in the inventory so emergency responders are aware what is all present and in what amounts. If you have some products that are only on-site occasionally but have amounts of polluting materials that exceed TMQ, list them in the inventory with a note clarifying they are not always present.

2. Include where the MSDS for these materials are located. If you have questions about MSDS retention, contact CIS Consultation, Education, and Training Division at 517-322-1809.

Rule 6(1)(3) V: Site Plan

1. thru 8. Develop a facility site design plan that identifies relevant site structures and the storage and use areas where polluting materials are located. This design plan should provide details about the facility site that

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are not necessarily included on the facility map required by Rule 6(1)(a). Consider the design and construction of indoor and outdoor areas and how it prevents releases from reaching the sewer systems, groundwater, and surface water as required by Rule 5(3) and (4). At a minimum, identify storage tanks, floor drains, loading and unloading areas, sumps, and on-site water supplies, and any other relevant structures that would be affected by a release or could be the source of a release. It is recommended to include shut-off valves, vents, connecting piping from storage tanks to process lines, the locations of response equipment and material, and other structures or devices that may provide prevention or response measures.

Make sure solid polluting materials are not stored within 50 feet of designated [wetlands](#) or shore or bank of any lake or stream.

Also when storing solid polluting materials outdoors, the containment must be designed and constructed to remain effective during a 100 year flood. [Information about 100 year floodplains](#) and how to request an estimated 100-year flood elevation is available from the [Land & Water Management Division, Water Management Section](#) at 517-373-1170.

Sewer system means the pipes, channels, conduits, manholes, pumping stations, and appurtenances, collectively or severally, actually used or intended for use by the public for the purposes of collecting, conveying, or transporting domestic and industrial waste to a treatment facility.

Rule 6(1)(f) VI: Outdoor Secondary Containment For Liquid Polluting Materials

The PIPP must include specific information about the engineering controls that have been used to meet the performance standards for outdoor containment structures for liquids as required by Rules 5(1) and (2). See Rule 2(d) for the definition of secondary containment structure. If you have questions if something is outdoors, look at the definition of “indoors” in Rule 1(c) and determine if it meets all those conditions. Also consider containment to prevent releases from escaping loading and unloading areas. See the [WD operational guidance](#) regarding railroad and truck unloading areas. Include the following in the PIPP:

1. Where the containment structure is located.

Information about isolation distances and other storage recommendations and requirements are often included on the MSDS. Check with the fire department for any local isolation distance requirements if you have flammable or combustible materials, or reactive or high risk chemicals. Numerous internet sites, such as response.restoration.noaa.gov/cameo/links.html, also provide additional chemical information that could be helpful when designing secondary containment.

2. What design, size, and construction materials were used for the amount of polluting material in that area.

The Part 5 rules allow flexibility in meeting containment requirements. Choose the best means to manage polluting material so if a release occurs, it can be contained. Make sure the construction material is compatible with the stored material and it is impervious per Rule 5(2)(a). Unsealed concrete or concrete blocks are not impervious surfaces. Minimum holding capacity is described in Rule 5(2)(b). It may be necessary to increase the size to contain collected precipitation. Generally, areas in Michigan receive an average of 3.5 inches to 4.5 inches in a 25 year, 24 hour rainfall. A record 24 hour precipitation was about 10 inches.

A consideration often overlooked is how to provide squirt protection in case containers holding liquids are punctured or ruptured. Use engineering calculations to calculate the potential distance a material can squirt, or a general rule of thumb for determining squirt distance for containers is to measure the tallest height of the containers and use that measurement as the minimum distance between the stored

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containers and the edge of the containment area. Other areas often overlooked are loading/unloading docks. There must be some provision made to prohibit any spilled material in a dock area from entering sewers, drainage systems, and surface water and groundwater.

Review the [“Guide to Understanding Secondary Containment Requirements in Michigan”](#) which summarizes other regulations requiring secondary containment. Printed copies are available by calling 800-662-9278 or from your local district office. There may be additional containment requirements if your facility is subject to the [storm water program](#) requirements and/or the [federal SPCC regulations](#).

3. Description how spilled materials will be collected and properly handled and disposed of.

If the collected materials can not be used on-site, identify how the waste will be characterized and handled as required by the waste regulations. See page 12 for waste information.

4. What security measures are being taken.

Include a description of any means to restrict access to the secondary containment area including fences, gates, and other barriers. This could also include signage stating restricted access, no smoking, etc.

5. How will collected precipitation be managed?

Rule 5(2)(c) allows collected precipitation from secondary containment structures to be discharged at the site if there has not been a release, the drainage is in compliance with other regulations, the valves are kept closed except during the removal, and the discharge is under direct supervision of qualified person. The Part 5 rules do not require the “qualified person” be a certified storm water operator, but if the facility is subject to the storm water regulations, then they would need to have a certified storm water operator. The discharge must also be in compliance with the facility’s storm water NPDES and other permit requirements. Discuss these storm water requirements with the WD Storm Water Program staff district office.

The discharge cannot be, or become, injurious, and not cause runoff to, ponding on, or flooding of adjacent property. It also cannot cause erosion or cause nuisance conditions. R 323.2210 [Rule 2210(d)] of the [Part 22 groundwater quality rules](#), overseen by the WD, allows discharges from secondary containment without a groundwater discharge permit if the storm water does not contain any leaks or spills and is inspected to ensure compliance with other discharge standards. The discharge must also meet the [Part 4 Water Quality Standards](#) rules overseen by the WD. When doing a visual inspection before discharging, consider odor, color of any discharges, turbidity, floatable matter, deposits or stains. See the EPA Storm Water Management Fact Sheet [“Visual Inspection.”](#) and discuss additional pollution prevention plan information with the WD Storm Water Program staff.

If the liquid precipitation will be hauled off-site in quantities greater than 55 gallons, then the [Part 121 Liquid Industrial Waste](#) regulations must be met, including using a [permitted and registered transporter](#) and meeting manifesting requirements, etc. If shipments are 55 gallons or less, then the Part 121 Section 324.12103(4) requirements must be met. See Chapter 2 of the [“Michigan Manufacturers’ Guide to Environmental, Safety and Health Regulations”](#) for more information.

6. How the facility will regularly inspect and maintain the secondary containment structures.

Consider designing a checklist identifying what employees should minimally look for when doing inspections or doing maintenance activities. For example, one item may be checking the valves are

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closed at all times except when precipitation is removed as required by Rule 5(2)(c)(ii). Other items may include general observations like looking for any vegetation impacts or staining that may indicate a release occurred or structural damage or problems with the security around the area. A particular polluting material may have other specific storage requirements that should be inspected. Include schedules how often inspections and maintenance activities will be done. When establishing your inspection schedules, consider Rule 5(2)(c) requirements and the time restrictions in Rule 2(b)(i) for exemption from reporting releases into secondary containment.

Rule 6(1)(g) & (h) VII: Other Control Mechanisms and Facility Security

1. Identify in the PIPP what other kinds of control measures the facility has which have not been previously addressed elsewhere in the plan. Rule 4 requires facilities to have surveillance of all manufacturing processes, treatment systems, storage areas, and other such areas containing polluting materials. "Adequate surveillance" does not require a company to conduct inspections at the facility on days they are normally closed. However, if a release did occur and was not detected in time, the facility may not qualify for any of the exemptions listed in Rule 2(b) and may have to report the release. Detection of losses in a "timely manner" is intended to mean before a release could reach waters of the state.

Control measures could include preventative maintenance and testing programs to minimize mechanical failures. If so, include a description and an inspection or testing schedule for those programs. Depending on the polluting materials on-site and how they are stored, you may want to review applicable technical standards or codes from organizations such as the American Petroleum Institute (API), National Fire Protection Association (NFPA), Steel Tank Institute (STI), National Association of Corrosion Engineers (NACE), and the International Codes Committee (ICC).

Although the Part 5 rules do not require documentation of facility inspections, it is recommended that appropriate records are kept to document and identify actions taken, people involved, and dates and times of inspections and maintenance activities. Other regulations may require inspection documentation. For example, large quantity generators must keep written records of their inspections of hazardous waste accumulation areas.

2. General facility security could involve a variety of measures that deal with potential threats from vandalism, arsonists, terrorism, bomb threats, etc. and may also be affected by what types of polluting materials are on-site. Contact the [State Police, Emergency Management Division](#) at 517-336-6198 for more information how to deal with these types of situations.
 - Identify what type of general facility physical security systems are in-place (e.g. lights, fences, gates, security guards, motion monitoring equipment, etc.).
 - Is there adequate lighting for the facility grounds?
 - What kind of surveillance is used at the site? Do you have video cameras, access or equipment alarms, and/or use security staff? Depending on the polluting materials on site, is it necessary for security spot checks of personnel and vehicles entering and leaving the facility? What is the frequency of checking that tampering hasn't occurred in areas with polluting materials? Especially look at storage areas, transfer pipelines or areas, loading and unloading areas, tanks, containment structures, and shipping containers.

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- Are there various methods of getting security messages to employees such as newsletters, bulletin boards, or other types of communication within the physical plant and company vehicles (cell phones, satellite tracking, radios, etc.)? Is the system capable of reaching all key personnel?
- Has the adequacy of locks and other protective measures been checked? Are you familiar with vendors that service your facility?
- What kind of precautions have you taken with computer systems? Could computer hackers access critical information from outside the facility? You may want to keep that type of information on disks instead of on the computer's hard drive.
- Are there procedures to report suspicious activities?

Rule 6(2)-(5) VIII: Plan Preparation, Submittal, and Update Requirements

1. & 2.

PIPPs and ICPs are required to be kept at the facility and available for inspection. DO NOT SUBMIT A COPY OF THE PLAN TO THE DEQ, MICHIGAN STATE POLICE, OR EPA UNLESS REQUESTED. If an ICP was prepared, submit copies of the plan as required by the other planning regulations. Plans are not submitted to DEQ as noted in the Michigan Department of Agriculture's Regulation No 641 Commercial Fertilizer Bulk Storage and Regulation No. 640 Commercial Pesticide Bulk Storage.

All facilities subject to the Part 5 rules must have plans prepared by August 31, 2003 or when they have polluting materials that meet or exceed TMQs after that date.

3.

Within 30 days of completing or updating the PIPP, or an ICP, submit a written notification of completion or update of the plan, and a certification the facility is in compliance with the Part 5 rules to the [Water Division district office](#) which oversees the county where the facility is located. Whoever signs the certification needs to have authority on behalf of the facility to certify compliance. The department does not require a specific form to be used to meet this requirement. Following is sample certification language that may be used, but is not required to be used:

"Under penalty of law, this certifies that (company name) at (site address) is in full compliance with the Part 5 administrative rules pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). A copy of the Pollution Incident Prevention Plan (PIPP) [or Integrated Contingency Plan (ICP) if prepared] may be requested by [include who and how to contact to request a copy]." Include a signature, title, date, and mailing address if different than the site address.

