



National Pollution Discharge Elimination System

Permit Application for Discharge of Storm Water to Surface Water of
the State from a Municipal Separate Storm Sewer System

November 2022

**CITY OF PORTAGE
KALAMAZOO COUNTY, MICHIGAN**

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Chapter 1 – Storm Water Discharge Permit Application

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Abbreviated National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Application Form (Reissuance)

version 1.10

(Submission #: HPG-17EG-EEKQW, version 1)

Details

Submission ID HPG-17EG-EEKQW

Submission Reason Renewal

Status On Hold

Form Input

Existing Permit Details

Existing Permit ID (Read Only)

1045599506745842154

Existing Permit Number (Read Only)

MI0060084

Applicant Information

Applicant Information

Organization Name

City of Portage

Phone Type

Number

Extension

Business

2693294428

Email

harmonj@portagemi.gov

Fax

NONE PROVIDED

Address

7719 S WESTNEDGE AVE

PORTAGE, MI 49002

United States

Permittee Type

City

Is this a Phase I or Phase II?

PHASE II

MS4 Location Information

Municipal Entity Name (e.g., City of Lansing)

Portage MS4-Kalamazoo

Identify the Primary Municipal Facility or the Mailing Address Location

A site needs to be identified as part of the application. Identify the physical address for the municipal entity, such as the primary municipal facility (e.g., City Hall).

Facility Location

42.24500000000001,-85.56166600000000

MS4 Contacts (1 of 3)

CONTACTS

A contact must be provided for each of the roles listed below. You may assign more than one role to a single contact by holding down the 'Ctrl' key while selecting each role. Use the "+" (repeat section) button to add an additional contact.

Contact

Annual Permit Billing Contact

Contact Information

Prefix

Ms.

First Name

Last Name

Kendra

Gwin

Title

Director of Transportation & Utilities

Organization Name

City of Portage

Phone Type

Number

Extension

Business

2693294422

Email

gwink@portagemi.gov

Fax

NONE PROVIDED

Mailing Address:

7719 S WESTNEDGE AVE

PORTAGE, MI 49002

United States

MS4 Contacts (2 of 3)

CONTACTS

A contact must be provided for each of the roles listed below. You may assign more than one role to a single contact by holding down the 'Ctrl' key while selecting each role. Use the "+" (repeat section) button to add an additional contact.

Contact

Storm Water Program Manager
Application Contact

Contact Information

Prefix

Ms.

First Name

Jamie

Last Name

Harmon

Title

Assistant City Engineer

Organization Name

City of Portage

Phone Type**Number****Extension**

Business

2693294428

Email

harmonj@portagemi.gov

Fax

NONE PROVIDED

Mailing Address:

7719 S WESTNEDGE AVE

PORTAGE, MI 49002

United States

MS4 Contacts (3 of 3)

CONTACTS

A contact must be provided for each of the roles listed below. You may assign more than one role to a single contact by holding down the 'Ctrl' key while selecting each role. Use the "+" (repeat section) button to add an additional contact.

Contact

Storm Water Program Manager

Application Contact

Contact Information

Prefix

Ms.

First Name

Jamie

Last Name

Harmon

Title

City of Portage

Organization Name

City of Portage

Phone Type**Number****Extension**

Business

2698062279

Email

harmonj@portagemi.gov

Fax

NONE PROVIDED

Mailing Address:

7719 S WESTNEDGE AVE

PORTAGE, MI 49002

United States

Regulated Area, Outfalls/Points of Discharge, and Nested Jurisdictions

Regulated Area

Identify the urbanized area(s) within the applicant's jurisdictional boundary as defined by the 2010 Census. The regulated MS4 means an MS4 owned or operated by a city, village, township, county, district, association, or other public body created by or pursuant to state law and the nested MS4 identified below that is located in an urbanized area and discharges storm water into surface waters of the state. The 2010 Census maps are located at the Urbanized Area Link below.

[Urbanized Area Link](#)

Select Applicable Urbanized Area(s)

Kalamazoo

Did the applicant's regulated MS4 expand since the 2000 Census? ?If yes, the applicant shall consider the expanded regulated MS4 in all responses provided below.

NO

Outfall and Point of Discharge Information

Provide the following information for each of the applicant's MS4 outfalls and points of discharge within the regulated area, including new outfalls and points of discharge in the expanded regulated area: identification number; description of whether the discharge is from an outfall or point of discharge; description of whether the outfall or point of discharge is newly identified in this application, previously identified in the last application, or authorized during the current permit term; and the surface water of the state that receives the discharge.

An outfall means a discharge point from an MS4 directly to surface waters of the state.

A point of discharge means a discharge from an MS4 to an MS4 owned or operated by another public body. In the case of a point of discharge, the surface water of the state is the ultimate receiving water from the final outfall.

Please note that an MS4 is not a surface water of the state. For example, an open county drain that is a surface water of the state is not an MS4.

OUTFALL AND POINT OF DISCHARGE INFORMATION

[2020 Storm Outfall Map.pdf - 03/29/2022 10:32 AM](#)

Comment

NONE PROVIDED

Nested Jurisdictions

Submit the name and general description of each nested MS4 for which a cooperative agreement has been reached to carry out the terms and conditions of the permit for the nested jurisdiction. The applicant shall be responsible for assuring compliance with the permit for those nested jurisdictions with which they have entered into an agreement and listed as part of the Application. If the primary jurisdiction and the nested jurisdiction agree to cooperate so that the terms and conditions of the permit are met for the nested MS4, the nested jurisdiction does not need to apply for a separate permit. A city, village, or township shall not be a nested jurisdiction.

Use the "+" (repeat section) button to add an additional Jurisdiction contact.

Nested Jurisdiction

Prefix

NONE PROVIDED

First Name

NONE PROVIDED

Last Name

NONE PROVIDED

Title

NONE PROVIDED

Organization Name

NONE PROVIDED

Phone Type**Number****Extension**

NONE PROVIDED

Email

NONE PROVIDED

Fax

NONE PROVIDED

Address

[NO STREET ADDRESS SPECIFIED]

[NO CITY SPECIFIED], MI [NO ZIP CODE SPECIFIED]

United States

General SWMP, Enforcement Response Procedure, and Public Participation/Involvement Program

STORM WATER MANAGEMENT PROGRAM (SWMP)

This Application requires certification of the Best Management Practices (BMPs) the applicant will continue to implement for each minimum control measure and proposed BMPs to be implemented to fully meet each minimum control measure and the applicable water quality requirements during the permit cycle. The applicant identified BMPs to develop an approved SWMP as part of the previously submitted Application associated with the current permit. As part of this Application, the SWMP shall be modified/updated as needed, implemented, and enforced to reduce the discharge of pollutants from the MS4 to the Maximum Extent Practicable and protect water quality in accordance with the appropriate water quality requirements of the NREPA 451, Public Acts of 1994, Part 31, and the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et seq.). The Maximum Extent Practicable may be met by implementing the BMPs identified in the SWMP and demonstrating the effectiveness of the BMPs. The applicant shall certify continued implementation of the previously approved SWMP and attach any appropriate and necessary documentation to update the SWMP and demonstrate compliance with the six minimum control measures and applicable water quality requirements as part of this Application. All updates to the SWMP will be reviewed for approval as part of the application review process.

The applicant shall complete this Application to the best of its knowledge and ensure that it is true, accurate, and meets the minimum requirements for a SWMP to the Maximum Extent Practicable. All references to the plans, programs, and BMPs to be certified for continued implementation are those from the previously submitted MS4 Individual Permit Application associated with the current permit. The content from the previously submitted Application will be available in MiWaters as part of the public notice process for this Application.

When answering the questions in this section of the Application, the applicant's MS4 encompasses what the applicant identified in the sections above. The applicant shall include a measurable goal for each new BMP or certify the approved measurable goal continues to be applicable. Each measurable goal shall include, as appropriate, a schedule for BMP implementation (months and years), including interim milestones and the frequency of the action. Each measurable goal shall have a measure of assessment to measure progress towards achieving the measurable goal. A United States Environmental Protection Agency (USEPA) guidance document on measurable goals is available at http://water.epa.gov/polwaste/npdes/swbmp/upload/measurablegoals.pdf#_ga=1.38737702.463004347.1438199466.

If the applicant chooses to work collaboratively with watershed or regional partners to implement parts of the SWMP, each applicant will be responsible for complying with the minimum permit requirements.

It is recommended that files be separated and then converted to a PDF format before being attached below to meet the file size limit. For best results, upload one document at a time. Please be aware that files exceeding 500 MB in size are not recommended.

[USEPA measurable goals guidance document link](#)

Enforcement Response Procedure (ERP)

Is the previously approved ERP true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Public Participation/Involvement Program (PPP)

Is the previously approved PPP true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including any expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Public Education Program (PEP)

PEP Procedures

NONE PROVIDED

Comment

NONE PROVIDED

Is the previously approved PEP true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Illicit Discharge Elimination Program (IDEP)

Is an up-to-date storm sewer system map(s) available, including any expanded regulated area? The map(s) shall identify the following: the storm sewer system, the location of all outfalls and points of discharge, and the names and location of the surface waters of the state that receive discharges from the permittee's MS4 (for both outfalls and points of discharge). If no, the application is considered incomplete.

YES

Was the applicant's MS4 previously prioritized for detecting non-storm water discharges? If yes, provide the updated procedure for prioritizing the detection of non-storm water discharges to target areas with high illicit discharge potential during the permit cycle, including the number of outfalls/points of discharge by geographic area using either a narrative description or map.

NO

Is the previously approved IDEP true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Construction Storm Water Runoff Control Program

Is the previously approved Construction Storm Water Runoff Control Program true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Post-Construction Storm Water Runoff Program

Is the previously approved Post-Construction Storm Water Runoff Program true, accurate and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Pollution Prevention and Good Housekeeping Program

Does the applicant have any new owned or operated facilities not identified in the previous application (e.g., a facility located in the expanded regulated area)?

NO

Is the previously approved Pollution Prevention and Good Housekeeping Program true, accurate, and with continued implementation to the maximum extent practicable in the regulated area (including expanded regulated area) expected to meet the minimum requirements for a SWMP as identified in the previous application?

YES

Total Maximum Daily Load Implementation Plan (TMDL)

Does the applicant have a currently approved TMDL Implementation Plan?

YES

Is the previously approved TMDL Implementation Plan true, accurate, and with continued implementation expected to reduce the discharge of the TMDL pollutant from the MS4 to make progress in meeting Water Quality Standards?

YES

Permittees Newly Subject to the Statewide E. coli TMDL

The list below identifies permittees with a new impairment listed in the statewide E. coli TMDL. Additional information on Michigan's statewide E. coli TMDL can be found by clicking the following link:

[Michigan's statewide E. coli TMDL](#)

Birmingham PS MS4-Oakland
Bloomfield Hills PS MS4-Oakland
Dearborn PS MS4-Wayne
Garden City PS MS4-Wayne
Kalamazoo CRC MS4
Kalamazoo MS4-Kalamazoo
Kalamazoo PS MS4-Kalamazoo
Livonia PS MS4-Wayne
Northville PS MS4-Wayne
Novi PS MS4-Oakland
Oxford Twp MS4-Oakland
Plymouth-Canton PS MS4-Wayne
Portage MS4-Kalamazoo
Rochester PS MS4-Oakland
Southfield PS MS4-Oakland
Troy PS MS4-Oakland
Washtenaw Co MS4-Washtenaw
Wayne-Westland PS MS4-Wayne
West Bloomfield PS MS4-Oakland
WMU MS4-Kalamazoo

Is the permittee's site listed above?

YES

The following questions address discharges to impaired waters with a United States Environmental Protection Agency (USEPA) approved Total Maximum Daily Load (TMDL) that includes a pollutant load allocation assigned to the applicant's MS4. BMPs shall be implemented to reduce the discharge of the TMDL pollutant from the MS4 to make progress in meeting Water Quality Standards. Applicable TMDLs are TMDLs approved prior to the applicant being notified of the need to apply for permit reissuance. Applicable TMDLs for the applicant were provided in the application notice letter.

The applicant shall describe the current and proposed BMPs to meet the minimum requirements for the TMDL Implementation Plan, which shall be incorporated into the SWMP. Please indicate in your response, if you are or will be working collaboratively with watershed or regional partners on any or all activities in the TMDL Implementation Plan during the permit cycle. The following questions represent the minimum requirements for a TMDL Implementation Plan. Please complete the following questions as appropriate. A measurable goal with a measure of assessment shall be included for each BMP, and, as appropriate, a schedule for implementation (months and years), including interim milestones and the frequency of the BMP. The responses shall reflect the nested MS4s identified in the Regulated Area, Outfalls/Points of Discharge, and Nested Jurisdictions section above.

The USEPA has a document to assist with developing a TMDL Implementation Plan available at the following link.
[Understanding Impaired Waters and Total Maximum Daily Load \(TMDL\) Requirements for Municipal Stormwater Programs](#)

Total Maximum Daily Load Implementation Plan

Chapter 12 - TMDL E. Coli Addition.pdf - 03/31/2022 04:56 PM

Comment

NONE PROVIDED

Proposing to work collaboratively on any or all activities in the TMDL Implementation Plan during the permit cycle.
Yes

1. If a TMDL(s) was included in the applicant's application notice, provide the name(s) below. If no TMDL was identified, skip to the next section.

Phosphorus and E. coli

2. Provide the reference to the procedure submitted above describing the process for identifying and prioritizing BMPs currently being implemented or to be implemented during the permit cycle to make progress toward achieving the pollutant load reduction requirement in each TMDL identified in Question 1. The procedure shall include a process for reviewing, updating, and revising BMPs implemented or to be implemented to ensure progress in achieving the TMDL pollutant load reduction.

See attached revised Section 12 - TMDL, Objective 2, page 3

3. Provide the reference to the TMDL BMP Priority List submitted above with prioritized BMPs currently being implemented or to be implemented during the permit cycle to make progress toward achieving the pollutant load reduction requirement in each TMDL identified in Question 1. Each BMP shall include a reference to the targeted TMDL pollutant.

See attached revised Section 12 - TMDL

Phosphorus - Background and Effort - Phosphorus, page 4

E. coli - Summary, page 8

4. Provide the reference to the TMDL Monitoring Plan submitted above for assessing the effectiveness of the BMPs currently being implemented, or to be implemented, in making progress toward achieving the TMDL pollutant load reduction requirement, including a schedule for completing the monitoring. Monitoring shall be specifically for the pollutant identified in the TMDL. Monitoring may include, but is not limited to, outfall monitoring, in-stream monitoring, or modeling. At a minimum, monitoring shall be conducted two times during the permit cycle or at a frequency sufficient to determine if the BMPs are adequate in making progress toward achieving the TMDL pollutant load reduction. Existing monitoring data may be submitted for review as part of the plan to meet part of the monitoring requirement.

See attached revised Section 12 - TMDL

Phosphorus - Monitoring, page 4

E. coli - Sampling Frequency and Timeline for Implementation, page 6

Certify and Submit

Comments (As needed)

NONE PROVIDED

Additional Documents (As needed)

NONE PROVIDED

Comment

NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
3/31/2022 4:56 PM	Chapter 12 - TMDL E. Coli Addition.pdf	Attachment	Jamie Harmon
3/29/2022 10:32 AM	2020 Storm Outfall Map.pdf	Attachment	Jamie Harmon

Agreements and Signature(s)

SUBMISSION AGREEMENTS

- ☒ I am the owner of the account used to perform the electronic submission and signature.
- ☒ I have the authority to submit the data on behalf of the facility I am representing.
- ☒ I agree that providing the account credentials to sign the submission document constitutes an electronic signature equivalent to my written signature.
- ☒ I have reviewed the electronic form being submitted in its entirety, and agree to the validity and accuracy of the information contained within it to the best of my knowledge.

Rule 323.2114(1-4), promulgated under the NREPA, requires that this Application be signed by either a principal executive officer or ranking elected official (e.g., mayor, village president, city or village manager, or clerk). Note: If the signatory is not a principal executive officer or ranking elected official, but is authorized to sign the Application, please provide documentation of the authorization.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for having knowledge of violations."

I understand that my signature constitutes a legal agreement to comply with the requirements of the NPDES Permit. I certify under penalty of law that I possess full authority on behalf of the legal owner/permittee to sign and submit this Application. I certify to the best of my knowledge that it is true, accurate and meets the minimum permit requirements for a SWMP to the MEP.

Signed
By Kendra Gwin on 04/01/2022 at 2:11 PM



Chapter 2 – Regulated Area Map

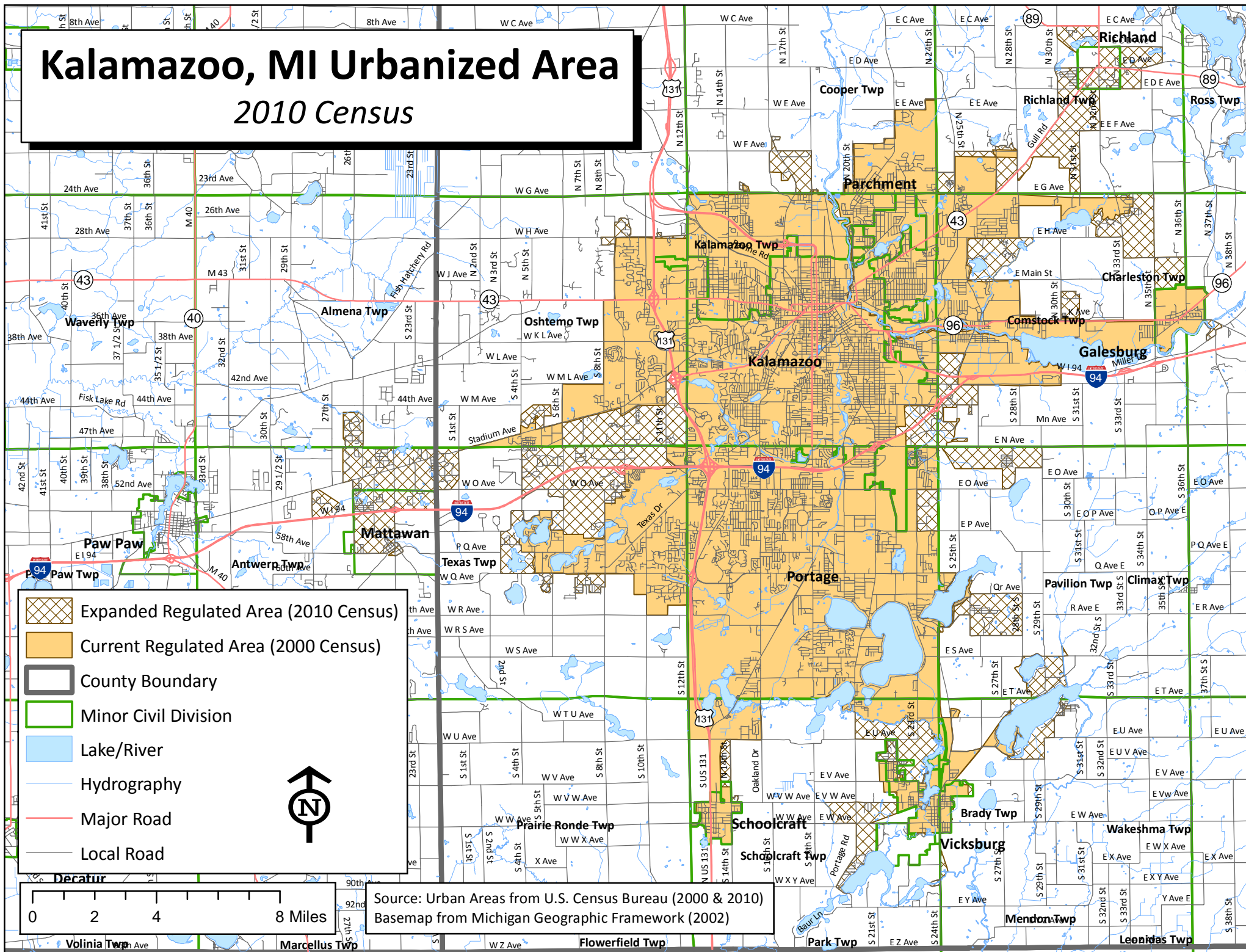


Regulated Area

The City of Portage's entire municipal boundary is within the urbanized area as defined by the 2010 Census. A copy of the 2010 urbanized area is included in this chapter and a copy of a larger City map is included in Chapter 3.

Kalamazoo, MI Urbanized Area

2010 Census





Chapter 3 – Outfalls and Points of Discharge



HISTORY

Initial identification of outfalls within the jurisdiction of the City has been conducted. Identification had been done through review of maps, plots, printouts, files, NPDES permits, municipal records, other agencies and field inspections.

EXISTING STORM SYSTEM

The City of Portage's stormwater collection system currently has approximately the following:

- 8,534 structures which are comprised of catch basins, leaching basins, manholes, and storm inlets.
- 759,264 feet of storm piping
- 97 infiltration basins (INCLUDES PRIVATELY MAINTAINED BASINS IN PLATS)
- 20 Manufactured Stormwater Treatment Units (STUs)

Per MS4 permit definitions, an outfall means a discharge from a MS4 directly to surface waters of the state and a Point of Discharge means a discharge from a MS4 to a MS4 owned or operated by another public body.

- The City has 122 outfalls which discharge directly to the Waters of the State including creeks, lakes, drains or adjoining wetlands. The City maintains some outfalls located in other jurisdictions:
 - 5 outfalls located in the City of Kalamazoo
 - 1 outfall located in Texas Township
 - 1 outfall located in Pavilion Township

City of Portage
Storm Water Discharge Permit Application
Table 1
Outfall and Point of Discharge Information

Designation (Outfall/POD)	GIS Number	Identification Number	OWNERSHIP		Receiving Water	Latitude	Longitude	Pipe Size (in)	Material	Notes	Last Inspection
			Public	Private							
Outfall	EP-01-01-001	01NES3	X		Davis Creek	42.2401	-85.5355	15	CPE	Part of the Lexington Green Ditch which was cleaned and restored in 2009	2019
Outfall	EP-01-02-002	01SES1	X		Lexington Green Drain	42.2341	-85.5301	36	CMP	Outlet thru Lexington Green Park cleaned and restored in 2009	2019
Outfall	EP-01-02-003	01SES2	X		Lexington Green Drain	42.2358	-85.5317	15	RCP	Outlet thru Lexington Green Park cleaned and restored in 2009	2019
Outfall	EP-01-02-004	01SES3	X		Lexington Green Drain	42.2358	-85.5329	15	RCP	Outlet thru Lexington Green Park cleaned and restored in 2009	2019
Outfall	EP-01-02-005	01SES4	X		Lexington Green Drain	42.2359	-85.5346	12	RCP	Outlet thru Lexington Green Park cleaned and restored in 2009	2019
Outfall	EP-01-02-006	01SES5	X		Lexington Green Drain	42.2373	-85.5365	24	RCP	Outlet thru Lexington Green Park cleaned and restored in 2009	2019
Point of Discharge	EP-02-03-001	02SWS1	X		Leaching Pond	42.2331	-85.5615	24	RCP	Outlet west of Portage, south of Yellow Brick, north of Milham	2021
Point of Discharge	EP-03-01-003	03SES4	X		Ditch	42.2382	-85.5746	12	-	Outlet on the south side of I-94 near Lovers overpass	2021
Outfall	EP-03-01-004	03NES1	X		Portage Creek	42.2452	-85.5760	12	CP	Outlet north of Kilgore, west of Lovers	2021
Outfall	EP-03-01-005	03NES2	X		Portage Creek	42.245	-85.5763	12	RCP	Southwest side of East Kilgore Road culvert, west of Lovers, Added to list in 2022	N/A
Outfall	EP-03-02-015	03SES2	X		Portage Creek	42.2346	-85.5748	12	RCP	Outlet west of Lovers, south of Kingsbury	2021
Outfall	EP-03-02-016	03SES3	X		Portage Creek	42.2359	-85.5748	36	RCP	Outlet west of Lovers, south of Hamelink	2018
Outfall	EP-03-04-001	03NES4	X		Portage Creek	42.2412	-85.5798	24	RCP	Outlets from west bank of Portage Creek behind and between 5211 and 5221 Woodmont Drive.	2019
Outfall	EP-03-04-002	03NWS1	X		Portage Creek	42.2406	-85.5811	12	concrete	Left bank of Portage Creek between 5307 and 5247 Woodmont Drive.	2019
Outfall	EP-03-04-004	03NWS2	X		Portage Creek	42.2392	-85.5816	15	RCP	Right bank of Portage Creek between 5359 and 5351 Woodmont Drive.	2019
Outfall	EP-03-04-005	03NWS3	X		Portage Creek	42.2383	-85.5808	12	RCP	Adjacent to 03NWS7.	2019
Outfall	EP-03-04-006	03NWS4	X		West Portage Creek	42.2442	-85.5877	30	CMP	Outlets from east bank of creek just north of Old Kilgore.	2019
Outfall	EP-03-04-007	03NWS5	X		West Fork	42.2440	-85.5882	15	RCP	Outlets from concrete retaining wall south of Old Kilgore along east bank of creek.	2019
Outfall	EP-03-04-009	03NWS6	X		West Fork	42.2436	-85.5894	36	RCP	Outlet with headwall on south bank of creek about 25' east of Westnedge. Improved in 2008 to 36" with	2019
Outfall	EP-03-04-010	03NWS6	X		Portage Creek	42.2453	-85.5871	12	CMP	Outlet west of Old Kilgore, 50' north of Kilgore CL	2018
Outfall	EP-03-04-011	03NWS7	X		Portage Creek	42.2454	-85.5870	12	RCP	Outlet west of Old Kilgore, 100' north of Kilgore CL	2018
Outfall	EP-04-01-003	04NES5	X		Wetland	42.2430	-85.5970	21	CP	Outlets about 200' behind 721 Phorncroft.	2021
Outfall	EP-04-01-004	04NES6	X		West Fork	42.2401	-85.5987	12	CP	Outlets into ravine about 200' behind 809 Dukeshire.	2021
Outfall	EP-04-01-005	04NES3	X		West Fork	42.2406	-85.5914	24	RCP	Storm sewer outlet into creek at Market Place. Stormceptor installed in 2000	2021
Outfall	EP-04-01-010	04NES10	X		West Fork	42.2393	-85.5923	12	RCP	Storm sewer from West Fork Crossing outlets into detention basin west of West Fork Crossing across	2021
Outfall	EP-04-01-011	04NES1	X		West Fork	42.2428	-85.5903	12	CPP	Outlets from wall of Conspan structure near inlet west of Westnedge.	2021
Outfall	EP-04-04-001	04NWS7	X		West Fork	42.2409	-85.6059	15	RCP	Outlets behind and between 1410 and 1416 Holiday Lane. Reconstructed in 2007	2021
Outfall	EP-04-04-002	04NWS3	X		West Fork	42.2402	-85.6037	12	RCP	Outlets behind and between 1260 and 1290 Holiday Lane.	2021
Outfall	EP-04-04-003	04NWS5	X		West Fork	42.2415	-85.6050	18	CMP	Outlets into stand pipe near north bank of creek behind 5217 Morningside.	2021
Outfall	EP-04-04-004	04NWS4	X		West Fork	42.2409	-85.6037	12	RCP	Outlets from road embankment across from 5245 Stonehenge.	2021
Outfall	EP-04-04-005	04NWS1	X		West Fork	42.2402	-85.6016	10	CMP	Outlet behind 5260 Bronson Boulevard	2021
Outfall	EP-04-04-008	04NWS6	X		West Fork	42.2410	-85.6058	beaver tail	concrete	Beaver tail to creek from roadway adjacent and south of driveway to 5227 Morningside.	2018
Outfall	EP-05-01-001	05NES1	X		West Fork	42.2419	-85.6097	24	RCP	Outlets behind and between 1822 and 1826 Greenbriar.	2020
Outfall	EP-05-01-002	05NES8	X		West Fork	42.2441	-85.6139	24	RCP	Outlets from embankment west of Oakland Drive about 20' south of culvert under Oakland.	2020
Outfall	EP-05-01-003	05NES9	X		West Fork	42.2443	-85.6143	18	RCP	Oakland Drive south of culvert on west side, Added to list in 2022	N/A
Outfall	EP-05-01-009	05NES4	X		West Fork	42.2433	-85.6109	12 & 18	RCP	Outlets south of Timberlane between 1815 and 1803 Timberlane.	2020
Outfall	EP-05-01-010	05NES2	X		West Fork	42.2429	-85.6098	12	RCP	Outlets south of Timberlane between 1803 and 1757 Timberlane.	2020
Outfall	EP-05-01-011	05NES11			West Fork	42.2428	-85.6115	12	RCP	Outlets behind and between 1926 and 2008 Greenbriar.	2019
Outfall	EP-05-01-012	05NES3	X		West Fork	42.2421	-85.6110	12	RCP	Outlets behind and between 1830 and 1908 Greenbriar, outlet covered by vegetation.	2020
Outfall	EP-05-04-003	05NWS3	X		West Portage Creek	42.2454	-85.6244	18	CMP	Outlet on the west of Angling, north of Merryview	2021
Outfall	EP-05-04-004	05NWS2	X		West Portage Creek	42.2455	-85.6232	12	DW	Outlet on the east side of Angling and Merryview, north of Brookhaven	2021
Outfall	EP-05-04-005	05NWS1	X		West Portage Creek	42.2457	-85.6214	15	DW	Outlet on the north side of Brookhaven, west of cul-de-sac	2021
Outfall	EP-06-01-001	06NES3	X		Howard Lake	42.2423	-85.6356	36	RCP	Outlets behind and between 3789 and 3783 Fleetwood, concrete energy dissipater at outlet.	2019
Outfall	EP-06-01-002	06NES1	X		Howard Lake	42.2444	-85.6326	24	RCP	Outlets behind and between 5088 and 5066 Trumpeter Drive, concrete energy dissipater at outlet.	2019

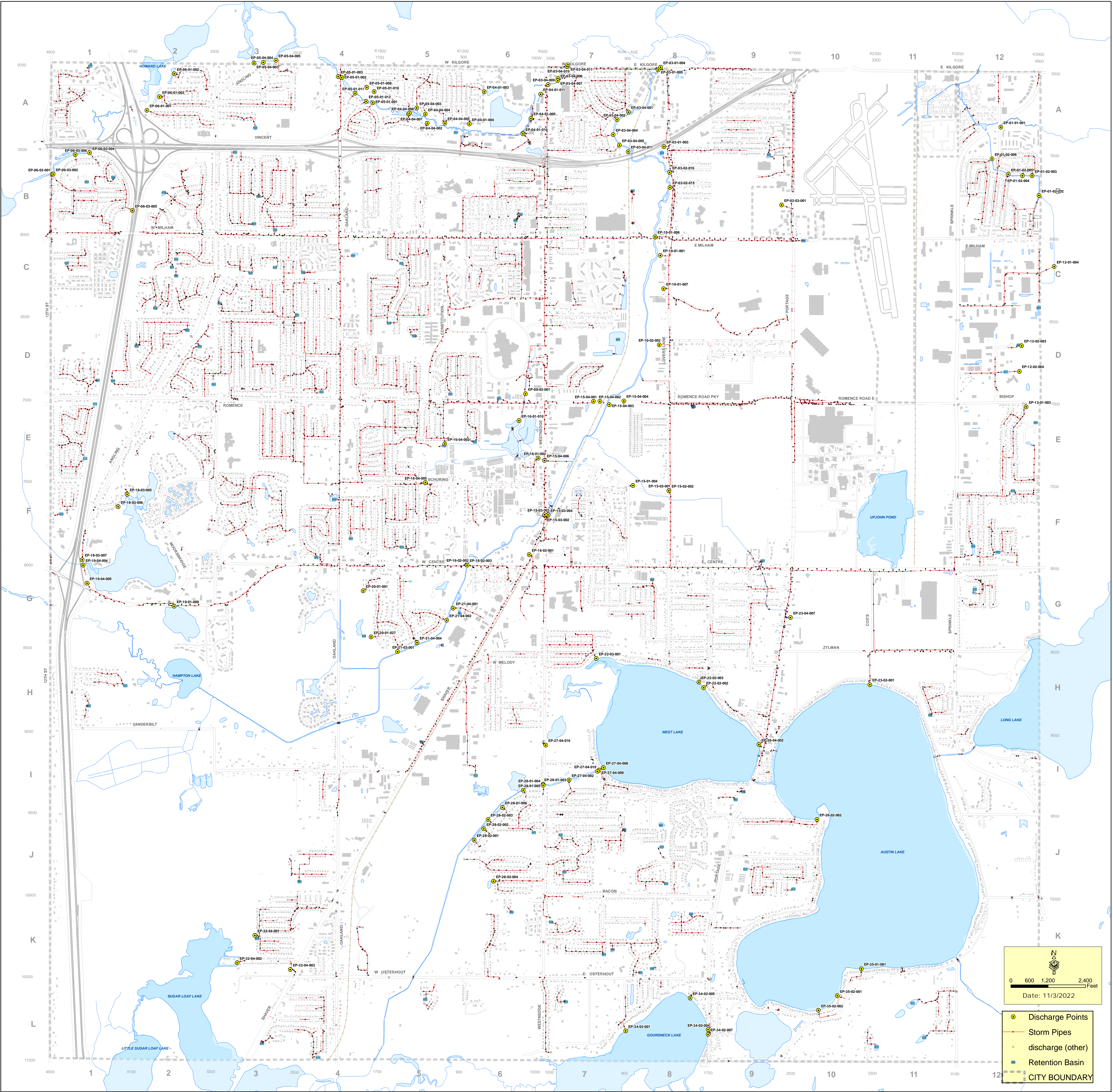
City of Portage
Storm Water Discharge Permit Application
Table 1
Outfall and Point of Discharge Information

Designation (Outfall/POD)	GIS Number	Identification Number	OWNERSHIP		Receiving Water	Latitude	Longitude	Pipe Size (in)	Material	Notes	Last Inspection
			Public	Private							
Outfall	EP-06-01-003	06NES2	X		Howard Lake	42.2411	-85.6368	24	CMP	Outlets from embankment about 200' behind and between 3907 and 3902 Wedgwood.	2019
Outfall	EP-06-03-001	06SWS1	X		West Fork Portage Creek	42.2354	-85.6482	15	CPP	Outlets from embankment east of 12th Street and adjacent to culvert under 12th Street.	2019
Outfall	EP-06-03-002	06SWS2	X		West Fork Portage Creek	42.2354	-85.6481	24	CMP	Outlets from south bank of creek about 50' east of 12th Street.	2019
Outfall	EP-06-03-004	06SWS5	X		West Fork Portage Creek	42.2372	-85.6455	12	CMP	Outlets from south bank of creek behind and between 4658 and 4642 Briarhill.	2019
Point of Discharge	EP-06-03-005	06SWS3	X		Ditch	42.2323	-85.6387	24	PERF	Outlet on the west side of US-131 near the W Milham overpass, east of Downing	2018
Outfall	EP-06-03-006	06SWS4	X		West Fork Portage Creek	42.2373	-85.6457	15	CMP	Outlets from south bank of creek behind 4492 Briarhill.	2019
Outfall	EP-09-02-001	09SES7	X		Consolidated Drain	42.2163	-85.5918	8	RCP	Outlet with rip rap from Millennium Park floor drain.	2021
Outfall	EP-10-01-001	10NES3	X		Portage Creek	42.2286	-85.5760	24	RCP	Storm sewer outlet into wetland between 6130 and 6054 S. Lovers Lane.	2019
Outfall	EP-10-01-006	03SES1	X		Portage Creek	42.2302	-85.5759	24	RCP	3 feet NE of 03SES5, end covered with large riprap.	2019
Outfall	EP-10-01-007	10NES1	X		Portage Creek	42.2256	-85.5755	24	CPP	Outlets and ditch about 50 yards west of Lover's Lane, between 6248 and 6316 S. Lovers Lane. Trash	2019
Outfall	EP-10-02-002	10SES1	X		Portage Creek	42.2207	-85.5760	30	CPP	Outlets into ditch near NW corner of parking lot of 6666 Lovers Lane, about 100 yards West of Lovers	2019
Outfall	EP-12-01-004	12NES1	X		Lexington Green Drain	42.2278	-85.5291	15	RCP	Storm sewers discharge into 24" RCP Corporate Ave. Connection	2019
Outfall	EP-12-02-003	12SES1	X		Lexington Gr Dr/wetland	42.2208	-85.5329	15	CPP	Storm sewer outlets to Quality Ct Branch detention basin that outlets to wetland	2019
Outfall	EP-12-02-004	12SES2	X		Lexington Gr Dr/wetland	42.2185	-85.5331	21	RCP	Storm sewer outlets to Environmental Dr Branch detention basin that outlets to wetland	2019
Outfall	EP-13-01-003	13NES1	X		Lexington Gr Dr/wetland	42.2154	-85.5323	18	PVC	Perforated storm sewer system overflows to wetland	2019
Outfall	EP-15-01-004	15NES1	X		Wetland	42.2083	-85.5790	24	CMP	Outlets toward the east, between bike path and access road.	2019
Outfall	EP-15-02-001	15SES1	X		Wetland	42.2078	-85.5747	24	CPP	Outlets into drainage ditch on west side of Lovers Lane 40 yards north of Garden Drive, adjacent to	2019
Outfall	EP-15-02-002	15SES2	X		Wetland	42.2078	-85.5747	48	RCP	Outlet into drainage ditch on west side of Lovers Lane, north of Garden Drive. Trash rack over metal FES.	2019
Outfall	EP-15-03-002	16SES2	X		Portage Creek	42.2056	-85.5895	18	RCP	Storm water outlet from Westnedge Ave, outlets from west abutment of structure under Westnedge	2020
Outfall	EP-15-03-003	16SES4	X		Portage Creek	42.2056	-85.5895	30	RCP	S Westnedge Ave west side north of Portage Creek culvert, Added to list in 2022	N/A
Outfall	EP-15-03-004	16SES3	X		Portage Creek	42.2056	-85.5891	18	RCP	Westnedge storm sewer overflow, outlets from east abutment beneath Westnedge Ave.	2020
Outfall	EP-15-04-001	10SWS5	X		Portage Creek	42.2157	-85.5837	24	CPP	15 feet west of 36-inch CPP culvert. Trash rack over FES.	2019
Outfall	EP-15-04-002	10SWS4	X		Portage Creek	42.2157	-85.5830	12	CPP	Half full of sediment. 100 feet west of railroad tracks.	2019
Outfall	EP-15-04-003	15NWS2	X		Portage Creek	42.2154	-85.5819	12	CPP	Outlets from embankment south of Romence Road, 50 feet east of Portage Creek.	2019
Outfall	EP-15-04-004	10SWS1	X		Portage Creek	42.2157	-85.5802	12	CPP	50 yards east of overhead power lines. Roadway storm sewer discharge.	2019
Outfall	EP-15-04-006	16NES1	X		Consolidated Drain	42.2104	-85.5895	24	RCP	Outlets into box culvert under Westnedge about 50' from culvert inlet.	2020
Outfall	EP-16-01-002	16NES2	X		Consolidated Drain	42.2106	-85.5903	15	RCP	Storm sewer outlet on south bank, between 7325 and 7315 Quail Street.	2020
Outfall	EP-16-01-003	16NES6	X		Consolidated Drain	42.2154	-85.5920	18	CMP	Outlets from southwest wing wall of pipe arch beneath Romence Road, end of pipe was repaired.	2020
Outfall	EP-16-01-005	16NES4	X		Consolidated Drain	42.2154	-85.5919	24	CMP	Outlet from southeast wing wall of pipe arch beneath Romence Road repaired in 2010.	2020
Outfall	EP-16-01-010	16NES13	X		Consolidated Drain	42.2139	-85.5926	24	RCP	Storm sewer outlet at northeast corner of pond. Discharge into forebay	2020
Outfall	EP-16-02-001	16SES1	X		Portage Creek	42.2021	-85.5912	36	RCP	Storm sewer discharge to drainage ditch on west side of Shaver Road across from Portage City Building.	2020
Outfall	EP-16-02-002	21NES3	X		Portage Creek	42.2012	-85.5987	24	CMP	Outlets from west bank of Portage Creek north of Centre.	2020
Outfall	EP-16-02-003	21NES2	X		Portage Creek	42.2011	-85.5992	24	RCP	Outlets from east bank of Portage Creek north of Centre.	2020
Outfall	EP-16-04-002	16NWS1	X		Consolidated Drain	42.2118	-85.6014	30	CMP	Outlets into drainage ditch behind and between 1033 and 1025 Woodland Drive.	2020
Outfall	EP-16-04-004	16NWS2	X		Consolidated Drain	42.2118	-85.6034	36	CMP	Outlets into drainage ditch behind and between 1215 and 1223 Woodland Drive repairs to outlet made	2020
Outfall	EP-16-04-005	16NWS6	X		Consolidated Drain	42.2084	-85.6036	24	RCP	Storm sewer outlets into drain directly north of CB in north shoulder of Schuring Rd. Cleaned in 2009	2020
Outfall	EP-18-03-005	18SWS1	X		Hampton Creek Wetland	42.2073	-85.6391	12	RCP	Overflow outfall from Squire Heath	2021
Outfall	EP-18-03-006	18SWS2	X		Hampton Creek Wetland	42.2061	-85.6401	18	RCP	Overflow outfall from Squire Heath	2021
Point of Discharge	EP-18-03-007	18SWS3	X		Ditch	42.2014	-85.6444	12	RCP	Storm water discharge from Angling Road, outlets into road side ditch west of Angling and north of	2021
Outfall	EP-19-01-009	19NES4	X		Hampton Creek Wetland	42.1973	-85.6334	18	RCP	Storm sewer outlet into wetland south of Centre at Moorsbridge.	2020
Point of Discharge	EP-19-04-004	19NWS4	X		Ditch	42.2009	-85.6443	48	RCP	Pipe arch under Angling Road conveys water from road side ditch west of Angling to wetland east of	2020
Point of Discharge	EP-19-04-005	19NWS1	X		Ditch	42.1993	-85.6438	12	RCP	Storm water discharge from Angling Road. Outlets into road side ditch west of Angling and south of	2018
Outfall	EP-20-01-001	20NES1	X		Wetland	42.1988	-85.6110	15	RCP	Outlets from embankment from parking area beneath tree, between 1776 and 1750 Valleywood Court.	2019
Outfall	EP-20-01-027	20NES2	X		Wetland	42.1947	-85.6100	24	RCP	Storm sewer outlet into ditch behind and between 8440 and 8420 Valleywood Lane.	2019