4. & 5.

Within 30 days of completing the PIPP, or an ICP, notify both of the following that you prepared a plan:

- [Local Emergency Planning Committee](#)
- [Local health department](#)

One recommendation is to submit a letter explaining you are notifying them as required by the Part 5 administrative rules pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) that your company has completed a PIPP or ICP. Although not required by the rules, check if the local agency would like a copy of the polluting material inventory that is included in the plan submitted with their notification. Due to security issues some facilities may not want to include the list. You may notify these entities by calling them, but keep written documentation when you called and who you spoke to. If the local entities know what

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material is on-site, it may help them decide if they will request a copy of your plan. Make sure to provide your company's name, site address (and mailing address if different), and who to contact to request a copy of the plan.

Discuss with your local responders if they use any system in your community where facilities place response information in a location on-site so that the fire department or other first responders can easily access it if called to the site when no one is there. The spill prevention and control coordinator may also want to keep a copy or summary of the plan available in their vehicle's glove box or somewhere outside of the facility so they have access to it in case there is a situation when they can't get to a plan kept on-site. However, consider any security concerns if you do this.

6. Provide a copy of the PIPP, or ICP, within 30 days after receiving a request from the DEQ, LEPC, or local health department. You may be required to submit a copy if requested by an agency or an ICP may be required to be sent to entities under other regulations. For example, an ICP containing hazardous waste contingency planning must be submitted to local entities.
7. & 9. The PIPP, or ICP, must be evaluated every three years or after any release that required implementation of the plan, whichever is more frequent. If no changes are necessary, it is suggested that a record be kept of who evaluated the plan and review date. It will be necessary to resubmit a notification and certification of Part 5 rule compliance to the DEQ, local emergency planning committee, and local health department of any updates (see items 3, 4, and 5 above).
8. & 9. The PIPP, or ICP, must be updated when there are changes to facility personnel, processes, or procedures identified in the plan, or whenever a change is necessary to maintain compliance with the Part 5 rules. This would include changes to the polluting materials inventory that is part of the PIPP. It will be necessary to submit a re-notification and recertification of Part 5 rule compliance to the DEQ, local emergency planning committee, and local health department of updates (see items 3, 4, and 5 above).
10. If the DEQ determines the PIPP, or ICP, is incomplete or inadequate, then the facility must modify the plan and resubmit the notifications and certifications as noted above within 30 days after receipt of the department's request, unless a longer response time is authorized by the DEQ.

Rule 7 IX: Pollution Incident Report (this section is not included on the checklist)

Facilities with reportable releases under the Part 5 rules must notify the DEQ as soon as practicable after detection of the release by calling the PEAS [see above summary for Rule 6(1)(b)]. Oil storage facilities subject to SPCC regulations must also report releases of oil per Rule 3(1)(b).

A written report must be submitted to the DEQ WD Chief, PO Box 30273, Lansing, MI 48909-7773 within ten days after the release. You may use the form [EQP 3465 "Spill or Release Report"](#) available on the Internet, or you can submit a written report containing the information in Rule 7(2). If you are required to submit a written release report to another DEQ Division (for example a permit may require reporting of releases) and are subject to the Part 5 rule reporting requirements, if the other required report contains the information listed below, it is not necessary to also submit a report to the WD.

In addition, you must meet other regulations requiring reporting. See section under Rule 6(1)(b) for more information.

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If a release occurs and is reportable, the company needs to meet the following:

- ☐ ☐ 1. Releases exceeding threshold reporting quantities are called into PEAS
- ☐ ☐ 2. Written report is submitted to WD Chief within 10 days after release. Include
 - ☐ ☐ a. Cause of release
 - ☐ ☐ b. Discovery of release
 - ☐ ☐ c. Response measures taken or schedule for completion of measures to be taken, or both
 - ☐ ☐ d. Measures taken to prevent recurrence of similar releases
- ☐ ☐ 3. Releases were reported as required under other regulations

If you have questions about the Part 5 rule requirements or preparing the plan, call the [contacts listed on the website](#). If you have questions about an Integrated Contingency Plan (ICP), contact the agency overseeing the particular regulation you are combining into one plan.

VII. WEBSITES USED IN PUBLICATION

The following table lists web addresses for encoded links and is provided for those reading printed copies of this publication instead of on-line. Internet sites are subject to change. You may also want to use a search engine on the Internet to find more or updated resources.

RESOURCE LINK	PAGE	WEB ADDRESS
Additional notification requirements	14	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Spill/Release Reporting
Annual Wastewater Report (AWR)	17	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Annual Wastewater Reporting
Consultation Education and Training Division	19	www.michigan.gov/cis Click on Workplace Safety & Health; Consultation, Education & Training
Contingency Plan and Emergency Procedures for Fully Regulated Generators	7	www.michigan.gov/deq Click on Waste; Hazardous Waste; Hazardous Waste Management; Spill Protection and Reporting
Critical Incident Protocol – A Public and Private Partnership	7	www.michigan.gov/msp Click on Publications, Forms & Statistics; Publications; Miscellaneous Publications; Emergency Management Publications
DEQ Emergency Planning website	9	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning
Emergency Poster	7	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; Hazardous Waste Emergency Poster and Guidance

***Pollution Incident Prevention Plan (PIPP) and Part 5 Rules —
Informational Packet***

EPA EnviroMapper	13	www.epa.gov/enviro/html/em/index.html
EPA Region 5, Oil Planning and Response Section	7	www.epa.gov/region5oil
EPA's SPCC website	7	www.epa.gov/oilspill
EQP 3465 "Spill or Release Report" or Generic report form	25 and 14	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Spill/Release Reporting; Release Reporting Forms
EQP 5150 "Site Identification Form"	19	www.michigan.gov/deq Click on Waste; Hazardous Waste; Hazardous Waste Management; under Forms heading Hazardous Waste Program Forms and Permit Applications, select Michigan Site Identification Form
Federal SPCC regulations	22	See EPA's SPCC website
Flammable and combustible liquids	3	www.michigan.gov/deq Click on Land; Storage Tanks Rules are under both Aboveground Storage Tanks and Underground Storage Tanks
Floodplains	21	www.michigan.gov/deq Click on Water; Water Management; Floodplain Management
Hazardous waste	4	www.michigan.gov/deq Click on Waste; Hazardous Waste; Hazardous Waste Management
Health and safety standards and MIOSHA Standards	19 and 7	www.michigan.gov/cis Click on Workplace Safety & Health; Standards & Legislation
How to Plan for Workplace Emergencies and Evacuations	9	www.osha.gov/Publications/osha3088.pdf
ICP plan guidance	7	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; select Integrated Contingency Plan Guidance
Land & Water Management Division, Water Management Section floodplain contacts	21	www.michigan.gov/deq Click on Water; Water Management; Floodplain Management; Floodplain Contacts
Liquid industrial waste	4	See Part 121 Liquid Industrial Waste
List of Lists	4 and 16	http://130.11.53.73/lo/
Local emergency planning committee or LEPC or local emergency management program contacts	2, 13, and 18	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; under Related Links select LEPC Web Links then Local Emergency Planning Committee (pdf) in Related Content column
Local health department	2, 13, and 18	www.malph.org/page.cfm/18/

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

Michigan Manufacturers' Guide to Environmental, Safety, and Health Regulations	22	www.michigan.gov/deq Click on Manufacturers' Guide under Quick Links
Michigan State Police posts and communities they serve	14	www.michigan.gov/msp Click on MSP Districts & Posts Click on Publications, Forms & Statistics; Publications; Miscellaneous Publications; Michigan Municipalities and Place Names 2002
MIOSHA regulations		See Health and safety standards (MIOSHA)
Office of Regulatory Reform	9	www.michigan.gov/orr
Oil and natural gas	4	www.michigan.gov/deq Click on Land; Fuels & Minerals; Oil & Gas
Part 4 Water Quality Standards	22	www.michigan.gov/deq Click on Water; Surface Water; NPDES Permits; under Information click on Water Quality Parameters
Part 5 Spillage of Oil and Polluting Materials administrative rules	1	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; under Information click on Pollution Incident Prevention Plan (PIPP)
Part 22 groundwater quality rules	22	www.michigan.gov/deq Click on Waste; Groundwater Discharge; under Groundwater Statutes & Rules click on Part 22 Rules, Groundwater Quality (of Part 31)
Part 121 Liquid Industrial Waste	4 and 22	www.michigan.gov/deq Click on Waste; Hazardous Waste; Hazardous Waste Management; Statutes and Rules
Permitted and registered transporters	22	www.michigan.gov/deq Click on Waste; Hazardous & Liquid Industrial Waste Transportation; under Information click on Participating Transporters
Petroleum and hazardous substances	4	www.michigan.gov/deq Click on Land; Storage Tanks; Underground Storage Tanks
Polluting Materials list	6	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; under Information click on Pollution Incident Prevention Plan (PIPP) then Part 5 Rules
Site Emergency Planning Workbook	9	www.michigan.gov/msp Click on Publications, Forms & Statistics; Publications; Miscellaneous Publications; Emergency Management Publications; under Planning click on Site Emergency Planning Workbook
SPCC regulations		See EPA's SPCC website

Pollution Incident Prevention Plan (PIPP) and Part 5 Rules — Informational Packet

Specific report forms for reporting spills or releases	14	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Spill/Release Reporting
State and federal hazardous material transportation requirements	20	State: www.michigan.gov/msp Click on Services to Governmental Agencies; Motor Carrier Division; Hazardous Materials Federal: http://hazmat.dot.gov/
State Police, Emergency Management Division	9 and 23	www.michigan.gov/msp Click on Services to Governmental Agencies; Emergency Management Division
Storm Water Management Spill Prevention Planning Fact Sheet	7	www.epa.gov/npdes/pubs/spillprv.pdf
Storm Water Management Fact Sheet regarding Visual Inspection	22	www.epa.gov/npdes/pubs/visnspct.pdf
Storm water program Storm water pollution prevention plan information	22 7	www.michigan.gov/deq Click on Water; Surface Water; Storm Water
Toxic Chemical Release Inventory (TRI) under SARA Title III, Section 313	11	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; SARA Title III-Toxic Chemical Release Inventory
Water Division District staff for storm water program	7	www.michigan.gov/deq Click on Water; Surface Water; Storm Water; under Information click on Contact Information
Water Division District staff for Part 5 rules	26	www.michigan.gov/deq Click on Assistance & Support Services; Environmental Reporting; Emergency Planning; under Information click on Pollution Incident Prevention Plan (PIPP); PIPP staff contacts
Water Division website	9	www.michigan.gov/deq Click on Water
WD operational guidance regarding railroad and truck unloading areas	2 and 21	www.michigan.gov/deq Click on Water; Emergency Response
Wellhead protection program	13	www.michigan.gov/deq Click on Water; Drinking Water; Water Wellhead Protection
Wetlands	21	www.michigan.gov/deq Click on Water; Wetlands Protection

This document was revised in June 2003 by the Environmental Science and Services Division in conjunction with the Water Division and is subject to future revisions. Be advised that subsequent law, rule, and other information may change the applicability of this document. This document is not intended to be used as a substitute for the actual regulations. It is not intended to convey any rights to any parties or create any duties or responsibilities under law.

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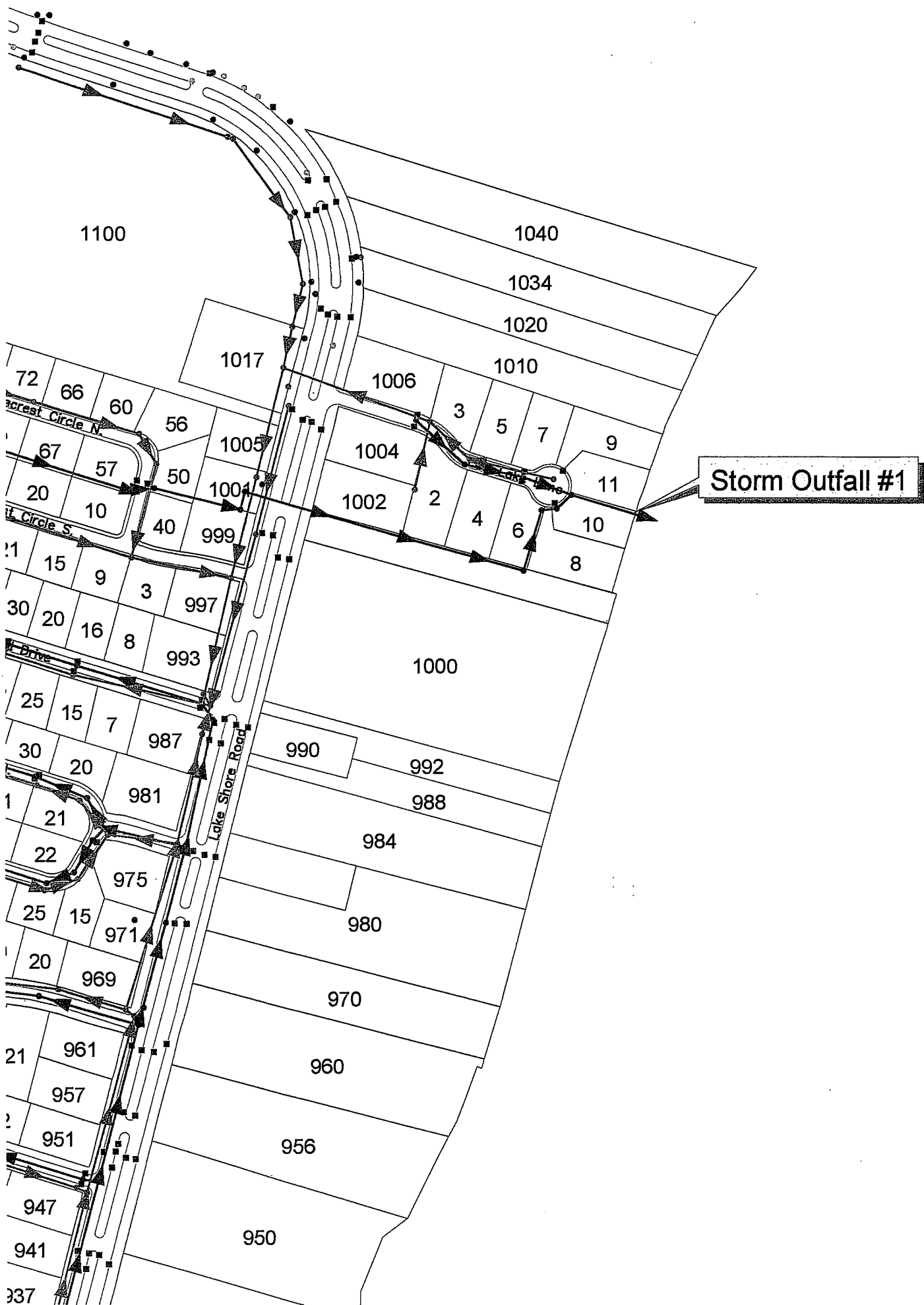
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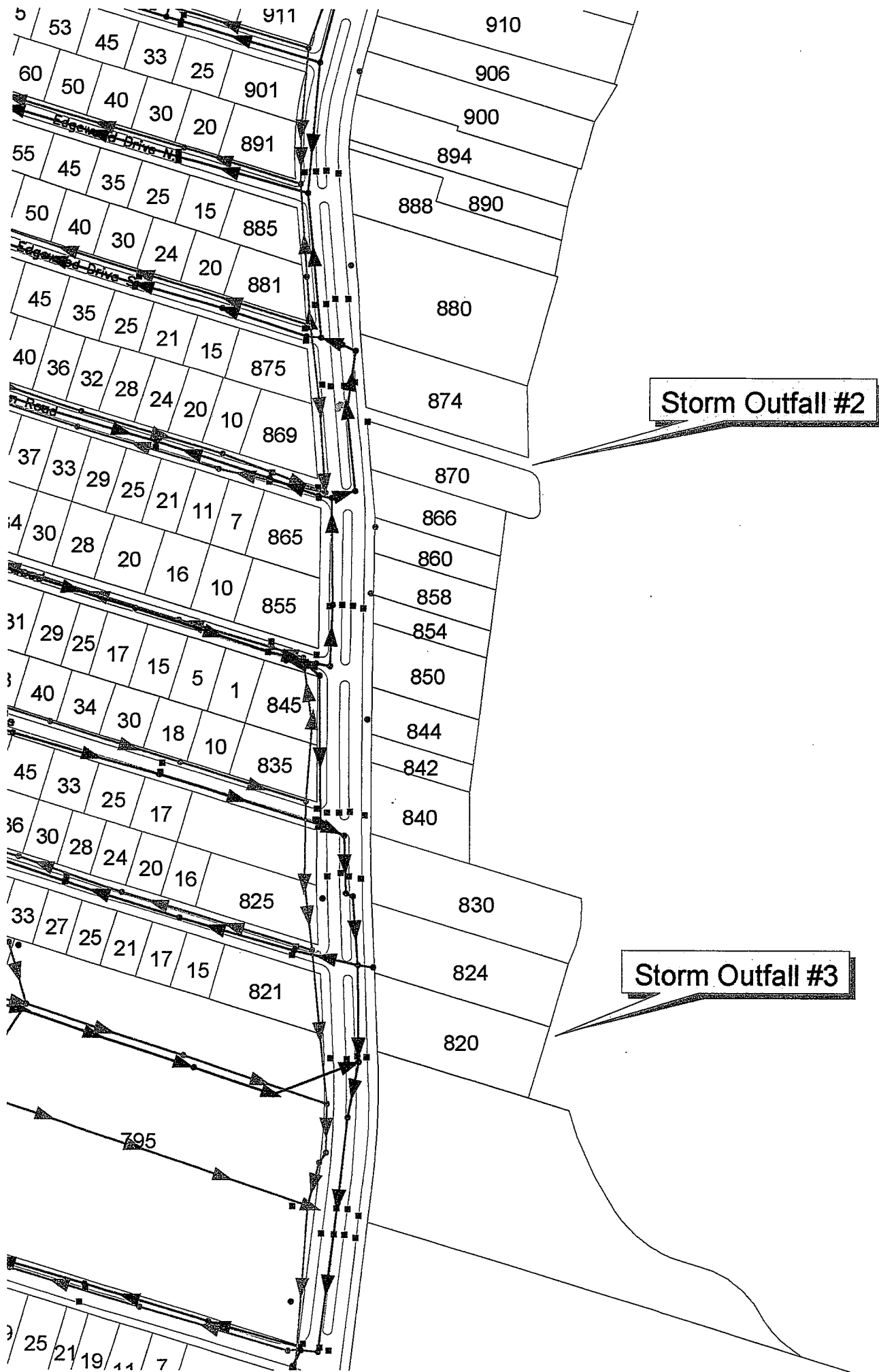


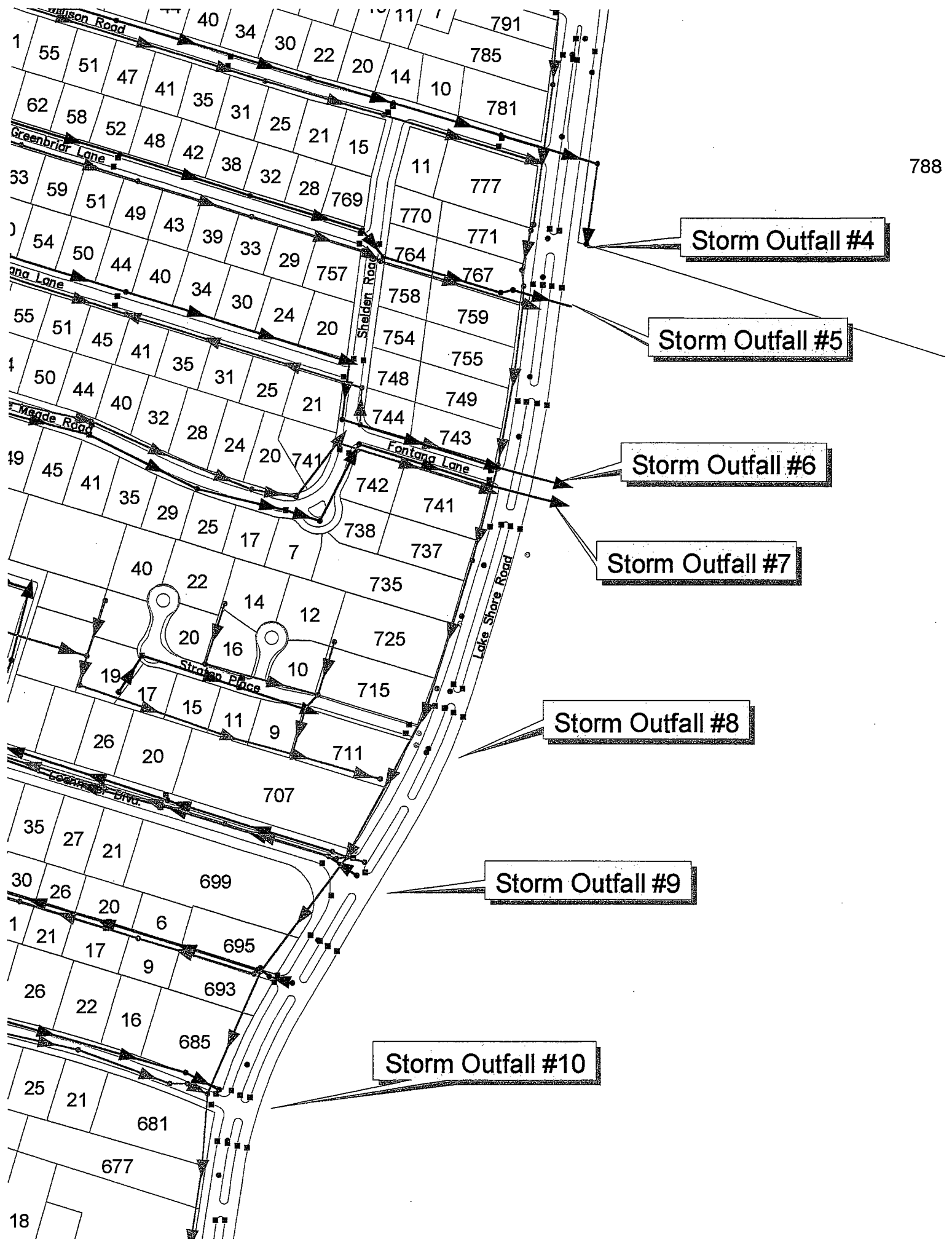
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STORM SEWER
MAINTENANCE