City of Portage
Storm Water Discharge Permit Application
Table 1
Outfall and Point of Discharge Information

			OWNERSHIP								
Designation (Outfall/POD)	GIS Number	Identification Number	Public	Private	Receiving Water	Latitude	Longitude	Pipe Size (in)	Material	Notes	Last Inspection
Outfall	EP-21-03-001	21SWS1	X		Portage Creek	42.1934	-85.6068	18	RCP	Storm sewer outlets from north bank of Portage Creek between 1545 and 1535 Dogwood Drive.	2021
Outfall	EP-21-04-001	21NWS3	X		Portage Creek	42.1973	-85.6003	36	CMP	Outlets into drainage ditch on south side of 6-foot chain link fence, between 865 and 862 Lenox.	2019
Outfall	EP-21-04-002	21NWS2	X		Portage Creek	42.1963	-85.6012	24	RCP	Outlets from west bank of Portage Creek between 1025 and 1035 Dogwood Drive.	2020
Outfall	EP-21-04-004	21NWS1	X		Portage Creek	42.1943	-85.6053	8	concrete	Outlets from west bank of Portage Creek between 1423 and 1413 Dogwood Drive.	2021
Outfall	EP-22-02-002	22SES2	X		West Lake	42.1904	-85.5715	12	CPP	Vegetation, South of 1630 John Street	2019
Outfall	EP-22-02-003	22SES11	X		West Lake	42.1909	-85.5711	10	CPP	South of 1534 Paul Court	2019
Outfall	EP-22-03-001	22SWS1	X		West Lake	42.1929	-85.5833	36	RCP	Large residential watershed drained Barberry Area, East of 1228 Forest Drive	2019
Outfall	EP-23-02-001	23SES1	X		Austin Lake	42.1908	-85.5507	48	CPE	Austin Lake outfall south of Cox's Drive, Added to list in 2022	N/A
Outfall	EP-23-04-007	23NWS1	X		Zylman Drain	42.1967	-85.5602	21	RCP	8229 Portage Road, Added to list in 2022	N/A
Outfall	EP-26-02-002	26SES1	X		Austin Lake	42.1788	-85.5569	18	RCP	Between 2713 and 2729 Woodbine Avenue	2020
Outfall	EP-26-04-002	26NWS4	X		West Lake	42.1854	-85.5639	24	CMP	South of 2214 Ames Drive	2020
Outfall	EP-27-04-002	27NWS2	X		Sugarloaf Drain	42.1822	-85.5864	24	CMP	Outlet from Gingham	2020
Outfall	EP-27-04-008	27NWS5	X		West Lake	42.1833	-85.5823	48	CMP	Outlet east of S Shore, south of West End, east edge of water	2021
Outfall	EP-27-04-009	27NWS1	X		Sugarloaf Drain	42.1831	-85.5828	12	CP	South Shore storm sewer outfall into Sugarloaf Drain	2019
Outfall	EP-27-04-010	27NWS4	X		Sugarloaf Drain	42.1830	-85.5830	48	CMP	Outlet southwest of S Shore, east edge of water	2021
Outfall	EP-27-04-016	27NWS3	X		Wetland	42.1853	-85.5892	24	RCP	South Westnedge outfall @ Bishops Bog	2020
Outfall	EP-28-01-003	28NES5	X		Sugarloaf Drain	42.1818	-85.5895	12	CMP	Color due to natural organic material breakdown in West Lake rather that the storm sewer discharge	2019
Outfall	EP-28-01-004	28NES7	X		Sugarloaf Drain	42.1817	-85.5895	12	CMP	Outlet fenced to basin	2019
Outfall	EP-28-01-005	28NES3	X		Sugarloaf Drain	42.1813	-85.5918	12	CPP	Replaced with 12" CPP and Stormceptor in summer 2007	2019
Outfall	EP-28-01-006	28NES4	X		Sugarloaf Drain	42.1797	-85.5943	12	CPP	Replaced with 12" CPP and Stormceptor in summer 2007	2019
Outfall	EP-28-02-001	28SES3	X		Sugarloaf Drain	42.1768	-85.5976	15	CMP	Installed Stormceptor in 2008	2019
Outfall	EP-28-02-002	28SES2	X		Sugarloaf Drain	42.1778	-85.5965	15	HDPE	Installed Stormceptor in 2008	2019
Outfall	EP-28-02-003	28SES1	X		Sugarloaf Drain	42.1787	-85.5959	18	HDPE	Replaced with 18" HDPE and Stormceptor in summer 2007	2019
Outfall	EP-28-02-004	28SES7	X		Sugarloaf Drain	42.1732	-85.5953	24	RCP	Color and turbidity due to suspended sediments in drain than sewer discharge	2021
Outfall	EP-32-04-001	32NWS1	X		Sugar Loaf Lake	42.1683	-85.6236	24	CMP	Replaced outfall pipe in 2008	2019
Outfall	EP-32-04-002	32NWS2	X		Sugar Loaf Lake	42.1659	-85.6257	24	CMP	East of 3091 Rolling Hill Avenue	2021
Outfall	EP-32-04-003	32NWS3	X		Sugar Loaf Lake	42.1653	-85.6194	18	RCP	South of 2519 Rolling Hill Avenue	2021
Outfall	EP-34-02-001	34SWS2	X		Gordneck Lake	42.1601	-85.5795	18	RCP	Outlet pipe is in gourneck lake	2019
Outfall	EP-34-02-004	34SES3	X		Gordneck Lake	42.1602	-85.5697	12	PVC	Outfall pipe replaced in 2008	2019
Outfall	EP-34-02-005	34SES1	X		Gordneck Lake	42.1630	-85.5719	8	PVC	Storm outlet is cut short of gourneck lake to protect from ice damage	2019
Outfall	EP-34-02-007	34SES2	X		Gordneck Lake	42.1598	-85.5697	12	CMP	West of Portage Rd, south end of 10744 Portage Rd	2019
Outfall	EP-35-01-001	35NES1	X		Austin Lake	42.1657	-85.5516	10	HDPE	Outlet between 3125 and 3133 Woodhams	2019
Outfall	EP-35-02-001	35SES2	X		Austin Lake	42.1633	-85.5544	12	CMP	Outlet at 2945 Woodhams 2" restrictor discharge pipe from street leaching system	2019
Outfall	EP-35-02-002	35SES1	X		Austin Lake	42.1620	-85.5567	12	CMP	Outlet at 2723 Woodhams repaired end section in 2009	2019

Outfall means a discharge point from an MS4 directly to surface waters of the state
Point of Discharge means a discharge from an MS4 to an MS4 owned or operated by another public body
"Outfall" Non MS4 means a discharge point to a City owned or Privately Owner Infiltration Area without a discharge to another water body



CITY OF PORTAGE STORM SYSTEM



Chapter 4 – Nested Jurisdictions



NESTED JURISDICTIONS

The City of Portage has not entered into any nesting agreements under this certificate of coverage since its inception.



Chapter 5 – Enforcement Response Procedure (ERP)



Enforcement Response Procedure (ERP)

The City of Portage's codified ordinances contain several provisions that require compliance with MS4 Program goals and requirements. The following are included in the Code of Ordinances:

1. Storm sewer discharge prohibitions included in the City ordinance meet MS4 Program requirements for the Illicit Discharge Elimination Program. Enforcement actions are described in the City ordinance, refer to [Chapter 13](#).
2. Soil erosion control included in the City ordinance meets MS4 Program requirements for Construction Storm Water Runoff Control Program. Enforcement actions are described in the City ordinance, refer to [Chapter 13](#).
3. Section 82-241 of the City ordinance requires property owners to connect to sanitary sewer within 18 months of publishing a notice of availability. The mandatory sewer connection ordinance was established to promote public health and safety. Enforcement actions are described in the City ordinance, refer to [Chapter 13](#).

The Code of Ordinances can be located on the City's website at www.portagemi.gov.

The City of Portage updated its Storm Water Management Ordinance (Chapter 64) in 2021 which grants them the authority to resolve issues related to storm water (illicit connections, not properly maintaining BMPs, etc.). As part of the updates, site plan required documents include a Storm Water Best Management Practices Operations and Maintenance Agreement to be signed and recorded.

An excerpt from the Storm Water Management Ordinance states:

Failure to Maintain Stormwater BMPs: If a responsible party fails or refuses to meet the requirements of the maintenance covenant or any provision of this chapter, the City, after reasonable notice, may correct a violation by performing all necessary work to place the BMP in proper working condition. In the event that the stormwater BMP becomes a danger to public safety or public health, the City shall notify the party responsible for maintenance of the stormwater BMP in writing. Upon receipt of that notice, the responsible person shall have thirty (30) days to effect maintenance and repair of the stormwater BMP in an approved manner. After proper notice, the City may assess, jointly and severally, the owners of the stormwater BMP or the property owners or the parties responsible for maintenance under any applicable written agreement for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes.



The Storm Water Design Criteria Manual for the City of Portage was adopted by resolution in 2003, and defines criteria for best management practices and design guidelines that meet the MS4 Program requirements for the Post-Construction Storm Water Control Program. See [Chapter 16](#) for a copy of the manual. The City requires the site development plans to meet the requirements stated in the Storm Water Design Criteria Manual prior to starting construction. If a new site development does not meet the requirements during the final inspection, the Department of Community Development will not provide final occupancy approval until the design is corrected to meet the criteria.

The Transportation and Utilities Department will be responsible for maintaining an electronic copy of a spreadsheet to keep track of non-compliances. The spreadsheet contains the following information regarding the violation for a better tracking system:

1. Date
2. Responsible Party Name
3. Location of Violation
4. Description of Violation
5. Enforcement Action
6. Duration of Returning to Compliance
7. Date of Resolution

Included with this chapter is a copy of the City's Enforcement Response Reporting form to document violations and compliance confirmation.

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.

[illegible]



Chapter 6 – Public Participation/Involvement Program (PPP)



Public Participation Program

POLICY

This policy is to establish procedures for the City of Portage Public Participation/Involvement Program (PPP).

BACKGROUND

The EGLE NPDES MS4 Storm Water Discharge Permit Application requires a procedure for public participation/involvement program as identified in the Application. This procedure includes a description of the opportunities for the public to provide comment on the Storm Water Management Plan and inviting public involvement and participation in the implementation and period review of the Storm Water Management Plan.

PROCEDURE

Stormwater Management Plan Available for Public Inspection and Comment

The storm water management plan is posted on the City of Portage's web site for review and comment by the public. Comments received are submitted to the storm water manager. The storm water manager will compile and track comments from the public including commenter's name, date, and comment.

Public Involvement and Participation

Public involvement and participation consist of action items that people can do at their own homes and within their community. Publication and promotion of events and action items will typically be virtual activities (promotion of event and activities via community websites, Stormwater group's websites, social media, various website links, etc.) for in-person events and activities to be performed by residents independently.



Public Involvement and Participation in the Implementation and Periodic Review of the Storm Water Management Plan

The following BMPs will be utilized to allow for public involvement and participation in the implementation and periodic review of the stormwater management plan.

BMP	Description	Schedule	Method of Assessment
Public Notice	The City will publicize using social media that the SWMP is available for review and comment on the City's website.	Annually	Copy of the website showing the document was available and the number of comments received.
	The City will publicize that the SWMP document is available on their website using the City's "Portager" newsletter.	Promote document twice per permit cycle	Copy of the City's "Portager" newsletter showing the document was available on the City website.
Website	The City's website will be utilized to explain the SWMP program and opportunities for public involvement and participation.	Ongoing	Number of comments.
Community Website Updates / Promote TMDL activities	The City will promote watershed or other events within the region that are appropriate for this community.	Ongoing	<p>Number of programs promoted on website.</p> <p>A link to the KSWG website or other agency's website that is promoting various event activities is included on the City's website or facebook post and/or the event information is promoted directly on the City's website.</p>

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.



Chapter 7 – Public Education Program (PEP)



Public Education Program

OVERVIEW

This updated Public Education Plan (PEP) is integrated into the 2022 Storm Water Management Plan (SWMP). The PEP with associated tables is included within the Chapter. The primary mechanism is to provide free public education material to residents via the City's website, utilize a social media campaign to cover each PEP topic and to promote ongoing storm water education activities by other groups and agencies.

INTRODUCTION

Background

The unique purpose of the public education portion of the NPDES MS4 permit is to increase the awareness of residents about how their everyday activities contribute pollutants to their community's water resources. Most citizens recognize the recreational and aesthetic benefits they receive from water, and most even recognize that water quality degradation is a serious concern in the Great Lakes Region. However, most people have not made the connection that most of this pollution can be generated from their normal everyday actions and not simply from large commercial and industrial sources.

This PEP is jurisdictional based; however, portions may be performed in conjunction, cooperation, and coordination with the other water quality educational efforts within the watershed, such as MS4 permit holders, partners within the Kalamazoo Storm Water Working Group (KSWG), Wellhead Protection Programs, and the TMDL Implementation Committee. It is recognized that some existing educational components were designed to address groundwater, certain watersheds, stretches of streams, particular audiences, to convey a specific message, or to implement a particular type of educational strategy or technique. However, many of the on-going educational efforts share certain general water quality messages and strategies that are relevant to the storm water program.



PEP Educational Components

The following ten educational components are PEP requirements of the MS4 program:

1. Promote public responsibility and stewardship in the applicant's watersheds.
2. Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.
3. Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.
4. Promote preferred cleaning materials and procedures for car, pavement and power washing.
5. Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.
6. Promote proper disposal of grass clippings, leaf litter, and animal wastes that may enter into the MS4.
7. Identify and promote the availability, location, and requirements of facilities for disposal or drop-off of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes and motor vehicle fluids.
8. Inform and educate the public on proper septic care and maintenance, and how to recognize system failure.
9. Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.
10. Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to storm water runoff.

CITY OF PORTAGE PEP TASK ELEMENTS

The City of Portage's planned educational activities are specified in Table 2. More specifically, these are the educational tasks to be undertaken by the City of Portage as a component of its Certificate of Coverage.

Table 2 of the SWMP is intended to illustrate the relationship between the ten topic components listed above and the desired messages, delivery mechanisms, evaluation methods, measurable goals, and an associated timetable for implementation.



SUMMARY OF ACTIVITIES

The City of Portage will increase public education by the following:

1. Participate in the Kalamazoo Area Storm Water Working Group, the TMDL, or other active group. (Attend meetings, promote educational activities on City's website, etc.)
2. Provide information on the City's website and/or links to centralized web page and utilize social media platforms to direct people to the educational materials.
3. Continue to support and provide Employee Training
4. Educate industrial, commercial and institutional entities as the need arises.
5. Conduct public survey twice per permit cycle.
6. Evaluate the effectiveness of the PEP at time of annual report.
7. Provide articles in the monthly "Portager" related to PEP topics as determined by the City.
8. Provide literature and information in the lobbies of City Hall and DPW.

CITY OF PORTAGE PEP - MEASURE OF ASSESSMENT

The City will conduct a public survey twice per permit cycle to measure change in education level. The first survey will be within the first 2 years of the permit cycle (year 1 or 2) and the second survey will occur in the last 2 years of the permit cycle (year 4 or 5). This survey will be brief and is intended to measure delivery mechanism effectiveness along with change in knowledge and behavior among residents.

The City of Portage will assess at a staff level, the effectiveness of the overall PEP at the time of the annual report and make changes to improve the PEP for the remaining years within the permit cycle as it relates to the measurable goals for each Best Management Practice (BMP). The procedure for evaluating and determining the effectiveness of the overall PEP will be at the discretion of the Storm Water Program Manager at the time of evaluation based on survey responses and other data available (website data, comments provided, etc.).

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness. If current procedures or portions of the PEP are determined by the Storm Water Program Manager to be ineffective, the City will make changes to the PEP based on input from the EGLE and recommendations of the Storm Water Program Manager to improve delivery mechanism effectiveness along with increasing knowledge and behavior among residents.

Table 2 – PUBLIC EDUCATION PROGRAM (PEP)
STORM WATER MANAGEMENT PROGRAM (SWMP)
PROGRAM ELEMENTS, TASKS AND DELIVERABLES

PUBLIC EDUCATION PROGRAM ELEMENTS					
Topic Number	PEP Topic	Delivery Mechanism / Methodology	Frequency	Evaluation / Measurable Element	Measurable Goals
1	Promote public responsibility and stewardship in the applicant's watersheds	A representative of the MS4 community or agency participates in the TMDL, Kalamazoo Area Stormwater Working Group or other active group with education activities.	As needed	Meeting attendance and participation in TMDL, KASWG or another applicable active group	Representative present at 50% or more of TMDL, KSWG, or other meetings. Participation by volunteering manpower, materials, or promoting educational activities on the website.
		Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
2	Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
3	Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
4	Promote preferred cleaning materials and procedures for car, pavement and power washing	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.

PUBLIC EDUCATION PROGRAM ELEMENTS					
Topic Number	PEP Topic	Delivery Mechanism / Methodology	Frequency	Evaluation / Measurable Element	Measurable Goals
5	Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshoots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
6	Promote proper disposal of grass clippings, leaf litter, and animal wastes that may enter into the MS4	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshoots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
7	Identify and promote the availability, location, and requirements of facilities for disposal or drop-off of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes and motor vehicle fluids	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshoots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
8	Inform and educate the public on proper septic care and maintenance, and how to recognize system failure	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshoots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.
9	Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development	Provide related documents on the community's website and/or links to centralized web page containing related topic. Utilize social media platforms (Facebook, Townsquare Media, etc.) to direct people to website and/or document location. Once the topic is available for promoting to the public and linked to the necessary website(s), the community or stormwater working group will utilize social media platform(s) to direct people to the material.	The topic is covered once per permit cycle (once per 5 years)	Educational document on the community's website and/or centralized web page Social media platform was used to direct people to the education document(s) Snapshoots (photos) or copies of social media posts.	Education topic / documents are reviewed, revised, updated, or replaced and promoted at a minimum of once per permit cycle. Effectively reach the targeted audience within the community and collectively in all of Kalamazoo County. Goal is to have an outreach campaign with an average of 20,000 impressions a month, a click through rate (CTR) equal or above the national average.

PUBLIC EDUCATION PROGRAM ELEMENTS					
Topic Number	PEP Topic	Delivery Mechanism / Methodology	Frequency	Evaluation / Measurable Element	Measurable Goals
10	Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to storm water runoff	Visit facilities for personal education, as necessary	As needed	Number of facilities visited and number of employees educated	Facilities are aware of where their on-site stormwater goes
1-10	Public Education delivery mechanism (Public Survey)	To be determined by Storm Water Program Manager. This may include Facebook or other social media outlet, "Portager" newsletter link, post card mailings, or other delivery mechanism.	Perform survey in year 1 or 2 to establish baseline. Perform survey in year 4 or 5 to measure change.	Webpage and Facebook metrics for KSWG and community websites, if available.	Obtain new ideas on how to reach out and educate residents. Evaluate responses to previous delivery mechanism to determine if it reached the target audience. Increase in the number of respondents with correct answers to storm water questions.



Chapter 8 – Illicit Discharge Elimination Program (IDEP)



Stormwater Ordinance

Chapter 64 of the City Code of Ordinances is titled “Storm Water, Illicit Discharges and Connections.” This ordinance is available on the City’s website and serves as an enforcement mechanism to control connections to the storm sewer system and enforce elimination of illicit connections. Chapter 13 contains a copy of the ordinance.

Program to Find and Eliminate Illicit Discharges

At least once per 5-year permit cycle all of the discharge points are observed during dry weather to determine if there is the potential for an illicit discharge. A form is completed for each discharge point and a photo is taken. The forms and pictures are available at the DTU office.

Staff Training

Staff training is completed once per 5-year permit cycle and when a new employee is hired.

Training is dependent upon the type of staff and include (office, parks, DPW, and seasonal). Office staff is trained on the basic awareness of the program and general overview. DPW is generally trained in how to respond to complaints, investigate illicit discharges and connections. Parks and Seasonal staff (generally limited to lawn mowing) is educated about maintenance buffers and to report unusual observations. This staff training in the past has been for all Streets and Parks Departmental Staff. Video tape material is used along with the presentation. Other training materials available from the EGLE website and You-Tube may be added in future training.

Method for Determining Effectiveness

Methods for determining the effectiveness of the IDEP tasks are listed in Table 3 and discussed below. A summary of the items include:

- Training Records (attendance and topics covered)
- Updated map of MS4 system, including identification/location of points of discharge
- Areas surveyed for unknown MS4 systems
- Number of suspected illicit discharges
- Number of suspected illicit discharges confirmed/resolved
- Effectiveness of Citizen Participation, percent of suspect discharges initially reported by sources other than municipal staff/agents.



REVIEW AND ESTABLISHMENT OF LEGAL ENFORCEMENT AUTHORITY

This activity involves reviewing current legal authority and enforcement procedures of the City to assure that it has adopted policy language necessary to fulfill its requirements under the MS4 program, and under the proposed work elements of the Storm Water NPDES Permit Application. The City has integrated a storm water ordinance, found in Chapter 13 to implement and enforce the MS4 program.

OUTFALL IDENTIFICATION

The City of Portage has approximately 122 storm water discharge locations which outfall into surface water. The city attempts to eliminate surface water discharge locations as opportunities arise and funding allows. Each of the outfalls are evaluated for water quality controls based upon the following criteria:

1. IDEP Screening Data – dry weather monitoring and wet weather sampling
2. Funding
3. Citizen Requests
4. Proximity to other City Capital Projects – adjacent street and utility projects
5. If available, other water quality data

The location of updated storm sewer system maps are available at the Department of Community Development at 7900 South Westnedge Avenue, Portage, MI 49002. The City includes all known outfalls on its latest storm water map located in Chapter 3 and in Table 1, located later in this Chapter. Continued investigation and mapping of all storm sewers and structures within the City is ongoing by City staff.

OUTFALL SCREENING PROGRAM

The City contracts outfall screening using an outside vendor. The screening program identifies indicators of illicit and/or environmentally damaging discharges at storm drain outfalls. If screening indicators persist thorough follow-up evaluations (see attached Screening/Investigation SOP), then an illicit discharge will be presumed.

If during dry weather screening a previous unknown dry weather flow is discovered, City staff will immediately begin a field investigating of upstream manholes in an attempt to determine the source. If the source is not identified during this field screening, the City/contracted services will take a water sample during the day of initial investigation for analyzing the discharge for indicator parameters. If field screening does not determine a source, the City will within 45 days begin dye testing, smoke testing and/or televising to help determine the source. If the discharge is hazardous to public health, the City will immediately begin searching for the source.



INVESTIGATION OF ILLICIT DISCHARGES (CONTRACTED SERVICES)

Should outfall screening, sampling, citizen complaints or other mechanisms lead to discovery of suspected illicit discharge by the City, then an illicit discharge investigation will be initiated. Due to limited staffing, equipment, etc., a detailed investigation will likely entail contracted services. These services shall be generally conducted in accordance with the Standard Operating Procedures (including forms) that are included in this chapter.

PUBLIC SANITARY SEWER OPERATION & MAINTENANCE

Public sewer in the City is operated and maintained by Veolia, a vendor contracted through the City. Standard operating procedures are designed to prevent the release of sanitary wastes to the environment. Inflow and Infiltration (I&I) of sanitary waste is addressed by the routine installation of storm water above the sanitary sewer. By maintaining a vertical separation, the chance of cross-contamination is greatly reduced. I&I are further reduced by on-going practices described below.

New service connections to the system are visually inspected. All new public sewer installation is inspected on-site full-time during construction. Prior to acceptance, new sewers are air tested, deflection tested and video-taped. Furthermore, in response to known or suspected trouble areas, sanitary sewer mains are typically video inspected. Infrastructure inspection and service records are maintained.

Cracked sanitary or storm sewers can be discovered by utility personnel noticing a change in the physical integrity or flow characteristics within the infrastructure systems. In all of these situations the noted concerns shall be investigated in a timely manner and any failings repaired. Strategies for discovery include those discussed herein, visual and olfactory observations, and citizen complaints, etc. Incident tracking, field investigations, sampling and testing, and repair/resolution will be documented using standard forms included in this Chapter.

INDIRECT CONNECTIONS (DUMPING, SPILLS AND SURFACE SOURCES)

Illegal dumping directly or indirectly into storm catch basins and inlets, and spills collected by drain catch basins and inlets, are typically discovered by either visual and/or olfactory observations, and are subsequently reported by citizens or municipal agents and field crews. An on-going effort to educate the citizens about water quality issues is critical to the success of decreasing illegal dumping into the storm water catch basins/inlets, and is included in the public education plan. If the City receives a complaint related to illegal dumping or spills, they will investigate the complaint within 24-hours of receiving the notice.



PUBLIC SANITARY SEWER / ON-SITE SEWAGE DISPOSAL SYSTEMS **(KALAMAZOO COUNTY HUMAN SERVICES DEPARTMENT)**

A map of the sanitary sewer service area has been prepared so that areas where sanitary service is available are defined (Generally the entire City limits). In accordance with the Public Health Code, where public sanitary sewer service is available, the County Environmental Health, through coordination with municipal building officials, will refuse to permit installation of on-site sewage disposal systems.

As the on-site disposal system enforcing agency, County Environmental Health will continue to investigate sewage disposal system failures when received via complaint or inquiry, and will enforce correction.

PUBLIC AGENCY ‘CUSTOMER INTERACTIONS’

Because of soil erosion concerns, construction sites and related activities are recognized as major potential contributors to storm water pollution. Soil erosion control enforcement in the City of Portage along with soil erosion control permitting and inspection has been delegated to the City’s Department of Community Development. The City of Portage staff will call EGLE with any SESC concerns that concern a discharge to an MS4 outfall. Work performed by utilities, contractors and other parties must comply with the City of Portage policies, including erosion control and site stabilization.

IDEP TRAINING

The intent is to have Public Employees and Contractors educated regarding IDEP. The City conducts employee training, which may consist of a PowerPoint presentation, DVD, off-site workshop, in-house training, or new employee orientation. The schedule for this training is existing employees to be trained once per 5-year permit cycle, and new employees to have one training within 1-year of employment. Contractors are provided training materials and information in bid documents and/or preconstruction meetings as warranted.

COMPLAINTS & INCIDENT RESPONSE PROCEDURES

A procedure has been developed to respond to public complaints, or other reports of suspected improper connections or illicit discharges. At a minimum, the procedures include an administrative record keeping mechanism to assure full and proper resolution to the maximum extent practicable. Steps will include (1) documenting/recording the complaint or suspicion, (2) investigation, (3) source identification (4) voluntary and/or enforced corrective action, and (5) administrative tracking of steps 1 through 4 to assure remedy and closure.



A tracking system is important because locating and correcting a known or suspected discharge may not be immediately achievable. Full and prompt resolution of a reported incident may be problematic due to the episodic nature of some releases, or due to the difficulty in locating the source within an extensive and complex drainage service area. Therefore, the incident procedure will include a DSA-based reporting system focused upon tracking both short-term and long-term resolution of known and suspected concerns.

The overall goals of the tracking system are generally identified as being (a) confirmation of a concern, (b) location and identification of the source, (c) assurance that appropriate corrective action has been taken, and (d) on-going IDEP program prioritization for long-term resolution.

SPILL OR RELEASE PROCEDURE

The procedure for reporting any release of any polluting materials is contained in the City's Administrative Order 6.10 titled Unknown Substance/Hazardous Materials Incidents and Investigations. A copy of the administrative order is included later in this Chapter.

If a spill or release of any polluting materials from the MS4 to the surface waters or ground waters of the state, the City will meet the following requirements, unless a determination is made that the release is not in excess of the threshold reporting quantities in the Part 5 Rules:

1. Call to report releases exceeding threshold reporting quantities:
 - EGLE Kalamazoo District Office (269) 567-3500 (to be called immediately upon discovering the release) during normal business hours; or
 - Michigan's Pollution Emergency Alerting System (PEAS) at 800-292-4706 on nights or weekends.
2. Submit written report within 10 days after the release to:
 - EGLE, Water Resources Division, District Supervisor via MiWaters
3. Report releases as required under other regulations.

The written report will explain the cause of the release, the discovery of the release, response (clean- up and/or recovery) measures takes, and preventative measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.



SCREENING EVALUATION & ANNUAL PROGRAM PRIORITIZATION

The screening results and the incident reports will be collectively reviewed by the City as part of an annual storm water program evaluation and prioritization effort. The purpose of this review will be to identify and prioritize proactive initiatives in areas of known concerns. This review will be based upon the outfall screening forms and the incident response forms. GIS tools will be used to the maximum extent practicable in linking recorded incidents to drainage infrastructure and geographic locations. Program prioritization decisions will be made among all the component activities of the storm water management program.

IDEP TASKS, DELIVERABLES, AND EVALUATION

The preceding discussion outlines the activities of the City initiatives and the tasks, deliverables, and evaluation are found on Table 3.

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.

TABLE 3
IDEP Stormwater Outfall Status Action Plan Table
City of Portage - Storm Water Monitoring Program

GIS Number	Identification Number	Receiving Water	Latitude	Longitude	Associated Stormceptor	Stormceptor Manhole	Nearest Upstream CB or MH	Historical Inspection Dates/Codes	Field Observation Form Complete	Water Quality Analysis Form Complete	Field Investigation Form Complete	Most Recent Code	Condition	Previously Reported Notes
EP-01-01-001	01NES3	Davis Creek	42.2401	-85.5355	-	-	CB-01-01-034	2014, 8/22/19 - DF	8/22/2019	8/22/2019	8/22/2019	DF	Sediment in oufall; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Part of the Lexington Green Ditch which was cleaned and restored in 2009
EP-01-02-002	01SES1	Lexington Green Drain	42.2341	-85.5301	-	-	CB-01-02-006, MH-01-02-001	2014, 7/24/19 - NF, 8/22/19 - ST(3")	7/24/19, 8/22/19	8/22/2019	8/22/2019	ST (3")	Sediment in outfall; lab fluoride = 0.15 ppm; lab phosphorus: 0.66 mg/L; sample collected	Outlet thru Lexington Green Park cleaned and restored in 2009
EP-01-02-003	01SES2	Lexington Green Drain	42.2358	-85.5317	-	-	MH-01-02-015, CB-01-02-090 CB-01-02-092	2014, 7/24/19 - ST(8"), 8/22/19 - ST(3")	7/24/19, 8/22/19	8/22/2019	8/22/2019	ST (3")	Receiving water: slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.050 mg/L; sample collected	Outlet thru Lexington Green Park cleaned and restored in 2009
EP-01-02-004	01SES3	Lexington Green Drain	42.2358	-85.5329	-	-	CB-01-02-089	2014, 7/24/19 - ST(2"), 8/22/19 - ST(3")	7/24/19, 8/22/19	8/22/2019	8/22/2019	ST (3")	Receiving water: slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlet thru Lexington Green Park cleaned and restored in 2009
EP-01-02-005	01SES4	Lexington Green Drain	42.2359	-85.5346	-	-	CB-01-02-069	2014, 7/24/19 - NF, 8/22/19 - NF	7/24/19, 8/22/19	N/A	N/A	NF	Receiving water: light brown, slightly turbid	Outlet thru Lexington Green Park cleaned and restored in 2009
EP-01-02-006	01SES5	Lexington Green Drain	42.2373	-85.5365	-	-	CB-01-02-022	2014, 7/24/19 - NF, 8/22/19 - NF	7/24/19, 8/22/19	N/A	N/A	NF	Receiving water: light brown, moderate tubidity	Outlet thru Lexington Green Park cleaned and restored in 2009
EP-02-03-001	02SWS1	Leaching Pond	42.2331	-85.5615	-	-	CB-02-03-003	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Normal conditions - no negative characteristics	Outlet west of Portage, south of Yellow Brick, north of Milham
EP-03-01-003	03SES4	Ditch	42.2382	-85.5746	-	-	CB-03-01-051	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall: Trash and Normal Vegetation. Receiving Water: Normal Vegetation	Outlet on the south side of I-94 near Lovers overpass
EP-03-01-004	03NES1	Portage Creek	42.2452	-85.5760	-	-	CB-03-01-084	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall: Sediment. Receiving Water: Light Brown and Slight Turbidity	Outlet north of Kilgore, west of Lovers
EP-03-01-005	03NES2	Portage Creek					MH-03-01-040 CB-03-01-010							Southwest side of East Kilgore Road culvert
EP-03-04-001	03NES4	Portage Creek	42.2412	-85.5798	TS-25	MH-03-04-018	CB-03-04-126	2014, 8/28/19 - DF	8/28/2019	8/28/2019	N/A	DF	Outfall water: rotten egg odor, light brown color, sediment deposits, slightly turbid; lab fluoride = <0.1 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlets from west bank of Portage Creek behind and between 5211 and 5221 Woodmont Drive.
EP-03-04-002	03NWS1	Portage Creek	42.2406	-85.5811	TS-24	MH-03-04-015	CB-03-04-130	2014, 8/28/19 - SUB, 11/5/19 - ST(8")	8/28/19, 11/5/19	11/5/2019	11/5/2019	ST (8")	Outfall water & receiving water: light brown and slightly turbid; receiving water also had normal vegetation; standing water is natural groundwater so no chemical analysis or sample collected	Left bank of Portage Creek between 5307 and 5247 Woodmont Drive.
EP-03-04-004	03NWS2	Portage Creek	42.2392	-85.5816	TS-13	MH-03-04-016	CB-03-04-146	2014, 7/24/19 - NF, 8/22/19 - NF	7/24/2019, 8/22/19	N/A	N/A	NF	Receiving water: light brown, moderate tubidity	Right bank of Portage Creek between 5359 and 5351 Woodmont Drive.
EP-03-04-005	03NWS3	Portage Creek	42.2383	-85.5808	TS-26	MH-03-04-017	CB-03-04-134	2014, 8/22/19 - DF	8/22/2019	8/22/2019	8/22/2019	DF	Receiving water: slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Adjacent to 03NWS7.
EP-03-04-006	03NWS4	West Portage Creek	42.2442	-85.5877	-	-	CB-03-04-073	2014, 7/24/19 - NF, 11/5/19 - ST(8")	7/24/2019, 11/5/19	11/5/2019	11/5/2019	ST (8")	Outfall water & receiving water: light brown and slightly turbid; receiving water also had normal vegetation; standing water is natural groundwater so no chemical analysis or sample collected	Outlets from east bank of creek just north of Old Kilgore.
EP-03-04-007	03NWS5	West Fork	42.2440	-85.5882	-	-	CB-03-04-197	2014, 7/24/19 - NF; 8/28/19 - NF	7/24/2019, 8/28/19	N/A	N/A	NF	Receiving water: normal vegetation	Outlets from concrete retaining wall south of Old Kilgore along east bank of creek.
EP-03-04-009	03NWS6	West Fork	42.2436	-85.5894	TS-31	MH-03-04-010	CB-03-04-015	2014, 7/24/19 - SUB, 8/28/19 - SUB	7/24/2019, 8/28/19	N/A	N/A	SUB	Receiving water: light brown color, slightly turbid, normal vegetation	Outlet with headwall on south bank of creek about 25' east of Westnedge. Improved in 2008 to 36" with treatment
EP-03-04-010	03NWS6	Portage Creek	42.2453	-85.5871	-	-	MH-22-01-003 CB-03-04-198	2018					Unable to locate, Underneath a parking lot	Outlet west of Old Kilgore, 50' north of Kilgore CL
EP-03-04-011	03NWS7	Portage Creek	42.2454	-85.5870	-	-	CB-03-04-199	2018					Unable to locate, Underneath a parking lot	Outlet west of Old Kilgore, 100' north of Kilgore CL
EP-03-02-015	03SES2	Portage Creek	42.2346	-85.5748	-	-	CB-03-02-010	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Trash and sediment in outfall. Receiving water: light brown, slight turbidity, and normal vegetation.	Outlet west of Lovers, south of Kingsbury
EP-03-02-016	03SES3	Portage Creek	42.2359	-85.5748	-	-	CB-03-02-012	2018					Unable to Locate	Outlet west of Lovers, south of Hamelink

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GIS Number	Identification Number	Receiving Water	Latitude	Longitude	Associated Stormceptor	Stormceptor Manhole	Nearest Upstream CB or MH	Historical Inspection Dates/Codes	Field Observation Form Complete	Water Quality Analysis Form Complete	Field Investigation Form Complete	Most Recent Code	Condition	Previously Reported Notes
EP-04-01-003	04NES5	Wetland	42.2430	-85.5970	-	-	CB-04-01-016	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Outlets about 200' behind 721 Phorncroft.
EP-04-01-004	04NES6	West Fork	42.2401	-85.5987	-	-	CB-04-01-025	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Outlets into ravine about 200' behind 809 Dukeshire.
EP-04-01-005	04NES3	West Fork	42.2406	-85.5914	TS-22	MH-04-01-001	CB-04-01-038	2018, 11/8/21 - ST(30")	11/8/2021	N/A	11/8/2021	ST(30")	Outfall and Receiving Water: Light Brown and Slight Turbidity; investigated upstream manholes and found no dry weather flow	Storm sewer outlet into creek at Market Place. Stormceptor installed in 2000
EP-04-01-010	04NES10	West Fork	42.2393	-85.5923	-	-	MH-04-01-005 MH-04-01-016	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Storm sewer from West Fork Crossing outlets into detention basin west of West Fork Crossing across from Gander Mountain.
EP-04-01-011	04NES1	West Fork	42.2428	-85.5903	-	-	CB-04-01-005	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Outlets from wall of Conspan structure near inlet west of Westnedge.
EP-04-04-001	04NWS7	West Fork	42.2409	-85.6059	-	-	MH-04-04-013 CB-04-04-017	2018, 11/8/21 - ST(8")	11/8/2021	N/A	11/8/2021	ST(8")	Outfall and Receiving Water: Light Brown and Slight Turbidity; investigated upstream manholes and found no dry weather flow	Outlets behind and between 1410 and 1416 Holiday Lane. Reconstructed in 2007
EP-04-04-002	04NWS3	West Fork	42.2402	-85.6037	-	-	CB-04-04-018	2018, 11/8/21 - ST(30")	11/8/2021	N/A	11/8/2021	ST(30")	Outfall and Receiving Water: Dark Brown and Moderate Turbidity; investigated upstream manholes and found no dry weather flow	Outlets behind and between 1260 and 1290 Holiday Lane.
EP-04-04-003	04NWS5	West Fork	42.2415	-85.6050	-	-	MH-04-04-004	2018, 11/8/21 - NF	11/8/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits. Outfall was broken by stump collapsing on top of outfall	Outlets into stand pipe near north bank of creek behind 5217 Morningside. Suez repaired outfall following inspection in 2021.
EP-04-04-004	04NWS4	West Fork	42.2409	-85.6037	-	-	CB-04-04-034	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall: Excessive Vegetation. Receiving Water: Normal Vegetation	Outlets from road embankment across from 5245 Stonehenge.
EP-04-04-005	04NWS1	West Fork	42.2402	-85.6016	-	-	CB-04-04-063	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall and receiving water: normal vegetation	Outlet behind 5260 Bronson Boulevard
EP-04-04-008	04NWS6	West Fork	42.2410	-85.6058	-	-	CB-04-04-022	2018					Unable to Locate	Beaver tail to creek from roadway adjacent and south of driveway to 5227 Morningside.
EP-05-01-001	05NES1	West Fork	42.2419	-85.6097	-	-	CB-05-01-043	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Algae is outfall. Receiving water: normal vegetation	Outlets behind and between 1822 and 1826 Greenbriar.
EP-05-01-002	05NES8	West Fork	42.2441	-85.6139	-	-	CB-05-01-067	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Receiving water: slight turbidity and normal vegetation	Outlets from embankment west of Oakland Drive about 20' south of culvert under Oakland.
EP-05-01-003	05NES9	West Fork					Add when GIS updated							Oakland Drive south of culvert on west side (storm pipe not shown on GIS)
EP-05-04-003	05NWS3	West Portage Creek	42.2454	-85.6244	-	-	CB-05-04-006	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits, Normal Vegetation	Outlet on the west of Angling, north of Merryview
EP-05-04-004	05NWS2	West Portage Creek	42.2455	-85.6232	-	-	CB-05-04-008	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Receiving Water: Normal Vegetation. Outfall broken	Outlet on the east side of Angling and Merryview, north of Brookhaven. Suez repaired outfall following inspection in 2021.
EP-05-04-005	05NWS1	West Portage Creek	42.2457	-85.6214	-	-	CB-05-04-010	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall: Sediment Deposited. Receiving Water: Light Brown, Slight Turbidity, Sediment Deposit, and Normal Vegetation.	Outlet on the north side of Brookhaven, west of cul-de-sac
EP-05-01-009	05NES4	West Fork	42.2433	-85.6109	-	-	CB-05-01-093 CB-05-01-071	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Sediment & normal vegetation in outfall; receiving water: normal vegetation	Outlets south of Timberlane between 1815 and 1803 Timberlane.
EP-05-01-010	05NES2	West Fork	42.2429	-85.6098	-	-	CB-05-01-072	2017, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Sediment in outfall; receiving water: normal vegetation	Outlets south of Timberlane between 1803 and 1757 Timberlane.
EP-05-01-011	05NES11	West Fork	42.2428	-85.6115	-	-	CB-05-01-035	2014, 7/24/19 - NF, 9/16/19 - NF	7/24/2019, 9/16/19	N/A	N/A	NF	Sediment & excessive vegetation in outfall; Receiving water: light brown, slightly turbid, sediment deposits, and normal vegetation	Outlets behind and between 1926 and 2008 Greenbriar.
EP-05-01-012	05NES3	West Fork	42.2421	-85.6110	-	-	CB-05-01-038	2015	9/14/2020			CNL		Outlets behind and between 1830 and 1908 Greenbriar, outlet covered by vegetation.
EP-06-01-001	06NES3	Howard Lake	42.2423	-85.6356	-	-	CB-06-01-051	2014, 7/24/19 - NF, 9/16/19 - NF	7/24/2019, 9/16/19	N/A	N/A	NF	Sediment & mineral deposits in outfall; Receiving water: light brown, slightly turbid, and normal vegetation	Outlets behind and between 3789 and 3783 Fleetwood, concrete energy dissipater at outlet.
EP-06-01-002	06NES1	Howard Lake	42.2444	-85.6326	-	-	CB-06-01-024	2014, 7/24/19 - NF, 9/16/19 - NF	7/24/2019, 9/16/19	N/A	N/A	NF	Mineral deposits in outfall; Receiving water: light brown, slightly turbid, and normal vegetation	Outlets behind and between 5088 and 5066 Trumpeter Drive, concrete energy dissipater at outlet.