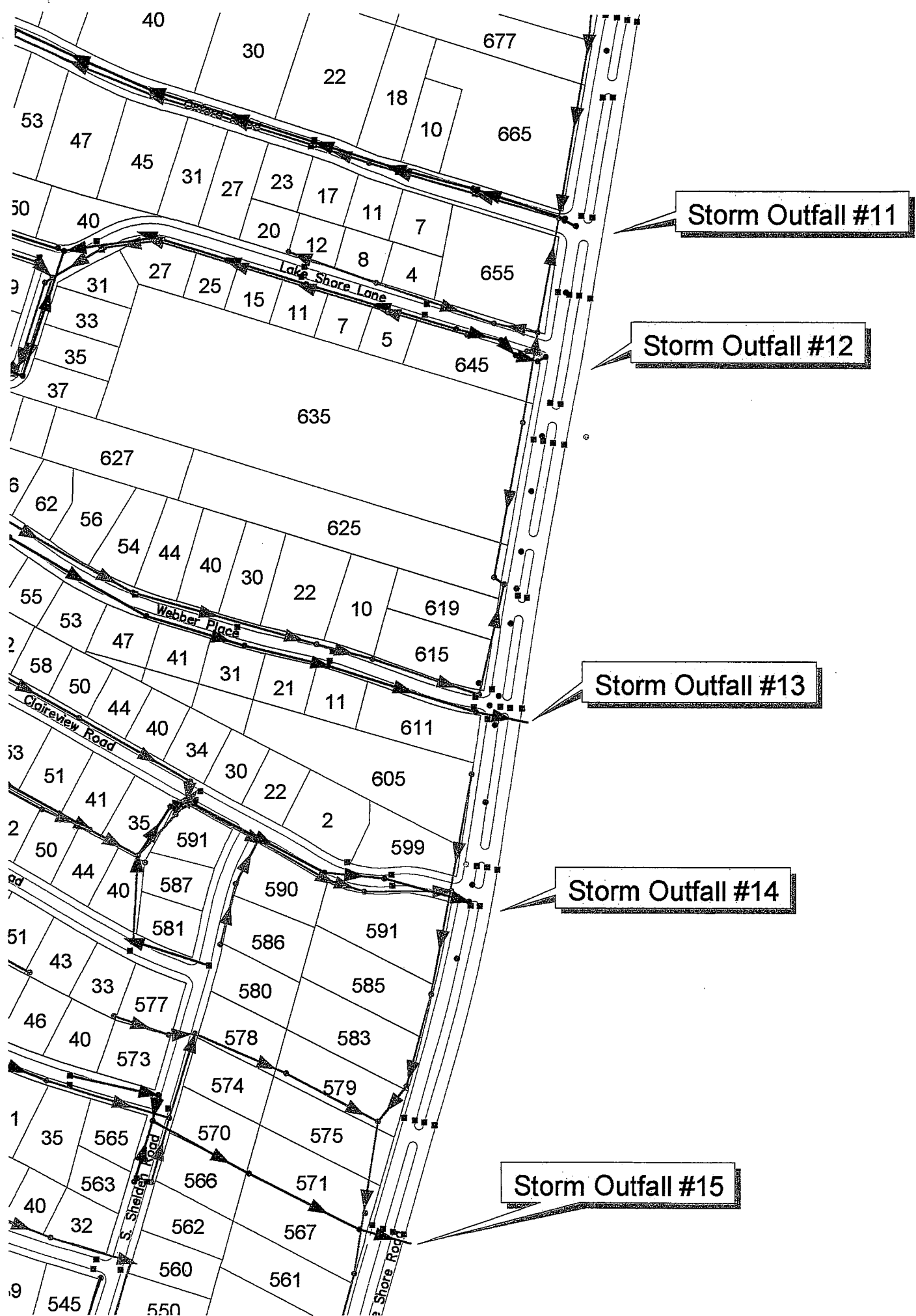
Storm Sewer Outfalls

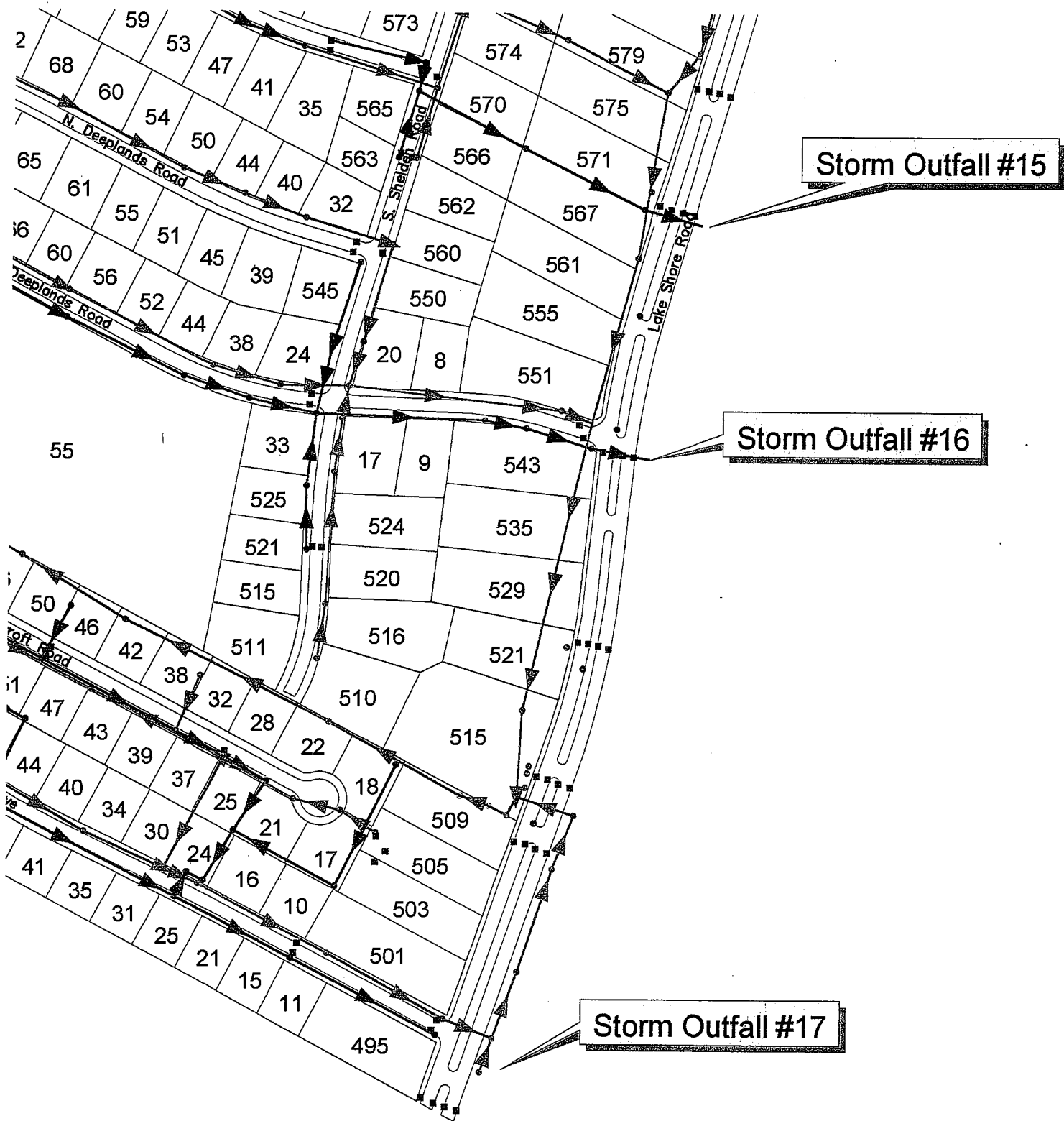
Outfall # & Street	Date	Up Steam Man Hole	Outfall
#1 Fair Lake	10/21/05	O.K.	O.K.
#2 Larned Ln.	10/21/05	O.K.	O.K.
#3 820 Lake Shore	10/21/05	O.K.	O.K.
#4 Willison	10/21/05	O.K.	O.K.
#5 767 Lake Shore	10/21/05	O.K.	O.K.
#6 Fontana	10/21/05	O.K.	O.K.
#7 Fontana	10/21/05	O.K.	O.K.
#8 Straton	10/21/05	O.K.	O.K.
#9 Lochmoor	10/21/05	O.K.	O.K.
#10 Renaud	10/21/05	O.K.	O.K.
#11 Oxford	10/21/05	O.K.	O.K.
#12 Lake Shore Ln.	10/21/05	O.K.	O.K.
#13 Webber	10/21/05	O.K.	O.K.
#14 Clairview	10/21/05	O.K.	O.K.
#15 571 Lake Shore	10/21/05	O.K.	O.K.
#16 S. Deeplands	10/21/05	O.K.	O.K.
#17 Woodland Shores	10/21/05	O.K.	O.K.

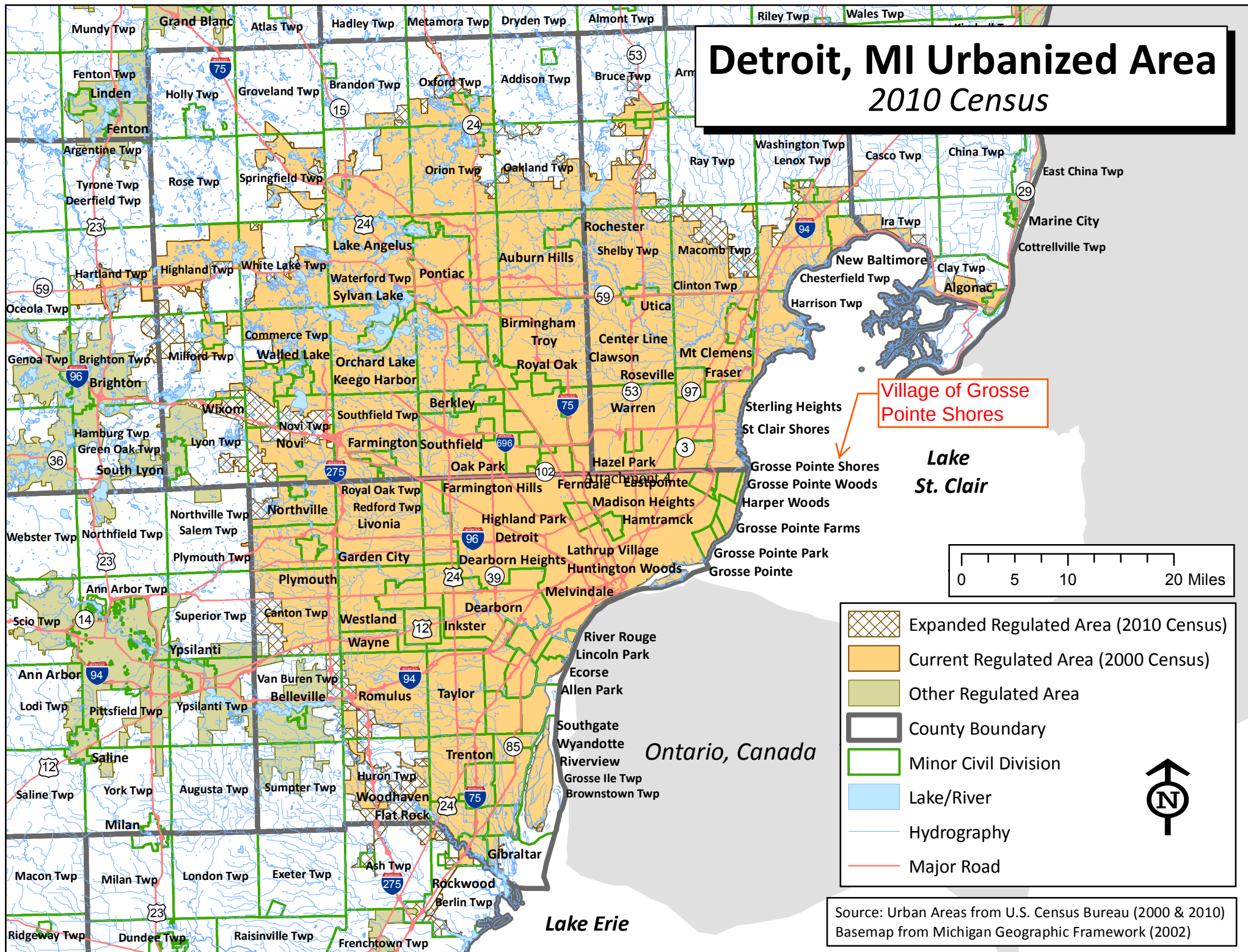












Source: Urban Areas from U.S. Census Bureau (2000 & 2010)
Basemap from Michigan Geographic Framework (2002)

Stormwater Pollution Prevention Plan
(SWPPP)
And
Pollution Incident Prevention Plan (PIPP)

Grosse Pointe Shores
Department of Public Works Maintenance Garage

Updated 2021

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Chapter 1: General Facility Information

Table 1: General Facility Information

NAME OF FACILITY:	Grosse Pointe Shores Department of Public Works Maintenance Garage
FACILITY ADDRESS:	795 Lake Shore Road, Grosse Pointe Shores, MI 48236
FACILITY CONTACT INFORMATION	
Name and Title:	Michael Way, Director of Public Works
Mailing Address:	795 Lake Shore Road, Grosse Pointe Shores, MI 48236
Telephone:	313-886-0020
24-Hour Emergency Telephone:	313-881-6565
Email:	mway@gpshoresmi.gov
SPILL PREVENTION AND CONTROL COORDINATOR	
Name and title:	Chief Kenneth Werenski
Telephone:	313-886-0020
PHASE II PERMIT INFORMATION	
Certificate of Coverage Number and Effective Date of Coverage:	MI0060181
Receiving Waters:	Lake St. Clair

Chapter 2: Stormwater Pollution Prevention and Spill Response Team

Grosse Pointe Shores is committed to maintaining the environmental integrity of city owned property by helping improve stormwater quality through the stormwater permit program. Grosse Pointe Shores Department of Public Works (DPW) staff is knowledgeable in stormwater protection activities in conjunction with their fleet maintenance and material storage operations. The Grosse Pointe Shores DPW Maintenance Garage houses vehicles and materials for vehicle road maintenance and storage piles of aggregate materials. The Grosse Pointe Shores DPW Maintenance Garage also stores road salt in threshold management quantities that requires the development of a Pollution Incident Prevention Plan (PIPP). The PIPP requirements for road salt are integrated into this SWPPP document. The Grosse Pointe Shores DPW Maintenance Garage staff identified to assist in stormwater pollution prevention and pollution incident prevention activities are as follows:

Table 2: Stormwater Pollution Prevention and Spill Response Team

NAME AND TITLE	STORMWATER RESPONSIBILITIES
Michael Way, Director of Public Works	Certification signing; Implementation
Nick Rudd, Water Department	Conducting Inspections; Record Keeping

Chapter 3: Site Map

The Grosse Pointe Shores DPW Maintenance Garage site consists of four (4) buildings. The 4 buildings include the following:

1. DPW Maintenance Garage
2. Fire Station
3. City Hall
4. Community Pool Pump House

The Maintenance Building (1) is where the maintenance of all DPW vehicles and equipment takes place. The interior floor drains all lead to the sanitary sewer. One exterior storm drain, just outside the Maintenance Garage in the parking lot also leads to the sanitary sewer. All drains have been dye-tested by City engineers to confirm drainage patterns.

The fire station houses fire trucks, however maintenance is not performed in this garage. Fire trucks are maintained onsite in the DPW garage and taken offsite by a contractor when necessary.

The Community Pool Pump House is a small brick building with a shingled roof that houses a 450-gallon tank of liquid chlorine that is pumped into the community pool. There is an interior floor drain in this building that leads directly to the sanitary sewer.

Site Map of Grosse Pointe Shores DPW Maintenance Garage, Community Pool House, and Municipal Complex



Chapter 4: Significant Materials & Activities

Inventory and Description of Exposed Significant Materials & Municipal Activities

To identify potential sources of significant materials, County and School District staff, with the assistance of the Southeast Michigan Council of Governments (SEMCOG) conducted an inventory of municipal facilities, activities and materials that may be exposed to stormwater at the Grosse Pointe Shores DPW Maintenance Garage. Municipal Activity Areas consistent with the SWPPP requirements for the Grosse Pointe Shores DPW Maintenance Garage include the following:

1. Loading, unloading and other material handling operations
 - Salt is stored on site inside the maintenance garage in quantities that require a PIPP. The PIPP requirements have been incorporated into this document.
 - A fueling station with underground storage tanks is located just outside the maintenance garage in the employee parking lot.
2. Maintenance and cleaning of vehicles and equipment
 - All vehicle maintenance is conducted indoors, where interior floor drains are connected to the sanitary sewer.

The following areas/activities as identified in the standard SWPPP template are not applicable to the Grosse Pointe Shores DPW Maintenance Garage:

- Outdoor storage
 - No aggregate materials are stored on site. Materials are ordered as needed and delivered directly to job sites, due to very limited space of the DPW yard.
- On-site waste disposal
 - No dumpsters located onsite. City garbage trucks are stored onsite, inside the maintenance garage, that take DPW generated debris directly to the City of Detroit Transfer station on a daily basis.
- Significant dust or particulate generating processes
- Areas of exposed and/or erodible soils
- Discharge from rooftop vents, stacks and air emission controls
- Outdoor manufacturing or processing activities
- Sites of environmental contamination listed under the NREPA Act 451, part 201 of 1994
- Areas of significant material residues
- Areas where wild or domestic animals congregate and deposit waste

The results are displayed in Table 3:

Table 3. Municipal Activities, Significant Materials, Exposure and Material Handling

Municipal Activity Areas	Area/Process Description	Significant Material	Method of Exposure	Exposure Potential	Material Handling & Storage Procedures	Discharge Point ¹
1. Loading, unloading and other material handling operations	Fuel Area	Gas, Diesel	Spills during loading or transfer	Low	One 8,000 gallon double underground storage tank contains 6000 gallons of gas and 2000 gallons of diesel. These tanks are used for fueling of Grosse Pointe Shores equipment and vehicles. The fueling station is covered with a wooden shingled roof and has barrier posts for crash protection. An emergency shut-off valve is located within the fueling area and has posted signage. The fueling area also has a cement slope to direct any potential spills or leaks to puddle in an area close to the fuel station, preventing runoff into any storm drains. A spill kit is located in the Fire Station for spills that may occur during fueling of vehicles.	N/A
	Salt in Maintenance Garage	Road salt (100 tons)	Trackout	Low	PIPP requirements are discussed below	N/A
2. Maintenance and cleaning of vehicles, machines, and equipment	Maintenance Garage	Used oil (250 gal tank) Used antifreeze (1) 55-gal drum New oil (3) 55-gal metal tanks	Spillage during transfer, leaking containers.	Low	Used oil is generated on site and collected from homeowners and stored in a 250-gallon metal tank, which is stored inside the DPW Maintenance Garage. The used oil is hauled and recycled by Future Environmental, Inc. Used oil filters are drained for at least 12 hours, stored in a plastic recycling bin provided by Future Environmental, and hauled away for recycling. The used antifreeze is not generated onsite, but collected from homeowners that drop off their used vehicle fluids. The material is recycled by	N/A