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EP-06-01-003	06NES2	Howard Lake	42.2411	-85.6368	-	-	CB-06-01-037	2014, 7/24/19 - NF, 11/5/19 - DF	7/24/2019, 11/5/19	11/5/2019	11/5/2019	DF	Mineral deposits in outfall; Receiving water: light brown, slightly turbid, and normal vegetation; lab fluoride = <0.1 ppm; lab phosphorus = <0.05 mg/L; sample collected	Outlets from embankment about 200' behind and between 3907 and 3902 Wedgwood.
EP-06-03-001	06SWS1	West Fork Portage Creek	42.2354	-85.6482	-	-	CB-06-03-004	2014, 7/24/19 - ST(3"), 8/28/19 - DF	7/24/2019, 8/28/19	8/28/2019	N/A	DF	Outfall & receiving water: light brown color, slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlets from embankment east of 12th Street and adjacent to culvert under 12th Street.
EP-06-03-002	06SWS2	West Fork Portage Creek	42.2354	-85.6481	-	-	CB-06-03-021	2014, 7/24/19 - NF, 8/28/19 - NF	7/24/2019, 8/28/19	N/A	N/A	NF	Outfall water: sediment deposits; receiving water: slightly turbid, normal vegetation	Outlets from south bank of creek about 50' east of 12th Street.
EP-06-03-004	06SWS5	West Fork Portage Creek	42.2372	-85.6455	-	-	MH-06-03-003CB-06-03-007	2014, 7/24/19 - NF, 8/28/19 - NF	7/24/2019; 8/28/19	N/A	N/A	NF	Sediment in outfall; receiving water: slightly turbid and normal vegetation	Outlets from south bank of creek behind and between 4658 and 4642 Briarhill.
EP-06-03-005	06SWS3	Ditch	42.2323	-85.6387	-	-	CB-06-03-079	2018						Outlet on the west side of US-131 near the W Milham overpass, east of Downing
EP-06-03-006	06SWS4	West Fork Portage Creek	42.2373	-85.6457	-	-	MH-06-03-002CB-06-03-008	2014, 7/24/19 - NF, 8/28/19 - NF	7/24/2019, 8/28/19	N/A	N/A	NF	Sediment in outfall	Outlets from south bank of creek behind 4492 Briarhill.
EP-09-02-001	09SES7	Consolidated Drain	42.2163	-85.5918	-	-	CB-09-02-033	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall: Sediment Deposites and Normal Vegetation. Receiving Water: Light Brown, Slight Turbidity, Normal Vegetation.	Outlet with rip rap from Millennium Park floor drain.
EP-10-01-001	10NES3	Portage Creek	42.2286	-85.5760	TS-33	MH-10-01-021MH-10-01-022	BA-10-01-001	2014, 7/25/19 - ST(3"), 8/28/19 - ST(6")	7/25/2019, 8/28/19	8/28/2019	8/28/2019	ST (6")	Outfall water: light brown, slightly turbid; receiving water: light brown, slightly turbid, normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Storm sewer outlet into wetland between 6130 and 6054 S. Lovers Lane.
EP-10-01-006	03SES1	Portage Creek	42.2302	-85.5759	-	-	CB-10-01-006	2014, 7/25/19 - ST(15"), 8/28/19 - DF	7/25/2019, 8/28/19	8/28/2019	N/A	DF	Sediment in outfall; receiving water: light brown, slightly turbid, and normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	3 feet NE of 03SES5, end covered with large riprap.
EP-10-01-007	10NES1	Portage Creek	42.2256	-85.5755	-	-	MH-10-01-008	2014, 7/25/19 - ST(3"), 8/28/19 - ST(4")	7/25/2019, 8/28/19	8/28/2019	8/28/2019	ST (4")	Outfall water: dark brown, highly turbid, trash floating; lab fluoride = <0.10 ppm; lab phosphorus: 0.70 mg/L; sample collected	Outlets and ditch about 50 yards west of Lover's Lane, between 6248 and 6316 S. Lovers Lane. Trash rack on FES.
EP-10-02-002	10SES1	Portage Creek	42.2207	-85.5760	-	-	MH-10-02-006	2014, 8/28/19 - DF	8/28/2019	8/28/2019	N/A	DF	Outfall water: dark brown, highly turbid; receiving water: dark brown, highly turbid, normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: 0.064 mg/L; sample collected	Outlets into ditch near NW corner of parking lot of 6666 Lovers Lane, about 100 yards West of Lovers Lane. Trash rack on FES.
EP-12-01-004	12NES1	Lexington Green Drain	42.2278	-85.5291	-	-	MH-12-01-005	2018, 8/29/19 - DF	8/29/2019	8/29/2019	N/A	DF	Outfall and receiving water: musty odor, dark brown, slightly turbid; lab fluoride = 0.18 ppm; lab phosphorus: 0.14 mg/L sample collected	Storm sewers discharge into 24" RCP Corporate Ave. Connection
EP-12-02-003	12SES1	Lexington Gr Dr/wetland	42.2208	-85.5329	-	-	CB-12-02-014CB-12-02-002	2018, 8/29/19 - NF, 9/16/19 - NF	8/29/2019, 9/16/19	N/A	N/A	NF	Outfall and receiving water: normal vegetation	Storm sewer outlets to Quality Ct Branch detention basin that outlets to wetland
EP-12-02-004	12SES2	Lexington Gr Dr/wetland	42.2185	-85.5331	-	-	CB-12-02-015MH-12-02-006	2018, 8/29/19 - NF, 9/16/19 - NF	8/29/2019, 9/16/19	N/A	N/A	NF	Outfall and receiving water: normal vegetation	Storm sewer outlets to Environmental Dr Branch detention basin that outlets to wetland
EP-13-01-003	13NES1	Lexington Gr Dr/wetland	42.2154	-85.5323	-	-	CB-13-01-004CB-13-01-003	2018, 8/29/19 - NF, 9/16/19 - NF	8/29/2019, 9/16/19	N/A	N/A	NF	Mineral and sediment deposits in outfall; receiving water: normal vegetation	Perforated storm sewer system overflows to wetland
EP-15-01-004	15NES1	Wetland	42.2083	-85.5790	-	-	CB-15-02-001	2014, 7/25/19 - ST(1"), 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Normal conditions - no negative characteristics	Outlets toward the east, between bike path and access road.
EP-15-02-001	15SES1	Wetland	42.2078	-85.5747	-	-	MH-15-02-010CB-15-02-010CB-15-02-009	2014, 7/25/19 - NF, 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Sediment in outfall; receiving water: normal vegetation	Outlets into drainage ditch on west side of Lovers Lane 40 yards north of Garden Drive, adjacent to 15SES2.
EP-15-02-002	15SES2	Wetland	42.2078	-85.5747	-	-	MH-15-02-011CB-15-02-011	2014, 7/25/19 - NF, 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Sediment in outfall	Outlet into drainage ditch on west side of Lovers Lane, north of Garden Drive. Trash rack over metal FES.

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EP-15-03-002	16SES2	Portage Creek	42.2056	-85.5895	TS-34	MH-15-03-007	CB-15-03-112	2015, 9/14/20 - ST(1")	9/14/2020	N/A	N/A	ST (1")	Outfall and receiving water: slight turbidity; investigated upstream manholes and found no dry weather flow	Storm water outlet from Westnedge Ave, outlets from west abutment of structure under Westnedge Ave.
EP-15-03-003	16SES4	Portage Creek			TS-35	MH-15-03-014	MH-15-03-015							S Westnedge west side north of Portage Creek culvert
EP-15-03-004	16SES3	Portage Creek	42.2056	-85.5891	-	-	CB-15-03-012	2015, 9/14/20 - ST(3")	9/14/2020	N/A	N/A	ST (3")	Sediment in outfall; investigated upstream manholes and found no dry weather flow	Westnedge storm sewer overflow, outlets from east abutment beneath Westnedge Ave.
EP-15-04-001	10SWS5	Portage Creek	42.2157	-85.5837	-	-	MH-15-04-004 CB-15-04-012 CB-15-04-006	2014, 7/25/19 - ST(1/4"), 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Normal conditions - no negative characteristics	15 feet west of 36-inch CPP culvert. Trash rack over FES.
EP-15-04-002	10SWS4	Portage Creek	42.2157	-85.5830	-	-	CB-15-04-011	2014, 7/25/19 - NF, 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Normal conditions - no negative characteristics	Half full of sediment. 100 feet west of railroad tracks.
EP-15-04-003	15NWS2	Portage Creek	42.2154	-85.5819	-	-	CB-15-04-008	2014, 7/25/19 - NF, 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Normal conditions - no negative characteristics	Outlets from embankment south of Romence Road, 50 feet east of Portage Creek.
EP-15-04-004	10SWS1	Portage Creek	42.2157	-85.5802	-	-	CB-15-04-002	2014, 7/25/19 - NF, 8/28/19 - NF	7/25/2019, 8/28/19	N/A	N/A	NF	Normal conditions - no negative characteristics	50 yards east of overhead power lines. Roadway storm sewer discharge.
EP-15-04-006	16NES1	Consolidated Drain	42.2104	-85.5895	-	-	CB-15-04-053	2015	9/14/2020			CNL		Outlets into box culvert under Westnedge about 50' from culvert inlet.
EP-16-01-002	16NES2	Consolidated Drain	42.2106	-85.5903	-	-	CB-16-01-018	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Receiving water: dark brown, moderately turbid, normal vegetation	Storm sewer outlet on south bank, between 7325 and 7315 Quail Street.
EP-16-01-003	16NES6	Consolidated Drain	42.2154	-85.5920	-	-	Point missing on GIS	2017, 9/14/20 - ST(6")	9/14/2020	N/A	N/A	ST (6")	Outfall and receiving water: light brown, slight turbidity; investigated upstream manholes and found no dry weather flow	Outlets from southwest wing wall of pipe arch beneath Romence Road, end of pipe was repaired.
EP-16-01-005	16NES4	Consolidated Drain	42.2154	-85.5919	-	-	Point missing on GIS	2017, 9/14/20 - ST(6")	9/14/2020	N/A	N/A	ST (6")	Outfall and receiving water: light brown, slight turbidity; investigated upstream manholes and found no dry weather flow	Outlet from southeast wing wall of pipe arch beneath Romence Road repaired in 2010.
EP-16-01-010	16NES13	Consolidated Drain	42.2139	-85.5926	-	-	CB-16-01-061	2015, 9/14/20 - SUB	9/14/2020	N/A	N/A	SUB	Outfall and receiving water: light brown, moderate turbidity; investigated upstream manholes and found no dry weather flow	Storm sewer outlet at northeast corner of pond. Discharge into forebay
EP-16-02-001	16SES1	Portage Creek	42.2021	-85.5912	TS-30	MH-16-02-021	CB-16-02-033	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Sediment in outfall	Storm sewer discharge to drainage ditch on west side of Shaver Road across from Portage City Building.
EP-16-02-002	21NES3	Portage Creek	42.2012	-85.5987	-	-	MH-16-03-015	2016, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Receiving water: slight turbidity	Outlets from west bank of Portage Creek north of Centre.
EP-16-02-003	21NES2	Portage Creek	42.2011	-85.5992	-	-	MH-16-02-017	2016, 9/14/20 - ST	9/14/2020	N/A	N/A	ST (trace)	Receiving water: slight turbidity	Outlets from east bank of Portage Creek north of Centre.
EP-16-04-002	16NWS1	Consolidated Drain	42.2118	-85.6014	-	-	CB-16-04-003	2015, 9/15/20 - ST	9/15/2020	N/A	N/A	ST (upright)	Normal Vegetation in outfall; investigated upstream manholes and found no dry weather flow	Outlets into drainage ditch behind and between 1033 and 1025 Woodland Drive.
EP-16-04-004	16NWS2	Consolidated Drain	42.2115	-85.603	-	-	CB-16-04-061 CB-16-04-067	2015, 9/14/20 - ST	9/14/2020	N/A	N/A	ST (upright)	Normal conditions - no negative characteristics; investigated upstream manholes and found no dry weather flow	Outlets into drainage ditch behind and between 1215 and 1223 Woodland Drive repairs to outlet made in 2011.
EP-16-04-005	16NWS6	Consolidated Drain	42.2084	-85.6036	-	-	CB-16-04-106	2015, 9/14/20 - ST (20")	9/14/2020	N/A	N/A	ST (20")	Outfall water: slight turbidity, sediment deposit, normal vegetation; receiving water: slight turbidity, normal vegetation; investigated upstream manholes and found no dry weather flow	Storm sewer outlets into drain directly north of CB in north shoulder of Schuring Rd. Cleaned in 2009
EP-18-03-005	18SWS1	Hampton Creek Wetland	42.2073	-85.6391	-	-	MH-18-03-005 MH-18-03-041	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall: Sediment Deposits. Receiving Water: Light Brown, Slight Turbidity,.	Overflow outfall from Squire Heath
EP-18-03-006	18SWS2	Hampton Creek Wetland	42.2061	-85.6401	-	-	CB-18-03-018	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Overflow outfall from Squire Heath
EP-18-03-007	18SWS3	Ditch	42.2014	-85.6444	-	-	CB-18-03-031	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits, Normal Vegetation	Storm water discharge from Angling Road, outlets into road side ditch west of Angling and north of culvert under Angling. Repaired in 2009
EP-19-01-009	19NES4	Hampton Creek Wetland	42.1973	-85.6334	-	-	CB-19-01-029	2015, 9/14/20 - NF	9/14/2020	N/A	N/A	NF	Normal conditions - no negative characteristics	Storm sewer outlet into wetland south of Centre at Moorsbridge.

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EP-19-04-004	19NWS4	Ditch	42.2009	-85.6443	-	-	CB-19-04-019	2015, 9/15/20 - NF	9/15/2020	N/A	N/A	NF	Sediment in outfall; normal vegetation in receiving water	Pipe arch under Angling Road conveys water from road side ditch west of Angling to wetland east of Angling, collects discharge from 19NWS1, 19NWS3 & 19NWS6.
EP-19-04-005	19NWS1	Ditch	42.1993	-85.6438	-	-	CB-19-04-008	2018						Storm water discharge from Angling Road. Outlets into road side ditch west of Angling and south of culvert under Angling Road.
EP-20-01-001	20NES1	Wetland	42.1988	-85.6110	-	-	CB-20-01-001	2014, 7/25/19 - ST(6"), 8/28/19 - ST(6")	7/25/2019, 8/28/19	N/A	N/A	ST (6")	Outfall water: dark brown, moderate turbidity; standing water is natural groundwater so no chemical analysis or sample collected	Outlets from embankment from parking area beneath tree, between 1776 and 1750 Valleywood Court. Outlet is three fourths buried.
EP-20-01-027	20NES2	Wetland	42.1947	-85.6100	TS-41	N/A	CB-20-01-008	2014, 7/25/19 - SUB, 8/28/19 - SUB	7/25/2019, 8/28/19	N/A	8/28/2019	SUB	Outfall and receiving water: dark brown, moderate turbidity	Storm sewer outlet into ditch behind and between 8440 and 8420 Valleywood Lane.
EP-21-03-001	21SWS1	Portage Creek	42.1934	-85.6068	-	-	CB-21-04-052	2018, 11/9/21 - ST(20")	11/9/2021	N/A	11/9/2021	ST(20")	Outfall and Receiving Water: Light Brown, Slight Turbidity.	Storm sewer outlets from north bank of Portage Creek between 1545 and 1535 Dogwood Drive.
EP-21-04-001	21NWS3	Portage Creek	42.1973	-85.6003	-	-	MH-21-04-001	2014, 7/25/19 - ST(15"), 8/28/19 - ST(6")	7/25/2019, 8/28/19	8/28/2019	8/28/2019	ST (6")	Outfall & receiving water: light brown & green colors, moderate turbidity, normal vegetation in receiving water; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlets into drainage ditch on south side of 6-foot chain link fence, between 865 and 862 Lenox.
EP-21-04-002	21NWS2	Portage Creek	42.1963	-85.6012	-	-	CB-21-04-008	2016, 9/15/20 - ST(6")	9/15/2020	N/A	N/A	ST (6")	Outfall water: light brown, slight turbidity, sediment; receiving water; light brown, slight turbidity, normal vegetation; investigated upstream manholes and found no dry weather flow	Outlets from west bank of Portage Creek between 1025 and 1035 Dogwood Drive.
EP-21-04-004	21NWS1	Portage Creek	42.1943	-85.6053	TS-27	N/A	CB-21-04-049	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall: Sediment Deposited. Receiving Water: Light Brown, Slight Turbidity.	Outlets from west bank of Portage Creek between 1423 and 1413 Dogwood Drive.
EP-22-02-002	22SES2	West Lake	42.1904	-85.5715	-	-	CB-22-02-023	2014, 7/25/19 - NF, 9/16/19 - NF	7/25/2019, 9/16/19	N/A	N/A	NF	Sediment and excessive vegetation in outfall; receiving water: light brown, slightly turbid, and normal vegetation	Vegetation, South of 1630 John Street
EP-22-02-003	22SES11	West Lake	42.1909	-85.5711	TS-23	MH-22-02-002	MH-22-02-001 CB-22-02-001	2014, 7/25/19 - NF, 9/16/16 - NF	7/25/2019, 9/16/19	N/A	N/A	NF	Sediment and normal vegetation in outfall; receiving water: light brown, slightly turbid, and normal vegetation	South of 1534 Paul Court
EP-22-03-001	22SWS1	West Lake	42.1929	-85.5833	-	-	CB-22-03-038	2014, 7/25/19 - ST(4"), 8/28/19 - DF	7/25/2019, 8/28/19	8/28/2019	N/A	DF	Outfall & receiving water: light brown, slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Large residential watershed drained Barberry Area, East of 512 Barberry
EP-23-02-001	23SES1	Austin Lake					MH-23-02-004							Austin Lake outfall south of Cox's Drive
EP-23-04-007	23NWS1	Zylman Drain			TS-11	MH-23-04-019	CB-23-04-093							8229 Portage Road, east side of Portage Road across from Presidential Brewery
EP-26-02-002	26SES1	Austin Lake	42.1788	-85.5569	-	-	CB-26-02-008	2015, 9/15/20 - NF	9/15/2020	N/A	N/A	NF	Outfall and receiving water; sediment deposit	Between 2713 and 2729 Woodbine Avenue
EP-26-04-002	26NWS4	West Lake	42.1854	-85.5639	TS-36	MH-26-04-001	CB-26-04-014	2015, 9/15/20 - ST(20")	9/15/2020	N/A	N/A	ST (20")	Outfall and receiving water; sediment deposit; investigated upstream manholes and found no dry weather flow	South of 2214 Ames Drive
EP-27-04-002	27NWS2	Sugarloaf Drain	42.1822	-85.5864	-	-	MH-27-04-005	2016, 9/15/20 - ST(20")	9/15/2020	N/A	N/A	ST (20")	Outfall and receiving water; sediment deposit; investigated upstream manholes and found no dry weather flow	Outlet from Gingham
EP-27-04-008	27NWS5	West Lake	42.1833	-85.5823	-	-	CB-27-04-045	2018, 11/9/21 - ST(30")	11/9/2021	N/A	N/A	ST(30")	Outfall and Receiving Water: Light Brown and Slight Turbidity	Outlet east of S Shore, south of West End, east edge of water
EP-27-04-009	27NWS1	Sugarloaf Drain	42.1831	-85.5828	-	-	CB-27-04-044	2014, 7/25/19 - NF, 9/16/19 - NF	7/25/2019, 9/16/19	N/A	N/A	NF	Sediment in outfall; normal vegetation in receiving water	South Shore storm sewer outfall into Sugarloaf Drain
EP-27-04-010	27NWS4	Sugarloaf Drain	42.1830	-85.5830	-	-	CB-27-04-045	2018, 11/9/21 - ST(30")	11/9/2021	N/A	N/A	ST(30")	Outfall and Receiving Water: Dark Brown and Slight Turbidity	Outlet southwest of S Shore, east edge of water

TABLE 3
IDEP Stormwater Outfall Status Action Plan Table
City of Portage - Storm Water Monitoring Program

GIS Number	Identification Number	Receiving Water	Latitude	Longitude	Associated Stormceptor	Stormceptor Manhole	Nearest Upstream CB or MH	Historical Inspection Dates/Codes	Field Observation Form Complete	Water Quality Analysis Form Complete	Field Investigation Form Complete	Most Recent Code	Condition	Previously Reported Notes
EP-27-04-016	27NWS3	Wetland	42.1853	-85.5892	-	-	CB-27-04-056	2016, 9/15/20 - ST(3")	9/15/2020	N/A	N/A	ST (3")	Outfall and receiving water; sediment deposit; investigated upstream manholes and found no dry weather flow	South Westnedge outfall @ Bishops Bog
EP-28-01-003	28NES5	Sugarloaf Drain	42.1818	-85.5895	-	-	CB-27-04-051	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown and highly turbid; receiving water: normal vegetation	Color due to natural organic material breakdown in West Lake rather than the storm sewer discharge
EP-28-01-004	28NES7	Sugarloaf Drain	42.1817	-85.5895	-	-	CB-27-04-052	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown and highly turbid; receiving water: normal vegetation	Outlet fenced to basin
EP-28-01-005	28NES3	Sugarloaf Drain	42.1813	-85.5918	TS-37	MH-28-01-007	CB-28-01-017	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown and highly turbid; receiving water: normal vegetation	Replaced with 12" CPP and Stormceptor in summer 2007
EP-28-01-006	28NES4	Sugarloaf Drain	42.1797	-85.5943	-	-	CB-28-01-006	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown, highly turbid, normal vegetation	Replaced with 12" CPP and Stormceptor in summer 2007
EP-28-02-001	28SES3	Sugarloaf Drain	42.1768	-85.5976	TS-40	N/A	CB-28-02-002	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown and highly turbid; receiving water: normal vegetation	Installed Stormceptor in 2008
EP-28-02-002	28SES2	Sugarloaf Drain	42.1778	-85.5965	TS-39	N/A	CB-28-02-006	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	8/29/2019	SUB	Outfall & receiving water: dark brown and highly turbid; receiving water: normal vegetation	Installed Stormceptor in 2008
EP-28-02-003	28SES1	Sugarloaf Drain	42.1787	-85.5959	TS-38	N/A	CB-28-02-009	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/19, 8/29/19	N/A	N/A	NF	Receiving water: dark brown, highly turbid, normal vegetation	Replaced with 18" HDPE and Stormceptor in summer 2007
EP-28-02-004	28SES7	Sugarloaf Drain	42.1732	-85.5953	-	-	CB-28-02-037	2018, 11/9/21 - NF	11/9/2021	N/A	N/A	NF	Outfall and Receiving Water: Sediment Deposits	Color and turbidity due to suspended sediments in drain rather than sewer discharge
EP-32-04-001	32NWS1	Sugar Loaf Lake	42.1683	-85.6236	-	-	CB-32-04-006	2014, 7/24/19 - ST(20"), 8/29/19 - NF	7/24/2019, 8/29/19	N/A	N/A	NF	Receiving water: normal vegetation	Replaced outfall pipe in 2008
EP-32-04-002	32NWS2	Sugar Loaf Lake	42.1659	-85.6257	-	-	CB-32-04-062	2018, 11/9/21 - ST(20")	11/9/2021	N/A	11/9/2021	ST(20")	Outfall and Receiving Water: Light Brown and Slight Turbidity; investigated upstream manholes and found no dry weather flow	East of 3091 Rolling Hill Avenue
EP-32-04-003	32NWS3	Sugar Loaf Lake	42.1653	-85.6194	-	-	CB-32-04-053	2018, 11/9/21 - ST(20")	11/9/2021	N/A	11/9/2021	ST(20")	Outfall: Dark Brown, Slight Turbidity, and Sediment Deposits. Receiving Water: Dark Brown, and Sediment Deposits. investigated upstream manholes and found no dry weather flow	South of 2519 Rolling Hill Avenue
EP-34-02-001	34SWS2	Gordneck Lake	42.1601	-85.5795	-	-	CB-34-03-029	2014, 7/25/19 - ST(6"), 8/29/19 - ST(6")	7/25/2019, 8/29/19	8/29/2019	8/29/2019	ST (6")	Outfall & receiving water: light brown, slightly turbid, normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: 0.13 mg/L; sample collected	Outlet pipe is in gourneck lake
EP-34-02-004	34SES3	Gordneck Lake	42.1602	-85.5697	-	-	CB-34-02-028	2014, 7/25/19 - NF, 8/29/19 - NF	7/25/2019, 8/29/19	N/A	N/A	NF	Excessive sediment in outfall; receiving water: light brown, slightly turbid, normal vegetation	Outfall pipe replaced in 2008
EP-34-02-005	34SES1	Gordneck Lake	42.1630	-85.5719	-	-	CB-34-02-031	2014, 7/25/19 - SUB, 8/29/19 - SUB	7/25/2019, 8/29/19	N/A	N/A	SUB	Outfall & receiving water: light brown and slightly turbid; receiving water: normal vegetation	Storm outlet is cut short of gourneck lake to protect from ice damage

TABLE 3
IDEP Stormwater Outfall Status Action Plan Table
City of Portage - Storm Water Monitoring Program

GIS Number	Identification Number	Receiving Water	Latitude	Longitude	Associated Stormceptor	Stormceptor Manhole	Nearest Upstream CB or MH	Historical Inspection Dates/Codes	Field Observation Form Complete	Water Quality Analysis Form Complete	Field Investigation Form Complete	Most Recent Code	Condition	Previously Reported Notes
EP-34-02-007	34SES2	Gordneck Lake	42.1598	-85.5697	TS-32	MH-34-02-002	MH-34-02-001 MH-35-03-001 CB-35-03-025	2014, 7/25/19 - NF, 8/29/19 - NF	7/25/2019, 8/29/19	N/A	N/A	NF	Receiving water: light brown, slightly turbid, normal vegetation	West of Portage Rd, south end of 10744 Portage Rd
EP-35-01-001	35NES1	Austin Lake	42.1657	-85.5516	-	-	CB-35-01-005	2014, 7/25/19 - ST(7"), 8/29/19 - ST(5")	7/25/2019, 8/29/19	8/29/2019	8/29/2019	ST (5")	Outfall & receiving water: light brown, slightly turbid; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlet between 3125 and 3133 Woodhams
EP-35-02-001	35SES2	Austin Lake	42.1633	-85.5544	-	-	CB-35-02-004	2014, 7/25/19 - ST(12"), 8/29/19 - ST(9")	7/25/2019, 8/29/19	8/29/2019	8/29/2019	ST (9")	Receiving water: normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlet at 2945 Woodhams 2" restrictor discharge pipe from street leaching system
EP-35-02-002	35SES1	Austin Lake	42.1620	-85.5567	-	-	CB-35-02-010	2014, 8/29/19 - ST(4")	8/29/2019	8/29/2019	8/29/2019	ST (4")	Sediment & normal vegetation in outfall; receiving water: normal vegetation; lab fluoride = <0.10 ppm; lab phosphorus: <0.05 mg/L; sample collected	Outlet at 2723 Woodhams repaired end section in 2009

NOTES:
NF - Dry, No Flow
CNL - Could Not Locate
DF - Dry Weather Flow, No Negative Signs
ST - Standing Water, No Flow
SUB - Completed Sumberged Under Water



STANDARD OPERATION PROCEDURES For OUTFALL SCREENING & INVESTIGATION OF ILLICIT DISCHARGES¹

Definitions

The following are key terms and their definitions for municipal separate storm sewer systems (MS4) and procedures to perform outfall screening and the investigation of illicit discharges:

Illicit discharge: Any discharge (or seepage) to the separate storm water drainage system that is not composed entirely of storm water or uncontaminated groundwater.

Illicit connection: A physical connection to the separate storm water drainage system that 1) primarily conveys illicit discharges into the system and/or 2) is not authorized or permitted by the local authority (where a local authority requires such authorization or permit).

Point source: An outfall from a drainage system to waters of the state, or a point where a storm water drainage system discharges into a system operated by another public body.

Outfall Screening

The primary method to confirm the *presence of illicit discharges* will be to perform a physical inspection (screening) of the outfalls. All outfalls will initially be categorized as either having a dry weather flow or not. Figure 1: Flow Chart for Outfall Field Evaluation is designed to provide procedural guidance to upstream field investigations. A collection of Field Observations Forms has been prepared to record information such as weather conditions, discharge characteristics (presence and rate of dry weather flow), visual and olfactory observations of discharge characteristics (odor, color, turbidity, and floatable matter). Physical characteristics along the land/water interface will also be noted, including deposits, stains, and vegetative type and stress adjacent to the outfall, and structure condition. The forms are included in this Chapter and will be used to record both field and laboratory water quality results. If a dry weather flow does not exist and there is no evidence of an illicit discharge, that outfall will be re-visited two additional times before the end of the initial permit period. Outfalls shall be screened at least once every five years thereafter.

¹ This Model SOP for the Investigation of Illicit Discharges was developed by the Kalamazoo Area Storm Water Working Group and is based upon a preliminary draft and model forms provided by the City of Kalamazoo.



If a dry weather flow exists, the discharge water will be tested for parameters such as temperature, pH, specific conductivity or total dissolved solids, total chlorine, and fluoride using appropriate field sampling/indicator kits. Each outfall will also be sampled for laboratory analysis of fluoride and phosphorus for field confirmation and the TMDL, respectively. Additional sampling for laboratory analysis will be used only if other methods are unsuccessful in determining the source of the discharge. Additional laboratory parameters will be selected on a case-to-case basis based on the indicators best indicative of the most likely source in the area but may include surfactants/detergents, phenols, ammonia/ammonium, toxicity, and E-coli. The following describes proposed general strategies for various initial flow situations.

Dry Weather flow Indicating Groundwater

If a dry weather flow exists and initial field visual indications, olfactory observations, and field analysis indicate the lack of negative discharge characteristics discussed above, the source will initially be field investigated as being from the public water supply system or natural untreated groundwater. Since groundwater services 100 percent of the source of the Public Water Supply System and fluoride is an additive, a sample will be collected to determine if fluoride levels exist within the common range of the water system: 0.7 to 1.0 mg/L (ppm). If it is, the reason will be determined and recorded, such as from a temporary scheduled activity such as the routine flushing of the water mains, landscape irrigation runoff, dechlorinated swimming pool discharges, emergency firefighting, or a broken water main, etc. If the fluoride levels are within the typical range of area groundwater of 0.2 to 0.3 mg/L (ppm), the possibility of in-flow/infiltration of the storm water infrastructure, pumped groundwater/dewatering activities, etc. will be investigated, categorized, and recorded. If the investigation indicates that the source is not solely groundwater, the strategy described below will be followed.

Dry Weather Flow Not Indicating Groundwater

If a dry weather flow exists and it exhibits unnatural and/or negative characteristics such as odor, color, sheen, staining, floatables and other deposits, vegetative stress or excessive growth, etc., or the discharge was determined not to be from the public water supply system or natural untreated groundwater, then further discharge samples will be collected for analysis to help indicate the type and origin of the flow. To the extent practicable, screening techniques shall be undertaken at the nearest upstream manhole. If indications of a dry weather flow, illicit discharge persist, then in like manner the screening shall continue upstream to determine the section of storm main from which the illicit discharge originates. Results will be recorded on the Field Investigation Form.



Investigation of Illicit Discharge(s)

When outfall screening techniques indicate the existence of a potential illicit discharge, additional administrative and field investigations shall be undertaken to identify and locate the suspected source. Field Investigation Forms shall be reviewed and collected samples (if any) analyzed to help indicate the type and origin of the flow. Land use familiarity and storm sewer records will be reviewed for known connections in the upstream vicinity of the apparent segment or point of origin. Property and facility ownership will be reviewed. If potential sources are not apparent, additional field investigation shall be initiated to further refine the location of the segment (if still undetermined) of the storm main from which the suspected illicit discharge is originating.

Source Investigation

Screening and sampling techniques will be repeated until the apparent storm sewer segment or point of origin of the illicit discharge is reasonably ascertained. Results of these activities will be recorded on the Field Investigation Form. Names and addresses of facilities/residences along the storm main segment between the "wet" and "dry" manholes will be recorded on the Source Investigation Form. MS4 System Records will be reviewed for third-party connection listings in the upstream vicinity of the apparent segment or point of origin. Property and facility ownership will be determined. If potential sources are not apparent, the suspected segment of the storm main will be televised.

Televising the storm main will be used to visually observe and note illicit connections, pipe condition, and create a permanent record of conditions at a specific time. Conditions such as heavily stained pipe, grease build-up on pipe walls, food scraps, toilet and other paper products, soapsuds, chemicals, paint, and other waste products will be looked for and recorded. If illicit connections are still not apparent, the search for illicit connections using other strategies such as sampling for additional parameters for laboratory analysis, televising of additional storm main, smoke testing, etc. will be performed as deemed appropriate. Laboratory analysis parameters will be selected on the basis of area land use and the presence/non-presence of septic systems, and may include surfactants/detergents, phenols, ammonia/ammonium, E-coli, and toxicity screening tests.

If there is a high level of confidence regarding the source(s) of the illicit discharge based on results from this approach, the property and/or facility owner will be contacted to arrange for testing at and near the suspected illicit connection origin, as discussed in the following section.



Correspondence and Site Inspections

All contacts and correspondence will be recorded on a Contact & Correspondence Form. The property/business owners of suspected illicit connection sources would be notified by certified letter that an investigation of illicit discharges is ongoing in their vicinity, and their facility is required to be inspected on a specific date and time. An explanation of the project and inspection and testing procedures will be provided and they will be requested to contact the municipal agent if another date and time are necessary. Other sources of information regarding the property may be researched in preparation for the site inspection, including inspection reports associated with Occupancy Permits, Building Permits, and Industrial Pretreatment Program inspections to increase observation and reporting of poor housekeeping and suspicious plumbing connections.

An inspection will target evidence of illicit connections, illegal dumping, or poor housekeeping practices that could be a source of illicit discharges. A Facility Inspection Form will be completed to document the results of the inspection. Once an inspection has been made, another letter will be sent informing them of the results, including a list of any necessary corrective actions/observed violations and/or recommendations for improved best management practices. They will be given 60 days to correct any listed illicit connections and improve poor housekeeping practices as necessary. The property owner and/or facility owner is responsible for the elimination of all illicit connections/discharges and the subsequent contacting of appropriate municipal agents to arrange for a follow-up inspection.

If violations had been found and the illicit connections and poor best management practices are reportedly eliminated and improved, respectively, a follow-up letter will be sent or a phone call will be made by the municipal agent to schedule a confirmatory inspection. After the inspections are completed and the facility is found in compliance, a final letter will be sent as a notification of compliance and appreciation. If the property/business owners do not eliminate the illicit connections as directed, a notification of non-compliance letter discussing the initiation of the legal process to complete the necessary work, citing existing Code of Ordinances.

Testing Procedures

Generally, color dye will serve as the primary investigative means to investigate suspected illicit connections. Use of colored dyes shall be performed in accordance with EGLE guidance and directives. Prior to use, the types of dyes will be approved by EGLE. In addition, the municipal agent will notify EGLE prior to dye use in case calls regarding visual observance of color discharges to the Public Emergency Assistance System (PEAS) occur.

Until such time that the Storm Water Work Group adopts a Standard Operating Procedure (SOP) for Dye, the Wayne County Department of Environmental Watershed Management Division, Dye Testing Procedures will be considered as a general guide.



Arrangements will be made for property and facility access as necessary. A crew of two or more will perform the dye inspections after a review is performed of the municipal storm water system adjacent to the subject site and a reasonable understanding of the facility plumbing configuration is achieved. If smoke testing is determined as a necessary means for source identification, the municipal agent will utilize practices consistent with industry standards. The municipal agent will contact EGLE prior to dye or smoke testing and a reasonable effort will be made to contact all property and facility owners that may witness the effects of the testing.

Colored dye will be placed in selected plumbing fixtures at the suspected source location and downstream sanitary and storm water manholes will be monitored for the presence of dye. If dye is observed in the sanitary manhole(s) but not in the storm water system under adequate viewing conditions, it will initially be assumed that the source(s) of the illicit discharge is elsewhere and the investigation will continue. If no dye is observed in the sanitary or storm systems, another investigative method such as televising or smoke testing, etc. will be implemented to locate the illicit connection or additional dye applications may be attempted.

If dye is observed in the storm water system, a source of the illicit discharge will be considered confirmed. Subsequently, the property owner and facility owner will be formally notified directing them to eliminate the illicit connection within 60 days and to contact the city when completed to arrange for a confirmatory inspection. If dry weather flows are no longer visible after confirmation of the illicit connection elimination, it will be assumed that the illicit connection has been corrected unless evidence to the contrary exists. If dry weather flows continues, other potential sources will be investigated.

Suspected Intermittent Illicit Flows

If dry weather flows were not observed at the outfall but evidence of deposits, stains, unusual vegetative type and stress, and odor adjacent to the outfall exist, an intermittent flow investigation will be initiated (Figure 1). Up to three subsequent visits will be made within one year (at least one week apart) during a dry period to document and sample a discharge. The investigative sequence of events and methodology will be similar to that with the dry weather flow but may also include wet weather sampling if the intermittent flows are not observed. Intermittent flows will be second in priority to dry weather flows.

OUTFALL EVALUATION
WATER QUALITY ANALYSIS FORM

Outfall ID: _____ Discharge Water Body: _____

Date: _____ Time: _____ Inspector(s): _____

DISCHARGE CHARACTERISTICS

Field Analysis (required for every sample)

Temperature (°F): _____ pH: _____

Specific Conductivity (micromhos): _____ OR Total Dissolved Solids (ppm): _____

Total Chlorine (ppm): _____ Fluoride (mg/L): _____

Laboratory Analysis

Only required for Fluoride and Phosphorus unless approved by supervisor. Record result and place
Laboratory Analytical Reports in appropriate outfall file.

Fluoride (mg/L): _____ Total Phosphorus (ug/L): _____

Surfactants/Detergents: _____ Phenols: _____ Ammonia/Ammonium: _____

Toxicity Screening: _____ E-Coli: _____ Other: _____

Note: If outfall is underwater and not safe to access, obtain sample from first available upstream manhole using an in-line sampling device ("sampling stick").

ILLICIT DISCHARGE ELIMINATION PLAN FIELD INVESTIGATION FORM

Outfall ID with Dry Weather Flow: _____

Date: _____ Time: _____ Inspector(s): _____

Upstream Manhole Reconnaissance

Start with immediate upstream manhole on primary storm main and work consecutively upstream. Indicate manholes inspected on field map(s).

Manhole I.D.: _____ Dry Weather Flow? Yes ☐ No ☐

If yes, continue to next up-gradient manhole.

If no, check field maps for connections within subject storm main segment between outfall and first upstream "dry" manhole. Proceed up-gradient manhole reconnaissance in each secondary storm main segment, repeating same procedure until the main segment contributing the flow is identified. List two manhole I.D.'s defining segment and indicate on field map.

Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Manhole I.D.: _____	Dry Weather Flow?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

ILLICIT DISCHARGE ELIMINATION PLAN
SOURCE INVESTIGATION FORM

Outfall ID with Dry Weather Flow: _____

Investigator(s): _____

Pipe Segment To Investigate

"Wet" Manhole ID: _____ "Dry" Manhole ID: _____

Sources To Be Investigated

List facilities/residences and associated addresses along storm main segment between "wet" and "dry" manholes, starting with most downstream and proceeding upstream.

1. Name _____ Address: _____
2. Name _____ Address: _____
3. Name _____ Address: _____
4. Name _____ Address: _____
5. Name _____ Address: _____
6. Name _____ Address: _____
7. Name _____ Address: _____
8. Name _____ Address: _____
9. Name _____ Address: _____
10. Name _____ Address: _____
11. Name _____ Address: _____
12. Name _____ Address: _____
13. Name _____ Address: _____

DISCHARGE TO STORM SEWER
FIELD INVESTIGATION FORM

Storm Sewer Structure Entry Point ID: _____ Downstream Outfall ID: _____

Inspector(s): _____ Date: _____ Time: _____

Observations

Observed Conditions:

Results

Action Taken:

Follow Up Needed:

Comments

**ILLICIT DISCHARGE ELIMINATION PLAN
FACILITY INSPECTION FORM**

Outfall ID with Dry Weather Flow: _____

Date: _____ Time: _____ Inspector(s): _____

FACILITY INFORMATION

Name of Facility: _____ Address: _____

Facility Contact: _____ Phone Number: _____

ILLICIT DISCHARGE TESTING

☐ Type of Test: ☐ Dye ☐ Smoke ☐ Other _____

TEST RESULTS

- ☐ Proper Connection – The fixtures tested in this establishment have been found to be properly connected to the sanitary sewer system. No problems were noticed at time of inspection.
- ☐ Incomplete/unfinished (state reason): _____
- ☐ Unsuccessful attempt (state reason): _____
- ☐ Violation/Illicit Connection/Improper discharge:
- ☐ Illicit Connection
 - ☐ Improper Discharge
 - ☐ Poor Housekeeping

List All Fixtures Tested: _____

Comments: _____

ILLICIT DISCHARGE ELIMINATION PLAN
CONTACT & CORRESPONDENCE FORM

Outfall ID with Dry Weather Flow: _____

Investigator(s): _____ Date: _____

Contact/Correspondence (check type)

☐ Phone Log (describe or attach separate log)

Contact: _____

Discussion: _____

☐ Letters (attach)

☐ Notification of Inspection/Testing Schedule

☐ Notification of Inspection Follow-up Results/Necessary Corrective Actions

☐ Notification of Illicit Connection Elimination Confirmation Inspection Schedule

☐ Notification of Compliance Appreciation

☐ Notification of Non-Compliance/Legal Procedures

☐ Other (Describe): _____

Owner/Operator: _____

Address: _____ City: _____ Zip Code: _____

Regarding Business: _____

Address: _____ City: _____ Zip Code: _____

ILLICIT DISCHARGE ELIMINATION PLAN
PHONE CONVERSATION LOG

City Representative: _____ Date: _____ Time: _____

Person Talked With

Name: _____ Title: _____

Address: _____ Organization: _____

Phone Number(s): _____

Illicit Discharge or Connection

Location: _____

Description of Discharge: _____

Illicit discharge or connection observation: _____
(Date) (Time)

Other notes: _____

Message Referral

Messaged referred to: _____ on _____
(City Representative) (Date & Time)

How was the referral made? (check all that apply)

☐ Phone Conversation ☐ Phone Message ☐ Email ☐ In Person

Provide copy of log to appropriate City contact

Confirmation of Phone Log Receipt: _____
(Signature) (Date)

Action taken or to be taken: _____



Outfall ID with Dry Weather Flow: _____

Inspector(s): _____ **Date:** _____

Comments:This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no vertical margin lines or other markings present. The paper appears to be a standard piece of stationery used for writing or drawing.



City of Portage Administrative Order 6.10

Unknown Substance/Hazardous Materials Incident and Investigations

ISSUED: July 30, 2012

ORDER NO.: 6.10

SUBJECT: Unknown Substance/Hazardous Materials Incidents and Investigations

This order provides basic response guidelines for the investigation of suspected hazardous materials and unknown substances. The Public Safety Department Fire Division shall be the primary emergency response agency for all suspected hazardous materials (haz-mat) incidents. The Fire Division Incident Commander (IC) shall assess the site and circumstances to determine if a release of hazardous materials has occurred. If, in the judgement of the IC, such a release has occurred, the following procedure shall be implemented.

The Fire Division is responsible and has the authority to restrict/require specific actions (e.g., evacuation) until a dangerous situation is abated. Public Safety Department Fire Division personnel shall respond to haz-mat incidents in a defensive mode only to identify and confine hazardous materials pursuant to their training. Other city employees will respond to a haz-mat incident and assist in the mitigation of the circumstances in accordance with their level of training in handling hazardous materials. It will be the primary responsibility of the Fire Division to conduct, assess and investigate suspected contamination as authorized by the IC.

- A. A Unified Incident Command System (ICS) shall be implemented at all suspected or confirmed haz-mat incidents. The Fire Division shall advise all responding departments of the location for the unified incident command post. Pursuant to state statute, the Fire Division shall be responsible for the abatement of the hazardous situation.
- B. Following the determination that a haz-mat incident has occurred, the IC shall notify Portage Central Dispatch of the incident and request a response by the Kalamazoo County Haz Mat Response Team (KCHMT). The KCHMT is specifically responsible for control efforts (i.e., stopping or controlling a release). The IC shall designate a Fire Division employee as a liaison between the command post and Central Dispatch. This individual will also ensure that emergency notifications, which may include the following, are completed:
 - 1. Kalamazoo County Emergency Management Director (through Kalamazoo County Sheriff dispatch).



2. Michigan DNRE Pollution Emergency Alerting System (PEAS) (800-292-4706).
3. Michigan Department of Labor and Economic Growth, Bureau of Fire Services (Voice Mail = 517-322-5316 or Pager = 888-237-4081).
4. City of Portage contacts:
 - a. Director of Parks, Recreation & Public Services: Any incident requiring diking materials (i.e., sand), traffic rerouting, etc.
 - b. Public Safety Department – Police Division: Assistance with traffic control, evacuations or other emergency activities.
 - c. Office of the City Manager: Large scale or serious incidents where the City Manager should be appraised or where activation of the Emergency Coordination Center (ECC) may be necessary.
 - d. Director of Transportation and Utilities.
5. American Red Cross local chapter (if evacuations are ordered).
6. Based on the size and complexity of the incident, additional notifications may be necessary as determined by Fire Division procedures.

Note: The purpose of these notifications shall be identified by the Fire Division and it shall be clarified as to whether assistance is being requested from those agencies being notified or if it is an “information only” notification.

- C. Any attempt to verify the presence of a reported substance or identify a discovered substance shall be in accordance with the level of training of the responder. This may be delegated to responding KCHMT members.
- D. Where incidents of contamination are involved, the IC shall implement an emergency response in accordance with the Fire Division standard operating guidelines.
 1. A clean-up contractor shall be contacted if necessary. If identification of a responsible party is not immediately practical, the IC (or designee) must contact the MDNRE for cleanup and payment. Only if this is not successful should the city commit to payment for cleanup. The Director of Transportation and Utilities has authority to contact a cleanup contractor to mitigate the incident and obligate the city for payment of the cleanup.
 2. As soon as is practical, the party responsible for the incident should be identified and held accountable for all clean-up efforts and associated costs.



3. If conditions warrant, the IC, Public Safety Director or Senior Deputy Fire Chief – Operations may, at any time, request through the City Manager's Office, to initiate provisions of the Emergency Preparedness Response Plan, including activation of the city ECC or Kalamazoo County EOC as appropriate.
- E. The Director of Parks, Recreation and Public Services shall ensure that Portage Central Dispatch is, at all times, provided with the appropriate telephone numbers and order of call-in for department personnel. The Director of Parks, Recreation & Public Services is responsible for providing proper and current telephone numbers for the MDNRE.
- F. The IC shall be responsible for all decisions related to incident and hazardous materials management, including communicating with and directing all other responders.
1. A unified command shall be established with representatives of involved city departments, the responsible party, or representative thereof (if identified and on site), and other state and/or federal response agencies.
 2. If the incident is determined to be the result of criminal or terrorist activities, the site shall be specified as a crime scene and the security and investigation of the scene shall become the responsibility of the Police Division. The lead agency in the unified ICS will then switch from the Fire Division to the Police Division.
- G. All traffic and crowd control and necessary communication related to these services, including evacuation of persons from the affected area, shall be the responsibility of the Police Division onsite command officer, under direction of the IC.
- H. The Public Safety Director or Senior Deputy Fire Chief - Operations shall prepare an incident report by the next working day following the conclusion of the incident. (If the incident is determined to be a criminal incident, the criminal investigative report shall be the responsibility of the Public Safety Director.) The report shall summarize the investigation and actions taken. Directors of all other departments assisting at the incident shall provide a report of the activities performed by their respective departments to the Senior Deputy Fire Chief – Operations to aid in the preparation of the report. The report may contain recommendations to prevent a similar incident or for any needed follow-up actions that may be necessary. The report shall be transmitted to the Office of the City Manager.



SPILL OR RELEASE REPORT

NOTE: Some State and Federal regulations require a specific form to use and procedures to follow when reporting a release. Those forms and procedures MUST be used and followed if reporting under those regulations. Please refer to the Michigan Reporting Requirements Tool to aid you in determining the proper form to use. This report form, although not required to be used, is designed to aid person to report releases under regulations. To report a release, some regulations require a facility to call the EGLE PEAS Hotline at 800-292-4706 (or the EGLE District Office that oversees the county where it occurred) and other agencies and provide information that is included in this form. This form may also be used for the written follow-up report to the department. If you prefer to submit this report electronically by FAX or e-mail, contact the regulating agency for the correct telephone number or e-mail address. Go to www.michigan.gov/chemrelease for more information.

Please print or type all information.

Name of Person Submitting Written Report		Title of Person Submitting Written Report		Telephone Number (provide area code)		
Name of Business		Release Location (Provide address if different than business, if known, and give directions to the spill location. Include nearest highway, town, road intersection, etc.)				
Street Address						
City	State					ZIP
Business Telephone Number (provide area code)						
Site Identification Number and Other Identifying Numbers (if applicable)		County	Township	Tier/Range/Section (if known)		
Release Data: Complete all applicable categories. Check all the boxes that apply to the release. Provide the best available information regarding the release and its impacts. Attach additional pages if necessary.						
Date of Release (if known)	Date of Discovery	Duration of Release (if known)	Type of Incident			
Time of Release (if known)	Time of Discovery					
	am pm	days hours minutes	<input type="checkbox"/> Explosion <input type="checkbox"/> Loading/unloading release <input type="checkbox"/> Fire <input type="checkbox"/> Pipe/valve leak or rupture <input type="checkbox"/> Leaking container <input type="checkbox"/> Vehicle accident <input type="checkbox"/> Other			
Material Released (chemical or trade name)		CAS Number or Hazardous Waste Code		Estimated Quantity Released (indicate unit e.g. lbs, gals, cu ft or yds)	Physical State Released (indicate if solid, liquid, or gas)	
<input type="checkbox"/> Check here if additional materials listed on the attached page						

Factors Contributing to Release		Source of Loss	
<input type="checkbox"/> Equipment failure <input type="checkbox"/> Operator error <input type="checkbox"/> Faulty process design	<input type="checkbox"/> Training deficiencies <input type="checkbox"/> Unusual weather conditions <input type="checkbox"/> Other	<input type="checkbox"/> Container <input type="checkbox"/> Railroad car <input type="checkbox"/> Pipeline <input type="checkbox"/> Ship	<input type="checkbox"/> Tanker <input type="checkbox"/> Tank <input type="checkbox"/> Truck <input type="checkbox"/> Other
Type of Material Released	Material Listed on or Defined by	Immediate Actions Taken	
<input type="checkbox"/> Agricultural: manure, pesticide, fertilizer <input type="checkbox"/> Chemicals <input type="checkbox"/> Flammable or combustible liquid <input type="checkbox"/> Hazardous waste <input type="checkbox"/> Liquid industrial waste <input type="checkbox"/> Oil/petroleum products or waste <input type="checkbox"/> Salt <input type="checkbox"/> Sewage <input type="checkbox"/> Unknown <input type="checkbox"/> Other	<input type="checkbox"/> CAA Section 112(r) list (40 CFR Part 68) <input type="checkbox"/> CERCLA Table 302.4 (40 CFR Part 302) <input type="checkbox"/> EPCRA Extremely Hazardous Substance (40 CFR Part 355) <input type="checkbox"/> NREPA Part 31, Part 5 Rules polluting material <input type="checkbox"/> NREPA Part 111 or RCRA hazardous waste <input type="checkbox"/> NREPA Part 121 liquid industrial waste <input type="checkbox"/> Unknown <input type="checkbox"/> Other	<input type="checkbox"/> Containment <input type="checkbox"/> Diversion of release to treatment <input type="checkbox"/> Dilution <input type="checkbox"/> Evacuation <input type="checkbox"/> Decontamination of persons or equipment <input type="checkbox"/> Hazard removal <input type="checkbox"/> Neutralization <input type="checkbox"/> Monitoring <input type="checkbox"/> System shut down <input type="checkbox"/> Other	
Release Reached <input type="checkbox"/> Surface waters (include name of river, lake, drain involved) <input type="checkbox"/> Distance from spill location to surface water, in feet <input type="checkbox"/> Drain connected to sanitary sewer (include name of wastewater treatment plant and/or street drain, if known) <input type="checkbox"/> Drain connected to storm sewer (include name of drain or water body it discharges into, if known) <input type="checkbox"/> Groundwater: <div style="margin-left: 40px;"> Is it a known or suspected drinking water source? Yes No <input type="checkbox"/> </div> <div style="margin-left: 40px;"> What is the name of aquifer, if known? </div> <input type="checkbox"/> Soils (include type e.g. clay, sand, loam, etc.) <input type="checkbox"/> Ambient Air <input type="checkbox"/> Spill contained on impervious surface			
Extent of Injuries(if any)		Was Anyone Hospitalized? <input type="checkbox"/> Yes Number Hospitalized: <input type="checkbox"/> No	Number of Injuries Treated Onsite:

Describe the incident, the type of equipment involved in the release, how the volume of loss was determined, along with any resulting environmental damage caused by the release. Identify who immediately responded to the incident (own employees or contractor — include cleanup company name, contact person, and telephone number). Also identify who did further cleanup activities if performed or known when report submitted.

☐ **Check here if description or additional comments are included on attached page**

Estimated quantity of any recovered materials and a description of how those materials were managed (include disposal method if applicable)

☐ **Check here if description or additional comments are included on attached page**

Assessment of actual or potential hazards to human health (Include known acute or immediate and chronic or delayed effects, and where appropriate, advice regarding medical attention necessary for exposed individuals.)

☐ **Check here if description or additional comments are included on attached page**

Michigan Department of Environment, Great Lakes, and Energy Notified

Initial Contact by: ☐ Phone ☐ FAX
☐ Email ☐ Other

Date of Initial Contact

Time of Initial Contact

All EGLE Staff Contacted Telephone Number

Name of Person Making Initial Report

Title of Person Making Initial Report

Contact made by calling EGLE Pollution Emergency Alerting System (PEAS):
800-292-4706

Log Number Assigned

EGLE District or Field Office:

☐ Bay City ☐ Cadillac ☐ Calumet
☐ Crystal Falls ☐ Detroit ☐ Gaylord
☐ Grand Rapids ☐ Jackson ☐ Kalamazoo
☐ Lansing ☐ Marquette ☐ Newberry
☐ Warren

Note: EGLE Office locations are subject to change

Divisions or Offices Contacted

☐ Air Quality Division
☐ Drinking Water and Environmental Health Division
☐ Environmental Support Division
☐ Materials Management Division
☐ Office of Climate and Energy
☐ Office of the Clean Water Public Advocate
☐ Office of the Environmental Justice Public Advocate
☐ Office of the Great Lakes
☐ Oil, Gas, and Minerals Division
☐ Remediation and Redevelopment Division
☐ Water Resources Division

Other Entities Notified

Date: Time:

- ☐ National Response Center (NRC): 800-424-8802
- ☐ US Coast Guard Office:
 Detroit Grand Haven Sault Ste. Marie
- ☐ US Department of Transportation
- ☐ US Environmental Protection Agency
- ☐ 911 (or primary public safety answering point)
- ☐ Local Fire Department
- ☐ Local Police/State Police/Sheriff Dept
- ☐ Local Emergency Planning Committee
- ☐ State Emergency Response Commission via MI SARA Title III Pgm
- ☐ Wastewater Treatment Plant Authority
- ☐ Hazmat Team
- ☐ Local Health Department
- ☐ MIOSHA
- ☐ Bureau of Fire Services Fire Marshal Division
- ☐ MI Dept of Agriculture & Rural Development: 800-405-0101
- ☐ Other _____

Person Contacted:

Telephone Number:

Date Written Report Submitted

Signature of Person Submitting Written Report

For information or assistance on this publication, please contact the Environmental Support Division, through EGLE Environmental Assistance Center at 800-662-9278. This publication is available in alternative formats upon request.

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This form and its contents are subject to the Freedom of Information Act and may be released to the public.



Chapter 9 – Construction Storm Water Runoff Control Program



Construction Storm Water Runoff Control Program

POLICY

The City of Portage is the local Soil Erosion and Sedimentation Control (SESC) Enforcing Agency. During the site plan review developer's plans are reviewed for SESC requirements and provided permits where appropriate. The standard operations procedure (SOP) for the City's Soil Erosion Program can be found in [Chapter 13](#).

The City's local soil erosion program is in accordance with local ordinance Section 42-965, as amended, and Part 91 of Public Act 451 of 1994 (Part 91) A copy of the ordinance can be found in [Chapter 13](#).

PROCEDURE

During the site plan review developers are referred to the City's SESC ordinances and forms for permitting when appropriate. If the site is one 1 acre or larger or a commercial parcel, regardless of size, and contains a point source discharge of storm water from a construction activity, then the developer, landowner, or applicants agent identified on the site plan application is mailed a letter advising them to comply with State of Michigan, Permit by Rule (Rule 323.2190), which includes the contractor providing a certified storm water operator and conducting regular inspections in compliance with Permit by Rule.

Department of Community Development (DCD) staff will perform site inspections for sites currently under construction consistent with the requirements of Part 91. Records of the inspection results will be maintained by the DCD in an organized manner. For sites not complying with the requirements of the soil erosion permit, DCD staff will contact the applicant in a reasonable timeframe to inform of the infraction and provide a deadline for improvements. If the applicant does not address the issue, the DCD will follow-up as outlined in the local ordinance and in accordance with Part 91.

If complaints related to SESC are received from the public, the complaint will be referred to DCD staff for evaluation. DCD staff will perform a site inspection within 48 hours of being notified of the issue and determine site compliance. For sites not complying with the requirements of the soil erosion permit, DCD staff will contact the applicant in a reasonable timeframe to inform of the infraction and provide a deadline for improvements.

If soil, sedimentation, or other pollutants are discharged to Portage's MS4 from a construction activity, the DCD will notify EGLE with 24-hours of discovery. Other pollutants may include, but not limited to pesticides, petroleum derivatives, construction chemicals, and solid wastes that may become mobilized when land surfaces are disturbed.



Additionally, the DCD will notify EGLE within 24-hours per part 4, Rule 50 (R 323.1050 – Physical characteristics) if the surface waters of the state have any of the following physical properties in unnatural quantities which are or may become injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits.

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.



Chapter 10 – Post-Construction Storm Water Runoff Program



Post-Construction Storm Water Runoff Program

OVERVIEW

The Department of Community Development manages and requires that the designer complete the Storm Water/Final Plan Information checklist, provide site plans for review, and approval of postconstruction storm water runoff BMPs prior to starting construction. A copy of the checklist can be found in the Storm Water Design Criteria Manual. Site plans within the City are reviewed by the Department of Community Development, Department of Transportation and Utilities, and the planning commission. The City requires site plan review for multi-family dwellings, mobile home parks, planned unit developments, office, commercial and industrial buildings. A single family residential building on an existing lot does not require a site plan review. The review includes appropriate storm water Best Management Practices (BMPs) such as; on-site management (no additional runoff standard); isolation of storm water from pollutants; secondary containment when required; and protection of sensitive environmental resource areas, and long term operations and maintenance along with the requirements of the Storm Water Design Criteria Manual adopted by the City. The applicant, in his plan submittals for Site Plan Approval, shall demonstrate compliance with these performance standards and shall be responsible for evaluating the elected best management practices.

The City's Storm Water Design Criteria Manual applies to new and redeveloped sites with projects that require site plan review, regardless of the size of the parcel or area that is disturbed. These requirements also apply to all public and private sites within the City, regardless of whether the storm water outlet(s) from the site discharge to a designated county drain, City storm sewer system, waters of the state or any other types of conveyance. All water quantity structurers will be subject to post- construction water requirements.

These Performance Standard's requirements also apply to sites under the control of public agencies such as schools, Federal and State governmental facilities, Kalamazoo County Road Commission, City of Portage, a designated County Drain, and other entities that might not otherwise be subject to site plan review procedures and requirements as set forth in the Storm Water Design Criteria Manual and other sections of the City's codified ordinances. When the City is notified of a project or potential project by an agency within the City limits that does not require site plan review, the City will provide the agency written communications and a copy of the City's Performance Standards and also request reviewing the proposed plans to provide input for the agency to implement such Standards.

Complaints of storm water or local flooding issues are responded to promptly by enforcing the standards set by the City and commitments made during site plan approval.

Problematic retention, detention, and infiltrative areas are reviewed after rainfall events to ensure infiltration. The City currently owns 50 infiltration areas scatted about the City limits.



As mentioned earlier, Chapter 64 of the City Code of Ordinances titled “Storm Water, Illicit Discharges and Connections” refers to “Performance Standards” which is a separate document, the Storm Water Design Criteria Manual for the City of Portage that can be easily updated based on the needs of the community and requirements of the NPDES Permit. The City updated its stormwater ordinances (Chapter 64 of the Code of Ordinances) and updated the Storm Water Design Criteria Manual in 2021 for the City of Portage to be in compliance with this current permit. A copy of the updated Ordinance is included in Chapter 13 of this application.

a) Minimum Treatment Volume Standard

The Storm Water Design Criteria Manual for the City of Portage document provides a "performance standard" for the minimum treatment volume standard.

b) Channel Protection

Storm Water Design Criteria Manual for the City of Portage the channel protection criteria.

c) Operation and Maintenance for Water Quality Treatment

Chapter 64 of the City Code of Ordinances “Storm Water, Illicit Discharges and Connections” defines enforcement mechanisms for the City to use to ensure operation and maintenance is continued for installed BMP's. This includes the execution and recording of a stormwater BMP O&M agreement (see chapter 15 of this application). This O&M agreement is transferred to subsequent property owners as outlined within the agreement.

SITE-SPECIFIC REQUIREMENTS (CONTAMINATED SITES)

Site plans within the City of Portage are reviewed by the Department of Community Development, Department of Transportation and Utilities, and planning commission. As a general rule, infiltration and maintaining all storm water on-site is the preferred method of controlling pollutants.

Sites which are contaminated (soil and/or groundwater) require special consideration during site plan review and are expected to still comply with the City’s Storm Water Criteria Manual. Typical solutions are to use proprietary treatment systems for storm water treatment and vaults and/or lined detention systems with controlled outlets for reducing flow rates to comply with such requirements. Additionally, the projects must coordinate with EGLE staff as appropriate. The ultimate goal of the City is to not have the developer/owner exacerbate existing conditions.



SITE-SPECIFIC REQUIREMENTS (HOT SPOT SITES)

If the subject property is a potential “Hot Spot” area with the potential for significant pollutant loading or with the potential for contaminating public water supply (wells), additionally site-specific requirements may apply to address the contaminate(s) of concern. Example of typical “hot spots” areas included, but not limited to gas stations, commercial vehicle maintenance and repair, auto recyclers, recycling centers, and scrap yards.

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.

TABLE 4 - POST CONSTRUCTION STORM WATER

Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
Site Appropriate BMP's	Site plans for all new and redeveloped sites other than single family homes shall be reviewed by City staff and the planning commission. Review shall include appropriate storm water BMP's such as: on-site management (no additional runoff standard); isolation of storm water from pollutants; secondary containment when required; and protection of central environmental resource areas, and long term operations and maintenance along with the requirements of the Storm water ordinance adopted by the City.	On-going	On-going	Site plans are reviewed and conform to applicable Performance Standards, such as, minimum treatment volume, channel protection, riparian buffers operation and maintenance outlined in the City's ordinance	All site plans reviewed and conform to applicable Performance Standards within the City ordinance.	No
	Site plans include a Stormwater Management Plan			City Engineer verifies developer's engineers calculations	BMP O&M Agreement is executed and recorded	
	Site Plans include City's worksheets for Water Quality Treatment Volume, Channel Protection, and where applicable, Flood Control					
	Property Owner provides an executed copy of the BMP O&M Agreement for recording				All public agencies such as schools, Federal and State governmental facilities, Road Commission of Kalamazoo County, City of Portage, MDOT, a designated County Drain, and other entities that might not otherwise be subject to site plan review procedures and requirements as set forth in other sections of the City's codified ordinances conform to applicable Performance Standards within the City ordinance.	
	Performance Standard's requirements also apply to sites under the control of public agencies such as schools, Federal and State governmental facilities, Road Commission of Kalamazoo County, City of Portage, MDOT, a designated County Drain, and other entities that might not otherwise be subject to site plan review procedures and requirements as set forth in other sections of the City's codified ordinances. When the City is notified of a project or potential project by an agency within the City limits that does not require site plan review, the City will provide the agency written communications and a copy of the City's Performance Standards and also request reviewing the proposed plans to provide input for the agency to implement such Standards.					
	All water quantity structururs will be subject to post-construction water requirements.				All new water quantity structururs met post-construction water requirements.	

TABLE 4 - POST CONSTRUCTION STORM WATER

Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
Long-term operation, maintenance and enforcement	Respond to complaints of storm water or local flooding issues promptly by enforcing storm water ordinances, performance standards, and commitments made during site plan approval.	On-going	On-going	Number of complaints	Number of complaints vs. number of complaints resolved	SeeClickFixIt reports are used to report and respond to storm water and flooding complaints. A number of complaints are reviewed and followed up on annually.
	Informal observation of private problematic retention and detention ponds after rainfall events to ensure infiltration.	On-going	On-going	Number of ponds that are not functioning properly	Fewer ponds that are not functioning properly	Landowners are contacted and action requested when problems are noted at private retention/detention ponds.
	Site plans provide O&M procedures related to site specific Stormwater Treatment Units (STUs) and/or BMPs	On-going	On-going	Information provided on site plan and installed per City approval. BMPs identified in the Stormwater Management Plan	100% site plan conformance BMP O&M agreement is recorded	Stormwater agreement required for all new private development projects.
	BMP agreement associated with the site plans provide provisions related to periodic inspections of Stormwater Treatment Units (STUs) and/or BMPs.	On-going	On-going	Information provided on site plan and inspected per City approval.	BMPs installed per plan and inspection records provided to City on an annual basis and also available upon request.	Stormwater agreement required for all new private development projects.
	Record Retention – Inspections and other records pertaining to O&M of best management practices are maintained by the property owner and City and retained for a minimum of five years	On-going	On-going	Site provide timely annual reporting 5 years of records available	City maintains the annual reports on file related to individual sites. City notifies property owner with 30-days if annual report is not provided. Records available from property owner upon request	Spreadsheet used to record site plans and annual reporting.



Chapter 11 – Pollution Prevention and Good Housekeeping Program



Pollution Prevention and Good Housekeeping

MUNICIPAL FACILITIES & FACILITY-SPECIFIC STORM WATER MANAGEMENT

The City owns and operates numerous buildings and facilities. None of the City owned properties or buildings have discharges to waters of the state and storm water is maintained on site at each of these facilities. A list of the City owned facilities are as follows:

City Hall	7900 S. Westnedge
Police	7810 Shaver Road
Fire Station #1	7810 Shaver Road
Fire Station #2	6101 Oakland Drive
Fire Station #3	8529 S. Sprinkle Road
Department and Public Services	7719 S. Westnedge
Composting Site	10905 Oakland Drive
Closed Landfill	9016 S. Westnedge
Four Cemeteries	
Numerous Parks	

As listed above, the City's Department of Public Works (DPW) and Fleet Maintenance area is located at 7719 South Westnedge Avenue. This facility site for the DPW serves many uses. Activities included at this facility site are maintenance building, fuel dispensing, transfer site for CB and street sweeping wastes, salt storage, and material storage. This property is located on the east-southeast side of a railroad adjacent to Portage Creek. This area does not discharge to Portage Creek or any other waters of the State through pipe or overland flow. All of the catch basins in this area discharge to an infiltration basin located on the northern portion of the site which has no outlet. For the water in the infiltration basin to overflow to the Portage Creek it would have to reach levels higher than the adjacent railroad. Because storm water does not discharge from this site, a Storm Water Pollution Prevention Plan (SWPPP) was not developed. The City DPW maintains the yard and associated activities in conformance to common sense related to pollution prevention and good housekeeping, like storing materials, salt, and street waste inside and grounds keeping and preventing "tracking" out from the yard.

The facilities above are reviewed and prioritized by the City based on having the high, medium, or low potential of discharging pollutants to surface waters of the state. The prioritization of the City's facilities is as follows:

City Hall	Low Priority	Composting Site	Low Priority
Police Station	Low Priority	Closed Landfill	Low Priority
Fire Stations	Low Priority	Cemeteries	Low Priority
DPW facility	Low Priority	Parks	Low Priority
City Parks	Low Priority		



Considerations in prioritizing each facility included:

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

If a facility use changes or a new facility is obtained by the City, the Storm Water Program Manager shall update/revise the facility assessments a minimum of 30 days prior to discharging storm water from a new facility and within 30 days of determining a need to update/revise the facility assessment. At a minimum, the City will identify the BMPs currently implemented or to be implemented during the permit cycle to prevent or reduce pollutant runoff at each facility to surface waters of the state using the assessment and prioritization list identified in the above paragraphs.

STORM WATER CONTROL INVENTORY

The City of Portage owns and maintains public roads, sanitary sewer, storm sewer, and water main. The City has the following storm water inventory:

- 8,534 structures which are comprised of catch basins, leaching basins, manholes, and storm inlets.
- 759,264 feet of storm piping
- 122 outfalls which discharge directly to the creek, lakes or adjoining wetlands
- 97 infiltration basins (includes privately maintained basins in plats)
- 20 Manufactured Stormwater Treatment Units (STUs)
- 3 detention basins which discharge to Portage Creek and West Branch of Portage Creek

A map showing the City's overall storm sewer system and a list of assets are included in Chapter 3.

STRUCTURAL STORM WATER CONTROL AND MAINTENANCE ACTIVITIES

The City of Portage prioritizes the catch basins within the system for routine inspection, maintenance, and cleaning based on preventing or reducing pollutant runoff. High priority catch basins are those that discharge to waters of the state and are inspected annually and cleaned as needed by Veolia. Lower priority catch basins are cleaned on a rotational basis, or when requested. Catch basins that historically fill with debris, or locations near a lake or pond, are prioritized for more frequent cleaning as needed.



All catch basins are inspected once every three years with sump measurements unless more frequent inspections are warranted. Catch basins are cleaned when the depth of sedimentation exceeds 1/2 the sump depth of the structure or when they are on the cleaning rotation. These services are contracted-out, with vendor records retained for verification that the waste was disposed of properly. Cleaning, dewatering, storage, and disposal of materials and sediment complies with EGLE's "Catch Basin Cleaning Activities Guidance Document". Debris from catch basin cleaning is delivered to the DPW Facility in one of two city-owned "Vactor" trucks and unloaded in a contained cell of the storm water collection system and allowed to decant.

After drying, the residue is deposited in the facility's debris storage building for disposal at a Class II Landfill. The decant water is directed to a treatment pond where all sediments and oils are removed. The treatment pond is cleaned as needed. All run-off from the treatment pond is being directed to a recharge pond. The recharge pond is not in a well head protection area and there is no surface discharge from this facility.

Storm water structural controls are evaluated by DPW and Veolia as complaints from residents are received and also in the fall during leaf collection. During leaf pick-up, the DPW spends adequate time at the catch basins to determine debris levels, including removing castings, as necessary, to determine debris levels within the structures.

If the City determines during the inspection of catch basins or via citizen complaint that more routine maintenance or cleaning is necessary, the City will revise its frequency for inspection of a specific structure accordingly by inspecting the structure yearly to determine an acceptable inspection frequency. The City will inspect all newly constructed storm structures within 3 years of installation to determine if a more frequent inspection is warranted.

Storm Water Treatment Units (STUs) (Oil/Water Separators)

The City maintains a number of proprietary storm water treatment units (STUs), such as, Stormceptors, Aqua Shield, Vortechincs and CDS, which filter storm water prior to surface water discharge. Devices typically treat runoff from public roadways before discharging to surface waters. The city has 20 devices which are cleaned annually by an outside cleaning vendor. Debris is tested and hauled to a Class II Landfill.

Existing Retention/Detention Basin Inspection

The City of Portage has three detention basins which discharge to Portage Creek and the West Branch of Portage Creek. The basins are summarized as follows:

LOCATION	RECEIVING WATER	BUILT
7614 South Westnedge Avenue	Portage Creek	2005
7122 South Westnedge Avenue	Portage Creek	2000
750 Trade Centre Way	West Branch of Portage Creek	2004



Each of these facilities is monitored monthly by city employees or contract operators on an annual basis. Inspection includes basic operational concerns such as soil erosion, pipe blockage, nuisance animal burrowing and the presence of contaminants in the fore bay area. The city's Annual Capital Improvement Budget includes funding for needed maintenance on retention/detention basins and this fund to date has been expended on infiltration areas which the city maintains.

MUNICIPAL OPERATIONS AND MAINTENANCE ACTIVITIES

Street Sweeping and/or Cleaning

The City of Portage streets with curb and gutters are the top priority for street sweeping over streets without curb and gutter systems. Street sweeping shall be performed regularly (once a month on Local Streets and twice a month on Major Streets), beginning with a thorough cleaning of all streets as soon as practical in the spring and continue through October. Street sweeping shall be performed at a level to keep the roadways/gutter pans neat in appearance and free from excess sediment and debris that detract from the physical appearance of the streetscape, plug storm drainage systems and creates a liability exposure. Sweeping is also required in conjunction with the city Fall Leaf Pickup Program conducted in November and December. Weather permitting, additional full sweeps may be provided during leaf pickup.

The city, through its contract operator, Veolia, sweeps and cleans routinely and for the Leaf Pickup Program every year. On average, 900 cubic yards of material are collected and disposed of in a Type II Landfill. In conjunction with leaf pickup, approximately 13,300 cubic yards of leaves are transported to a composting site annually.

Currently there are not any streets within the City that have warranted a more frequent sweeping. Additional street sweeping after storms is performed as necessary. If the City determines a street requires more routine sweeping is necessary, based on citizen comments or if the surface waters of the state develop any of the following physical properties in unnatural quantities which are or may become injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits caused by pollutants upon City streets, the City will revise its frequency for sweeping of that street to an acceptable frequency.

Proper sweeping methods include operating sweeping equipment according to the manufacturer's operating instructions and to protect water quality. Cleaning, dewatering, storage, and disposal of street sweeper waste materials complies with EGLE's "Catch Basin Cleaning Activities Guidance Document". All debris collected via street sweeping of public streets is deposited in an enclosed storage facility with all drainage contained within the storage facility. As the City is responsible for ensuring proper disposal methods, street sweeping debris is removed and transferred from this storage facility by a licensed transporter to a Class II Landfill.



Composting

The City collects leaves during the fall months and disposes of the leaves at 10905 Oakland Drive. The leaves are then tilled and composted naturally. Potential pollutants are not expected to be discharged from this operation and maintenance activity.

Salt & Winter Operations

During the winter, the City applies salt to the sidewalks and roads when necessary. The city currently has in place a program which uses reduced salt and/or eliminates salt usage on roadways in critical drainage areas. Critical drainage areas are determined by retention basin water quality testing by an independent environmental contractor. Monitoring takes place in 36 city-owned storm water basins which are analyzed semi-annually for impacts on receiving groundwater.

The operating procedure for ice and snow control is on file at the DPW offices. It details the means and methods for ice and snow control materials. Salt is used primarily on major streets. Local streets receive sand only at intersections, hills and curves. The City's salt trucks and spreaders are calibrated prior to winter operations. Currently no snow is transported from City sites and stockpiled at alternative locations.

All road salt and deicing materials (liquid chemical deicing agents) are stored within enclosed storage facility located at the DPW property and is designed to retain all run-off within the enclosed storage area. All unloading and loading of deicing materials is performed within the enclosed storage area.

Vehicle Washing

City vehicles are washed in a bay at the DPW facility. All washing is performed within the garage areas with all drainage of the garage storage areas contained and conveyed through floor drains which are equipped with sand traps and grease/oil traps prior to final discharge into the sanitary sewer system with final discharge at the regional wastewater treatment plant. Potential pollutants are not expected to be discharged from this operation and maintenance activity.

Vehicle Fueling

The City vehicles are fueled at the DPW facility. All employees are instructed to stay by and monitor their vehicle when fueling. Potential pollutants would be gasoline or diesel fuel, but are not expected to be discharged from this operation and maintenance activity.



Fleet Maintenance and Storage Yards

Equipment & Hazardous Waste products are all stored within fully enclosed, climatic controlled garage areas. This includes all vehicles and large plow trucks including large construction equipment. All equipment washing is performed within the garage areas with all drainage of the garage storage areas contained and conveyed through floor drains which are equipped with sand traps and grease/oil traps prior to final discharge into the sanitary sewer system with final discharge at the regional wastewater treatment plant.

All potential fluid spills and/or leakages generated from vehicles, construction equipment and equipment hoist are contained and retrieved with appropriate oil dries, again all within the garage areas. No equipment or vehicles are ever stored in the outdoor environment at any time.

All hazardous chemical products (gas, oils, hydraulic fluids, paints, grease, cleaning fluids) are stored within approved enclosed and vented cabinets, with all materials complying with the MSDS program. All waste oil, waste oil filters, and water hydraulic fluids are contained in tanks with a licensed waste hauler retrieving these waste products on a frequent basis.

All surface and building storm water run-off within the public works outdoor yard is controlled via a contain and retain storm water system, in which all storm water run-off is directed to a containment pond, where all sediments are cleaned on a frequent basis with all run-off being directed to a recharge pond upon sediment entrapment. All storm water run-off is retained onsite with no impact to natural surface waters. Potential pollutants are not expected to be discharged from this operation and maintenance activity.

Household Hazardous Waste Recycling Program

The City of Portage has curbside recycling pickup available to all residents. Additionally, Portage participates in funding the Household Hazardous Waste program which is free to all City Residents. The City has literature related to the HHW program at the City's office and on the City's website for residents to obtain more information regarding this program. Potential pollutants are not expected to be discharged from this operation and maintenance activity.

Roadway Maintenance, Sidewalk, Curb and Gutter repair and pothole patching

The City of Portage typically performs small quantity repairs to sidewalk, curb and gutters, and patching of potholes. The DPW staff blocks catch basins during the course of work to prevent pollutants (such as saw cutting fluids) from reaching nearby structures. Potential pollutants are not expected to be discharged from this operation and maintenance activity with proper preventative procedures.



Large scale sidewalk removal and replacement, along with curb and gutter replacement is typically in conjunction with road or utility projects, are contracted out and are part of the Contractor's agreements with the City. Contractors are provided information in bid documents and/or preconstruction meetings regarding BMPs associated with preventing pollutants from reaching catch basins and water bodies.

Concrete washout from cement trucks is typically limited to single sites, away from catch basins and water bodies.

City Specifications require that all road projects conform to all requirements related to erosion controls and that all local hazardous product spills be contained and disposed of through regulated means. All storm water catch basins are to be protected by filter fabric during any construction activities, including paving activities.

All roadside vegetation is controlled through a mowing and/or pruning process, with no chemicals (herbicides, pesticides) being employed for roadside vegetation.

Municipal Operations and Maintenance Activity Assessment

The City of Portage will assess on an annual basis its municipal operation and maintenance activities, related to roads, parking lots, and sidewalk maintenance; cold water operations; and vehicle washing and maintenance of municipal owned vehicles. The assessment shall identify all pollutants that could be discharged from each O&M activity. The City shall implement BMPs and/or procedures to prevent or reduce pollutant run-off. If current practices are determined to be ineffective in preventing or reducing pollutant run-off, the City will update or revise its existing BMPs O&M procedures to an effective BMPs method or activity within 30 days of determine current procedures are ineffective.

MANAGING VEGETATIVE PROPERTIES

The City currently oversees and manages properties adjacent to both Portage Creek and the West Branch of Portage Creek. Much of the management involves using contractors for mowing, snow removal and landscape bed maintenance.

The Parks Department maintains weekly litter pickups of areas in and around West Fork Park, Liberty Park, Band shell/Central Park, Bicentennial Park, Trailhead Park and outlooks at various points along the creek. The West Fork Park creek bed has seasonal flows and the creek bed itself is cleaned of litter and debris during the summer as conditions allow.

Herbicides are used infrequently for broadleaf weed control at turf areas near the Bandshell/Central Park, Liberty Park, Celery Flats area, and Trailhead Park. When herbicides are required, the City only uses ready-to-use products from the original container. Pesticides are not used by the City. In the event a pesticide is required, the City only uses ready-to-use products from the original container.



In developed areas near the creek and where mowing occurs, the creek edge is left unmowed, and wildflower plots and natural plantings are often used to supplement this unmowed setback. In some places, wildflower plots have been added near the Bandshell and Liberty Park to enhance aesthetics as well as erosion control. Also at these property locations, the grass clippings are mulched in place, not bagged.

Super decking, a floating deck used for walkways, is used along Portage Creek to access or traverse sections of wetlands near the creek. Use of the super decking provides safe, wearable trails with limited site disturbance and erosion.

Any turf fertilizer used is specified as phosphorus free. Known commonly in the industry as “Lake Blend”, the granular type fertilizers used contain no phosphorus.