Municipal Activity Areas	Area/Process Description	Significant Material	Method of Exposure	Exposure Potential	Material Handling & Storage Procedures	Discharge Point ¹
					Future Environmental as needed. The new oil is stored inside the DPW Maintenance Garage in three 55-gallon metal tanks that are double-walled for spill and leak protection, have locking lids and locking hand pumps for added security. The oil is delivered in drums, and then transferred to the tanks by DPW staff. Funnels are used to perform the transfer and spill response materials (spill pads, absorbents, and oil dry) are available onsite to aid in pollution prevention. These tanks are stored against the wall of the maintenance garage, to aid in crash protection. Oil hand cans are stored neatly inside a cabinet with locking doors.	
	Street sweepings	Sediment, heavy metals	Leaking vehicle	Low	Street sweepings that are collected from local roadways during municipal street sweeping activities are taken directly to Grosse Pointe Woods for disposal.	N/A
	Catch Basin Cleanings	Sediment, heavy metals	Leaking vehicle	Low	Catch basin cleanings are collected from local storm drains with a vactor truck and taken directly to Grosse Pointe Woods Waste Water Treatment Plant for disposal. They are not stored onsite.	N/A
	Vehicle Wash Area	Vehicle wash water	Sediment, salt	Low	All vehicles and equipment are washed in a dedicated outdoor area where the wash water leads to the exterior storm drain connected to the sanitary sewer.	N/A

Municipal Activity Areas	Area/Process Description	Significant Material	Method of Exposure	Exposure Potential	Material Handling & Storage Procedures	Discharge Point ¹
	Parts Washer	Wash water	Spills or leaks	Low	The parts washer does not contain degreaser, only hot water and is a completely contained unit that recycles the wash water for reuse in parts cleaning. The washer has a mini oil water separator unit that separates the oil into a trap. The oil trap is then drained and added to other used oil onsite for recycling. The wash water is then drained by hand into a bucket and disposed of in the sanitary sewer.	N/A
	DPW Storage Yard	Miscellaneous small equipment	Leaks	Low	The DPW Storage Yard is a small pervious area without storm drains that stores small equipment such as leaf vacuums, trailers, brick that is used for landscaping, and fencing material. All equipment is inspected for leaks prior to being stored outside and is monitored on a monthly basis as indicated in the Routine Inspection Checklist (Appendix A).	N/A

¹ **Discharge point** is any location on the MS4 owned or operated by the permittee that discharges directly to a surface water of the state, or any location on the MS4 owned or operated by the permittee that discharges to any other separate storm sewer system before discharging to a surface water of the state. [Permit No. MIG610000 Definitions]

Solid Salt Storage Area Description (PIPP Requirement)

The Grosse Pointe Shores DPW Maintenance Garage stores road salt inside a dedicated bay within the DPW Maintenance Garage. The salt is stored on the cement floor surrounded by three concrete walls. The capacity of the cement bin is 100 tons. When delivered, the salt is unloaded outside in the employee parking lot and brought inside by a loader.

Loading of salt from the barn into vehicles occurs just inside the DPW Maintenance Garage with a loader. Employees are trained in the procedure to immediately sweep excess salt from track out or spills back into the storage bin.

All buildings have locking doors and remain locked during non-business hours. In addition, fire station employees are staffed 24-hours per day. The grounds are also equipped with outdoor lighting and a surveillance camera that is monitored by the police department.

The salt storage facility **is not** located within 50 feet of a lake shore, stream bank, or wetland, nor is it located in a 100-year floodplain.

Chlorine Storage Description (PIPP Requirement)

Grosse Pointe Shores owns and maintains a community pool across the street from the DPW facility, located on Lake St. Clair. A small pump house, constructed from brick with a shingled roof, houses a 450-gallon single-walled tank of chlorine that is pumped into the pool through enclosed piping. The tank is properly labeled. The pump house has a single interior floor drain that leads directly to the sanitary sewer.

The chlorine is loaded into the tank from smaller containers where it is diluted with water. This process is solely handled by an outside vendor company.

The tank is inspected for leaks and cracks on a monthly basis (see Routine Inspection Checklist, Appendix A).

The pump house does not have any windows and only one door that remains locked at all times. Limited City staff have access to this pump house to prevent extra people from unnecessarily entering this small building and to aid in spill prevention. The property that surrounds the pump house and pool area is gated, which remains locked during non-business hours. This area is also well lit at night with flood lights, and is regularly patrolled by City police.

Spill Response Procedures and Equipment

For significant materials covered under the SWPPP, if there is a spill or release to the waters of the state, a Spill Response Form will be filled out (**Appendix E**), and Grosse Pointe Shores DPW Maintenance staff will contact the MDNRE.

During Regular Business Hours:

SE Michigan District Office
27700 Donald CT
Warren MI 48092-2793
(586) 753-3700

During Non-Business Hours:

Pollution Emergency Alert System (PEAS) at 1-800-292-4706

Detailed spill response procedures related to both the SWPPP and the PIPP are located in **Appendix D**.

List of Significant Spills and Leaks

There have been no significant spills and significant leaks of polluting materials that have occurred at areas that are exposed to precipitation or that otherwise discharge to a point source at the Grosse Pointe Shores DPW Maintenance Garage within the last three years.

Any release that occurs after the SWPPP has been developed shall be controlled in accordance with the SWPPP (see Spill Response Plan, **Appendix D**) and is cause for the SWPPP to be updated as appropriate within 14 calendar days of obtaining knowledge of the spill or loss. The listing shall include spills that occurred over the three (3) years prior to the effective date of a certificate of coverage authorizing discharge under this permit. The listing shall include the date, volume, exact location of release, and actions taken to clean up the material and/or prevent exposure to stormwater runoff or contamination of surface waters of the state.

Summary of Sampling Data

The SWPPP requires a summary of existing stormwater discharge sampling data (if available) describing pollutants in stormwater discharges. **No stormwater sampling has been conducted at this site.**

Chapter 5: Nonstructural Controls

The Grosse Pointe Shores DPW Maintenance Garage is committed to employing preventative maintenance practices through the use of several nonstructural controls to prevent stormwater pollution. These nonstructural controls are everyday types of activities undertaken by employees at the facility. The permit requires that the SWPPP shall, at a minimum, include each of the following non-structural controls:

1. Routine Inspections & Good Housekeeping Procedures
2. Comprehensive Site Inspections
3. Soil Erosion & Sedimentation Control Measures
4. Employee Training Program
5. List of Significant Materials Still Present

Flows from firefighting activities to the City's MS4 are excluded. The City prohibits non-stormwater discharges in the City's MS4 except:

- Water line flushing and discharges from potable water sources
- Landscape irrigation runoff
- Diverted stream flows and flows from riparian habitats
- Rising groundwaters and springs
- Uncontaminated groundwater infiltration and seepage

- Uncontaminated pumped groundwater
- Foundation drains
- Air conditioning condensation
- Waters from noncommercial car washing
- Street wash water
- Dechlorinated swimming pool water from single, two, or three family residences

Routine Inspections and Good Housekeeping Procedures

Preventive maintenance at the Grosse Pointe Shores DPW Maintenance Garage involves the regular inspection, testing, and cleaning of facility equipment, vehicles (including buses), and operational systems. A Routine Inspection Form has been created for the Grosse Pointe Shores DPW Maintenance Garage and is located in **Appendix A**. The Routine Inspection Form will be used by facility staff during site walk-throughs that will be conducted on a **monthly basis**. The purpose of these inspections is to identify and prevent conditions that could lead to stormwater pollution. Good housekeeping procedures reduce the potential for pollutants to come into contact with stormwater.

The Grosse Pointe Shores DPW Maintenance Garage performs all vehicle maintenance for the vehicles and equipment used in the department. Preventative vehicle maintenance is a priority for Grosse Pointe Shores. Mechanics are employed full time at Grosse Pointe Shores DPW Maintenance.

The Grosse Pointe Shores DPW staff perform a pre-trip vehicle inspection each time they drive a Grosse Pointe Shores vehicle. The inspection includes a comprehensive examination of the vehicle for safety, proper operation, and environmental impacts such as fluid leaks. When problems occur, the vehicle drivers indicate the problems to the DPW Maintenance Staff. Maintenance is scheduled on the vehicle within 24 hours. If fluid leaks are present, drip pans are used to catch fluids to prevent spills or releases.

Completed vehicle maintenance records and Routine Inspection Forms will be kept on file with the SWPPP.

Part 5 rules also require surveillance of polluting materials. The routine inspections will include this information for the Salt Barn and the oil storage areas.

A log of the routine inspections and corrective actions shall be maintained on file and shall be retained for three years.

Comprehensive Site Inspection

The permit requires a schedule for comprehensive site inspections to include but not be limited to, the areas and equipment identified in the good housekeeping procedures, a review of the routine preventive maintenance reports, and any other paperwork associated with the SWPPP. The whole facility will be evaluated during the comprehensive inspection. This inspection will determine the overall adequacy of the SWPPP and will be coordinated with the annual plan review.

The comprehensive site inspection for the Grosse Pointe Shores DPW Maintenance Garage will be conducted once every six months. A report of the comprehensive site inspection results shall be

prepared and retained for three years. The report shall identify any incidents of non-compliance with the SWPPP or this permit. If there are no reportable incidents of non-compliance, the report shall contain a certification that the facility is in compliance with this permit. The Comprehensive Site Inspection and Report Form that will be used for each inspection is located in **Appendix B**.

Soil Erosion & Sedimentation Control Measures

The permit requires the identification of areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion. ***There are no areas present that have a high potential for significant soil erosion.***

Employee Training Program

The permit requires a description and documentation of employee training programs which will be implemented to inform appropriate personnel at all levels of responsibility the components and goals of the SWPPP. Records of employee must be kept and retained on site documenting employee training. Employee training components include:

Employees Trained	Training Description and Frequency
New Grosse Pointe Shores DPW Maintenance Employees	Upon hire, employees will: • View the MDNRE online employee training video “Stormwater Employee Training” during the Phase II permit cycle.
All Grosse Pointe Shores DPW Maintenance Staff	• Review the final SWPPP. • Review Spill Response Plan • View the MDNRE online employee training video “Stormwater Employee Training” during the Phase II permit cycle.

List of Significant Materials Still Present

The permit requires the identification of significant materials expected to be present in stormwater discharges following implementation of nonstructural preventative measures and source controls. ***No significant materials are expected to be present.***

Chapter 6: Structural Controls

The permit requires that where implementation of non-structural controls does not control stormwater discharges to prevent contact with significant materials to the maximum extent practicable, the SWPPP shall provide a description of the location, function, and design criteria of structural controls for prevention and treatment.

Several structural controls have been implemented at the Grosse Pointe Shores DPW Maintenance Garage to prevent stormwater from being exposed to significant materials and municipal activities. These structural controls include:

Structural Control Type	Description	Significant Materials Intended to be Managed
Protective mat over catch basin	A protective mat has been installed over the storm drain that is closest to the DPW Maintenance Garage to prevent salt from entering during loading and unloading operations.	Salt, sediment
Catch basin cleaning	The catch basins in the DPW parking lot are inspected monthly and vactored out annually	Sediment, vehicle fluid leaks, gasoline, leaks and spills.