CONTRACTOR REQUIREMENTS AND OVERSITE

Contractors are hired by the City on an as-needed basis for street sweeping, catch basin cleaning and less frequently for sidewalk and curb and gutter construction. These services that are contracted-out with vendors require records to be retained for verification that the waste was disposed of properly. Contractors are required to comply with EGLE’s “Catch Basin Cleaning Activities Guidance Document” and operate equipment according to the manufacturer’s operating instructions and to protect water quality. Contractors are provided information in bid documents and/or preconstruction meetings regarding disposal of debris from catch basin and storm pipe cleaning, or street sweeping.

EMPLOYEE TRAINING

The City educates Public Employees and Contractors regarding Pollution Prevention and Good Housekeeping BMPs. The City provides employee training, which may consist of DVD, YouTube Videos, off-site workshop, in-house training, or new employee orientation. The schedule for this training is the existing employees are trained once per permit cycle, and new employees have one training event within one year of new employment and done in conjunction with other necessary trainings for City employees, including IDEP training.

Office staff is trained on the basic awareness of the program and general overview. DPW is generally trained in vehicle fueling, salt and winter operations, vehicle washing and maintenance. Seasonal staff (generally limited to lawn mowing) is educated about fertilizers, pesticides, vehicle fueling, and equipment maintenance. Signature sheets are used for each employee trained each year and kept on record.



TABLE 5

Table 5 shows the overall storm water pollution prevention activities of the Permittee and outlines the overall Pollution Prevention Program Elements (i.e. MS4 owner/operator best management practices (BMP) for system operation and maintenance).

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

Evaluation of progress toward the goals and objectives will consist of the compilation of data from the various permit activities, analysis of data and reporting of the results of the activities. Evaluation of the permit implementation will be done annually and reported in the annual report. Several ongoing programs contribute directly and indirectly to water quality data including:

- Portage Creek water quality and temperature analysis (South Westledge Avenue area)
- Quarterly retention basin monitoring and annual wet weather sampling
- Reporting of household hazardous materials, street sweeping and catch basin cleaning

Generally, the data of these reports are compared on a year-by-year basis to determine trends in the collected data. As data is compiled over successive years, trends in water quality will be developed. Although many variables exist, data collection will detect any long-term change in water quality.

The majority of retention basins owned by the city do not have surface water discharges. The three previously listed detention basin systems with surface water discharges will be continuously monitored for water quality trends and the analysis will be compiled with the annual report.

Reporting of household hazardous material collection, street sweeping and catch basin material disposal will be summarized annually to determine trends in collection.

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.

TABLE 5 - POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATION - MS4 OWNER/OPERATOR BMP's (Operation & Maintenance Program Elements)

Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
(a) maintenance activities, maintenance schedules, and inspection procedures for storm water structural controls to reduce pollutants (including floatables) in discharges from our permitted separate storm water drainage system						
Evaluate storm water structural controls, City owned infiltration areas / retention ponds / detention basins, and Storm Treatment Units.	Visually observe catch basin's sediment traps to assess if maintenance is required.	Approximately 1/5 of all catch basins annually	Annually	Number of Catch Basins Observed	All catch basins observed every 5 years	Total number of catch basins inspected: 2020 - 1,812; 2021 - 911
	Visually observe infiltration areas/ retention ponds / detention basins to verify they are functioning as intended. Cleaning needs and any significant erosion or infrastructure wear or damage is reported to the City's DPS Supervisor for follow up	Annually – All infiltration areas / retention ponds / detention basins	Annually	Infiltration Areas / retention ponds / detention basins are visually inspected while they are mowed several times per year.	All infiltration areas / retention ponds are observed annually All detention basins are observed annually	All retention and detention basins were visually observed/inspected annually
	Visually observe Stormwater Treatment Units (STUs) to assess if maintenance is required. Cleaning of unit is performed on an annual basis.	Annually – All Stormwater Treatment Units (STUs)	Annually	Stormwater Treatment Units (STUs) are visually inspected Cleaning of unit is performed on an annual basis.	All Stormwater Treatment Units (STUs) are observed annually All Stormwater Treatment Units (STUs) are cleaned annually	All STU's were cleaned by Plummer's during the fall of both 2020 and 2021
Maintenance of storm water structural controls.	Removal of sedimentation and floatables from catch basin sedimentation traps via contracted service.	As-Needed	Annually	Depth of sediment exceeds 1/3 of sump depth	100% of catch basins found to contain excessive sedimentation to be cleaned within 6 months.	100% of catch basins found to contain excessive sedimentation were cleaned within 6 months.
	Restore erosion issues within infiltration areas	As-Needed	At time of Mowing	Case-by-case, based on visual observation during mowing of areas	100% of the City's infiltration areas / retention ponds / detention basins are stabilized and show no signs of significant erosion.	Basins are stabilized on an as-needed basis to restore erosion issues that are observed.
	Remove sedimentation from pond bottoms	As-Needed	Annually	Infiltration areas have stopped working properly. Sedimentation is covering 50% of the outfall pipe. Sedimentation exceeds 12 inches.	100% of the City's infiltration areas / retention ponds / detention basins are working properly and outfall pipe into the ponds are unobstructed.	100% of the City's infiltration areas / retention ponds / detention basins are working properly and outfall pipe into the ponds are unobstructed.
	Removal of sedimentation and floatables from Stormwater Treatment Units (STUs) via contracted service.	As-Needed Based on yearly inspection	Annually	Sedimentation or floatables exceeds the manufacturer's recommendation for the Stormwater Treatment Units (STUs). STUs are cleaned annually.	All sedimentation and floatables have been removed from the Stormwater Treatment Units (STUs) annually or has had all sedimentation and floatables removed when STU's capacity exceeds the manufacturer's recommendation.	All STU's were cleaned by Plummer's during the fall of both 2020 and 2021

TABLE 5 - POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATION - MS4 OWNER/OPERATOR BMP's (Operation & Maintenance Program Elements)						
Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
(b) controls for reducing or eliminating the discharges of pollutants from streets, roads, highways and parking lots, and maintenance garages						
Ensure that pollutants are not disposed into surface waters	DPS procedures for pavement sweeping. Street sweeping is done throughout the City's curbed streets as needed, with sweepings taken to DPS and then transferred to a landfill. Certain areas are swept more frequently, as needed. Debris is placed directly into a dump truck, with no dewatering.	On-going	Annually	Records of receipts from the landfill; Track amount if sedimentation collected and the frequency of streets sweeping	Achieving the recommended street sweeping frequency to minimize debris from entering surface water (i.e. once per year City-wide, more frequency in targeted areas) No Citizen complaints which would require street sweeping.	Collected roadside debris from sweeping. Debris from sweeping disposed of at the Three Rivers landfill; 2020 - 797 cubic yards; 2021 - 759 cubic yards.
	DPS procedures for - snow and ice removal operations. Salt trucks are calibrated based on weather conditions. The preferred practice is to avoid discharge of plowed snow into waters of the state, due to the associated pollutants.	On-going	Annually	Salt trucks are calibrated based on weather conditions. The amount of salt used is tracked only on an annual basis.	100% of Staff Conformance to procedures	Sand is no longer mixed with salt due to additional sweeping needed in spring. Boost product is added to salt as needed in lower temperatures.
	Maintenance vehicles washing	On-going	Annually	Vehicles wash in wash bay with floor drain connected to sanitary sewer	100% of vehicles washed occur at in approved washing site.	100% of vehicles washed occur at in approved washing site.
	Maintenance vehicles maintenance	On-going	Annually	Vehicles maintained in workshop type bay or shop with floor drain connected to sanitary sewer	100% of vehicles repaired / maintained at approved site.	100% of vehicles repaired / maintained at approved site.
	Fueling of maintenance vehicles and equipment	On-going	Annually	Vehicles and equipment are fueled at a DPS fueling station. All employees are instructed to stay by and monitor their vehicles when fueling	No fuel spills entered the storm system	No incidents requiring mobilization by outside contractor to perform clean up. No discharges to the storm system.
	DPS yard is maintained and no tracking of sedimentation is found on the roadway area	On-going	Annually	No sedimentation is found on driveway area. Sedimentation to be swept to prevent tracking onto roadway.	No tracking of sedimentation occurs from DPS yard	Public Works maintenance yard is cleaned daily as needed to remove salt and roadside material.
	<u>Administrative Procedures</u> Office staff is trained on the basic awareness of the program. DPS is generally trained in vehicle fueling, salt and winter operations, vehicle washing and maintenance. Seasonal staff (generally limited to lawn mowing) is educated about fertilizers, pesticides, vehicle fueling, and equipment maintenance.	Existing employees – trained 1 per Permit Cycle New Employees – Trained during 1 year of employment	Annually	Training attendance records	All applicable staff trained according to the training schedule with the appropriate knowledge	Training provided annually for all new and existing employees.

TABLE 5 - POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATION - MS4 OWNER/OPERATOR BMP's (Operation & Maintenance Program Elements)						
Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
(c) procedures for the proper disposal of operation and maintenance waste from the permitted separate storm water drainage system (dredge spoil, accumulated sediments, floatables, and other debris)						
Ensure that pollutants are not disposed into surface waters	Collected catch basin sediments shall be contracted to a responsible party. Sediments and water shall be tested and disposed of properly in a licensed Type II municipal landfill unless contaminated then sediment shall be disposed of properly.	On-going	Annually	Collected/ tabulated data Cleaning the inside of the catch basin is done as needed, and is performed by a contractor. Records in the form of waste manifests, which contain the volume of waste and disposal location.	100% of sedimentation tested and disposed of properly	100% of sedimentation tested and disposed of properly
	Street Sweeping debris is disposed of properly in a licensed Type II municipal landfill by contracted service provider.	As-Needed	Annually	City contracts out with outside services with contract language or specifications for how to properly dispose of materials.	Documentation that all debris was properly disposed.	Documentation that all debris was properly disposed.
	Dredged material and/or accumulated sediments found within retention ponds / infiltration areas / detention basins is stabilized on site adjacent to infiltration areas	As-Needed	Annually	90% of sediment is removed for infiltration / pond areas /detention basins and 100% properly stabilized on site within 14 days.	Infiltration areas / retention ponds / detention basins function properly and all material from dredging operation is stabilized.	Infiltration areas / retention ponds / detention basins function properly and all material from dredging operation is stabilized.
(d) ways to ensure that new flood management projects assess the impacts on the water quality of the receiving waters and, whenever possible, examine existing projects for incorporation of additional water quality protection devices or practices						
Properly design, engineer and permit new flood management projects.	Permittee initiated flood control projects will include provisions to reduce pollutants to water bodies to maximize extent practicable by including such criteria in all RFP's for flood control engineering services. Performance Standard's requirements also apply to sites under the control of public agencies such as schools, Federal and State governmental facilities, Road Commission of Kalamazoo County, City of Portage, MDOT, a designated County Drain, and other entities that might not otherwise be subject to site plan review procedures and requirements as set forth in other sections of the City's codified ordinances. When the City is notified of a project or potential project by an agency within the City limits that does not require site plan review, the City will provide the agency written communications and a copy of the City's Performance Standards and also request reviewing the proposed plans to provide input for the agency to implement such Standards.	On-going through site plan review	Annually	Track and compare the number of flood control projects that include water quality criteria	Utilizing new technologies to reduce pollutants in storm water All new projects implement City Performance Standards for water quantity All public agencies such as schools, Federal and State governmental facilities, Road Commission of Kalamazoo County, City of Portage, MDOT, a designated County Drain, and other entities that might not otherwise be subject to site plan review procedures and requirements as set forth in other sections of the City's codified ordinances conform to applicable Performance Standards within the City ordinance. All new water quantity structurers met post-construction water requirements.	Site plans approved : 2020 - 17; 2021 - 27 No stormwater violations. No new surface water discharges constructed. Stormwater agreement required for all new private development projects.
	Examine existing water quantity structures for incorporation of additional water quality protection devices or practices.	Consider when such structures are scheduled for major repair or replacement	Annually	New technologies are considered when planning for major repair or replacement of existing structures.	All major repaired or replacement of existing storm quantity water structures, consider potential incorporation of new technology for water quality features.	New technology and water quality features are considered for major storm water structures.

TABLE 5 - POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATION - MS4 OWNER/OPERATOR BMP's (Operation & Maintenance Program Elements)						
Task	Methodology	Time Table		Evaluation/ Measured Element	Measurable Goals	Accomplishments, Outcome and Effectiveness
		Implementation	Evaluation			
(e) Implementation of controls to reduce the discharge of pollutants related to application of pesticides, herbicides, and fertilizers applied in our permitted jurisdiction.						
Proper use of lawn chemicals, pesticides, herbicides and fertilizes.	Use a phosphorus-free fertilizer on City parks, lawn areas, City property, and other areas. Herbicides and pesticides, when used, the City uses ready-to-use products from the original container.	On-going	Annually	If the City applies fertilizer, what type of fertilizer was used. City uses ready-to-use herbicides and pesticides products from the original container.	All areas that the City apply fertilizer, a phosphorus-free fertilizer are used. City uses only ready-to-use herbicides and pesticides products from the original container.	All pesticides were certified lake blends. No phosphorus fertilizer use on city property per SWPPI. Nine miles of roadside mowings without use of pesticides. Two mows per season.

CATCH BASIN CLEANING ACTIVITIES

GUIDANCE

INTRODUCTION

Catch basins are included in storm sewer system designs as a best management practice to remove pollutants such as gravel, sand, oils, and organic material carried by storm water runoff. Catch basins are designed to capture the pollutants in a sump, which may vary in depth depending on the design. The solids captured in the sump may have elevated concentrations of metals from street runoff or drainage from industrial, commercial, and residential properties. In order to maintain the effectiveness of the catch basin, the sump must be regularly inspected and cleaned out. The Water Resources Division (WRD) and Materials Management Division (MMD) of the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) oversee environmental regulations pertaining to this activity. The Michigan Occupational Safety and Health Administration (**MIOSHA**) within the Department of Labor and Economic Opportunity oversees confined space entry and other worker health and safety standards.

Waste generated from catch basin cleaning activities and discharged back into the storm sewer system is unauthorized per **Part 31, Water Resources Protection (Part 31) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)** and is therefore illegal. The combined solid and liquid waste stream from cleaning storm sewers systems, including catch basin sumps, is legally defined as "liquid industrial by-product" pursuant to **Part 121, Liquid Industrial By-Products (Part 121) of NREPA**. If an environmental spill were captured by a storm sewer system, the material in the storm sewer system could be a hazardous waste pursuant to the **Part 111, Hazardous Waste Management (Part 111) of the NREPA** and subject to additional management requirements.

If the storm sewer system is found to contain contaminants or abandoned waste materials, report the details to EGLE by calling the **Pollution Emergency Alert System** at 800-292-4706.

VISUAL INSPECTION

When cleaning out catch basin sumps, it is important to conduct a visual inspection prior to the cleaning. This is necessary to ensure the water in the sump has not been contaminated and qualifies to be managed as a liquid industrial by-product. The visual inspection is important for worker safety and to ensure proper management of the material once it is removed from the catch basin sump. If contamination is expected based on a visual inspection (visible sheen, discoloration, turbidity, obvious odor, etc.), a grab sample should be collected and analyzed

before handling the materials and generating a waste. While waiting for the sample analysis, efforts to prevent stormwater from entering the storm sewer system should be taken. For additional details on performing visual inspections, see the U.S. Environmental Protection Agency's [Storm Water Management Fact Sheet on Visual Inspections](#). For additional details on sampling and determining if a material is hazardous or not, please see the EGLE [Waste Characterization Guidance](#).

HANDLING THE LIQUID INDUSTRIAL BY-PRODUCT

The following are options for handling liquid industrial by-products generated from catch basin cleaning activities:

1. Have the liquid industrial by-product transported to drying beds to separate the solids and liquids. This is usually performed at a publicly-owned treatment plant or at a privately-owned permitted facility where the liquid portion of the waste stream is separated from the solids and treated prior to discharge. Once dry, the solids should be disposed in a licensed solid waste landfill in accordance with [Part 115](#), Solid Waste Management, of the NREPA.
2. Request permission from the local wastewater treatment plant operator to discharge the combined solid/liquid waste into the sanitary system. Most treatment plants will require pre-treatment prior to the discharge. All applicable local ordinance provisions must be followed.
3. When conducting catch basin cleaning activities where the above options are not available, the following method can be used after the water in the sump is confirmed to be non-contaminated.
 - Using a sump pump, or any other pumping mechanism, remove the majority of water in the sump of the basin without disturbing the solid material below. Do not use pumps connected to the vacuum truck's holding tank.
 - The clear water may then be directly discharged to one of the following:
 - Municipal sanitary sewer system (with prior approval from local sewer authority).
 - Application to the ground adjacent to the catch basin may be allowed on a site-specific basis. To learn more about this option, contact the WRD, Groundwater Discharge Program, at 517-290-9607.
 - The remaining liquid/solid in the sump should be collected with a vacuum truck and disposed of off-site in accordance with Parts 115 or 121.

The owner of the storm sewer system is responsible for meeting the liquid industrial by-products generator requirements under Part 121, even if the catch basins are cleaned out by a private contractor. See the [Liquid Industrial By-Products Generator Requirements](#) guidance for more details on the generator requirements for handling liquid industrial by-products.

Transporters of catch basin clean-out materials must be permitted and registered to transport liquid industrial by-products. Only local, state, and federal government agencies are exempt from

this and only when using their own vehicles and staff to do the work. Transporters needing a permit and registration must notify MMD of their transport activity and obtain a Site Identification Number using the [EQP5150 Form](#). There is a \$50 fee for a new Site Identification Number that can be paid for [on-line](#). For more details on transporter requirements, see the [Hazardous Materials Transportation Act, 1998 PA 138, as amended](#) and [Transporters Web page](#).

When the liquid by-product is transported over public roadways by local government officials or by contractors, a [shipping document](#) is required. The shipping document can be a bill of lading, non-hazardous waste manifest, uniform hazardous waste manifest, consolidated shipping document, etc. The shipping records must be kept by both the generator and the transporter for at least three years from the date of shipment. The portion of the vehicle that contains the liquid industrial by-product and/or containers used to transport the liquid industrial by-products must be kept closed except when adding or removing the waste, and the exteriors must be kept free of any liquid industrial by-products and residue. Containers must also be labeled with words describing their contents. For more details on shipping documents, including details on consolidated shipping documents, please see the [Liquid Industrial By-Products Frequently Asked Questions](#).

Facilities accepting liquid industrial by-products must meet the following operating requirements:

- They must notify MMD using the [EQP 5150 Form](#) that they are operating a liquid industrial by-product designated facility, obtain a Site Identification Number, and meet the operating requirements under [Part 121](#). This includes implementing practices to prevent unauthorized discharge of the liquid industrial by-products; keeping shipping, training, and other records; having emergency response plans; annually reporting the amount and types of liquid industrial by-products received; and reporting unauthorized release to the environment. If managing containers of liquid industrial, they must be kept closed, labeled, and protected from the weather, fire, physical damage, and vandals.
- The discharge of the liquids into the treatment plant that is permitted by the WRD must meet the wastewater treatment plant requirements. Any other discharge of the liquids would require a separate EGLE discharge permit.
- Any resulting solid waste from processing must be managed as specified under [Part 115](#) and disposed in a licensed solid waste landfill. Contact the landfill for the specific testing and disposal requirements needed to verify the waste is solid and not a hazardous waste. They will likely require specific tests or only accept data from specific laboratories. Ask the disposal company for a list of required tests, the purpose for the tests, approved testing methods, and acceptable laboratories. The solids cannot be used as fill on public or private property, or for any other use, unless they meet the conditions in Section 11504 of [Part 115](#) and can be demonstrated to be an inert material. EGLE relies upon the methods in the [Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria](#) for collecting representative samples.

See [Part 121](#) for more details on the operating requirements for liquid industrial by-products designated facilities.

Street sweeping activities are also subject to the above solid waste requirements. Street sweeping involves the use of specialized equipment to remove litter, loose gravel, soil, pet waste, vehicle debris and pollutants, dust, de-icing chemicals, and industrial debris from road surfaces. See the best management practices for [Street Sweeping](#).

WHERE TO GO FOR HELP

- Using the solids as fill or other use under Part 115:
[Jeff Spencer](#): 517-281-4411 | SpencerJ3@Michigan.gov
- Part 121 and Hazardous Materials Transportation Act transportation requirements
[Jeanette Noechel](#): 586-494-5091 | NoechelJ@Michigan.gov
- Managing waste under Part 31, or general questions regarding this guidance
[Christe Alwin](#): 517-420-1501 | AlwinC@Michigan.gov
- Groundwater permitting requirements
[Sherry Thelen](#): 517-290-9607 | ThelenS5@Michigan.gov
- Confined space entry requirements:
[MIOSHA Consultation, Education and Training Division](#): 800-866-4674

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Chapter 12 – Total Maximum Daily Load (TMDL) Implementation Plan



Total Maximum Daily Load (TMDL) Implementation Plan

GENERAL OVERVIEW

The total maximum daily load (TMDL) plan was developed to address the three monitoring objectives described below. Ultimately, the goal of this monitoring manual is to provide an approach for municipal separate storm sewer system (MS4) permittees in the watershed to demonstrate progress towards meeting TMDL targets. The implementation of this plan over a 5-year period involves evaluation of structural and operational best management practices (BMP), sampling of targeted outfalls in dry and wet weather, monitoring of impaired streams, and reporting of other restoration and water quality surveys conducted in the impaired waterways.

OBJECTIVES

Objective 1. Determining progress toward meeting TMDL targets.

The State of Michigan is required by the Clean Water Act to assess all water resources. If, during this assessment, a water body is found not to support its designated use or attain its water quality standards (WQS), a TMDL is developed to define the steps necessary to achieve attainment. Since 2002, the Kalamazoo River has had a TMDL for Phosphorus. As of December 2020, three sub watersheds within the Kalamazoo River Watershed (KRW) has had a TMDL for E. coli and are as follows, Arcadia Creek, Davis Creek, and Axtell Creek.

Note that the Michigan Department of Environment, Great Lakes & Energy (EGLE) periodically reassesses and updates the list of impaired streams in the KRW. TMDLs addressing recreational and aquatic life use impairments have been developed for several waterways in the KRW. Because bacteria are used to assess recreation use impairment, target concentrations for E. coli have been developed for the TMDLs addressing bacteria impairments.

Several communities within the KRW own or operate a municipal separate storm sewer system (MS4) and are regulated by a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are now issued to individual MS4 communities; however, MS4s in the KRW are working on a watershed scale. By working on a watershed scale, communities can implement regional plans for permit compliance, saving money and reducing duplicate initiatives by neighboring communities.

MS4s in the KRW are updating permit applications in October 2022, incorporating this TMDL plan for E. coli. These permits require MS4s to make progress in achieving the pollutant load reduction requirements in the TMDL. In addition, the MS4s are required to implement the monitoring plan to assess the effectiveness of the best management practices (BMPs) implemented in making progress towards achieving the TMDL. Communities that do not have a MS4 permit and areas outside the MS4 are not required to implement BMPs; however, BMPs implemented in these areas are consistent with the watershed-scale approach to meeting the TMDL in-stream targets.



Given the need to address the requirements in the TMDLs, the Kalamazoo Storm Water Group (KSWG) determined that it would be to the benefit of the KRW if TMDL-related activities and other water quality monitoring were done in a collaborative, uniform manner throughout the watershed.

Objective 2. Evaluate the effectiveness of municipal storm water runoff controls and practices (BMPs)

For permitted MS4 communities, the NPDES permit application requires the development and evaluation of BMPs. BMPs are implemented within each community, and each BMP is designed to reduce pollutants from entering a waterbody. Each MS4 is responsible for BMPs as a part of their permit that identifies numerous structural and operational BMPs and their operation and maintenance.

Monitoring at MS4 outfalls in targeted areas that have the highest risk of polluting waterways will be one method to measure the effectiveness of operational BMPs on in-stream water quality. The monitoring locations and sampling identified in this monitoring manual provide information about water quality benefits resulting from BMP implementation by individual MS4 permittees. The sampling and analytical procedures identified can be further used in various illicit discharge detection and verification processes if needed.

Objective 3. Coordinate with partners' reasonable assurance activities toward meeting TMDL targets

Non-point source pollution includes both agricultural and urban pollution sources that are commonly difficult to define and locate. Land cover in the Kalamazoo River watershed is 1,302,804 acres and is comprised of approximately 47% agriculture (dominated by corn and soybeans), 30% unmanaged terrestrial uplands (mostly secondary deciduous forest and successional old fields), 15% lakes and wetlands, and 8% urban. In addition, several villages and unincorporated developed areas do not have MS4 permits. The impact of runoff from these non-point sources contribute to the overall health of a watershed.

MONITORING APPROACH

The MS4 permits include requirements to implement monitoring to assess the effectiveness of implemented BMPs in making progress toward achieving the TMDL pollutant load reductions. Methods selected to meet these requirements include water quality monitoring, Illicit Discharge Elimination Plan (IDEP) implementation, and the successful implementation of the watershed Public Education Plan (PEP). MS4 permittees in the KRW have chosen to work collaboratively on the TMDL Implementation Plan to address impairments to water quality. This collaborative effort provides an opportunity to work with watershed partners in a cost-effective manner. In-stream monitoring and/or outfall sampling conducted by watershed partners will be recorded and assessed to complement the efforts taken under this Plan to evaluate water quality improvements. The monitoring approach follows a 5-year plan to ensure that an adequate amount of time is considered in showing pollutant reductions.



BACKGROUND AND EFFORT - PHOSPHORUS

The City of Portage MS4 system discharges to three watersheds; Portage Arcadia Creek, Kalamazoo Mainstem 3, and Portage River Watersheds. The Portage Arcadia Creek and Kalamazoo Mainstem 3 watersheds discharge to the Kalamazoo River which has a TMDL for Phosphorus. The TMDL implementation of a communities MS4 program as part of the storm water loading reductions is anticipated to help achieve this limit. As such, storm water is part of the non-point source load allocation in the TMDL.

The City of Portage implements the goals developed in the Watershed Management Plan (WMP) developed by the Kalamazoo River/Lake Allegan Phosphorus Total Maximum Daily Load Implementation Plan (TMDL) group. Therefore the City of Portage's goal is to have a 50% Total Phosphorus removal as a compliance target.

The City's short term goal and priority is to continue with street sweeping, catch basin cleaning and public education to reduce the Phosphorus loading to the maximum extent practical. The City will also review funding sources to implement long term solutions to phosphorus removal at individual outfalls.

MONITORING

The City of Portage will use sampling of its outfalls and points of discharge for its monitoring plan. The City will sample twice per permit cycle during a rain event five outfalls that discharge into the Portage Arcadia Creek and Kalamazoo Mainstem 3 watersheds. These five outfalls will be sampled to determine if the BMPs are adequate in making progress toward achieving the TMDL pollutant load reduction and analyzed for dissolved oxygen, E.coli, pH, specific conductivity, temperature, total suspended solids, total phosphorus, and total nitrogen.

BACKGROUND AND EFFORT – E. COLI

As of December 2020, three sub watersheds within the Kalamazoo River Watershed (KRW) has had a TMDL for E. coli and are as follows, Arcadia Creek, Davis Creek, and Axtell Creek. The City of Portage discharges storm water to Davis Creek with a TMDL for E. coli.

The daily max in Michigan's Water Quality Standards is 300 E. Coli per 100 mL from May to October (Total Body Contact criteria). When conducting in stream sampling, further investigation into sources is needed if the value is above 300. When conducting outfall sampling, Kalamazoo County MS4 communities are using 1,000 counts/ 100 mL as the criteria below which they are not doing further investigation in the current permit cycle.



OUTFALL SAMPLING AND INSTREAM SAMPLING

Targeted Outfalls for E. coli Sampling in Wet and Dry Weather

MS4 communities will sample targeted outfalls and streams during wet weather events and outfalls during dry-weather monitoring to determine contribution of pollutants to TMDL reaches. Outfalls will be prioritized based on the following criteria:

- Outfalls identified will be in the MS4 urbanized area.
- Outfalls will have a direct discharge to a State identified impaired reach for a TMDL stream.
- Drainage areas to each outfall. Targeted outfalls will be those with the highest potential of bacteria and sediment yield in the drainage area.

In the future, sampling locations may be removed from the targeted list if sample results at that location are below threshold levels. The water quality standard of 130 E. coli per 100mL as a 30-day geometric mean and 300 E. coli per 100mL as a daily maximum for Total Body Contact use are the target levels for the TMDL reaches for May 1 through October 31, and 1,000 E. coli per 100mL as a daily maximum year-round for Partial Body Contact use. Sampling locations have the possibility to be added to the targeted list as the IDEP and TMDL investigation deems necessary to identify and reduce pollution coming from MS4 areas. Outfalls may also be added to the list if IDEP screening results in flow present with no other field indicators present.

IDEP Dry Weather Sampling Conditions

The IDEP requirements of the permits have the potential to identify areas and take actions to reduce pollutants entering impaired water bodies. The first monitoring component of this TMDL plan is to evaluate past IDEP results. The IDEP requires permittees to develop a program to find and eliminate illicit connections and discharges to their MS4. The IDEP approved by EGLE in 2018 includes a plan to conduct dry-weather screening of each prioritized MS4 outfall and point of discharge once every five years. This approved plan will be continued in the new permit cycle beginning in 2022. If outfalls in TMDL reaches are determined to have illicit discharges or connections during dry weather screening, extra sampling will be completed for the specific stream reach impairment because E. coli are not parameters that are evaluated in the IDEP. However, to gain insight on pollutant sources, samples from dry weather screening can aid data collected during wet weather in order to determine effectiveness of reducing E. coli in impaired reaches.

If dry weather flow is detected at a targeted outfall during IDEP screening, the IDEP procedure will be followed. If IDEP contaminants (ammonia, pH, temperature, surfactants in a certain range) are not detected during the field analysis, then an E. coli sample will be taken and transported to the lab for analysis, if that waterbody has a TMDL impairment for E. coli. If the lab analysis is above threshold levels, then the IDEP will be followed in order to discover and eliminate the source of the illicit discharge or connection.



Wet Weather Sampling Conditions

The sampling conditions in this monitoring component should target sample collection during wet weather conditions at the targeted outfalls and/or in-stream monitoring. Samples will be collected during a qualifying rain event. A qualifying rain event is a storm event of sufficient size to produce enough runoff to influence local receiving water quality after the local streams have been predominantly base flow. A qualifying rain event has these characteristics:

- Precipitation event generally greater than 0.25 inches
- Preceded by dry weather or less than 0.1 inches of rain in the previous 48 hours; and,
- Occurs during Michigan's recreation season, which is May through October.

However, sampling should never occur during unsafe weather conditions. Samples should capture the first flush, which occurs within the first 30 minutes of the rain event, if possible, but not longer than the first 60 minutes.

Sampling Frequency

Sampling will occur twice during wet weather at the targeted outfalls within 5 years of the approval of this plan. Depending on sampling results, outfalls can be removed from the list as outlined under the prioritization requirements. This number of targeted outfalls should provide enough data for individual communities to address pollutant loading.

Public Education Plan Coordination

Much of the pollution contributing to the degradation of the KRW is suspected to be coming from rural areas (i.e. agricultural land) that is outside of MS4 jurisdiction. The collaborative KRW Public Education Plan (PEP) performed thru the KSWG addresses education in the watershed that focuses on things like proper septic system maintenance, properly disposing of pet waste, the impacts of feeding waterfowl, and reporting illicit discharges. Many of the actions found in the PEP directly impact the TMDL requirements. The success of this TMDL plan depends on implementation of the PEP, in addition to other operational BMPs performed by communities.

TIMELINE FOR IMPLEMENTATION

The implementation of this plan involves evaluation of structural and operational BMPs, sampling of targeted outfalls in dry and wet weather, monitoring of impaired streams, and reporting of other restoration and water quality surveys conducted in the impaired waterways. The following is the 5-year implementation plan:



Year 1:

- Collect and analyze data regarding Phosphorus and E. coli from partners who performed in-stream or outfall water quality sampling in TMDL watersheds.
- Prioritize BMPs to reduce pollutants entering MS4.
- Implement activities listed in the PEP including education on proper septic system maintenance, properly disposing of pet waste, etc.
- Create a list of targeted TMDL outfalls based on potential contribution of Phosphorus and E. coli to water body to guide wet weather and IDEP sampling efforts.

Year 2:

- Conduct outfall sampling of E. coli at targeted discharge outfalls for Arcadia Creek, Davis Creek, and Axtell Creek in wet weather.
- Continue to implement prioritized BMPs to reduce pollutants entering MS4.
- Collect and analyze data regarding Phosphorus and E. coli from partners who performed in-stream or outfall water quality sampling in TMDL watersheds.
- Implement activities listed in the PEP including education on proper septic system maintenance, properly disposing of pet waste, etc.

Year 3:

- Prepare progress reports on BMP implementation and document effectiveness as defined in Storm Water Management Plans.
- Continue to implement prioritized BMPs to reduce pollutants entering MS4
- Collect and analyze data regarding Phosphorus and E. coli from partners who performed in-stream or outfall water quality sampling in TMDL watersheds.
- Implement activities listed in the PEP including education on proper septic system maintenance, properly disposing of pet waste, etc.

Year 4:

- Adjust BMP implementation based on monitoring results.
- Review TMDL Implementation Plan to identify next steps.
- Continue to implement prioritized BMPs to reduce pollutants entering MS4.
- Collect and analyze data regarding Phosphorus and E. coli from partners who performed in-stream or outfall water quality sampling in TMDL watersheds.
- Implement activities listed in the PEP including education on proper septic system maintenance, properly disposing of pet waste, etc.
- Conduct outfall sampling according to IDEP, with addition of TSS and E. coli at targeted outfalls in wet weather.



Year 5:

- Conduct outfall sampling of E. coli at targeted discharge outfalls for Arcadia Creek, Davis Creek, and Axtell Creek in wet weather to check for progress.
- Prepare progress reports on BMP implementation and document effectiveness as defined in Storm Water Management Plans.
- Continue to implement prioritized BMPs to reduce pollutants entering MS4.
- Collect and analyze data regarding Phosphorus and E. coli from partners who performed in-stream or outfall water quality sampling in TMDL watersheds.
- Implement activities listed in the PEP including education on proper septic system maintenance, properly disposing of pet waste, etc.

EVALUATION

The effectiveness of this plan will be evaluated by the following:

- Determining if progress has been made to meet the TMDL by evaluating the actions outlined in the community's Storm Water Management Plan (ex: number of catch basins cleaned, miles of streets swept, number of projects constructed under new storm water standards)
- Meeting goals and metrics outlined in the community's PEP and IDEP
- Data collected from sampling events shows reasonable progress towards meeting the TMDL

SUMMARY

NPDES regulations require the development and evaluation of BMPs. BMPs are implemented within each community, and each BMP is designed to reduce pollutants from entering a waterbody. The individual MS4 communities identifies structural and operational BMPs within their community and their operation and maintenance.

Non-point source pollution includes both agricultural and urban pollution sources that are commonly difficult to define and locate. Land cover in the Kalamazoo River watershed is 1,302,804 acres and is comprised of approximately 47% agriculture (dominated by corn and soybeans), 30% unmanaged terrestrial uplands (mostly secondary deciduous forest and successional old fields), 15% lakes and wetlands, and 8% urban. In addition, several villages and unincorporated developed areas do not have MS4 permits. The impact of runoff from these non-point sources contribute to the overall health of a watershed and will be taken into consideration when analyzing data that is collected and determining BMP implementation and feasibility.

The monitoring locations and outfall sampling and analytical procedures identified in this monitoring program provide a solid foundation for water quality benefits resulting from BMP implementation by individual MS4 permittees. MS4 permittees in the KRW will follow the objectives outlined:



1. Determining progress toward meeting TMDL targets
2. Evaluate the effectiveness of municipal storm water runoff controls and practices (BMPs)
3. Coordinate with partners' reasonable assurance activities toward meeting TMDL targets in order to make progress towards meeting TMDL requirements.

OTHER

Any questions on this policy and procedure should be directed to the Storm Water Program Manager with the City of Portage.

PROCESS FOR UPDATING/REVISING THIS PROCEDURE

This procedure shall be reviewed on an annual basis by the Storm Water Program Manager for any updates to improve effectiveness.



Chapter 13 – Storm Water Management Ordinances



City Ordinance Chapter 64 - Storm Water, Illicit Discharges and Connections

ARTICLE 1. IN GENERAL

Sec. 64-1. Statutory authority and title.

This chapter is adopted in accordance with the Home Rule City Act, as amended, being MCL 117.1, et seq.; the Drain Code of 1956, as amended, being MCL 280.1, et seq.; the Land Division Act, as amended, being MCL 560.1, et seq.; the Revenue Bond Act, as amended, being MCL 141.101, et seq.; the Natural Resources and Environmental Protection Act, as amended, being MCL 324.101, et seq.; Section 401(p) of the Federal Water Pollution Control Act (also known as the Clean Water Act), as amended, being 33 USC 1342(p) and 40 CFR Parts 9, 122, 123, and 124; and other applicable state and federal laws.

The city shall administer, implement and enforce the provisions of this part. Any powers granted or duties imposed upon the city may be delegated by the city manager to persons or entities acting in the beneficial interest of or in the employ of the city.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-2. Findings.

The city finds that:

- (1) Illicit discharges contain pollutants that will significantly degrade the water bodies and water resources of the city.
- (2) Illicit discharges enter the MS4 and water bodies through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the storm drain system or spills connected by drain inlets).
- (3) Establishing the measures for controlling illicit discharges and connections contained in this chapter and implementing the same will address many of the deleterious effects of illicit discharges.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-3. Purpose.

It is the purpose of this chapter to establish minimum storm water management requirements and controls to accomplish, among others, the following objectives:



- (1) To regulate the contribution of pollutants to the MS4 and water bodies by storm water discharges by any user.
- (2) To prohibit illicit discharges and connection to the MS4 and water bodies.
- (3) To establish legal authority to carry out all inspection, surveillance, and monitoring procedures necessary to ensure compliance with this chapter.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-4. Applicability, exemptions, and general provisions.

This chapter shall apply to all discharges entering the storm drain system generated on any developed and undeveloped lands, unless explicitly exempted.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-5. Definitions.

For the purpose of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section, unless the context in which they are used specifically indicates otherwise:

Authorized enforcement agency: Employees or designees of the director of the department of transportation and utilities designated to enforce this chapter.

Best management practices (BMPs): A practice, or combination of practices and design criteria that comply with the Michigan Department of Environment, Great Lakes, and Energy Nonpoint Source Best Management Practices Manual, or equivalent practices and design criteria that accomplish the purposes of this chapter (including, but not limited to, minimizing storm water runoff and preventing the discharge of pollutants into storm water) as determined by the city engineer.

Chapter: The six articles of storm water.

City: The City of Portage.

Clean Water Act: The Federal Water Pollution Control Act, 33 USC section 1251 et seq., as amended, and the applicable regulations promulgated thereunder.

Director: The director of the department of transportation and utilities.



Discharger: Any person or entity who directly or indirectly discharges storm water from any property. Discharger also means any employee, officer, director, partner, contractor, or other person who participates in, or is legally or factually responsible for, any act or omission which is or results in a violation of this chapter.

Drain: Any drain as defined in the Drain Code of 1956, as amended, being MCL 280.1, et seq., other than an established county or intercounty drain.

Drainage: The collection, conveyance, or discharge of groundwater and/or surface water.

Drainageway: MS4, drain, water body, or floodplain.

EGLE: Michigan Department of Environment, Great Lakes and Energy

EPA: The United States Environmental Protection Agency.

Exempted discharges: Discharges other than storm water as specified in section 64-7 of this chapter.

Floodplain: The area, usually low lands, adjoining the channel of a river, stream, or watercourse or lake, or other body of standing water, which has been or may be covered by floodwater.

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

Illicit connection: Any method or means for conveying an illicit discharge into water bodies or the storm water system of the city.

Illicit discharge: Any discharge to water bodies that does not consist entirely of storm water, discharges pursuant to the terms of an NPDES permit, or exempted discharges as defined in this chapter.

MS4: Municipal separate storm sewer system, as defined by federal and state laws.

National pollutant discharge elimination system (NPDES) storm water discharge permit: A permit issued by the U.S. Environmental Protection Agency (EPA) (or a state under authority delegated pursuant to 33 USC section 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.



Nonstorm water discharge: Any discharge to the storm drain system that is not composed entirely of storm water.

Pollutant: A substance discharged which includes, but is not limited to, the following: Any dredged spoil, solid waste, vehicle fluids, yard wastes, animal wastes, agricultural waste products, sediment, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological wastes, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt, and industrial, municipal, commercial, and agricultural waste, or any other contaminant or other substance defined as a pollutant under the Clean Water Act.

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

Property owner: Any person having legal or equitable title to property or any person having or exercising care, custody, or control over any property.

State of Michigan Water Quality Standards: All applicable state rules, regulations, and laws pertaining to water quality, including the provisions of section 3106 of part 31 of 1994 PA 451, as amended.

Storm drain: A system of open or enclosed conduits and appurtenant structures intended to convey or manage storm water runoff, groundwater, and drainage.

Storm water pollution prevention plan: A document, which describes the best management practices (BMPs) and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to storm water, storm water conveyance systems, and/or receiving waters to the maximum extent practicable.

Storm water runoff: The runoff and drainage of precipitation resulting from rainfall, snowmelt, or other natural event or process.

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

Water body: A river, lake, stream, creek, or other watercourse or wetlands.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

ARTICLE 2. PROHIBITIONS AND EXEMPTIONS

Sec. 64-6. Prohibited discharges.



- (a) No person shall discharge to a water body, directly or indirectly, any substance other than storm water or an exempted discharge. Any person discharging storm water shall effectively prevent pollutants from being discharged with the storm water, except in accordance with BMPs.
- (b) The city is authorized to require dischargers to implement pollution prevention measures, utilizing BMPs, necessary to prevent or reduce the discharge of pollutants into the storm water drainage system of the city.
- (c) Prohibition of illicit discharges: No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials including, but not limited, to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited, except for discharges specified in writing by the city as being necessary to protect public health, safety and welfare.
- (d) Prohibition of illicit connections:
 - (1) The construction, use, maintenance, or continued existence of illicit connections to the storm drain system is prohibited.
 - (2) 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.
 - (3) A person is considered to be in violation of this chapter if the person connects a conduit conveying wastewater to the MS4, or allows such a connection to continue.
- (e) The prohibition shall not apply to any nonstorm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the U.S. EPA, provided the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-7. Exempted discharges.

The following nonstorm water discharges shall be permissible, provided they are not significant contributors to violations of water quality standards.



- (1) Water supply line flushing.
- (2) Landscape irrigation.
- (3) Diverted stream flows.
- (4) Rising groundwater.
- (5) Uncontaminated groundwater infiltration to storm drains.
- (6) Uncontaminated pumped groundwater.
- (7) Discharges from potable water sources.
- (8) Foundation drains.
- (9) Air conditioning condensate.
- (10) Individual residential car washing.
- (11) Dechlorinated swimming pool water.
- (12) Street wash water.
- (13) Discharges or flows from emergency firefighting activities.
- (14) Discharges for which a specific federal or state permit has been issued.
- (15) Lawn watering runoff
- (16) Dye testing using EGLE approved dyes, so long as authorized by a EGLE Rule 97 Certificate of Approval, and preceded by a written notification to and permission from the director of transportation and utilities.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-8. Storage of hazardous or toxic materials in drainageway.

Except as permitted by law, it shall be unlawful for any person to store or stockpile, within a drainageway, any hazardous or toxic materials, unless adequate protection and/or containment has been provided so as to prevent any such materials from entering a MS4, drain, or water body.



(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

ARTICLE 3. INSPECTION, MONITORING, REPORTING, AND RECORD KEEPING

Sec. 64-9. Inspection and sampling.

To assure compliance with the standards in this regulated area, the city may inspect and/or obtain storm water samples from storm water runoff facilities of any discharger to determine compliance with the requirements of this chapter. Upon request, the discharger shall allow the properly identified representative of the city to enter the premises of the discharger at all hours necessary for the purposes of such inspection or sampling. The city shall provide the discharger reasonable advance notice of such inspection and/or sampling, or monitoring including, but not limited to, smoke/dye testing, televising pipes, examination and/or copying of records that are required by this chapter to be maintained, sampling and excavation. The city or its properly identified representative may place on the discharger's property the equipment or devices used for such sampling or inspection. Unreasonable delays in allowing access to a facility is a violation of this chapter.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-10. Storm water monitoring facilities.

A discharger of storm water runoff suspected of violating this chapter shall provide and operate equipment or devices for the monitoring of storm water runoff, so as to provide for inspection, sampling, and flow measurement of each discharge to a water body or a storm water runoff facility, when directed in writing to do so by the city. The city may require a discharger to provide and operate such equipment and devices if it is necessary or appropriate for the inspection, sampling, and flow measurement of discharges in order to determine whether adverse effects from, or as a result of, such discharges may occur. All such equipment and devices for the inspection, sampling, and flow measurement of discharges shall be installed and maintained in accordance with applicable laws, ordinances, and regulations.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-11. Accidental discharges.

(a) Any discharger who accidentally discharges into a water body any substance other than storm water or an exempted discharge shall immediately inform the city concerning the discharge. If such information is given orally, a written report concerning the discharge shall be filed with the city within five days. The written report shall specify the following:

(1) The composition of the discharge and the cause thereof.



- (2) The exact date, time, and estimated volume of the discharge.
 - (3) All measures taken to clean up the accidental discharge, and all measures proposed to be taken to reduce and prevent any recurrence.
 - (4) The name and telephone number of the person making the report, and the name of a person who may be contacted for additional information on the matter.
- (b) A properly reported accidental discharge shall be an affirmative defense to a civil infraction proceeding brought under this chapter against a legal action brought to obtain an injunction, to obtain recovery of costs or to obtain other relief as a result of, or arising out of, the discharge. A discharge shall be considered properly reported only if the discharger complies with all the requirements of section 64-11(a).;hn0;

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-12. Record keeping requirement.

Any person violating any part of this chapter or subject to monitoring under the chapter shall retain and preserve for no less than ten years any and all books, drawings, plans, prints, documents, memoranda, reports, correspondence, and records, including records on magnetic or electronic media, and any and all summaries of such records relating to monitoring, sampling, and chemical analysis of any discharge or storm water runoff from any property.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-13. Right-of-entry and furnishing information.

Representatives of the City, Michigan Department of Environment, Great Lakes and Energy (EGLE), Michigan Department of Transportation (MDOT) and Kalamazoo County Drain Commission (KCDC) shall have the right to enter at any reasonable time any property served by a storm water drainage facility for inspections, investigations, or monitoring. On request, the owner, lessees or occupants of any property so served shall furnish to the inspection agency any pertinent information regarding the drainage system or systems on such property. The refusal of such information or refusal of access, when requested, shall be deemed evidence of the presence of unlawful discharge.

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

ARTICLE 4. ENFORCEMENT

Sec. 64-14. Sanctions for violation.



- (a) Any person violating any provision of this chapter shall be responsible for a municipal civil infraction and subject to the penalties in section 1-7(e) of this Code. Each day such violation occurs or continues shall be deemed a separate offense, and shall make the violator liable for the imposition of a fine for each day. The rights and remedies provided for in this section are cumulative and in addition to any other remedies provided by law. An admission or determination of responsibility shall not exempt the offender from compliance with the requirements of this chapter.
- (b) A notification of a violation shall be sent to any person violating any provision of this chapter. Notification of violation shall include a notice to cease the violation and corrective action which must be taken and a deadline for completion of such action. Failure to comply with the corrective action within the deadline or after an appeal pursuant to section 64-20 may be a basis to take enforcement action pursuant to section 64-15 or suspension of MS4 access as defined in section 64-19.
- (c) Any person who aids or abets a person in a violation of this chapter shall be subject to the sanctions provided in this section.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-15. Failure to comply; completion.

In addition to any other remedies, should any owner fail to comply with the provisions of this chapter, the city may, after the giving of reasonable notice and opportunity for compliance as provided in section 64-14 (b), have the necessary work done, and the owner shall be obligated to promptly reimburse the city for all costs of such work.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-16. Emergency measures.

When emergency measures are necessary to moderate a nuisance; to protect public safety, health, and welfare; and/or to prevent loss of life, injury, or damage to property, the city is authorized to carry out or arrange for all such emergency measures. Property owners shall be responsible for the cost of such measures made necessary as a result of a violation of this chapter, and shall promptly reimburse the city for all of such costs.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-17. Cost recovery for damage to storm drain system.

A discharger shall be liable for all costs incurred by the city as the result of causing a discharge that produces a deposit or obstruction, or causes damage to, or impairs a storm drain,



or violates any of the provisions of this chapter. Costs include, but are not limited to, those penalties levied by the EPA or EGLE for violation of an NPDES permit, attorney fees, and other costs and expenses.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-18. Collection of costs; lien.

Costs incurred by the city pursuant to sections 64-15, 64-16, and 64-17 shall be a lien on the premises, which shall be enforceable in accordance with Act No. 94 of the Public Acts of 1933, as amended from time to time. Any such charges which are delinquent for six months or more may be certified annually to the finance director, who shall enter the lien on the next tax roll against the premises, the costs shall be collected, and the lien shall be enforced in the same manner as provided for in the collection of taxes assessed upon the roll and the enforcement of a lien for taxes. In addition to any other lawful enforcement methods, the city shall have all remedies authorized by Act No. 94 of the Public Acts of 1933, as amended.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-19. Suspension of MS4 access.

- (a) Suspension due to illicit discharges in emergency situations. The city may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge, which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4. If the violator fails to comply with a suspension order issued in an emergency, the city may take such steps as deemed necessary to prevent or minimize damage to the MS4 or the environment, or to minimize danger to persons.
- (b) Suspension due to the detection of illicit discharge. Any person discharging to the MS4 in violation of this chapter may have their MS4 access terminated, if such termination would abate or reduce an illicit discharge. The city will notify a violator of the proposed termination of its MS4 access. A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this section without the prior approval of the city.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-20. Appeals.

A written appeal may be taken to the city manager or his designated representative by any person affected by a decision or action of the director or the enforcing agency taken under this article not later than 30 days after said action or decision. Such appeal shall identify the



matter being appealed and the basis for the appeal. An appeal shall stay all proceedings in furtherance of the action appealed unless the director certifies to the city manager that by reason of the facts a stay would cause imminent peril to life or property. The city manager shall consider the appeal and make a decision whereby it affirms, rejects, or modifies the action being appealed. In considering any such appeal, the city manager may consider the recommendations of the city engineer and the comments of other persons having knowledge of the matter. In considering any such appeal, the city manager may grant a variance from the terms of this chapter so as to provide relief, in whole or in part, from the action being appealed, but only upon finding that the following requirements are satisfied:

- (1) The application of the chapter provisions being appealed will present or cause practical difficulties for a facility; provided, however, that practical difficulties shall not include the need for the property owner to incur additional reasonable expenses in order to comply with the chapter; and
- (2) The granting of the relief requested will not substantially prevent the goals and purposes sought to be accomplished by this chapter, nor result in less effective management of storm water runoff.

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

ARTICLE 5. PERFORMANCE AND DESIGN STANDARDS

Sec. 64-21. Responsibility to implement BMPs.

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

(Ord. No. 02-02, 2-19-02; Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-22. Performance standards.

- (a) Storm water management areas and facilities, whether on-site or off-site, shall be designed, constructed, and maintained to prevent flooding and protect water quality. In



order to be approved, all storm water management plans must meet the following performance standards:

- (1) Runoff leaving the site shall be controlled to a non-erosive velocity, both during and after construction.
 - (2) Capture and treatment of runoff.
 - (3) Channel protection criteria.
 - (4) Flood control.
- (b) Storm water storage facilities which protect water quality and provide channel protection shall be required for all sites. In order to improve the quality of storm water runoff and reduce the discharge of sediment into wetlands, watercourses, roadways, structures and other property within, and downstream of the City of Portage techniques and standards defined in the "Storm Water Design Criteria Manual - City of Portage, Michigan" shall be used.
- (c) Storm water storage facilities which prevent adverse flooding on-site and off-site shall be required for all sites. In order to prevent adverse flooding on-site and off-site techniques and standards defined in the
- "Storm Water Design Criteria Manual - City of Portage, Michigan" or as approved by the director of transportation and utilities shall be used.
- (d) Pipes, conduits, ditches, drains, or other conveyance facilities shall not discharge directly to the following receiving waters without providing the minimum treatment volume and channel protection criteria:
- (1) Any natural watercourses, including lakes, ponds, rivers and streams.
 - (2) Any wetlands.
- (e) Operation and maintenance. All structural and vegetative best management practices installed as a performance standard for storm water management shall include a plan for maintaining maximum performance through the long-term operation and maintenance (O&M). The plan shall include a schedule for O&M procedures and recordkeeping provisions such as periodic inspections.
- (f) Records retention. Inspection and other records pertaining to the O&M of best management practices for storm water quality protection shall be maintained by the property owner and retained for a minimum of ten years.



- (g) No storm water management plan shall be approved if the director of transportation and utilities finds that the action will or is likely to pollute, impair or destroy air, water or other natural resources or the public trust therein, provided that there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety and welfare.

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-23. Design standards.

The city shall maintain design standards. Water quality standards and channel protection standards shall be as indicated in the "Storm Water Design Criterial Manual - City of Portage, Michigan." Flood control volume and flood management shall be as indicated in the "Storm Water Design Criteria Manual - City of Portage, Michigan" or as approved by the director of transportation and utilities.

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-24. "Hot Spots" Properties.

If the subject property is a potential "Hot Spot" area with the potential for significant pollutant loading or with the potential for contaminating public water supply (wells), additionally site-specific requirements may apply to address the contaminant(s) of concern. Example of typical "hot spots" areas included, but not limited to gas stations, commercial vehicle maintenance and repair, auto recyclers, recycling centers, and scrap yards. See city design standards related to address these properties in the "Storm Water Design Criteria Manual - City of Portage, Michigan."

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-25. Contaminated properties.

If the subject property contains soil and/or groundwater contamination, site-specific requirements may apply. See EGLE Post-Construction Storm Water Runoff Controls Program Compliance Assistance Document (MDEQ, 2014) for specifics regarding storm water. In addition, see Appendix 13 Soil and Groundwater Contamination in the "Storm Water Design Criteria Manual - City of Portage, Michigan."

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-26—64-39. Reserved

ARTICLE 6. STORM WATER MANAGEMENT PLAN AND POST CONSTRUCTION



Sec. 64-40. Storm water Management Plan.

No building, grading, or sediment control permit shall be issued until a satisfactory storm water management plan (or a waiver thereof) shall have undergone a review and been approved by the city after determining that the plan or waiver is consistent with the requirements of this chapter. After review of the storm water management plan, and modifications to that plan as deemed necessary by the city, a storm water management final plan must be submitted to the city for approval. Information required for the storm water management plan is provided in the "Storm Water Design Criteria Manual - City of Portage, Michigan".

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-41. Maintenance and repair of storm water BMPs.

- (a) Storm water best management practices operations and maintenance agreement. Prior to the issuance of any permit for development involving any storm water BMP, the applicant or owner of the site must execute a storm water best management practices operations and maintenance agreement that shall be binding on all subsequent owners of land served by the storm water BMP. The agreement shall provide for access to the BMP and the land it serves at reasonable times for inspection by the city or city's designee, as determined by the city and for regular or special assessments of property owners to ensure that the BMP is maintained in proper working condition to meet city storm water requirements. The agreement shall be recorded by the city at the expense of the permit holder or property owners.
- (b) Maintenance covenants. Maintenance of all storm water BMPs shall be ensured through the creation of a formal maintenance covenant that must be approved by the city and recorded prior to the storm water management final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the storm water BMPs. The covenant shall also include plans for periodic inspections to ensure proper performance of the BMPs between scheduled cleanouts. Developer or entity responsible shall have the inspections performed by qualified persons or entities.
- (c) Requirements for maintenance covenants. All storm water BMPs must undergo, at the minimum, an annual inspection to document maintenance and repair needs and ensure compliance with the requirements of this chapter and accomplishment of its purposes. Developer or entity responsible shall have the inspections performed by qualified persons or entities. These needs may include (but are not limited to) removal of silt, litter, and other debris from all storm water treatment and conveyance facilities including ponds, infiltration basins, raingardens, catch basins, inlets, and drainage pipes, grass cutting and vegetation removal, and necessary replacement of landscape vegetation. Any maintenance or repair needs detected must be corrected by the developer or entity



responsible under a written maintenance agreement within 30 days, or as determined by the city, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the storm water BMPs.

- (d) Inspection of storm water BMPs. Inspection programs may be established on any reasonable basis, including, but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or the NPDES storm water permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in storm water BMPs, and evaluating the condition of storm water BMPs.
- (e) Records of installation and maintenance and repair activities. Parties responsible for the operation and maintenance of storm water BMPs shall be required to prepare an annual maintenance and inspection report including all records of the installation and of all maintenance and repairs conducted. The responsible parties shall retain the report and records for at least ten years or longer if the city inspector deems it necessary. These report and records shall be made available to the city during inspection of the facility and at other reasonable times upon request.
- (f) Failure to maintain storm water BMPs. If a responsible party fails or refuses to meet the requirements of the maintenance covenant or any provision of this chapter, the city, after reasonable notice, may correct a violation by performing all necessary work to place the BMP in proper working condition. In the event that the storm water BMP becomes a danger to public safety or public health, the city shall notify the party responsible for maintenance of the storm water BMP in writing. Upon receipt of that notice, the responsible person shall have 30 days to effect maintenance and repair of the storm water BMP in an approved manner. After proper notice, the city may assess, jointly and severally, the owners of the storm water BMP or the property owners or the parties responsible for maintenance under any applicable written agreement for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes.

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)

Sec. 64-42. Effective date.



This Ordinance shall not become effective until 15 days after its adoption and publication.

(Ord. No. 20-07 , 7-28-2020; Ord. No. 21-02 , 3-9-2021)



City Ordinance Chapter 42 – Land Development Regulations

ARTICLE 7. GRADING AND SOIL EROSION CONTROL¹

Sec. 42-951. Authority and purpose of article.

- (a) The City of Portage adopts this article pursuant to part 91, Soil Erosion and Sedimentation Control (SESC), of the Natural Resources Environmental Protection Act, Act 451 of 1994 as amended, MCL 324.9101 et seq. of the Michigan Compiled Laws, and the Administrative Rules ("Rules") promulgated under the authority of part 91, R 323.1701 et seq., (Part 17).
- (b) The purpose of this article is to prevent soil erosion and sedimentation from earth-change activities in the city by requiring proper provisions for water disposal and the protection of soil surfaces during and after construction, in order to promote the safety, public health, convenience and general welfare of the community.
- (c) The department of community development shall be the municipal enforcing agency responsible for the administration and enforcement of this article and part 91, as amended.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-952. Definitions.

- (a) The City of Portage adopts by reference the definitions contained in part 91 and the rules unless expressly given a different meaning by this article. The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Accelerated soil erosion means the increased loss of the land surface that occurs as a result of human activities.

Certification of completion means a signed written statement by the department of community development that specific construction has been inspected and found to comply with all grading plans, specifications and permit conditions.

Department of community development means the department authorized agents having the appropriate part 91 certifications to administer and enforce the soil erosion and sedimentation control program within the City of Portage.

¹Editor's note(s)—Ord. No. 20/21-A , adopted 12-1-2020, amended ch. 42, art. 7 in its entirety, §§ 42-951—42-967, and enacted a new article, §§ 42-951—42-968, as set out herein. Formerly, art. 7 pertained to similar subject matter and derived from Code 1967, §§ 6-67—83; Min. Bk. 1975, p. 228, Vol. 5, adopted Feb. 18, 1975; Code 1983, §§ 1462.01—1462.17; and Ord. No. 092-24, adopted Aug. 4, 1992.



Earth change permit means a permit issued to authorize work to be performed under the provisions of part 91, the Rules and this article.

Erosion means the process by which the ground surface is worn away by action of wind, water, gravity or a combination thereof.

Excavation and cut mean any act by which soil or rock is cut into, dug, quarried, uncovered, removed, displaced or relocated, and includes the conditions resulting therefrom.

Floodplain means that area which would be inundated by storm runoff or floodwater equivalent to that which would occur with a rainfall or flood of 100-year recurrence frequency after total development of the watershed.

Grading means any stripping, excavating, filling, stockpiling or combination thereof, and includes the land in its excavated or filled condition.

Land use means a use of land which may result in an earth change, including, but not limited to, subdivision, residential, commercial, industrial, recreational or other development; private and public highway, road and street construction; drainage construction; logging operations; agricultural practices; and mining.

Municipal enforcing agency means an agency designated by a municipality under section 9106 of part 91 to enforce a local ordinance related to part 91 and the rules.

Permanent soil erosion and sedimentation control measure means a control measure which is installed or constructed to control soil erosion and sedimentation and which is maintained after project completion.

Stripping means any activity which removes or significantly disturbs the vegetative surface cover of land, including clearing and grubbing operations.

Temporary soil erosion and sedimentation control measures means interim control measures which are installed or constructed for the control of soil erosion and sedimentation and which are not maintained after project completion.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-953. Compliance with article prerequisite to issuance of building permit or plat approval.

Soil erosion and sediment control measures for a development shall be consistent with the requirements of this article prior to issuance of any building permit for a development



approved under article 4 of this chapter and prior to final approval of a plat approved under article 5 of this chapter or article 6 of this chapter.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-954. Reserved.

Sec. 42-955. Earth change permit required; issuance.

- (a) Required. A landowner or designated agent who contracts for, allows, or engages in an earth change shall obtain an earth change permit before commencing an earth change which disturbs one or more acres of land or which is within 500 feet of the water's edge of a lake or stream. Except as exempted by section 42-965, no person shall do any grading, stripping, excavating or filling, or undertake any earth change, unless they have a valid earth change permit issued by the department of community development.
- (b) Application. A separate application is required for each earth change permit. Plans, specifications and timing schedules shall be submitted with each application for an earth change permit. The earth change plans shall be prepared or approved and signed by a professional engineer or architect. The department of community development may waive the preparation or approval and signature by the professional engineer or architect upon request by the applicant when the work entails little hazard to other property and does not include the addition of fill upon which a structure may be erected.
- (c) Required information. The plans and specifications accompanying the earth change permit application shall contain, but not be limited to, the following data:
 - (1) A site map, at a scale not to exceed one inch equal to 200 feet, showing the distance and location of any proposed earth change to the nearest lake or stream. The site map shall include a legal description of the site.
 - (2) A location sketch.
 - (3) A soil investigation report, soils survey or written description of the soil types of the site on which the work is to be performed; and
 - (4) Details for the proposed earth change shall include all of the following:
 - a. A timing schedule indicating the anticipated starting and completion dates of the development sequence and the time of exposure of each area prior to the completion of effective erosion and sediment control measures;



- b. The location and description for installing and removing all proposed temporary soil erosion and sedimentation control measures;
 - c. A description and the location of the physical limits of each proposed earth change with the pre-construction topography;
 - d. The location of any structure or natural feature on the site;
 - e. The elevations, dimensions, location, extent and slope of all proposed earth changes, including building and driveway grades;
 - f. A description and the location of all proposed permanent soil erosion and sedimentation control measures;
 - g. Plans of all drainage provisions and dewatering facilities; and
 - h. A program proposal for the continued maintenance of all permanent soil erosion and sediment control measures that remain after project completion, including the designation of the person responsible for the maintenance. Maintenance responsibilities shall become a part of any sales or exchange agreement for the land on which the permanent soil erosion control measures are located.
- (d) *Fees.* At the time of filing an application for an earth change permit, a nonrefundable filing fee in the amount established by resolution of the council shall be paid to the city treasurer. An additional nonrefundable fee as established by the council will be charged for plan review and site inspection, with a minimum fee as established by the council for such review and inspection.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-956. Bond.

- (a) Required. No earth change permit shall be issued unless the permittee first posts, with the department of community development, a bond executed by the owner and a corporate surety with authority to do business in the state as a surety.
- (b) Form. The bond shall be in a form approved by the city attorney, payable to the city and in the amount of the estimated total cost of all temporary or permanent soil erosion and sedimentation control measures. The total cost shall be estimated by the department of community development. The bond shall include penalty provisions for failure to complete the work as specified on the earth change permit. In lieu of a surety bond, the



applicant may file with the city a cash bond or an instrument of credit in the amount equal to that which would be required for the surety bond.

- (c) Conditions. Every bond and instrument of credit and every cash deposit shall include, and every certificate of self-insurance shall be made on, the condition that the permittee complies with all of the provisions of this article and the earth change permit and completes all the work contemplated under the earth change permit within the time limit permitted. If the terms of the earth change permit are not met, the bond will be used to address any outstanding issues.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-957. Extension of time for completion of work.

If a permittee under this article is unable to complete the work within the permitted time, they may, at least ten days prior to the expiration of the earth change permit, present in writing, to the department of community development, a request for an extension of time, setting forth the reasons for the requested extension. If such an extension is warranted, the department of community development may grant additional time for the completion of the work, but no such extension shall release the owner or the surety on the bond or the person furnishing the instrument of credit or cash bond.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-958. Failure to complete work.

If a permittee under this article fails to complete the work or comply with all the requirements, conditions and terms of the earth change permit, the department of community development may order such work as is necessary to eliminate any danger to persons or property and to leave the site in a safe condition, and may authorize completion of all necessary temporary or permanent soil erosion measures. The permittee and the surety executing the bond, or the person issuing the instrument of credit or making the cash deposit, shall continue to be firmly bound under a continuing obligation for the payment of all necessary costs and expenses that may be incurred or expended by the city in causing any such work to be done. In the case of a cash deposit, any unused portion thereof shall be refunded to the permittee.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-959. Disapproval of earth change permit application.



- (a) The department of community development shall approve, disapprove, or require modification of an application for an earth change permit. If an application is disapproved, the applicant shall be notified by certified mail of its reasons for disapproval and conditions required for approval. The department of community development need not notify an applicant of approval or disapproval by mail if the applicant is given written approval or disapproval of the application in person. A permit given to the applicant either in person or by mail constitutes approval.
- (b) Earth change permits shall not be issued where:
 - (1) The proposed work would cause hazards to the public safety and welfare.
 - (2) The work as proposed by the applicant will damage any public or private property in such a manner as to cause damage to any adjacent property or result in the deposit of debris or sediment on any public way or into any waterway or create an unreasonable hazard to persons or property.
 - (3) The land area for which earth change is proposed is susceptible to natural hazards to the extent that no reasonable amount of corrective work can eliminate or sufficiently reduce settlement, slope instability or any other such hazard to persons or property.
 - (4) The land area for which the grading is proposed may lie within the floodplain of any stream or watercourse (not specifically designated and delineated by the city as an area subject to flood hazard), unless a hydrologic report, prepared by a professional engineer, is submitted to certify that the proposed grading will have, in their opinion, no detrimental influence on the public welfare or upon the total development of the watershed.
 - (5) The earth change permit application is incomplete or does not comply with the provisions of part 91, the rules, or this article.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-960. Modification of approved plans.

All modifications of the approved earth change plans must be submitted and approved by the department of community development. All necessary sustaining reports shall be submitted with a proposal to modify the approved earth change plan. No earth change work in connection with any proposed modification is permitted without the approval of the department of community development.



(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-961. Responsibilities of permittee.

During earth change operations, a permittee under this article is responsible for:

- (1) The prevention of damage to any public utility or service within the limits of earth change and along any route of travel of the equipment;
- (2) The prevention of damage to adjacent property. No person shall make earth changes on land so close to the property line as to endanger any adjoining public street, sidewalk, alley or public or private property without supporting and protecting such property from settling, cracking or other damage which might result;
- (3) Carrying out the proposed work in accordance with the approved plans and in compliance with the requirements of the earth change permit and this article; and
- (4) The prevention of all soil, miscellaneous debris or other materials applied, dumped or otherwise deposited on public streets, highways, sidewalks or other public thoroughfares during transit to and from the construction, where such spillage constitutes a public nuisance or hazard.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-962. General standards.

- (a) Erosion control required. Any earth changes shall be conducted in a manner which will effectively reduce accelerated soil erosion and resulting off-site sedimentation.
- (b) Compliance with state rules. All persons engaged in earth changes shall design, must implement and maintain acceptable soil erosion and sedimentation and control measures, in conformity with part 91 and the rules, which effectively reduces accelerated soil erosion and off-site sedimentation.
- (c) Limitation of exposure of disturbed land. All earth changes shall be designed, constructed and completed in a manner which shall limit the exposed area of any disturbed land for the shortest possible period of time.
- (d) Removal of sediment from runoff water. Sediment caused by accelerated soil erosion shall be removed from runoff water before it leaves the site of the earth change.



- (e) Limitation of water flow. A temporary or permanent facility designed and constructed for the conveyance of water around, through or from the earth change area shall be designed to limit the water flow to a non-erosive velocity.
- (f) Final grading and stabilization. Temporary soil erosion and sedimentation control measures shall be removed after permanent soil erosion and sedimentation control measures are in place and the area is stabilized. All earth change areas shall be graded and stabilized with permanent soil erosion control measures as shown on the approved earth change plan.
- (g) Completion of permanent erosion control measures. Permanent soil erosion control measures for all slopes, channels, ditches or any disturbed land area shall be completed within five calendar days after final grading or the final earth change has been completed. If it is not possible to permanently stabilize a disturbed area after an earth change has been completed or if significant earth change activity ceases, temporary soil erosion control measures shall be maintained until permanent soil erosion control measures are in place and the disturbed areas are stabilized.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-963. Maintenance of protective devices.

Persons carrying out soil erosion and sediment control measures under this article, and all subsequent owners of property in which such measures have been taken, shall install and maintain all permanent anti-erosion devices, retaining walls, structures, plantings and other protective devices in accordance with the standards and specifications included in this article.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-964. Design and installation standards.

All temporary and permanent soil erosion and sedimentation control measures shall be completed in accordance with the approved earth change plan. Installation and maintenance of all soil erosion and sedimentation control measures shall be in accordance with the product manufacturer, Michigan Department of Environment, Great Lakes and Energy and the City of Portage Contract Conditions and Specifications. If a conflict exists between the standards, the department of community development shall determine which specifications are appropriate for the project.

(Ord. No. 20/21-A , 12-1-2020)



Sec. 42-965. Exemptions from earth change permit requirement; variances.

- (a) Notwithstanding any other provision of this part, a person is not required to obtain a permit for earth changes associated with the following agricultural practices if the earth change activities do not result in or contribute to soil erosion or sedimentation of the waters of the state or a discharge of sediment off-site:
 - (1) The construction, maintenance, or removal of fences and fence lines.
 - (2) The removal of tree or shrub stumps or roots.
 - (3) The installation of drainage tile, irrigation, or electrical lines.
 - (4) The construction or maintenance of one or more ponds that meet all of the following:
 - a. The earth change associated with the construction or maintenance is less than five acres.
 - b. The earth change associated with the construction or maintenance does not result in a discharge of storm water into the waters of the state.
 - c. The earth change associated with the construction or maintenance is not part of a larger plan of development. As used in this subparagraph, "larger plan of development" means a contiguous area where multiple separate and distinct construction activities are occurring under a single plan as identified in documentation or physical demarcation indicating where construction activities may occur.
- (b) Notwithstanding any other provision of this part, a residential property owner who causes the following activities to be conducted on individual residential property owned and occupied by him or her is not required to obtain a permit under this part if the earth change activities do not result in or contribute to soil erosion or sedimentation of the waters of the state or a discharge of sediment off-site:
 - (1) An earth change of a minor nature that is stabilized within 24 hours of the initial earth disturbance.
 - (2) Gardening, if the natural elevation of the area is not raised.
 - (3) Post holes for fencing, decks, utility posts, mailboxes, or similar applications, if no additional grading or earth change occurs for use of the post holes.



- (4) Removal of tree stumps, shrub stumps, or roots resulting in an earth change not to exceed 100 square feet.
- (5) All of the following activities, if soil erosion and sedimentation controls are implemented, the earth change is stabilized within 24 hours of the initial earth disturbance, and soil erosion or sedimentation to adjacent properties or the waters of the state has not or will not reasonably occur
 - a. Planting of trees, shrubs, or other similar plants.
 - b. Seeding or reseeded of lawns of less than one acre if the seeded area is at least 100 feet from the waters of the state.
 - c. Seeding or reseeded of lawns closer than 100 feet from the waters of the state if the area to be seeded or reseeded does not exceed 100 square feet.
 - d. The temporary stockpiling of soil, sand, or gravel not greater than a total of ten cubic yards on the property if the stockpiling occurs at least 100 feet from the waters of the state.
 - e. Seawall maintenance that does not exceed 100 square feet.
- (c) A permit is not required for any of the following:
 - (1) A beach nourishment project permitted under part 325 of Act 451 of the Public Acts of 1994 as amended.
 - (2) Normal road and driveway maintenance, such as grading or leveling that does not increase the width or length of the road or driveway and that will not contribute sediment to lakes or streams.
 - (3) Metallic mineral mining activity that is regulated under a mining and reclamation plan under part 631 or 634 or a mining, reclamation, and environmental protection plan under part 632, if the plan contains soil erosion and sedimentation control provisions and is approved by the department. As used in this section, "mining" does not include the removal of clay, gravel, sand, peat, or topsoil.
 - (4) Earth changes associated with well locations, surface facilities, flowlines, or access roads relating to oil or gas exploration and development activities regulated under part 615, or mineral well exploration and development activities regulated under part 625, if the application for a permit to drill and operate contains a soil erosion and sedimentation control plan that is approved by the



department under part 615 or 625. However, those earth changes shall conform to the same standards as required for a permit under part 91. This subsection does not apply to a multisource commercial hazardous waste disposal well.

- (5) Earth changes associated with logging, mining, or the plowing or tilling of land for the purpose of crop production or the harvesting of crops. However, all earth changes associated with the activities listed in this section shall conform to the same standards as if they required a permit under part 91. the exemption from obtaining a permit under this subsection does not include either of the following:
 - a. Access roads to and from the site where active mining or logging is taking place.
 - b. Ancillary activities associated with logging and mining.
- (6) Any additional exemptions listed in section 9115 or 9115a of part 91 or rule 1705.
- (d) Exemptions provided in this section shall not be construed as exemptions from enforcement procedures under part 91 or the rules if the exempted activities cause or result in a violation of part 91 or the rules.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-966. Enforcement generally; inspections; issuance of certification of completion.

- (a) This article shall be enforced by the department of community development. If it is determined that soil erosion or sedimentation of adjacent properties or the waters of the state has or will reasonably occur from land in violation of this article, part 91 or the rules, a notification of a violation shall be sent to the alleged violator and the owner(s) of the property according to the tax rolls at the city assessor's office. Notification of violation shall include: a notice to cease the violation, description of the violation, necessary corrective action and a deadline for completion of such action to comply with this article, part 91 or the rules.
- (b) A person who violates this article is responsible for the following enforcement provisions, and any additional enforcement provisions listed under part 91 and the rules:
 - (1) Any person violating any provision of this article shall be responsible for a municipal civil infraction and may be ordered to pay a civil fine of not more than \$2,500.00.



- (2) A person who knowingly violates any of the provisions of this article or part 91 after having received the written notice of determination as required under section 9112 or 9117 of part 91, through registered or certified mail of the existence of the violation and being directed to correct the violation within a specified time, is responsible for the payment of a civil fine of not less than \$2,500.00 or more than \$25,000.00 for each day of violation.
- (3) Any person who knowingly violates any of the provisions of this article or part 91 or knowingly makes a false statement in an application for an earth change permit, or knowingly makes a false statement in an earth change plan, is responsible for the payment of a civil fine of not more than \$10,000.00 for each day of violation.
- (c) The department of community development shall inspect the work and shall require adequate inspection of compaction by a soil engineer or by a soil testing agency, unless the department of community development determines that such inspection requirements may be waived due to the nonhazardous nature of the earth changes.
- (d) Upon satisfactory execution of all approved earth change plans and other requirements, the department of community development shall release the respective bond. If the department of community development finds any existing condition not as stated in the application, earth change permit or approved plan, release of bond may be delayed until approval of a revised grading plan which conforms to the existing conditions.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-967. Right-of-entry.

The department of community development may, at all reasonable times, enter in or upon any private or public property for the purpose of inspecting and investigating conditions and practices which may be a violation of this article, part 91 or the rules.

(Ord. No. 20/21-A , 12-1-2020)

Sec. 42-968. Effective date.

This article shall not become effective until 30 days after its adoption and publication.

(Ord. No. 20/21-A , 12-1-2020)

Secs. 42-969—42-990. Reserved.



City Ordinance Chapter 48 – Utilities

ARTICLE 3. – SEWERS AND SEWAGE DISPOSAL

DIVISION 1. - GENERALLY

Sec. 82-241. Connection to public sewer required.

- (a) *Findings.* It is hereby recognized by the city that certain on-site sewage disposal systems, including septic tanks, pose a threat to the public health, safety and welfare by threatening the quality of surface water and groundwater of the city. It is hereby declared that the required connection to an available public sanitary system as ordained in this section is for the public health, safety and welfare and necessary in the public interest.
- (b) *Definitions.* The following definitions shall be used for purposes of this section. If there is a conflict or inconsistency with other definitions in this article, these definitions shall govern:

Available public sanitary sewer means a public sanitary sewer system located in a right-of-way, easement, highway or street or other public way which crosses, joins or abuts upon the property and passes not more than 200 feet from the nearest structure in which sanitary sewage originates.

Commission means the environmental commission.

New structure means a structure which has been issued a building permit by the city after the effective date of the ordinance codified in this section.

Owner and property owner mean both the owner of title of record and those occupying or in possession of property or the premises.

Premises and property mean a tract or parcel of land on which a building is located in which a toilet, kitchen, laundry, bathing or other facilities which generate water or carry the sanitary sewage are used or are available for use for household, commercial, industrial or other purposes.

Public sanitary sewer system means a sanitary sewer or combined sanitary and storm sewer used or intended for use by the public for the collection and transportation of sanitary sewage for treatment or disposal.



Structure in which sanitary sewage originates and structure mean a building in which a toilet, kitchen, laundry, bathing or other facility which generates water-carried sanitary sewage is used, or is available for use, for household, commercial, industrial or other purposes.

(c) Connection required.

- (1) Existing structures. Structures from which sanitary sewage originates located within the city shall be connected to an available public sanitary sewer system not later than 18 months after the city has published notice of the availability of the public sanitary sewer system in a newspaper of general circulation in the city.
- (2) New structures. Notwithstanding subsection (c)(1) of this section, all new structures in which sanitary sewage originates shall connect to an available public sanitary sewer system before issuance of any certificate of occupancy, and no such certificate of occupancy shall be issued if not connected.

(d) Violations; enforcement.

- (1) Any person convicted of failing to connect to an available public sanitary sewer as provided in this section, or in any other way violating the provisions of this section, shall be guilty of a misdemeanor.
- (2) If any structure from which sanitary sewage originates is not connected to an available public sanitary sewer within the time set forth in this section, the city may bring an action for a mandatory injunction or order in the district or circuit court in the county and compel the owner to connect to the available sanitary sewer system forthwith. The city may join in any such action any number of owners or structures to compel each owner to connect to the available public sanitary sewer system.
- (3) Any structure from which sanitary sewage originates not connected to an available public sanitary sewer system as required by this section is deemed to be a nuisance per se.
- (4) The city may enforce the provisions of this section by any means available to it pursuant to law and this section. The city may use one or more remedies available, and the use of one such remedy does not preclude the use of another simultaneously or at a later date.

(e) Application for hardship relief.

- (1) Notwithstanding any provision of this section to the contrary, it is recognized that paying the cost of labor and materials for connecting to an available sanitary



sewer system may create undue financial hardship on some property owners who are required to make such connection.

- (2) Any property owner who believes that the payment of the costs of labor and materials which must be incurred to connect the structure to an available public sanitary sewer system will subject him to unreasonable financial hardship may apply to the commission for relief from the mandatory provisions of this section. The cost of connection, however, shall not include those charges and fees required to be paid to the city for connection.
 - (3) Such application shall be in writing, shall be signed by the property owner under penalty of perjury and shall contain such financial information about the applicant and the members of the applicant's family living at the premises as may be required by the commission in order for the commission to determine whether the mandatory requirements of this section will subject the property owner to undue financial hardship. If the commission does not receive enough information from the applicant to make an informed decision, it may deny the application. All applications shall include copies of at least two estimates regarding the approximate cost of making the connection, a legal description of the property involved, and an application fee.
 - (4) The commission may establish, by resolution, a standing committee to hear and decide all applications under this subsection. Such standing committee may be given authority to take all actions and impose any requirement or condition that the commission may impose, including the power to make a final decision on the merits of any application.
- (f) Criteria for finding of hardship.
- (1) The commission may find undue financial hardship if the applicant demonstrates one or more of the following:
 - a. Such finding may be made if the applicant's gross total household income, as that term is defined by the Community Development Block Grant Program, is less than 80 percent of the median income for the county. In determining such median income, the schedule provided to the city by the Department of Housing and Urban Development shall be followed.
 - b. Such finding may be made if the cost of connecting the structure to the sewer, excluding those fees and charges required to be paid to the city for the connection, will exceed 25 percent of the total gross household income as such income is defined by the Community Development Block Grant Program.



- c. In all other applications not falling under subsections (f)(1)a and b of this section, the commission may determine that the applicant is subjected to undue financial hardship if it finds that paying the cost of connecting to the sewer will be an intolerable burden on the applicant and his family when the applicant's gross total household income is considered in relationship to unusual expenses and obligations of the applicant not considered by the Community Development Block Grant Program.
- (2) Notwithstanding subsections (f)(1)a, b and c of this section, the commission shall not grant relief to any applicant who has applied for and has received a loan for the required connection pursuant to the Community Development Block Grant Program of the city or to an applicant who has refused to apply for such loan after being requested to do so by the city.
- (3) Deferments for nonresidential uses shall not be given unless the applicant can demonstrate, by adequate documentation, that financing for the required connection is unavailable to the applicant by any means. The commission may require the applicant to make additional attempts to obtain financing.
- (g) Deferment of connection in hardship cases. In all cases where the commission finds that the property owner will be subjected to undue financial hardship if required to connect to an available public sanitary sewer system, the commission may defer the connection of the structure to the sewer. Such deferment may be with or without a date fixed for connection as the commission so chooses, but in no event shall such deferment exceed 18 months. In all such cases, the commission shall require as a condition to the granting of any relief that the applicant agree in writing that the structure will be connected at such time as the premises are sold, transferred or assigned, and in any event on the death of the survivor of the applicant or his spouse, and that all parties having an interest in the property sign such document. Such document shall be recorded with the register of deeds and the recording costs shall be borne by the applicant. The commission may impose further conditions and requirements it deems just and necessary under the circumstances.

(Code 1983, § 1042.15.5; Min. Bk. 1985, p. 279, Vol. 10, 1-22-1985; Ord. No. 088-16, 12-6-1988)



Chapter 14 – Site Plan Review



PROGRAM PROCEDURES

SUBJECT: SOIL EROSION AND SEDIMENTATION CONTROL

EFFECTIVE: OCTOBER 1, 2001 (Revised 5/29/19)

I. INTRODUCTION:

Management responsibilities of the Soil Erosion Control Program lie with the Department of Community Development. To ensure continued timely issuance of permits, the following information is provided to inform staff of the permitting procedures.