Chapter 7: Annual Review

The permit requires that the permittee shall review the SWPPP annually after it is developed and maintain written summaries of the reviews (See **Appendix C** for Annual Review Form). Based on the review, the Grosse Pointe Shores DPW Maintenance Garage will amend the SWPPP as needed to ensure continued compliance with the terms and conditions of the permit. The annual review will be retained on site.

Chapter 8: Record Keeping

Grosse Pointe Shores DPW Maintenance Garage will maintain records of all SWPPP-related inspections and maintenance activities. Records will also be kept describing spills or other discharges that can affect the quality of stormwater runoff. All such records will be retained for three years. The following records are required to be kept by the Phase II permit:

- Routine and Good Housekeeping Inspection Reports
- Comprehensive Inspection Reports
- Written summaries of the annual SWPPP review

The PIPP requires that Grosse Pointe Shores will notify the MDNRE Water Bureau District Office within 30 days of completing the PIPP requirements at:

SE Michigan District Office
27700 Donald CT
Warren MI 48092-2793
(586) 753-3700

Grosse Pointe Shores will also notify the following agencies that the PIPP requirements have been completed:

- Wayne County Public Health Department:
Health Administration Building
33030 Van Born
Wayne, MI 48184
(734) 727-7000
- Local Emergency Planning Committee:
Ms. Lisa DiRado
10250 Middlebelt
Detroit MI 48242
734-942-5289

Chapter 9: SWPPP Certification

The completed SWPPP shall be signed by the facility manager and certified stormwater operator or stormwater program manager, as applicable, and retained on-site at the facility which generates the stormwater discharge.

Nicholas Rudd Water operator

Printed Name and Title

 11-3-2021

Signature and Date

Michael Way DPW Director

Printed Name and Title

 11-3-2021

Signature and Date

Appendix A: SWPPP Routine Inspection and Good Housekeeping Report

Date:	Facility Name:
Inspector Name:	
Routine Inspection Schedule: Monthly	

Preventative maintenance involves the regular inspection, testing, and cleaning of facility equipment, vehicles, and operational systems. All systems and equipment in which a breakdown could result in significant materials impacting stormwater runoff should be included in a preventative maintenance and good housekeeping program.

Municipal Activity Area #1: Loading, unloading, and other material handling operation areas

Fueling Area

Check Box	Method	Comment/Action Taken
☐	Spill clean-up materials are located inside the DPW Maintenance Garage and the Fire Station (<i>do not hose down the area for cleaning. Use broom.</i>)	
☐	Fuel pump shutoffs are installed and working properly	
☐	Fuel dispensing equipment is properly maintained	
☐	Overflow protection devices on tank systems	
☐	Protective guards are installed around tanks	
☐	Hose breakaways are implemented and properly working	
☐	Storm drains are covered during transfer of fuel	
☐	Procedures are in place to have employees avoid topping off tanks	
☐	Employees are trained to report fuel leaks as soon as possible	

Salt Storage Area

Check Box	Method	Comment/Action Taken
☐	Spill clean-up materials are located near salt storage area (<i>e.g. broom, shovel, absorbents</i>)	
☐	Salt storage area is swept to contain trackout, and salt is returned for reuse (<i>don't hose down the area</i>)	
☐	Check loading/unloading equipment for leaks, through a vehicle/equipment inspection	
☐	Protective mat is installed and functioning properly over closest storm drain during loading of salt in parking lot	
☐	Interior floor drains are inspected monthly. Ensure sumps are vactored out as needed.	

Chlorine Storage at Pool Pump House

Check Box	Method	Comment/Action Taken
☐	Interior floor drain is covered to prevent spills from entering sanitary sewer	
☐	Chlorine tank is inspected for leaks or cracks and is repaired immediately.	
☐	Chlorine tank is properly labeled	
☐	Area around chlorine tank is easily accessible and is free of materials and equipment.	
☐	Spill kit materials are stocked and available in the pump house	

Onsite Catch Basins

Check Box	Method	Comment/Action Taken
☐	Inspect catch basins monthly and vactor them out when sumps are full.	

Municipal Activity Area #2: Maintenance and cleaning of vehicles, machines, and equipment

Maintenance Garage

Check Box	Method	Comment/Action Taken
☐	Spill clean-up materials (<i>oil dry, absorbent pads, oil dry, brooms, shovels, etc.</i>) and procedures are clearly accessible to employees	
☐	Funnels are used when transferring fluids	
☐	Floors are swept with debris disposed of (<i>not hosed down</i>)	
☐	Any batteries are stored inside	
☐	All cracked batteries are stored in a non-leaking secondary container to retain acid leaks.	
☐	Use drip pans while performing maintenance (<i>such as removing parts, unscrewing filters, or unclamping hoses.</i>) Promptly transfer used fluids to the proper waste or recycling drums.	
☐	New oil tanks are inspected for leaks or cracks and are repaired immediately.	
☐	Oil tanks are properly labeled	
☐	New oil tanks are free of oil residue (use spill pads and absorbents to clean and prevent leaks)	
☐	Drain used oil filters for a minimum of 12 hours prior to recycling.	
☐	Used oil filter container is inspected for leaks or cracks and is replaced as necessary	

Vehicle and Equipment Washing Areas

Check Box	Method	Comment/Action Taken
☐	Wash equipment and vehicles in designated area just outside the DPW Maintenance Garage where the wash water goes to the sanitary sewer.	
☐	Use biodegradable, phosphate-free soap or just water to clean vehicles and equipment	

☐	Inspect sumps monthly and clean out as often as needed, or at least annually.	
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Used Oil Storage

Check Box	Method	Comment/Action Taken
☐	Used oil drums are inspected for leaks or cracks and are repaired immediately.	
☐	Secondary containment structure is inspected for leaks or cracks and is repaired immediately.	
☐	Drums and containment structure is kept clean of oil residue	
☐	Drums and containment structure is kept closed at all times, except when filling	
☐	Tanks are properly labeled "Used Oil"	

DPW Outdoor Storage Yard

Check Box	Method	Comment/Action Taken
☐	Inspect equipment for leaks or spills of fluids.	
☐	Drip pans are available and used for leaking equipment. Maintenance is scheduled immediately and necessary repairs are made.	
☐	Prior to storing any drums or containers outside, ensure they are triple-rinsed with wash water directed to sanitary sewer.	
☐	Store drums upside down to avoid collection of stormwater	
☐	Recycle (or crush and place in landfill) any unused drums or containers	

Appendix B: SWPPP Comprehensive Inspection Report

Date:	Facility Name:
Inspector Name:	
Comprehensive Inspection Schedule: Every three months	

The permit requires a schedule for comprehensive site inspection (see Table 3) to include but not be limited to, the areas and equipment identified in the preventive maintenance program and good housekeeping procedures, a review of the routine preventive maintenance reports, and any other paperwork associated with the SWPPP. The whole facility should be evaluated during the comprehensive inspection. In contrast to the routine inspections, comprehensive inspections should focus on areas that have a reasonable potential for significant materials to contaminate stormwater runoff. This inspection should determine the overall adequacy of the SWPPP and should be coordinated with your annual plan review.

Check Box	Method	Comment/Action Taken
☐	Review Routine Inspection and Good Housekeeping Forms	
☐	Review vehicle and equipment maintenance logs	
☐	Review spill reports (if applicable)	
☐	Review Spill Response Procedures and phone numbers for updates	
☐	Perform inspection of outfalls	
☐	Ensure Material Safety Data Sheets are up-to-date and available for all chemicals onsite	
☐	Check high risk areas for need of safety posts, barriers, or fences to eliminate accidental spills due to human error. Many of these types of structures may already be required under other regulations.	

Appendix C: Annual SWPPP Review Form

Date of Review:

Reviewer Name	
Print:	Signature:

Annual SWPPP Review Checklist

1) Facility general information and SWPPP team information is current and accurate	Yes	No	
2) Site map is current and accurate	Yes	No	
3) Significant material inventory is current and accurate	Yes	No	
4) New exposures, processes and related controls have been documented	Yes	No	NA
5) Spills have been recorded and reported as appropriate	Yes	No	NA
6) Records of routine preventative maintenance, housekeeping and employee training are available in the SWPPP file	Yes	No	
7) Comprehensive site inspections have been completed, certified and filed in the SWPPP file	Yes	No	
8) Corrective actions noted in the inspection reports have been completed	Yes	No	
9) Annual fees have been paid	Yes	No	
10) Permit renewal request has been processed	Yes	No	NA
11) SWPPP has been reviewed and signed by the Stormwater Program Manager and the Permittee or designated representative	Yes	No	

Additional Comments:

Appendix D: Grosse Pointe Shores DPW Maintenance Garage Spill Response Plan

EMERGENCY NUMBERS (to be posted at key telephones throughout facility)

Fire Department

Emergency 911
Non-Emergency 313-881-5500

Police

Emergency 911
Non-Emergency 313-881-5500

U.S. Coast Guard

National Response Center 800-424-8802

Michigan Department of Natural Resources and Environment (MDNRE)

8:00 a.m. – 5:00 p.m.

SE Michigan District Office
(586) 753-3700

After Hours:

PEAS Hotline 1-800-292-4706

Grosse Pointe Shores Public Safety Department

To be called for spill response services in the event the County is unable to properly respond (i.e., large or hazardous spills)

Emergency 911
Non-Emergency 313-881-5500

Waste Water Treatment Plant

For spills into the sanitary system, contact the Detroit Water and Sewerage Wastewater Treatment Plant at 313-267-7401.

SPILL RESPONSE PLAN - FOR SMALL SPILLS (Less than 5 gallons)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder
2. Stop source of spill (plug hole, upright the container, shut off valve)
3. Check for hazards (flammable material, noxious fumes, cause of spill). If flammable liquid is spilled, turn off engines and (nearby electrical equipment). If serious hazards are present leave the area and call 911. When in doubt consult the Material Safety Data Sheets for hazards
4. Notify Supervisor
5. Block the nearest storm drain (use absorbent or other material as necessary, close valve to drain, cover or plug drain)
6. If spilled material has entered a storm sewer, check catch basins and contact Nick Rudd at 313-886-0020.
7. Clean up spilled material/absorbent (do not flush with water)
8. Dispose of cleaned material/absorbent into secure container for proper disposal
9. Complete a Spill Reporting Sheet

SPILL RESPONSE EQUIPMENT

- 5 lb floor dry
- 1 – Shovel
- 1 - Broom
- 1 – Absorbent Boom
- 5– Absorbent Pads
- Container for clean-up (dustpan, 5-gallon container, etc)

SPILL RESPONSE PLAN - MEDIUM SPILLS (5 < 50 gallons)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder.
2. Stop source of spill (plug hole, upright the container, shut off valve).
3. Check for hazards (flammable material, noxious fumes, cause of spill). If flammable liquid is spilled, turn off engines and nearby electrical equipment. If serious hazards are present leave the area and call 911. When in doubt consult the Material Safety Data Sheets for hazards.
4. Contact co-workers and Supervisor for assistance and to make them aware of the spill and potential dangers.
5. Block the nearest storm drain (use absorbent or other material as necessary, close valve to drain, cover or plug drain).
6. Stop spill from spreading (use absorbent or other material).
7. If spilled material has entered a storm sewer, check catch basins and contact Nick Rudd at 313-886-0020.
8. Clean up spilled material/absorbent (do not flush with water) – If outside clean-up service is required contact.
9. Dispose of cleaned material/absorbent into secure container for proper disposal.
10. Complete a Spill Reporting Sheet.