II. LOCAL ORDINANCE

The authority to carry out and enforce a local soil erosion control program is in accordance with local ordinance Section 42-965, as amended, and Part 91 of Public Act 451 of 1994 (Part 91).

III. LOCAL AUTHORITY

The Director of Community Development or a designated representative shall be responsible for ensuring the local soil erosion control program is in compliance with Part 91. Each individual who is responsible for administering the soil erosion control program with decision-making responsibilities shall complete the soil erosion and sedimentation control training program sponsored by Michigan Department of Environment, Great Lakes and Energy prior to administering the local soil erosion control program.

IV. ADMINISTRATIVE PROCEDURES

Community Development staff will distribute the permit application form upon request for all projects requiring a soil erosion permit as determined by local ordinance or Part 91. Upon receipt of the completed application form and two soil erosion control plans from the applicant, staff will review the application form and plans for approval.

The plan is reviewed to determine adequacy of proposed temporary and permanent soil erosion and sedimentation control measures. Fees are calculated based on the current fee schedule. Surety amount for bonding purposes is calculated based on current construction costs for temporary and permanent soil erosion and sedimentation control measures as proposed on the approved soil erosion control plan. If the plan is acceptable, Community Development staff will input the permit application into the BS&A computerized database system. Community Development staff inform the applicant of the fee and bonding amounts and inform him/her that the permit will be available to be picked up at Community Development upon payment of the application



and bond fees. If the plan is unacceptable, Community Development staff will communicate with the applicant to finalize the plan details.

Community Development staff shall print the permit when the applicant arrives to obtain the permit. Community Development staff shall then read to the applicant the requirements listed on the permit, instruct the applicant to sign and date the permit form and to remit the permit fees at the Finance office.

V. INSPECTION AND REPORTING PROCEDURES

Community Development staff will perform site inspections for sites currently under construction consistent with the requirements of Part 91. Records of the inspection results will be maintained by Community Development in an organized manner. For sites not complying with the requirements of the soil erosion permit, Community Development staff will contact the applicant in a reasonable timeframe to inform of the infraction and provide a deadline for improvements. If the applicant does not address the issue, Community Development will follow-up as outlined in the local ordinance and in accordance with Part 91.

VI. PERMIT CLOSURE PROCEDURES

Community Development will close the soil erosion permit when the site is deemed adequately stabilized by the DTU with all permanent soil erosion and sedimentation control measures in place. Refund of surety and permit closure will be completed by Community Development utilizing the BS&A computerized database system. The Finance Department is automatically notified to refund "cash" bond if properly inputted into the BS&A system. All "bonds" are to be returned via U.S. Mail to the applicant with a cover letter stating authorization to release the bond.

VII. BS&A INSTRUCTIONS

Instructions to Input Soil Erosion Permit Application and Approve Permit in BS&A System:

Create a permit

- Open Building Department module in BS&A
- Click on green Property Address under Quick Search
- Enter Street Number and click ok
- Select active address from list for the permit project location and click ok
- Click "Add" button on toolbar
- Select "1. Add New Project" and click ok
- Click on Soil Erosion Permit
- Select "white paper" on left hand column labeled "Permit Soil Erosion"
- Click on green "Click here to attach a Soil Erosion Permit to the Requirement" in center
- Select "1. Add New Permit" and click ok



Add New Permit

- Enter contractor name (can use search function to find contractor information)
- Enter applicant name (can use search function or down arrow to select owner or contractor)
- Click “Add” on the bottom of form
- Click “Add” adjacent to Soil Erosion Permit Fee
 - To override cost for larger projects click “edit selected item”
 - Check override cost
 - Enter new amount
 - Enter comment (example 3 acres)
 - Click “Close” button
- Click “Done” button
- Print (run invoice) or close (can print to screen to view invoice)

Create a Bond

- Click “Add” button on toolbar
- Select “5. Add New Bond” and click ok
- For cash bonds, enter bond type (can use search function to select “Soil Erosion – Cash”) and click ok
- For paper bonds, enter bond holder (can use search function or down arrow to select owner)
- Enter bond amount
- Enter comments (i.e. silt fence, inlet protection, mulch blanket, seeding, street sweeping, etc.)
- Click “bond” button
- Print bond invoice

Add Progress Inspection

- Click on plus sign next to soil erosion permit
- Click on “white paper” under Soil Permit #_____
- Click on green “Click here to attach a Soil Erosion Inspection to this Requirement” in center

Refund Bond

- Under Soil Erosion Permit, click on “Bond Summary”

Close Soil Erosion Permit



City Ordinance Chapter 42 – Land Development Regulations

ARTICLE 4. - ZONING

DIVISION 5. - SPECIAL LAND USES AND SITE PLAN REVIEW

Subdivision 2. Site Plan Review

Sec. 42-480. Intent and purpose.

It is the purpose of this subdivision to require site plan review and approval for certain buildings, structures, projects and uses. Certain land uses possess characteristics such as natural features and planned improvements involving size, mass and construction and operational factors that can affect adjacent or nearby land uses. Site plan review is necessary to protect and promote public health, safety and general welfare and ensure the protection of property values through the review of the proposed use and improvement of property.

(Ord. No. 03-01 (Exh. A, § 42-520), 2-18-03)

Sec. 42-481. Site plans reviewed.

- A. No building shall be erected or moved, or externally altered or added to or enlarged, and no building or land shall be used, and no building permit or occupancy permit shall be issued, except in accordance with a site plan that has been approved as provided by this subdivision. This subdivision shall not apply to the following:
1. One-family, detached residential structures or uses and accessory structures and uses.
 2. One- or two-family, attached residential structures or uses and accessory structures and uses under separate ownership and each on a separate lot or parcel.
 3. For any use or development in an I-1, light industrial district or I-2, heavy industrial district, where such use or development does not take place within 200 feet of the zoning district boundary, and within 200 feet of any owner other than the property to be used or developed, and where it is proposed that no driveway intersects a public street within 200 feet of an intersection of two or more public streets. This section will only apply in the following quarter sections:
 - a. West one-half of the northwest quarter of Section 13.
 - b. West one-half of the southwest quarter of Section 13.



- c. Northeast quarter of Section 14.
 - d. Southeast quarter of Section 14.
 - e. Northeast quarter of the northwest quarter of Section 14.
- B. The following shall have the authority to review, approve or deny site plans as provided by this subdivision.
 - 1. Planning commission: The planning commission shall be authorized to approve, deny or approve with conditions site plans, except as otherwise noted in this section. Site plans associated with the review and approval of a special land use permit, planned developments, and other site plans as may be required by this subdivision, are subject to planning commission review and approval.
 - 2. City administration: The director shall be authorized to approve, deny or approve with conditions site plans submitted for review that meet at least one of the following criteria:
 - a. New nonresidential development in an OS-1, B-1, B-2 or B-3 district with developments comprised of 20,000 square feet or less of building area;
 - b. New nonresidential development in an I-1 or I-2 district with developments comprised of 50,000 square feet or less of building area;
 - c. Existing nonresidential development in an OS-1, B-1, B-2 or B-3 district which involves a building addition to a previously approved site plan when, combined with the existing building, will not exceed 20,000 square feet;
 - d. Nonresidential building additions to previously approved site plans in an I-1 or I-2 district that involve a gross floor area increase of 50 percent or less and will not exceed 50,000 square feet;
 - e. Multifamily residential developments involving eight or fewer total dwelling units;
 - 3. Should the director determine that a site plan presents issues such as, but not limited to, traffic or environmental conditions which have a greater potential impact on adjacent land uses, neighborhoods and/or the community overall, the director may, with ten-day written notice to the applicant, refer the site plan to the planning commission for review in accordance with the procedures and standards set forth in this subdivision.



(Ord. No. 03-01 (Exh. A, § 42-521), 2-18-2003; Ord. No. 15-05, 6-23-2015)

Sec. 42-482. Site plan review procedures.

A. Application.

1. The application and plans shall be submitted by the owner of an interest in land for which site plan approval is sought, or by the owner's designated agent. The applicant or a designated agent shall be present at all scheduled meetings or consideration of the plan may be tabled due to lack of representation.
2. The department of community development shall provide application forms and information designed to assist the applicant in the preparation of the site plan.
3. The site plan shall be prepared as specified in this section. The applicant is responsible for being sufficiently familiar with and have a working knowledge of the codes and ordinances of the city.
4. The following information must be submitted and/or included on the site plan:
 - a. Filing information.
 - (1) Development application.
 - (2) Filing fee per fee schedule.
 - (3) Eight sets of final plan documents and one 11-inch by 17-inch reproduction of the plan.
 - (4) Permits required from other agencies as applicable:
 - (a) Kalamazoo County Road Commission.
 - (b) Kalamazoo County Environmental Health Division.
 - (c) Michigan Department of Natural Resources/Environmental Quality.
 - (d) Kalamazoo County Drain Commission.
 - (e) Kalamazoo/Battle Creek International Airport.
 - (f) Kalamazoo County Planning Department.

- (g) Others, as may be required.
- (5) For final/specific plans, confirmation of conformance with the previously approved tentative or conceptual plan, as applicable, and any easements, restrictive covenants, bonds or other appropriate documents.
- b. Plan preparation and guidelines.
 - (1) All plans will be drawn on uniform sheets no greater than 24 inches by 36 inches.
 - (2) All plans will be drawn to an engineering scale not to exceed one inch equals 50 feet or less than one inch equals 20 feet with a north arrow oriented to the top of the sheet.
 - (3) All plans and notations will be clear, legible and accurately scaled.
 - (4) If more than one plan/set, all required plans stapled along the left margin into sets, folded to a size not greater than 8½ inches by 14 inches.
- c. Plan information.
 - (1) Name, address and phone number of property owner, applicant, engineer and/or architect.
 - (2) Legal description of property, including parcel area and building/property address number.
 - (3) Vicinity map showing closest major cross streets, zoning and existing land use of adjacent parcels.
 - (4) Property lines, lot dimensions and existing easements.
 - (5) Building height, type of construction (per the adopted building code of the City of Portage and square footage of all floors including basements and mezzanines.
 - (6) Existing and proposed topography depicted in two-foot contour lines labeled with USGS datum.

- (7) Location, dimension and area of existing and proposed buildings on site, and approximate location of all buildings on adjacent properties within 200 feet.
- (8) Building setbacks on front, side and rear and spacing between buildings on site.
- (9) Location and type of natural features such as woods, wetlands, streams, rivers, lakes, floodplains, drains, etc.
- (10) USGS first floor elevation of all buildings.
- (11) Soil erosion control/site grading measures, including a schedule indicating the anticipated start and completion dates of the development stage(s).
- (12) Access to the site—Both pedestrian and vehicular, showing approach type, radii on curb returns, points of ingress and egress and cross access with adjoining properties.
- (13) Access to adjacent properties —Both pedestrian and vehicular, and across the street from the proposed project showing driveway width and radii on the curb returns.
- (14) Off-street parking and loading areas showing location, number and typical dimension of standard and barrier free spaces, and location and dimension of loading areas.
- (15) Adjacent rights-of-way including private driveways within 100 feet of the site, curb, gutter, sidewalks, median islands, streetlights, hydrants.
- (16) Location of existing, proposed and size of water main and/or water service, fire hydrants or private well.
- (17) Location of existing, proposed and size of sewer main and/or sewer lead or septic tank.
- (18) Location of existing, proposed and size of storm water structures and systems. The storm water system must be designed in accordance with the Storm Water Design Criteria Manual.



- (19) Location of private utilities including electric, gas, phone, cable, etc.
- (20) Locations of refuse disposal areas and method of screening if visible from a public right-of-way or adjacent to a residential district or use.
- (21) Location of existing and/or proposed signs.
- (22) Location and type of proposed screening, fencing or landscaping particularly around the perimeter of the proposed project.
- (23) Location of exterior lighting showing the height of the standards, lighting affixed to the proposed building(s) and level of illumination.

- d. The director or planning commission may require, in addition to a site plan, studies that address environmental, traffic, economic, social or other impacts of a development or a development's impact upon the systems or services of the community. The impact studies shall contain such information, and shall be in such form, as the director or planning commission may prescribe.

5. Submission.

- a. A site plan that does not meet the requirements shall be considered incomplete and shall therefore not be subject to review.
- b. If a site plan does not meet one or more of the requirements of this article and requires a variance from the zoning board of appeals, action on the variance request must precede site plan review as provided in this subdivision.
- c. The application materials, required fees and eight copies of the completed site plan shall be submitted to the department of community development for review.

B. Plan reviews.

1. Plan review: Administrative review.

- a. The department of community development will distribute the site plan and related materials to the appropriate administrative departments.



Within 14 days of the date the completed site plan and related materials were submitted, the department of community development will transmit in writing to the applicant the requirements, recommendations and pertinent comments related to the project.

- b. If additional review time is necessary, the department of community development will advise the applicant in writing that additional time is needed to complete review of the site plan and related materials.
2. Resubmission and final review.
- a. Following the review by the administrative departments, the applicant shall revise the site plan according to the requirements and recommendations set forth in the department of community development written correspondence.
 - b. The applicant shall submit eight copies of the revised plan. If the plan is approved by the director, the director or his/her designee shall sign a copy of the approved plan and forward a copy to the applicant.
 - c. If the director determines that a planning commission review is required, the site plan will be scheduled for the next available planning commission meeting.

(Ord. No. 03-01 (Exh. A, § 42-522), 2-18-2003)

Sec. 42-483. Site plan review standards.

The planning commission and city administration during the review of all site plans shall utilize the following standards of review. These standards are intended to provide a frame of reference for the applicant in the preparation of a site plan as well as the planning commission and city administration. These standards are intended to encourage a creative site design based on site characteristics and surrounding land uses. These standards are not intended to be all-inclusive.

- A. The uses proposed will not adversely affect the public health, safety, or welfare. Uses and structures located on the site shall take into account topography, size of the property, the uses on adjoining property and the relationship and size of buildings to the site. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this article.
- B. Safe, convenient, uncongested, and well-defined vehicular and pedestrian circulation shall be provided for ingress/egress points and within the site. Drives, streets, sidewalks



and other circulation routes shall be designed to promote safe and efficient traffic/pedestrian operations within the site and at ingress/egress points. Depending on the size, intensity and location of the proposed use, a traffic study may be required.

- C. The arrangement of public or private vehicular and pedestrian connections to existing or planned streets or between adjacent properties in the area shall be planned to provide a safe and efficient circulation system for traffic within community.
- D. Significant natural features shall be preserved. Removal or alteration of significant natural features shall be restricted to those areas which are reasonably necessary to develop the site in accordance with the requirements of this article. Landscaping, buffers, and/or greenbelts may be required to be preserved and/or provided to ensure that proposed uses will be adequately buffered from one another and from surrounding public and private property.
- E. Visual and sound privacy should be reasonably provided for dwelling units located therein, and adjacent thereto. Fences, walls, barriers, and landscaping shall be used, as appropriate, to accomplish these purposes.
- F. Emergency access shall be provided. All buildings and groups of buildings shall be arranged so as to permit necessary emergency vehicle access, consistent with applicable ordinances.
- G. Storm water systems must be designed and constructed consistent with the Storm water Master Plan and Design Criteria Manual. Appropriate measures shall be taken to ensure that storm water will not adversely affect neighboring properties. Provisions shall be made to accommodate storm water, prevent erosion and the formation of dust.
- H. Site plans shall conform to all applicable requirements of county, state, federal, and local statutes and ordinances. Approval may be conditioned on the applicant receiving necessary county, state, federal, and city permits before final site plan approval or before issuance of the building permit.
- I. The general purposes and spirit of this article and the comprehensive plan of the city shall be maintained.

(Ord. No. 03-01 (Exh. A, § 42-523), 2-18-2003)

Sec. 42-484. Site plan approval (site plan review).

- A. The planning commission or city administration may impose requirements and conditions upon the approval of site plan that are deemed necessary to mitigate adverse impacts and essential to protect the public health, safety and general welfare, provided that the



planning commission or city administration does not impose requirements upon the development that are in direct conflict with those requirements imposed by the city council, if any including ordinances.

B. Appeals.

1. A person aggrieved by a final decision for a site plan review conducted by the director under this subdivision may file an appeal with the planning commission specifying the grounds thereof within 30 days of receiving notice of the director's decision.
 - a. The director shall forthwith transmit to the planning commission all papers constituting the record upon which action appeal was taken. The planning commission shall hear the appeal within a reasonable time and may combine the appeal with the subsequent site plan review, if the appeal overturns the initial decision of the director.
 - b. In hearing the appeal, the planning commission shall review only the applicable portion of the decision in question, and in making the determination shall apply the same standards and method of review used by the director. Where the commission finds an error in the order, requirement, permit, decision or refusal made by the director in carrying out this article, it may overturn the decision and make its own findings, in accordance with the procedures of this subsection used for site plan review by the director.
 - c. The concurring vote of five members of the planning commission is necessary to grant relief or reverse an order of the director.

C. Site plan expiration: If construction activity has not commenced within 12 months of final site plan approval, the site plan becomes null and void and a new application for site plan review in accordance with the procedures of this subsection shall be required.

D. Modifications to an approved site plan.

1. It is recognized that minor modifications to an approved site plan may become necessary prior to or during construction that would improve the function and/or appearance of the site.
2. In an effort to facilitate the continued development of the site, minor modifications to a site plan previously approved by the planning commission or the director, may be approved by the director.



3. Minor modifications include those that do not substantially affect the character or intensity of use, vehicular or pedestrian circulation, drainage patterns, the demand for public services or the vulnerability to hazards as determined by the director.
4. Any modification that is not deemed minor shall be a major modification. Major modifications shall be submitted and reviewed in accordance with the requirements of this subdivision for new site plans.
5. As-built plans: If changes to the approved site (final) plan were made prior to or during construction, four copies of as-built plans shall be submitted to the department of community development prior to the issuance of a certificate of occupancy.

(Ord. No. 03-01 (Exh. A, § 42-524), 2-18-2003; Ord. No. 19-04 , 10-15-2019)

Sec. 42-485. Performance guarantee.

It is recognized that due to weather or other unforeseen circumstances, issuance of a certificate of occupancy permit may be necessary prior to the completion of all required improvements. In lieu of completing of all required improvements, a temporary certificate of occupancy permit may be issued in accordance with the performance guarantee provisions set forth in section 42-655.

(Ord. No. 03-01 (Exh. A, § 42-525), 2-18-2003)

Secs. 42-486—42-519. Reserved.

Site/Final Plan Information

Address:

Project Name:

This checklist is intended as a guide to assist the applicant in the Administrative/Planning Commission site plan review process. The applicant is responsible for being sufficiently familiar with and have a working knowledge of the codes and ordinances of the City of Portage but the Department of Community Development will be glad to assist. A meeting with Department staff is encouraged.

Filing Information

Yes No N/A

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Commercial Development Application. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Filing fee per fee schedule. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Electronic submission meeting the following guidelines: |
| | | <input type="checkbox"/> | All plans will be drawn on uniform sheets no greater than 24" x 36". |
| | | <input type="checkbox"/> | All plans will be drawn to an engineering scale not to exceed 1" = 50' or less than 1" = 20' with a north arrow oriented to the top of the sheet. |
| | | <input type="checkbox"/> | All plans and notations will be clear, legible and accurately scaled. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Permits required from other agencies as noted: |
| | | <input type="checkbox"/> | Kalamazoo County Road Commission |
| | | <input type="checkbox"/> | Kalamazoo County Environmental Health Division |
| | | <input type="checkbox"/> | Michigan Department of Environment, Great Lakes and Energy |
| | | <input type="checkbox"/> | Michigan Department of Natural Resources |
| | | <input type="checkbox"/> | Kalamazoo County Drain Commission |
| | | <input type="checkbox"/> | Kalamazoo/Battle Creek International Airport |
| | | <input type="checkbox"/> | Kalamazoo County Planning Department |
| | | <input type="checkbox"/> | Other _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. For final/specific plans, confirmation of conformance with the previously approved tentative plan. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. For final/specific plans, any easements, restrictive covenants, bonds or other appropriate documents. |

Plan Information

Yes No N/A

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Name, address and phone number of property owner, applicant, engineer and/or architect. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Legal description of property, including parcel area and building/property address number. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Vicinity Map showing closest major cross streets, zoning and existing land use of adjacent parcels. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Property lines, lot dimensions and existing easements including recording document number. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Building height, type of construction (per the State of Michigan Construction Code), square footage of all floors including basements and mezzanines, and usable floor area. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Existing and proposed topography depicted in two-foot contour lines labeled with USGS datum. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Location, dimension and area of existing and proposed buildings on site, and location of all buildings on adjacent properties within 200 feet. |

(Continued to next page)

Yes No N/A

- ☐ ☐ ☐ 8. Building setbacks on front, side and rear and spacing between buildings on site.
- ☐ ☐ ☐ 9. Location and type of natural features such as woods, wetlands, streams, rivers, lakes, floodplains, drains, etc.
- ☐ ☐ ☐ 10. USGS first floor elevation of all buildings.
- ☐ ☐ ☐ 11. Location of existing and/or proposed signs.
- ☐ ☐ ☐ 12. Location, type, width and document recording number/liber and page number of existing easements.
- ☐ ☐ ☐ 13. Location, type and width of proposed easements.

Access and Parking Information

- ☐ ☐ ☐ 14. Access to the site - both pedestrian and vehicular, showing approach type, radii on curb returns, points of ingress and egress and cross access with adjoining properties. Driveways shall comply with City of Portage Contract Conditions and Specifications and City of Portage standard practices.
- ☐ ☐ ☐ 15. Access to adjacent properties - both pedestrian and vehicular, and across the street from the proposed project showing driveway width and radii on the curb returns.
- ☐ ☐ ☐ 16. Off-street parking and loading areas showing location, number and typical dimension of standard and barrier free spaces, and location and dimension of loading areas. Pavement markings shall conform to the standards set forth in the current edition of the Michigan Manual of Uniform Traffic Control Devices.
- ☐ ☐ ☐ 17. Adjacent right-of-ways including private driveways, curb, gutter, sidewalks, median islands, streetlights, hydrants.
☐ Width of adjacent public and/or private road right-of-way: _____
- ☐ ☐ ☐ 18. Low impact parking alternatives.
- ☐ ☐ ☐ 19. Pedestrian connection from public sidewalk to the main building entrance.
- ☐ ☐ ☐ 20. Bicycle racks.

Utility Information

- ☐ ☐ ☐ 21. Location of existing, proposed and size of water main and/or water service, fire hydrants or private well. Public water main and water services shall comply with City of Portage Code of Ordinances Chapter 42, Article 5, Division 4, City of Portage Contract Conditions and Specifications, and City of Portage standard practices.
- ☐ ☐ ☐ 22. Location of existing, proposed and size of sewer main and/or sewer lead or septic tank. Public sanitary sewer and sanitary services shall comply with City of Portage Code of Ordinances Chapter 42, Article 5, Division 4, City of Portage Contract Conditions and Specifications, and City of Portage standard practices.
- ☐ ☐ ☐ 23. Location of existing, proposed and size of storm water structures and systems. The storm water system must be designed in accordance with the Storm Water Design Criteria Manual.
- ☐ ☐ ☐ 24. Location of private utilities including electric, gas, phone, cable, etc.
- ☐ ☐ ☐ 25. Other _____

Water Main Information - Please see Water Main Review Checklist

Sanitary Sewer Main Information - Please see Sanitary Sewer Main Review Checklist

Storm Sewer System Information - Please see Storm Sewer System Review Checklist

Storm Water Design Information - Please see Storm Water Design Checklist

Fire Service Information - Please see Fire Service Checklist

Landscaping Information - Please see Landscape Plan Review Checklist

Exterior Lighting Information – Please see Lighting Plan Review Checklist

Soil Erosion Information - Please see Soil Erosion Permit Application



Chapter 15 – Storm Water BMP Operations and Maintenance Agreement

STORMWATER BEST MANAGEMENT PRACTICES OPERATIONS & MAINTENANCE AGREEMENT

THIS AGREEMENT, effective _____, 20____ between the City of Portage, a Michigan municipal corporation, whose address is 7719 South Westnedge Avenue, Portage, Michigan 49002 (City) and _____,
[status of landowner; i.e. individual(s) or companies] whose address is _____ (Landowner).

Recitals:

- A. The City is regulated under the U.S. Environmental Protection Agency's (EPA) Phase II Stormwater Program since it has a municipal separate storm sewer system (identified in the Performance Standards as MS4). Therefore, the City is required to have a National Pollutant Discharge Elimination System (NPDES) Permit for its discharge of stormwater. The Michigan Department of Environmental Quality (MDEQ) administers the NPDES permit program for the State of Michigan (33 U.S.C. 1251 et seq., P.L. 92-500, 95-217) under Part 31, Water Resources Protection, of Michigan's "Natural Resources and Environmental Protection Act", 1994 PA 451 (NREPA).
- B. Landowner owns real estate in the City at _____, Portage, MI _____ - Parcel No(s) _____ - and which is more specifically described in Exhibit A (Property).
- C. Landowner uses the Property for multi-family residential, commercial, industrial purposes, or a combination of those uses. Landowner is making improvements to the Property that requires approval under the City's Site Plan Review process, or is modifying the existing stormwater discharge system on the Property that either impacts the City's system or the retention of stormwater on the Property. As a result of those uses, improvements or modifications, Landowner agrees: (i) to install and maintain stormwater best management practices (BMPs) on the Property in accordance with approved plans and conditions; and (ii) to ensure that the BMPs continue serving the intended function in perpetuity.
- D. Before signing this Agreement the Landowner, including its representatives, contractors or agents, has reviewed or had the opportunity to review the Performance Standards, work sheets or other documents maintained by the City relating to the City's regulation of its Stormwater Program and this Agreement.

THEREFORE, in consideration of the above recitals and the covenants, conditions, and restrictions stated below, the parties agree as follows:

1. Recitals. The above recitals are acknowledged as true and correct, and are incorporated by reference into this paragraph.
2. Installation and Maintenance. Landowner is solely responsible for the installation, maintenance and repair of the stormwater BMPs.
3. Inspections and Repairs. Landowner shall regularly inspect, maintain, repair or replace the private stormwater BMPs consistent with the Manufactured Treatment Device (identified in the Performance Standards as MTD) as recommended by the manufacturer, and those recommendations provided in the "Low Impact Development Manual for Michigan – A Design Guide for Implementers and Reviewers" (Southeast Michigan Council of Governments and MDEQ, 2008), and "Michigan Nonpoint Source Best Management Practices Manual" (MDEQ, 2014).
4. Submittal of Reports. Landowner shall annually submit a report to the City regarding stormwater BMPs Operation & Maintenance for each of the MTDs and other BMPs. Landowner shall deliver the report to the Director of Transportation and Utilities either by mail to 7719 South Westnedge Avenue, Portage, Michigan 49002, via fax at 269-324-9240, or via e-mail at PortageT&U@portagemi.gov, within 30 calendar days of the inspection date.
5. Modifications to the Stormwater System. Landowner shall contact the City for approval prior to any design modifications to the stormwater treatment and/or conveyance system on the Property.
6. City's Access to the Property. Landowner, its successors and assigns, hereby grants the City, its authorized agents and employees, the right to enter upon the Property to inspect the stormwater BMPs whenever the City reasonably considers an inspection necessary in carrying out the intent and purpose of this Agreement. For example, an inspection may occur: (i) to follow-up on reported deficiencies in Landowner's exercise of stormwater BMPs; or (ii) to address lack of submitted documentation Landlord is required to submit to the City; or (iii) to respond to citizen complaints. The City shall provide Landowner with copies of the inspection findings, including any directive to perform maintenance, repairs or replacements, if necessary, to the stormwater conveyance system on the Property.
7. Default by Landowner/Remedies. If Landowner fails to maintain the stormwater BMPs and associated stormwater conveyance system in good working condition acceptable to the city, the City may enter upon the Property and take whatever steps necessary to correct deficiencies, including those identified in the inspection report. Landowner is responsible to pay the costs the City incurred for those repairs. The City will provide an itemized list of the repairs in an invoice to Landowner, which is due within 30 days of the date on the invoice. To secure any amount owed by Landowner to the City under this Paragraph, the City has the right to place a lien against the Property in the same manner as delinquent taxes,

including accruing interest, penalties and administrative expenses until the lien is fully satisfied.

It is expressly understood and agreed that the City is under no obligation to inspect, maintain or repair the stormwater BMPs or stormwater conveyance system; and in no event shall this Agreement be construed to impose those obligations on the City.

8. **No Liability of the City.** This Agreement imposes no liability of any kind whatsoever on the City and the Landowner agrees to hold the City harmless from any liability if the stormwater BMPs and/or stormwater conveyance system failure to operate properly.
9. **Compliance with other Laws.** This Agreement does not replace or change the requirements of the Landowner to comply with all other applicable federal, state and local laws, rules and regulations; specifically including, without limitation, Chapter 75 of the Code of Ordinances (Stormwater Management).
10. **Binding Effect/Third Parties.** This Agreement is binding on and shall inure to the benefit of the parties to this Agreement and their respective successors. Neither party may assign this Agreement without the prior written consent of the other party. The parties do not intend to confer any benefits on any person, firm, corporation, or other entity which is not party to this Agreement.
11. **Governing Law.** This Agreement is governed under applicable Michigan law. Both parties had the assistance of or the opportunity to seek legal counsel regarding the signing of this Agreement. Therefore, no construction or ambiguity of this Agreement is resolved against either party.
12. **Waiver.** A party does not waive any of its rights under this Agreement if that party fails to complain about an act or omission by the other party, no matter the duration of that act or omission. And a waiver by either party, whether expressed or implied, of any breach of a provision in this Agreement is not considered a waiver or consent to any subsequent breach of this same or other provision.
13. **Exhibits.** This Agreement includes the following exhibits Landowner agrees to provide:

Exhibit A: Legal description of the real estate for which this Agreement applies ("Property").

Exhibit B: Location map(s) showing a location of the Property and an accurate location of each stormwater BMP affected by this Agreement.

Exhibit C: A List of all stormwater BMPs, including Manufacturer, Model, and locational reference to Exhibit B.

14. Headings. Headings in this Agreement are for convenience only and are not intended to interpret or construe its provisions.
15. Entire Agreement/Counterparts. This Agreement supersedes all agreements previously made between the parties relating to the subject matter. There are no other understandings or agreements between them. The parties may sign this Agreement in counterparts, which together shall comprise a single agreement, and the effective date for which is the date it is signed by both parties.
16. Authorization. Each of the parties represents and warrants to the other that this Agreement and its execution by the individual(s) on its behalf are authorized by the city commission, the board of directors or other governing body or organizational agreement of that party.
17. Definitions. The terms set forth in this Agreement shall have the same meaning as commonly used, except any term that is defined under statutes, ordinances or laws identified above, or any other applicable state statute shall have the meaning set forth under that ordinance, statute or law, including any subsequent amendments.
18. Recording. This agreement shall be recorded with the Kalamazoo County Register of Deeds.

Dated: _____

LANDOWNER

By: _____

Its: _____

[This notary section for use by Corporations]

STATE OF MICHIGAN)
)SS.
COUNTY OF KALAMAZOO)

On this _____ day of _____, 20____, before me personally came the above named _____, to me personally known, who being duly sworn did and each for himself say that he/she is the _____ for said corporation named _____ in and who and that said instrument was signed on behalf of said corporation by authority of its _____; and said _____ acknowledges said instrument to be the free act and deed of said corporation.

_____, Notary Public

_____ County, Michigan

My commission expires: _____

[This notary section for use by Individuals]

STATE OF MICHIGAN)
)SS
COUNTY OF KALAMAZOO)

On this _____ day of _____, 20____, before me, a Notary Public, in and for said County, personally appeared _____, to me known to be the same persons described in and who executed the within instrument, who acknowledged the same to be their free act and deed.

_____, Notary Public
_____ County, Michigan
My commission expires: _____

Dated: _____

CITY OF PORTAGE

By: Kendra Gwin
Its: Director of Transportation
and Utilities

STATE OF MICHIGAN)
)SS.
COUNTY OF KALAMAZOO)

On this _____ day of _____, 20____, before me personally came the above named Kendra Gwin, to me personally known, who being duly sworn did say that she is the Director of Transportation and Utilities for The City of Portage named in said instrument and signed on behalf of The City of Portage; and said Kendra Gwin acknowledges said instrument to be the free act and deed of The City of Portage.

_____, Notary Public
_____ County, Michigan
My commission expires: _____

When Recorded Return To:
City of Portage Department of Transportation & Utilities
7900 S. Westnedge Avenue
Portage, MI 49002

THIS INSTRUMENT PREPARED BY:

[Insert name and address of person]



Chapter 16 – Storm Water Design Standards

STORM WATER DESIGN CRITERIA MANUAL

CITY OF PORTAGE, MICHIGAN

ADDENDUM NO. 1

DOCUMENT: Storm Water Design Criteria Manual
City of Portage, Michigan
August 2003

DATE OF ISSUE: January 17, 2019

This addendum updates the referenced document to comply with the latest federal storm water regulations with regard to the water quality treatment and stream protection (now channel protection) performance standards. The following sections of the manual are hereby updated as indicated below:

2.0 INTRODUCTION TO THE MANUAL

2.1 BACKGROUND

➤ *The fourth paragraph is updated as follows:*

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) regulations require the City of Portage (City) to adopt an ordinance or other regulatory mechanism to address post-construction storm water runoff from new development and redevelopment projects, including preventing or minimizing water quality impacts. The City is required to obtain an individual permit under Section 402 of the Federal Clean Water Act, as amended, and under Water Resources Protection (Part 31, Act 451, PA 1994) of the Michigan Natural Resource and Environmental Protection Act (NREPA), as amended. The Post-Construction Storm Water Runoff Program of the MS4 permit requires among other things:

1. A water quality treatment performance standard to ensure specified reductions in total suspended solids.
2. A channel protection performance standard to address resource impairments resulting from increases in bankfull flow rates and volumes.
3. A review procedure for the evaluation of infiltration BMPs to meet water quality and channel protection standards in areas of soil or groundwater contamination.
4. Measures to address associated pollutants in identified "hot spots," which include land uses with the potential for significant pollutant loading that could result in the contamination of surface water or groundwater, including public water supplies.
5. A long-term operation and maintenance (O&M) plan and agreement allowing for the inspection of the BMP, including a mechanism for tracking the transfer of O&M responsibility and compliance.

The minimum standards in this manual adhere to the Post-Construction Storm Water Runoff Program requirements for new and redevelopments set forth in the *State of Michigan National Pollutant Discharge Elimination System Permit Application for Discharge of Storm Water to Surface Waters of the State from a Municipal Separate Storm Sewer System* (Michigan Department of Environmental Quality, 2013, Rev 10/2014).

3.0 GUIDELINES FOR DESIGN OF THE STORM WATER MANAGEMENT SYSTEM

3.2 UNIFORM STORM WATER TREATMENT CRITERIA

➤ *Water Quality Volume, Stream Protection Volume, and Spill Containment Volume are updated as follows:*

Table No. 4 – Summary of Uniform Storm Water Treatment Criteria

Treatment Criteria	Description
Water quality volume, V_{wq} (cft)	Treat the runoff generated from 1 inch of rain over the project site (i.e. the 90% annual nonexceedance storm) through BMPs designed to reduce post-development TSS loadings by 80%, or achieve a discharge concentration not to exceed 80 mg/L.
Channel protection volume, V_{cp} (cft)	Retain onsite the increase between the pre-development and post-development runoff volume and rate for all storms up to and including the 2-year, 24-hour rainfall event.
Flood control volume, V_{fc} (cft)	Infiltration: V_{fc} = 2-year, 24-hour rainfall with zero outflow, or 3,630 cft/acre, whichever is greater. Detention: V_{fc} = 25-year storage volume released at 0.15 cfs per contributing catchment acre.
Spill containment volume, V_{sp} (cft)	V_{sp} = 15% of V_{wq}

3.2.1 WATER QUALITY VOLUME

Treatment of the water quality volume is required for all sites to capture and treat the “first flush” of storm water runoff that typically carries with it the highest concentration of pollutants.

Capture and treatment of the runoff from the 90% annual nonexceedance storm is required for the project site. This storm is approximately equivalent to 1 inch of rain (1.00 inch for Michigan Climatic Zone 8 per MDEQ memo “90 Percent Annual Nonexceedance Storms” dated March 24, 2006).

Treatment of the runoff volume from the 90% annual nonexceedance storm with properly designed BMPs to reduce TSS loading by 80%, or achieve TSS discharge concentrations not to exceed 80 mg/L, is required by the MS4 permit.

Note: TSS is a surrogate for other pollutants normally found in storm water runoff. Control of TSS to meet this requirement is expected to achieve control of other pollutants to an acceptable level that protects water quality.

Natural areas of the site left undisturbed and BMPs that provide water quality treatment need not be included in the calculations.

Water quality volume can be provided through one of the following methods:

- Settling (Permanent Pool or Detention)
- Filtration
- Infiltration
- Absorption
- Chemical/Mechanical Treatment



Permanent Pool. The volume of a permanent pool incorporated into a storm water BMP and sized at 2.5 times the water quality volume.¹ This is the volume below the ordinary static water level (also known as dead storage).

Detention. The storage volume provided by detention of storm water.

Filtration. The volume of storm water runoff routed through a BMP that provides filtration (i.e. an underdrained BMP, a vegetated buffer).

Infiltration. The volume of storm water runoff infiltrated into the ground through a storm water BMP.

Absorption and Chemical/Mechanical Treatment. The volume of storm water runoff routed through a proprietary water quality device.

3.2.2 CHANNEL PROTECTION VOLUME

Channel protection is required for surface water discharges.

The post-development runoff rate and volume shall not exceed the pre-development rate and volume for all storms up to and including the 2-year, 24-hour storm. Onsite retention of the volume increase is required.

Pre-development is defined as the last land use prior to the planned new development or redevelopment.

Note: Volume control for channel protection is required to mitigate increases in runoff rates and volumes for the more frequent (bankfull) rainfall events that have the greatest influence on shaping stream channels. An increase in runoff volume can expose channels to critical erosive velocities for a longer duration, causing accelerated channel adjustments to occur.

Retention can be provided through infiltration, interception and evapotranspiration, or reuse.

3.2.5 REDEVELOPMENT

➤ *Revise Table 5 as follows:*

Table No. 5 – Storm Water Treatment Required for Redevelopment

Treatment	Groundwater Discharge	Surface Water Discharge
Water quality volume, V_{wq}	Yes	Yes, if reconstruction or additions to buildings, parking lots, roadways, and/or driveways results in >20,000 sft of impervious surface. ⁺
Channel protection volume, V_{cp}	No	Yes
Flood control volume, V_{fc}	Yes	Yes
Spill containment volume, V_{sp}	Yes, if 1. Storm water hot spot. 2. High-risk zoning district with >20,000 sft of impervious surface. ⁺	Yes, if storm water hot spot.
<p>Note: The 20,000-sft limit is based on water quality modeling.</p> <p>⁺Reconstruction is defined as removal of pavement, including subbase, and repaving (excludes overlays). Redevelopments conducted in phases will be regulated according to the total paved areas in all phases.</p>		

¹ Barrett, Michael (2005). *BMP Performance Comparisons: Examples from the International Stormwater BMP Database*, Center for Research in Water Resources, PRC#119, University of Texas, 2005 Water Environment Federation.

4.0 PERFORMANCE CRITERIA FOR URBAN BMP DESIGN

➤ *Revise section heading to read:*

4.1 DETERMINATION OF SURFACE RUNOFF AND CHANNEL PROTECTION VOLUME

➤ *Add the following at the end of this section:*

4.1.3 CHANNEL PROTECTION VOLUME (V_{cp})

Channel protection consists of retaining onsite the net increase in runoff volume between pre-development and post-development conditions for a 2-year, 24-hour storm using the Runoff Curve Number Method. Channel protection volume is calculated with the following equation:

$$V_{cp} = V_{t_{post}} - V_{t_{pre}}$$

where:

- V_{cp} = minimum required channel protection volume (cubic feet)
- $V_{t_{post}}$ = runoff volume of the 2-year, 24-hour storm for post-development conditions
- $V_{t_{pre}}$ = runoff volume of the 2-year, 24-hour storm for pre-development conditions

The “Open Spaces” cover type in “fair” hydrologic condition shall be used for post-development pervious areas with 50% or more grass cover if they are not receiving Storm Water Runoff Reduction Controls such as vegetated buffers, urban forestation, protection from over-compaction during construction.

4.5 INFILTRATION BASINS

4.6 DETENTION BASINS

4.8 PROPRIETARY STORM WATER TREATMENT SYSTEMS

4.9 WATER QUALITY SWALES

➤ *The content in the above sections is updated as follows:*

WATER QUALITY VOLUME (V_{wq})

The Small Storm Hydrology Method shall be used to calculate the water quality treatment volume. The method was developed to estimate the runoff volume from urban land uses for relatively small storm events where the Rational and NRCS (formerly SCS) Methods prove less accurate. Water quality volume is calculated by the formula:

$$V_{wq} = ARv(1)(3630)$$

where:

- V_{wq} = minimum required water quality volume (cubic feet)
- A = area (acres); the developed portion of the site, both impervious and pervious
- Rv = area-weighted volumetric runoff coefficient (from Table 8)
- 1 = 90% non-exceedance storm rainfall amount (inches)
- 3630 = factor to convert acre-inches to cubic feet

The Volumetric Runoff Coefficients (Rv) provided in Table 8 are similar to the Rational runoff coefficient, but are exclusive to the rainfall amount (1-inch).