SPILL RESPONSE EQUIPMENT

- 20 lb floor dry
- 1 – Shovel
- 1 - Broom
- 2 – Absorbent Booms
- 20 – Absorbent Pads
- Container for clean-up (30 gal)

SPILL RESPONSE PLAN - LARGE SPILLS (Greater than 50 Gallons or 50 pounds, including salt or chlorine)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder
2. Stop source of spill (plug hole, upright the container, shut off valve)
3. Check for hazards (flammable material, noxious fumes, cause of spill). If flammable liquid is spilled, turn off engines and nearby electrical equipment. If serious hazards are present leave the area and call 911.
4. Call Nick Rudd at 313-886-0020 to make them aware of the spill and potential dangers. Notify police and fire departments if necessary for possible lane closure and need for assistance.
5. **LARGE SPILLS ARE LIKELY TO PRESENT A HAZARD AND WILL REQUIRE SPILL RESPONSE SERVICES FROM THE GROSSE POINTE SHORES PUBLIC SAFETY DEPARTMENT**
6. Protect all drains from spilled material (use absorbent or other material as necessary, cover or plug drain)
 - a. A spill kit is located at 795 Lake Shore Road, Grosse Pointe Shores, MI 48236 and consists of the proper spill response equipment for spills ranging from less than 5 gallons to spills over 50 gallons.
 - b. The MSDS for salt and chlorine is kept at the DPW and at the pool pump house.
7. Stop spill from spreading (use absorbent or other diking material such as sand, dirt, etc.)
8. For spills of materials indoors, clean up spilled material with absorbents, oil dry, etc. (Do not flush with water). If material is spilled outside, a clean-up service may be required.
9. Spilled salt will be swept up and either transferred to the Salt Barn, or into a truck for road application use. Industry standards will be followed regarding usage concentration and application rates using normally accepted practices.
10. Dispose of cleaned material/absorbent into secure container for proper disposal.
11. A call to PEAS at 800-292-4706 will be made to report the release.
12. Submit written report within 10 days after the release to:
 - a. MDNRE Water Bureau District Supervisor that oversees the area where the release occurred:
SE Michigan District Office
27700 Donald CT
Warren MI 48092-2793
 - b. Wayne County Public Health Department:

Health Administration Building
33030 Van Born
Wayne, MI 48184
Fax: (586) 469-5885

SPILL RESPONSE EQUIPMENT

- 20 lb floor dry
- 1 - Broom
- 1 – Shovel
- Caution Tape
- 5– Absorbent Booms
- 20 – Absorbent Pads
- Container for clean-up (30 gal)

Appendix E: SPILL REPORTING SHEET

Date of Incident	
Time of Incident	
Location & Cross Streets	
Type of Spill	
Estimated Quantity	
Reported To	
Time Reported	
Responsible Party	
Address	
Phone Number/Contact	
Describe materials used to clean up spill:	
Describe response measures that have been done, and the schedule for completion of other measures to be taken, or both	
Describe measures taken to prevent recurrence of similar releases	
Completed By:	

Additional Notes:

Village of Grosse Pointe Shores

Total Maximum Daily Load (TMDL) Implementation Plan

The City shall implement the TMDL Implementation Plan to reduce the discharge of pollutants from the permittee's MS4 to make progress in meeting Water Quality Standards. The City shall implement the TMDL Implementation Plan as part of the SWMP.

The following TMDL(s) is applicable to the discharge from the permittee's MS4:

- Lake St. Clair Metropolitan and Memorial Beaches - E. Coli

As stated in the application and our subsequent response, Lake St. Clair Metro Beach is approximately 10 miles north of the closest city outfall, while Memorial Beach is approximately 6 miles north. Lake St. Clair would dilute any stormwater draining from the City's MS4. This point was proven by the Macomb County Health Department during their Lake St. Clair Assessments conducted annually between 1998 and 2005. Given that storm drain outlets in the Grosse Pointe area are further downstream from the beaches and subject to greater dilution (given its proximity to the outlet of Lake St. Clair), the City maintains that its MS4 discharges will have no impact on the E. coli concentrations at these beaches. However, as part of its stormwater permit activities, the City will commit to sampling the same 8 outfalls in year 2 and year 4 of the permit cycle that are not submerged. The 8 outfalls that will be sampled are outfalls #6, #8, #9, #11, #13, #14, #15, and #17. The City will sample within 30-60 minutes of a 0.25-inch rainfall event. Due to the proximity to Lake St. Clair, the storm system is partially or entirely submerged during dry weather conditions. During wet weather conditions, the system is entirely submerged. If the outfall is submerged, the City will attempt to sample at an upstream representative catch basin or manhole. If flow is present in non-submerged outfalls, then the City will collect one **wet** weather sample and analyze for E. coli. If the **wet** weather sample results > 1000 cts/100 ml the permittee shall increase implementation of high priority actions; focus on source elimination/confirmation.

The TMDL lists the possible sources of E. coli as combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), failing septic systems, illicit connections to storm sewers, and wildlife and/or pet waste.

- I. The City of Grosse Pointe Shores shall implement the prioritized Best Management Practices (BMPs) included in the TMDL Implementation Plan during the permit cycle to make progress in achieving the pollutant load reduction requirement in the TMDL. The City shall review, update, and revise the list of BMPs implemented as part of the TMDL Implementation Plan in accordance with the procedure included in the SWMP. The Michigan Department of Environmental Quality (MDEQ) may determine that a permit modification is required, after opportunity for public comment, based on modifications to the TMDL Implementation Plan. The MDEQ will notify the City if a modification is required.

The following BMPs are prioritized in accordance with activities that are most likely to discover or eliminate sources of E.coli to Lake St. Clair.

1. **Illicit Discharge Elimination Plan (IDEP) Outfall Inspections (High Priority):** The City currently inspects all of its outfalls once every five (5) years in accordance with the Village of Grosse Pointe Shores Illicit Discharge Elimination Plan.

Dry weather inspections are conducted if no rain/precipitation event has occurred for a minimum of 48 hours. If flow is observed in the sewer at that time, it may be attributed to sewage, cooling water, sump pump discharge, infiltration from ground water sources, or runoff from potable water sources such as lawn sprinklers.

The City may be able to locate the source of an illicit connection/discharge solely through visual observation of flow in the storm sewer at manholes. Odor, color, turbidity, bacteria growth, quantity of flow, etc., may lead to the source of a problem without additional sampling. All storm outfalls that are

discharging during dry weather will be investigated further by upstream visual inspection or with televising, as-built pipe schematic review, dye and/or smoke testing, sampling, or other investigation as needed to determine the nature and source of the flow.

2. **Catch Basin Cleaning (High Priority):** Catch basin investigations and cleaning are performed on a rotating basis; a few sections of the City are performed per year. All catch basins are cleaned every 2 years. No catch basins are prioritized – all are given high priority. During investigations/cleaning, if some areas are identified as being severely clogged, these areas will then be put on the priority list for cleaning in the future.

Catch basin waste is taken to the Grosse Pointe Woods Wastewater Treatment Plant to be dried, and then hauled away to a landfill for disposal.

3. **Street Sweeping (High Priority):** All City-owned streets are swept monthly. Street sweeping waste is dried at the Grosse Pointe Woods Wastewater Treatment Plant, and then taken to a landfill for disposal. Priority is given to curbed areas.

The City utilizes an Elgin Crosswind street sweeping machine. The machine has a 12 foot sweeping path with a debris hopper of approximately 8 cubic yards. We consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc. For example (found in Street & Parking Lot Maintenance SOP):

- High pollutant loadings areas
- Areas identified by staff with sediment accumulation
- High litter or erosion areas

4. **Public Education (Medium Priority):** The City of Grosse Pointe Shores is to perform all Public Education activities required by the NPDES MS4 Permit. The activities specifically related to the reduction of E. Coli to the water ways are as follows:
 - a. The City's Website is to contain information and links on Clean Boating, Riparian Management, and Waterfront Wisdom.
 - b. The City's Newsletters will include articles that pertain to the reduction of E. coli Pollution. The articles include Clean Boating, cleaning up after pets, what not to discharge to the separate storm sewer system, and septic system maintenance.
 - c. The City will promote water quality workshops put on by the Michigan State University Extension, Macomb County, Southeast Michigan Council of Governments, and the Clinton River Watershed Council.
5. **Riparian Management (High Priority):** The City takes steps to properly maintain its riparian areas.
 - a. **Riparian Buffers:** The City is to maintain no-mow buffers, containing natural vegetation, along all water ways. The purpose of the buffers is to absorb nutrient and pet waste runoff as well as discourage the migration of waterfowl from the water to land.
 - b. **Pet Waste Receptacles:** The City installed pet waste receptacles along North Shore Road. The City will enforce the cleaning of pet waste in all public areas.
6. **Regional Collaboration (Medium Priority):** The City of Grosse Pointe Shores will participate in and collaborate with other entities/groups in the region. They include, but are not limited to, the following:
 - Lake St. Clair Direct Drainage District Storm Water Action Group
 - Macomb County Public Works Office
 - Macomb County Health Department
 - Clinton River Watershed Council
 - Southeast Michigan Council of Governments
 - Michigan State University Extension

Prioritization of BMPs and the implementation of additional BMPs will be considered on a biennial basis based on the surface water monitoring results.

- II. The City will commit to sampling the same 8 outfalls in year 2 and year 4 of the permit cycle that are not submerged, as well as referencing the routine water quality testing data collected by the Macomb County Health Department. The Macomb County Health Department conducts routine water quality tests from mid-April through September each year as part of their Bathing Beach Water Quality Monitoring Program. Both the Lake St. Clair Metropark and St. Clair Shores Memorial Park Beaches are tested for E. coli bacteria as part of this program. This data shall be used to assess the effectiveness of the BMPs implemented in make progress toward achieving the TMDL pollutant load reduction. The monitoring data shall be submitted with each progress report.