Table 8 – Runoff Coefficients for Small Storm Hydrology Method

Rainfall Amount (inches)	Volumetric Runoff Coefficient, R_v					
	Directly Connected Impervious Area			Disturbed Pervious Area		
	Flat Roofs/ Unpaved	Pitched Roofs	Paved	Sandy Soils (HSG A)	Silty Soils (HSG B)	Clayey Soils (HSG C&D)
1.0	0.815	0.965	0.980	0.035	0.120	0.2015
Source: Adapted from SEMCOG (2008). <i>Low Impact Development Manual for Michigan</i> , Table 9.3. (R. Pitt (2003). <i>The Source Loading and Management Model (WinSLAMM): Introduction and Basic Uses</i>).						

4.6.2.2. STREAM PROTECTION VOLUME (V_{sp})

➤ *Omit this section.*

PRETREATMENT CRITERIA (INCLUDING SPILL CONTAINMENT VOLUME AND SEDIMENT FOREBAY)

➤ *All references to capacity of Pretreatment BMP being 30% of Water Quality Volume are updated to 15%.*

FIGURES

➤ *All references to capacity of Pretreatment BMP being 30% of Water Quality Volume are updated to 15%.*

APPENDIX 2 REQUIRED STORM WATER TREATMENT WORKSHEETS FOR NEW DEVELOPMENTS AND REDEVELOPMENTS

➤ *Worksheets are updated to include revised water quality and channel protection volume standards as follows:*

**REQUIRED TREATMENT VOLUME WORKSHEET
FOR
NEW DEVELOPMENTS**

Water Quality Volume Required?	Yes	_____
--------------------------------	-----	-------

- Water quality volume is required for all sites.

Channel Protection Volume Required?	Yes	_____	No	_____
-------------------------------------	-----	-------	----	-------

If the following is checked “yes,” channel protection volume is required.

- Discharge to a surface water. Yes _____ No _____

Flood Control Volume Required?	Yes	_____	No	_____
--------------------------------	-----	-------	----	-------

If the following is checked “yes,” flood control volume is not required.

- Direct discharge to a lake. Yes _____ No _____

Spill Containment Volume Required?	Yes	_____	No	_____
------------------------------------	-----	-------	----	-------

If any of the following are checked “yes,” spill containment volume is required.

- Surface water discharge from a storm water hot spot. Yes _____ No _____
- Groundwater discharge from a high-risk zoning district in GCR Areas B and C. Yes _____ No _____
- Groundwater discharge in GCR Area A. Yes _____ No _____



REQUIRED TREATMENT VOLUME WORKSHEET FOR REDEVELOPMENTS

Water Quality Volume Required?	Yes _____	No _____
--------------------------------	-----------	----------

If any of the following are checked "yes," water quality volume is required.

- Groundwater discharge. Yes _____ No _____
- Surface water discharge from reconstruction or addition to a building, parking lot, roadway, and /or driveway with greater than 20,000 square feet of impervious surface.* Yes _____ No _____

Channel Protection Volume Required?	Yes _____	No _____
-------------------------------------	-----------	----------

If the following is checked "yes," channel protection volume is required.

- Discharge to a surface water. Yes _____ No _____

Flood Control Volume Required?	Yes _____	No _____
--------------------------------	-----------	----------

If the following is checked "yes," flood control volume is not required.

- Direct discharge to a lake. Yes _____ No _____

Spill Containment Volume Required?	Yes _____	No _____
------------------------------------	-----------	----------

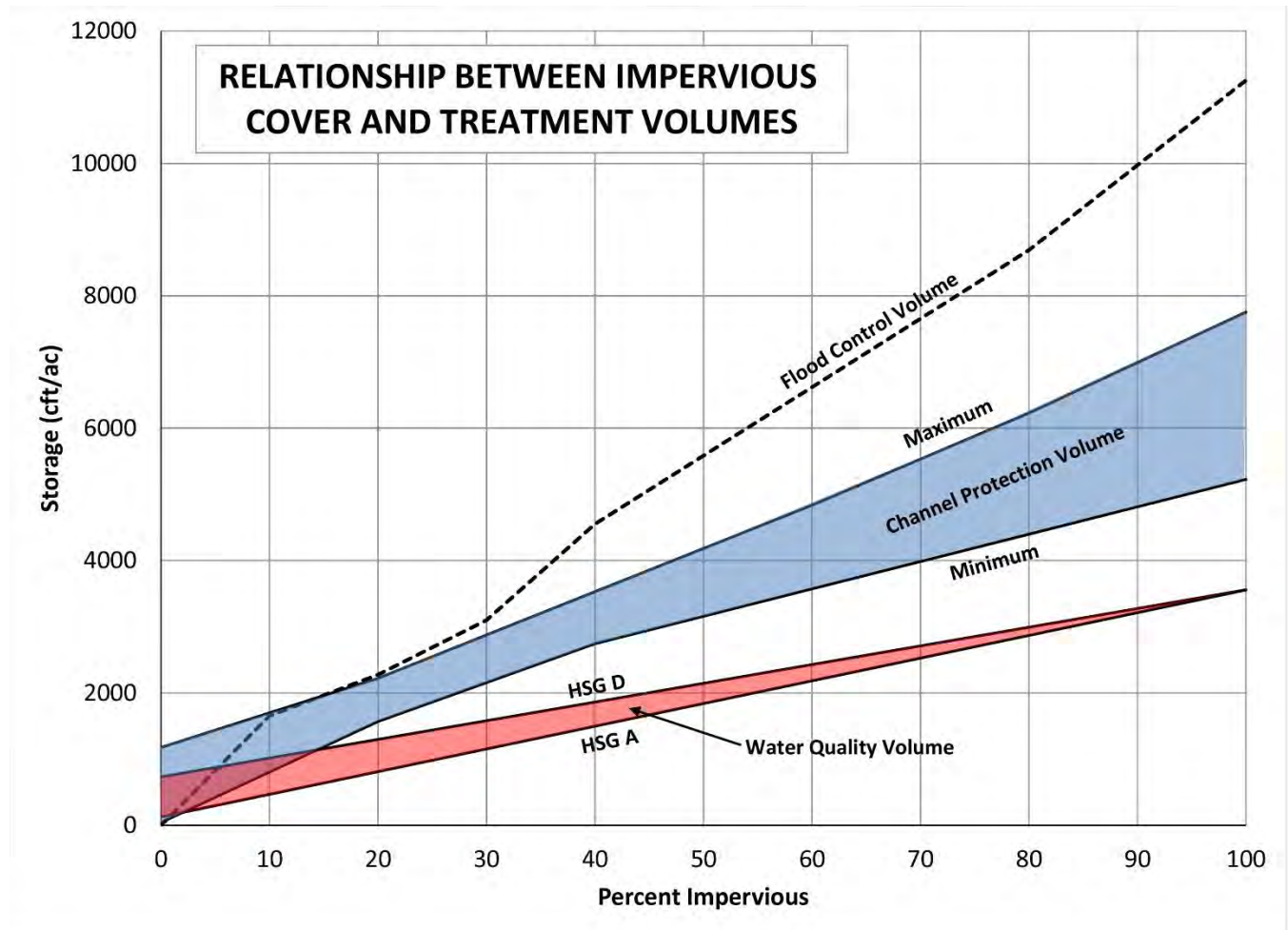
If any of the following are checked "yes," spill containment volume is required.

- Site is a storm water hot spot. Yes _____ No _____
- Groundwater discharge from a high-risk zoning district with greater than 20,000 square feet of impervious surface.* Yes _____ No _____

*Reconstruction is defined as removal of pavement, including subbase, and repaving (excludes overlays).
 Phased redevelopments are regulated by the total square feet of paved area in all phases.

APPENDIX 4 DESIGN PARAMETERS

- Diagram is updated to show revised water quality and channel protection volume standards.



APPENDIX 12 STORM WATER MANAGEMENT PLAN

- Appendix 12 is added to the manual. Content follows.



Storm Water Management Plan

No building, grading, or sediment control permit shall be issued until a satisfactory storm water management plan (or a waiver thereof) shall have undergone a review and been approved by the City after determining that the plan or waiver is consistent with the requirements of this document. After review of the storm water management plan, and modifications to that plan as deemed necessary by City, a storm water management final plan must be submitted to the City for approval. The storm water management plan shall at a minimum include the following:

- A. **Contact Information:** The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.
- B. **Topographic Base Map:** 1" = 200' topographic base map of the site which extends a minimum of 100 feet beyond the limits of the proposed development and indicates existing surface water drainage including streams, ponds, culverts, ditches, and wetlands; current land use including all existing structures; locations of utilities, roads, and easements; and significant natural and manmade features not otherwise shown.
- C. **Calculations:** Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms.
- D. **Soils Information:** If a storm water BMP depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil sites shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the BMP.
- E. **Maintenance and Repair Plan:** The design and planning of all storm water management facilities shall include detailed maintenance and repair procedures to ensure their continued function. These plans will identify the parts or components of a storm water BMP that need to be maintained and the equipment and skills or training necessary. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.
- F. **Landscaping Plan:** The applicant must present a detailed plan for management of vegetation at the site after construction is finished, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved.
- G. **Storm Water Best Management Practices Operations & Maintenance Agreement:** Proof of a recorded Storm Water Best Management Practices Operations & Maintenance Agreement binding on all subsequent owners of land served by storm water BMPs to ensure maintenance and repair in accordance with the specifications of this document.

Storm Water Design Criteria Manual

City of Portage, Michigan

**August 2003
Project No. G00499B**

ftc&h
fishbeck, thompson, carr & huber
engineers • scientists • architects



STORM WATER DESIGN CRITERIA MANUAL

**PREPARED FOR:
CITY OF PORTAGE
PORTAGE, MICHIGAN**

**AUGUST 2003
PROJECT NO. G00499B**

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1.0 HOW TO USE THE MANUAL

The revised Storm Water Design Criteria Manual is divided into four sections, summarized as follows.

1.1 INTRODUCTION TO THE MANUAL

This section provides the background and purpose for the adoption of a set of rules for the management of storm water within the City of Portage (City). General performance standards summarize the position the City has determined to take to protect its water resources. Definitions and abbreviations are included in this section.

1.2 GUIDELINES FOR DESIGN OF THE STORM WATER MANAGEMENT SYSTEM

Guidelines for designing the storm water system for a site development or redevelopment are outlined in this section.

First, a groundwater contamination risk assessment is completed to determine if the land use or activity is high or low risk, or a storm water hot spot, and to determine if the preferred strategy for storm water discharge is to groundwater or surface water.

Second, uniform treatment criteria for urban storm water practices is defined based on four factors:

- Water quality
- Stream protection
- Flood control
- Provisions for accidental spills

The system of Best Management Practices (BMPs) must meet all criteria that apply for the site. Exemptions are specified.

Third, urban storm water practices are categorized by the major elements of a site development storm water management system:

- Runoff reduction controls
- Conveyance systems
- Storm water treatment and control facilities
- Protection of natural hydrologic buffers

Direction for the appropriate selection of urban storm water BMPs is given.

1.3 PERFORMANCE CRITERIA FOR URBAN BMP DESIGN

Specific performance/design criteria for each urban storm water practice is given in this section. Performance criteria for runoff reduction controls and storm water treatment and control facilities are based on the following eight factors to ensure an effective and durable BMP:

- Physical feasibility
- Treatment criteria
- Pretreatment criteria
- Controls
- Geometry
- Public safety
- Landscaping
- Maintenance

1.4 APPENDICES

The appendices include information to assist with design, worksheets to determine required storm water treatment, a list of related state and federal regulations, and a submittal checklist.

2.0 INTRODUCTION TO THE MANUAL

2.1 BACKGROUND

The City published a Storm Water Design Criteria Manual in 1994, after a comprehensive review of environmental regulation trends related to surface and groundwater protection. This revision to the manual builds upon the City's existing *Storm Water Management Review*, *Storm Water Master Plan*, *Wellhead Protection Area Delineation*, *Codified Ordinance*, and *Contract Conditions and Specifications*, all of which were updated in approximately 1994.

The *Storm Water Design Criteria Manual* was developed as a companion document to the *Storm Water Master Plan* to expedite the development design and review process by providing a detailed, organized methodology for the design of storm water systems in the City. It contains formulae, tables, graphs, and data for sizing piping systems, detention and infiltration basins, and other storm water drainage and treatment measures.

In keeping with past efforts and recognizing the need to further protect and enhance its natural resources, the City has revised its *Storm Water Design Criteria Manual* to provide specific design criteria and basis of design for storm water management within the City.

This revised manual is a component of the City's Voluntary National Pollutant Discharge Elimination System (NPDES) Permit and Watershed Management Plan, since storm water management has come to be addressed through the planning and implementation of six major elements or tools:

- Public involvement/education
- Water resource based zoning
- Elimination of illicit discharges
- Construction site erosion/sediment controls
- Postconstruction storm water runoff BMPs
- Source control/good housekeeping

The rules herein deal with urban storm water runoff from new site developments and redevelopment. Thus, the focus of this manual is exclusively on postconstruction storm water runoff BMPs.

2.2 PURPOSE

The future of the City's water resources depends to a great extent on the management of storm water runoff. The City takes an active role in protecting these resources through effective storm water management planning and practices.

The general intent of storm water management in the City is to achieve predevelopment conditions with respect to, 1) the quantity of storm water runoff, both rate and volume, and 2) groundwater quality to protect natural resources and man-made improvements, both downstream of and internal to the site. To this end, the following performance standards shall be applied to all new site development and redevelopment in the City.

2.3 GENERAL PERFORMANCE STANDARDS

The City has adapted nine performance standards that must be met at development and redevelopment sites:

- Standard 1 Infiltration of storm water shall be maximized to promote groundwater recharge. All lots and parcels should retain and infiltrate storm water onsite, unless drainage agreements between adjacent property owners are obtained or the designated strategy is surface water discharge.

- Standard 2 Perforated piping systems are discouraged in favor of solid-wall pipes that discharge to defined infiltration areas.

- Standard 3 The maximum design rate or volume of storm water discharged from a site shall not impair nor exceed the capacity of the downstream storm sewer, open channel, watercourse, wetland, or overland flow path.

- Standard 4 The management strategy for rainfall events exceeding the design storm shall be conveyance through floodplain preservation, provision for secondary conveyance routes, and where available, storage of flood discharges through wetland preservation and enhancement.

- Standard 5 Water quality management shall be provided through the use of structural and/or vegetative practices, in addition to the measures and guidelines implemented by the City in the Voluntary NPDES Permit and Watershed Management Plan.

- Standard 6 For surface water discharges to watercourses, channel protection volume shall be provided through the use of extended detention.
- Standard 7 Storm water discharges from land uses, or activities with a high risk for pollutant loadings, shall require the use of pretreatment (spill containment) measures.
- Standard 8 All BMPs shall meet applicable criteria for physical feasibility, treatment, pretreatment, hydraulic controls, soil erosion controls, geometry, public safety, landscaping, and maintenance.
- Standard 9 A vegetative buffer shall be established along all streams.

Single and two-family residential structures are exempt from the storm water management rules presented in this manual.

Any deviations from these standards, and the specific guidelines included in this manual, shall be subject to approval by the City. Other local, state, and federal rules and regulations related to storm water activities also apply to development within the City. A summary of the most applicable regulations is included in Appendix 1.

2.4 DEFINITIONS

Bankfull Flood: A condition where flow completely fills the stream channel to the top of the bank. In undisturbed watersheds, this occurs on average every 1.5 to 2 years and controls the shape and form of natural channels.

Best Management Practices (BMP): A structural or nonstructural practice or combination of practices that prevent or reduce storm water runoff and/or associated pollutants.

Buffer Strip: A zone of variable width located along a natural feature (stream, wetland, etc.) where plantings capable of filtering storm water are established or preserved.

Catch Basin: A solid-walled storm water inlet to the storm sewer system that includes a sump to capture course sediments.

Catchment: The land area that drains to a single outlet, determined by site topography.

Culvert: A closed conduit used for the passage of surface water under a road or other embankment.

Design High Water Level: The high water level in a storm water conveyance channel or facility calculated using the specified design criteria, which will not result in overbank flow in the channel, or outflow from the facility via the emergency overflow spillway.

Design Maximum Water Level: The water level in a storm water facility calculated for the design discharge of the emergency overflow spillway.

Detention: The temporary storage of storm runoff to control peak discharge rates and provide gravity settling of pollutants.

Detention Basin: A constructed basin that temporarily stores water before discharging into a surface water body. Basins can be classified into three groups:

1. **Dry Detention Basin:** A basin that remains dry except for short periods following large rainstorms or snowmelt events. This type of basin is not effective at removing pollutants.
2. **Extended Dry Detention Basin:** A dry detention basin that has been designed to increase the length of time that storm water will be detained, typically between 24 and 40 hours. This type of basin is not effective at removing nutrients, such as phosphorous and nitrogen, unless a shallow marsh is incorporated into the lower stage of the design.
3. **Wet Detention Basin:** A basin that contains a permanent pool of water that will effectively remove nutrients, in addition to other pollutants.

Directly-Connected Impervious Area (DCIA): Those impervious surfaces that are directly connected to the storm water conveyance system and storm water facility.

Drawdown: The gradual reduction in water level in a pond BMP due to the combined effect of infiltration and evaporation, and withdrawals for storm water reuse.

Dual-Cell Basin: A detention or infiltration basin preceded by a spill containment cell.

Erosion: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff, but can be intensified by land-clearing practices related to development.

Extended Detention: A storm water design feature that provides for the holding and gradual release of storm water over a longer period of time than that provided by conventional detention basins, typically 24 to 40 hours. Extended detention allows pollutants to settle out before storm water is discharged from the basin.

First Flush: The delivery of a highly concentrated pollutant loading during the early stages of a storm due to the washing effect of runoff on pollutants that have accumulated on the land.

Flood Protection Volume: The storm water volume detained or infiltrated to protect downstream areas from flooding.

Freeboard: The difference in elevation from the top of an embankment to the highest water elevation expected for the largest design storm to be stored or conveyed. The distance is required as a safety margin in a pond, basin, or channel.

General Zone of Contribution: The land area included in the zone of contribution to the active municipal well fields, as identified in the *City of Portage Wellhead Protection Area Delineation* report.

Grassed Waterway: A natural or man-made watercourse consisting of vegetated banks and bottom area, designed to accommodate concentrated flows without erosion. Also referred to as ditches, swales, and open channels (although open channels are typically of larger cross section and may have a stable earthen bottom due to the presence of base flows and associated velocities).

Groundwater Contamination Risk (GCR) Areas: Areas within the City classified according to the probability of polluted groundwater contaminating a municipal well.

Hot Spot: An area where land use or activities generate highly contaminated runoff, with a concentration of pollutants in excess of those typically found in storm water (see Table 2).

Headwater Stream: The smallest streams in a drainage network defined as first- and second-order streams. Headwater streams represent a majority of the drainage network and are exceptionally vulnerable to watershed development.

Hydraulic Length: The shortest length between the inlet to a treatment cell and the outlet, measured along the normal water surface. Minimum hydraulic length is based on the necessary travel time of water through a basin to allow for a specific size of soil particle to settle out.

Impervious Cover: Those surfaces of the landscape that cannot infiltrate rainfall consisting of building rooftops, pavement, sidewalks, driveways, etc.

Infiltration: The penetration of water through the ground surface into subsurface soils, or the penetration of water from the soil into sewer or other pipes via defective joints, connections, or manhole walls.

Infiltration Basin: A facility without a positive outlet in which storm water runoff is collected and allowed to infiltrate into the ground.

Infiltration Trench: A narrow, shallow excavation located over permeable soils and backfilled with appropriate aggregate to provide a subsurface reservoir to store storm water and allow it to infiltrate into the subsurface soils, while removing coarse to fine sediments and the pollutants associated with them.

In-line Detention: Detention provided within the flow-carrying network.

In-line Storm Sewer Storage: Oversizing storm sewers and installing restrictors to provide flood control volume storage.

Leaching Basin: A storm water inlet that may connect to the storm sewer system and includes a sump with an open bottom and/or perforated sidewalls to allow collected storm water to infiltrate into adjacent permeable soils.

Manhole: A solid-walled chamber within the storm sewer system, having a bottom flush with the outlet pipe, that is used to facilitate access and changes in pipe configuration.

Off-line Detention: Detention of storm water that has been diverted outside the natural watercourse or storm sewer system.

Permeability: The property of subsurface soils that is a measure of the soils' ability to transmit water.

Pocket Wetlands: A storm water wetland design adapted for small drainage areas without a reliable source of baseflow. The surface area of pocket wetlands is usually less than .10 acre. The pocket wetland is usually intended to provide some pollutant removal for very small development sites.

Pretreatment: Technique to capture or trap coarse sediments within runoff, before they enter a BMP, to preserve storage volumes or prevent clogging. Examples include swales, forebays, and micropools.

Retention Pond: A wet infiltration basin designed to capture runoff that does not discharge directly to a surface water body. The water is discharged by infiltration or evaporation.

Runoff: That part of precipitation, snowmelt, or irrigation waters that do not infiltrate or evaporate, but run off to a surface water body or storm sewer system.

Sediment Forebay: A small, separate storage area near the inlet to a storm water facility used to trap and settle incoming sediments before they can be delivered to the basin.

Short Circuiting: The passage of flow through a BMP in less than the design detention time.

Spill Containment Cell: The first cell of dual-cell detention and infiltration basins (or storm water wetlands) designed to provide controlled removal of oils and grease, coarse to fine sediments, and the pollutants associated with them, to protect groundwater and surface water quality, and provide for a containment area in the case of an accidental spill.

Spill Containment Volume: The volume of storm water required in a spill containment cell to protect groundwater and surface water from pollutant spills.

Storm Water: Runoff from a rainfall or snowmelt event.

Storm Water Facility: A BMP usually located at the downstream end of the site conveyance system (end-of-pipe) designed to provide the uniform treatment volumes required for the site (detention basins, storm water wetland, and infiltrations basins).

Storm Water Wetland: A detention area, consisting of deep water, low marsh, and high marsh zones, that creates conditions suitable for the growth of marsh plants. Storm water wetlands are designed to maximize pollutant removal through wetland uptake, retention, and settling. These constructed systems are not located within delineated natural wetlands.

Stream Protection Volume: A storm water treatment volume that controls storm water runoff from more frequent events that have an impact on the stability of headwater streams.

Ten-Year Time of Travel: The radial distance from municipal well fields to the limits of the 10-year zones of contribution based on soil and groundwater flow conditions, as identified in the *City of Portage Wellhead Protection Area Delineation* report.

Treatment: The additional measures taken for the specific purpose of collecting storm water runoff rates and volumes, and enhancing water quality by the removal of pollutants beyond those required for the adequate collection and removal of storm water runoff, and maintenance of the collection system.

Treatment Cell: The first cell of dual-cell detention and infiltration basins, designed to provide controlled removal of oils and grease, coarse to fine sediments, and the pollutants associated with them to protect groundwater and surface water quality, and provide for a containment area in the case of an accidental spill.

Urban Storm Water Practice: Any technique for the collection, storage, treatment, infiltration, or prevention of storm water runoff from urban site developments.

Water Table: The depth or level below the ground surface at which the ground is saturated with water. Water located within the saturated portion of the subsurface is referred to as groundwater.

Water Quality Volume: A storm water treatment volume that protects surface water from the pollution impacts associated with urban runoff.

2.5 ABBREVIATIONS

BMPs	best management practices
DCIA	directly connected impervious area
EPA	U. S. Environmental Protection Agency
GCR	groundwater contamination risk
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
NPDES	National Pollutant Discharge Elimination System
SCS	Soil Conservation Service
V _{fc}	flood control volume
V _{sp}	stream protection volume
V _{wq}	water quality volume
V _{sc}	spill containment volume

2.6 UNIT ABBREVIATIONS

ac.in	acre inch
cft	cubic feet
cfs	cubic foot per second
cm/sec	centimeters per second
ft	feet (or foot)
ft/ft	feet per foot (or foot per foot)
ft/s	feet (or foot) per second
in/hr	inches per hour
sft	square feet

3.0 GUIDELINES FOR DESIGN OF THE STORM WATER MANAGEMENT SYSTEM

3.1 GROUNDWATER CONTAMINATION RISK ASSESSMENT

The City has been divided into three groundwater contamination risk areas, as shown in Figure 1. Each area is labeled according to the probability of groundwater contaminating or impacting a municipal well field and is classified as follows:

- Area A: Areas located within a 10-year travel time to a municipal well field.
- Area B: Areas located outside the 10-year travel time, but within the general area of contribution of municipal well fields.
- Area C: Areas located outside the general area of contribution of municipal well fields.

Table 1 categorizes land-use zoning districts as either high-risk or low-risk for potential groundwater contamination. High-risk designation was assigned to zoning districts typically allowing activities that include the use and disposal of hazardous substances in quantities exceeding 100 kilograms per month. The U.S. EPA Office of Groundwater Protection published a list in June 1987 that appears in *Guidance for Applications for State Wellhead Protection Assistance Funds Under the Safe Drinking Water Act*. A Standard Industrial Classification code list, also published by the EPA, lists facilities and industries subject to federal storm water regulations. These lists have been edited and combined for the City to determine high-risk land-use activities. The subsequent list of high-risk land-use activities that pose potential threats to groundwater (hot spots) is given in Table 2.

The storm water discharge strategies presented in Table 3 will differ depending on the groundwater contamination risk area, zoning district (as defined in the City of Portage Zoning Code), land-use activities, proximity to surface water bodies, and the physical characteristics of the site. The preferred discharge strategy is infiltration of storm water to the groundwater, except where the potential for groundwater contamination is determined to be a high risk. In this case, a surface water discharge is preferred to minimize the economic and environmental impact of a discharge of hazardous substances.

Table No. 1 – Risk Designations
Storm Water Design Criteria Manual
City of Portage

Groundwater Travel Time Regional Areas	High-Risk Zoning Districts	Low-Risk Zoning Districts
Area A	All zoning districts	None
Areas B and C	<p>Commercial (B-2, B-3, PD, and CPD).</p> <p>Industrial (I-1, I-2, and PD).</p> <p>Multi-family residential (RM-1, RM-2, and PD with greater than 30 residential units).</p> <p>Community facilities (including public services, service centers, schools, fire and police departments, public transportation facilities, vocational shops, and landfills).</p> <p>Office and local business (OS-1, PD, and B-1 with greater than 20,000 square feet of paved area).</p> <p>Research/office parks (OTR and PD).</p> <p>Parking (P-1 with greater than 20,000 square feet of paved area).</p> <p>Transportation corridors (including state truckline, major arterial and minor arterial roadways, and collector roadways).</p>	<p>*Single and two-family residential (R-1A, R-1B, R-1C, R-1D, R-1E, R-1T, and PD).</p> <p>*Multi-family residential (RM-1, RM-2, and PD with 30 residential units or less).</p> <p>*Recreation/open space (including parks and cemeteries).</p> <p>*Office and local business (OS-1, PD, and B-1 with 20,000 square feet or less of paved area).</p> <p>*Community facilities (including churches, city hall, and library).</p> <p>*Parking (P-1 with 20,000 square feet or less of paved area).</p> <p>*Transportation corridors (including city local roadways).</p>

*See Table 2 for high-risk land uses to determine the associated risk designation.

**Table No. 2 – High-Risk Land-Use Activities that Pose Potential Threats to Groundwater
(Hot Spots)**

Storm Water Design Criteria Manual
City of Portage

Commercial
Analytical and clinical laboratories
Auto rustproofers/engine repair
Auto washes
Boat builders/refinishers
Car rental and service stations/automotive repair
Commercial establishments with fleets of trucks and cars
Concrete/asphalt/coal/tar companies
Equipment repair
Food processors/meat packers/slaughter houses
Fuel oil distributors/stores
Furniture strippers/finishers/painters
Gas stations
Junkyards
Laundries and dry cleaners
Pesticide application services/pesticide storers/retailers
Petroleum bulk storage (wholesale)
Photographic development
Printing
Salvage yards/impoundment lots
Wood preserving and treatment
Industrial
Analytical and clinical laboratories
Governmental agencies with fleets of trucks and cars
Salt piles/sand-salt piles
Vehicle maintenance operations (transportation/trucking, contractors/construction, auto dealers)
Manufacturing
Chemical, paint, and plastics manufacturing
Furniture manufacturing
Metal manufacturing (including metal plating)
Mining operations/injection wells
Other manufacturing (textiles, rubber, glass, etc.)
Pulp and paper industry
Transportation
Airport maintenance/fueling areas
Salt piles/sand-salt piles
Vehicle maintenance operations (transportation/trucking, contractors/construction, auto dealers)
Utilities
Aboveground oil pipelines
Electric power generation substations
Waste Disposal
Landfills/dumps/transfer stations

Table No. 3 – Storm Water Discharge Strategies

Storm Water Design Criteria Manual

City of Portage

Storm Water Strategy	Area A	Area B		Area C	
	High-Risk	High-Risk	Low-Risk	High-Risk	Low-Risk
Groundwater discharge	N/A	II	I	I	I
Surface water discharge	I	I	II	II	II

I = Preferred storm water strategy.

II = Second strategy, to be employed only if site constraints prohibit the use of the preferred strategy.

N/A = Not allowed without City approval on a site-by-site basis.

3.2 UNIFORM STORM WATER TREATMENT CRITERIA

The City has adapted a uniform standard for the treatment of storm water through the use of urban storm water BMPs. Adequate controls and volumes shall be provided to maintain groundwater recharge, meet pollutant removal goals, reduce channel erosion, prevent overbank flooding, and provide for containment of accidental spills of toxic materials. Four criteria are used, as summarized in Table 4.

Table No. 4 – Summary of Uniform Storm Water Treatment Criteria

Storm Water Design Criteria Manual

City of Portage

Treatment Criteria	Description
Water quality volume, V_{wq} (cft)	$V_{wq} = 1,815$ cft per impervious acre provided as permanent pool, extended detention, or infiltration. Equivalent to 0.5 inch of runoff per impervious acre.
Stream protection volume, V_{sp} (cft)	$V_{sp} = 5,000$ cft per impervious acre. Released at 0.05 cfs per impervious acre to provide 24-hour extended detention. Equivalent to a routed 1.5-year, 24-hour SCS Type II rainfall detained for 24 hours.
Flood control volume, V_{fc} (cft)	Infiltration: $V_{fc} = 2$ -year, 24-hour rainfall with zero outflow, or 3,630 cf/acre, whichever is greater. Detention: $V_{fc} = 25$ -year storage volume released at 0.15 cfs per contributing catchment acre.
Spill containment volume, V_{sp} (cft)	$V_{sp} = 30\%$ of V_{wq} .

3.2.1 WATER QUALITY VOLUME

A storm water management system designed to treat the water quality volume better protects the Portage Creek, Davis Creek, and Gourdneck Creek watersheds from the impacts of pollutants associated with urban runoff and helps meet pollutant-removal goals.

Water quality volume is required to treat the first flush of storm water runoff that typically carries with it the highest concentration of pollutants. Water quality volume shall be provided for all new developments where storm water management is required. A minimum water quality volume of 550 cft shall be provided for sites with less than 0.3 acre of impervious surface.

3.2.2 STREAM PROTECTION VOLUME

After development, the increased frequency and magnitude of storm water runoff can erode the stable banks and bed of a stream.

Stream protection volume is required to control urban storm water runoff for the smaller, more frequent rainfall events (bankfull flood) that have a greater impact on the stability of headwater streams. The intent is to store and release storm water runoff in such a gradual manner that critical erosive velocities, during bankfull events, will seldom be exceeded in downstream channels.

Stream protection volume shall be provided for all surface water discharges to watercourses. Stream protection volume is not required for sites where the weighted runoff coefficient (c) times the area (A) is less than one acre.

3.2.3 FLOOD CONTROL VOLUME

The flood control volume is required for detention and infiltration basins to control the larger, less frequent rainfall events that typically cause flooding.

With the exception of direct surface water discharges to inland lakes, flood control volume shall be provided for all new developments where storm water management is required.

3.2.4 SPILL CONTAINMENT VOLUME

Spill containment volume is required to protect groundwater and surface water from pollutant spills. Land-use activities included on the City's list of operations that pose potential threats to groundwater are considered to be storm water hot spots. A copy of the list is included in Table 2. These operations may pose a risk to water quality, depending upon the quantities of hazardous substances and the storage, handling, and disposal practices.

Spill containment volume is required for storm water hot spots to provide for capture and containment of a slug discharge of pollutants from an accidental spill for both surface and groundwater discharges. Spill containment volume for infiltration shall also be required for new developments in high-risk zoning

districts in groundwater contamination risk areas B and C and for all zoning districts in groundwater contamination risk area A.

3.2.5 REDEVELOPMENT

Redevelopment and additions requiring either a building permit or a soil erosion and sedimentation control permit shall provide storm water system upgrades in accordance with Table 5.

Table No. 5 – Storm Water Treatment Required for Redevelopment

Storm Water Design Criteria Manual
City of Portage

Treatment	Groundwater Discharge	Surface Water Discharge
Water quality volume, V_{wq}	Yes	Yes, if additions to parking lots, roadways, and/or driveways result in >20,000 sft of paved area. ⁺
Stream protection volume, V_{sp}	No	Yes, if total site C x A >1 acre.
Flood control volume, V_{fc}	Yes	Yes
Spill containment volume, V_{sc}	Yes, if 1. Storm water hot spot. 2. High-risk zoning district with >20,000 sft of paved area. ⁺	Yes, if storm water hot spot.

Note: The 20,000-sft limit is based on water quality modeling, and the 1-acre limit is based on the minimum practical orifice size.

⁺Developments conducted in phases will be regulated according to the total paved areas in all phases.

3.3 STORM WATER SYSTEM COMPONENTS

Urban storm water practices are categorized by four primary components of a site development's storm water management system. Individual urban storm water practices, and their ability to meet the uniform treatment criteria, are summarized in Table 6. Table 6 shall be used to select appropriate urban storm water practices to provide the required treatment.

3.3.1 STORM WATER RUNOFF REDUCTION CONTROLS

3.3.1.1 MEASURES

Storm water runoff reduction controls involve measures to manage storm water before it reaches the subdivision/development conveyance system. Typical measures include:

- Limiting the number of roof drains to provide rooftop detention of storm water.
- Catch basin restrictors to provide parking lot or rear yard detention of storm water.
- Oversizing storm sewers and installing restrictors to provide in-line storm sewer storage.
- Infiltration trenches or leaching basins.

- In-line oil-and-grit separators.
- Water quality swales.
- Reduced lot grading to allow greater ponding of storm water and natural infiltration.
- Disconnect roof drains from the conveyance system.
- Impervious cover reduction.
- Rain gardens/urban forestation.

3.3.1.2 APPLICATION

These types of measures are applicable for very small sites, where space is not available for the construction of storm water treatment facilities.

The type or types of runoff reduction controls selected for an independent site (not part of a larger development with a storm water treatment facility) shall meet all uniform volume criteria required for the site. A required treatment worksheet is included in Appendix 2. Table 6 can then be used to select appropriate BMPs.

3.3.2 STORM WATER CONVEYANCE CONTROLS

3.3.2.1 MEASURES

Storm water conveyance controls consist of the following:

- Storm sewer and catch basins
- Culverts and bridges
- Grassed waterways

3.3.2.2 APPLICATION

In general, grassed waterways (ditches) encourage longer storm water travel times and contact with vegetation to provide some filtering of pollutants. However, their use is discouraged in urban settings. They are most applicable in rural areas.

Perforated storm sewer and catch basins (leaching basins) provide for groundwater recharge and reduce the volume of surface water runoff discharged to a receiving stream. However, their use is discouraged as a conveyance measure, due to the difficulty in pretreating storm water and containing spills along a linear route with numerous inlets.

The strategy for rainfalls greater than the flood control rainfall event is safe passage through floodplain preservation and planning for secondary conveyance.

All public storm sewer systems shall be placed within street rights-of-way, where possible. Easements shall be provided for all public storm drainage systems located outside street rights-of-way.

3.3.3 STORM WATER FACILITIES

3.3.3.1 MEASURES

Storm water facilities are those practices implemented at the downstream end of the conveyance system on a site development level. They consist of the following urban BMP groups:

- Infiltration basins (dry, retention ponds)
- Detention basins (dry, extended, and wet)
- Storm water wetlands

3.3.3.2 APPLICATION

The type or types of storm water facility selected for a given site shall meet all uniform volume criteria required for the site. A required treatment volume worksheet is included in Appendix 2. Table 6 can then be used to select appropriate BMPs.

3.3.4 PRETREATMENT

3.3.4.1 MEASURES

Pretreatment is conducted just upstream from the storm water facilities and downstream from the conveyance system. Pretreatment consists of the following:

- Spill containment cells
- Sediment forebays

3.3.4.2 APPLICATION

The type of pretreatment for a given site shall meet the uniform volume criteria for the site. A required treatment volume worksheet is included in Appendix 2. Table 6 can then be used to select an appropriate BMP.

Table No. 6 – Treatment Suitability of Urban Storm Water Practices

Storm Water Design Criteria Manual

City of Portage

Control	Urban Storm Water Practice	Volume			
		Water Quality	Stream Protection	Flood Control	Spill Containment
Runoff reduction	Rooftop storage			✓	
	Parking lot storage			✓	
	In-line storm sewer storage			X	
	Infiltration trench	X	X ¹	X	
	Leaching basin/dry well	X	X ¹	X	
	Proprietary storm water treatment system	✓			X
	Water quality swale	X			X
	Reduced lot grading		✓	✓	
	Disconnect roof drains		✓	✓	
	Impervious cover reductions		✓	✓	
Conveyance	Storm sewers				
	Perforated storm sewers				
	Catch basins	✓			
	Grassed waterways	✓			
Storm water facility	Dry detention basin		X	X	
	Extended detention basin	X	X	X	
	Wet detention basin (storm water pond)	X		X	
	Dry infiltration basin	X	X ¹	X	
	Retention pond	X	X ¹	X	
	Storm water wetland	X	X	X	
Pretreatment	Spill containment cell	X			X
	Sediment forebay	✓			

Empty space = Volume criteria not applicable to BMP, or does not provide treatment volume.

X = Fully meets or can be designed to meet treatment volume.

X¹ = If infiltration is used exclusively, stream protection volumes are not required and, therefore, are shown as met.

✓ = Can be used with other BMPs to help meet uniform treatment criteria.

3.3.5 PROTECTION OF NATURAL HYDROLOGIC BUFFERS

This section governs natural wetlands, streams, floodplains, and vegetated buffers.

3.3.5.1 NATURAL WETLANDS

Wetlands shall be delineated prior to siting storm water BMPs.

Wetlands shall be protected from damaging modifications and adverse changes in runoff quality and quantity associated with land developments. All necessary wetland permits from the MDEQ (Part 303, Act 451, PA 1994) and local governments shall be in place prior to final site approval.

Direct discharge of untreated storm water to a natural wetland is prohibited. All runoff from the development will be pretreated to remove sediment and other pollutants prior to discharge to a natural wetland.

Energy dissipation measures shall be incorporated at the end of pipe outfalls to natural wetlands to reduce erosive velocities and spread the flow entering the wetland.

All proposed storm water discharges to natural wetlands or ponds not contiguous to a surface water body (i.e., without a natural overflow conveyance system to a surface water body) shall not raise the normal groundwater or surface water levels so as to adversely impact property in proximity to the site. This determination shall be done by a hydrogeologist and professional engineer. If the noncontiguous wetland drainage area is jointly shared by adjoining property owners, drainage agreements need to be provided.

3.3.5.2 STREAMS

In-line detention is prohibited on perennial streams.

3.3.5.3 FLOODPLAINS

Where available, the community flood insurance study shall be used to determine the 100-year floodplain elevation.

All development projects adjacent to a known or suspected floodplain need to provide updated topographic information to determine the floodplain delineation.

A storm water facility may be located within the 100-year floodplain of a stream, creek, or lake, if the existing floodplain volume is maintained and additional volume is provided for effective detention or retention. Spill containment must be provided above the 100-year flood elevation.

The proprietor shall demonstrate that any activity proposed within a 100-year floodplain will not diminish the flood storage capacity.

Compensatory storage will be required at a minimum ratio of 1:1 for all lost floodplain storage.

3.3.5.4 VEGETATED BUFFERS

Buffer strips shall be established adjacent to all streams through deed restrictions or provisions of condominium master deed documents. Deeds shall state, "There shall be no clearing, grading, construction, nor disturbance of vegetation except as permitted by the City of Portage."

Plantings capable of filtering storm water shall be preserved or established.

Storm water BMPs may be located within a buffer.

A buffer at least 25-feet-wide on each side of all streams is required. Streams requiring buffers are shown in Figure 2. The buffer should be composed of two zones:

- The streamside zone (15 feet from the edge of the stream under base flow conditions). This zone protects the physical integrity of the stream. A mature riparian forest is the goal of vegetation management. Land use is highly restricted to storm water BMPs, footpaths, and permitted utilities and road crossings.
- Secondary zone (10 feet from the upland edge of the streamside buffer or the width of the 100-year floodplain, whichever is greater). The secondary zone provides distance between development and the stream. This is the key to a successful buffer function. Pervious ground surface is the goal for this area. Land use is not as limited as in the streamside zone. This zone can be used for the same land uses as the streamside zone, plus recreational uses approved by the City.

The vegetation in both zones may not meet the goal upon establishment of the buffer, but it should be managed to do so. For example, a grassy area needs to be allowed to grow into a shrubbed area and, over time, into a forest.

Paved areas adjacent to buffers shall be curbed to prevent runoff from flowing directly onto the buffer and causing concentrated flow and erosion.

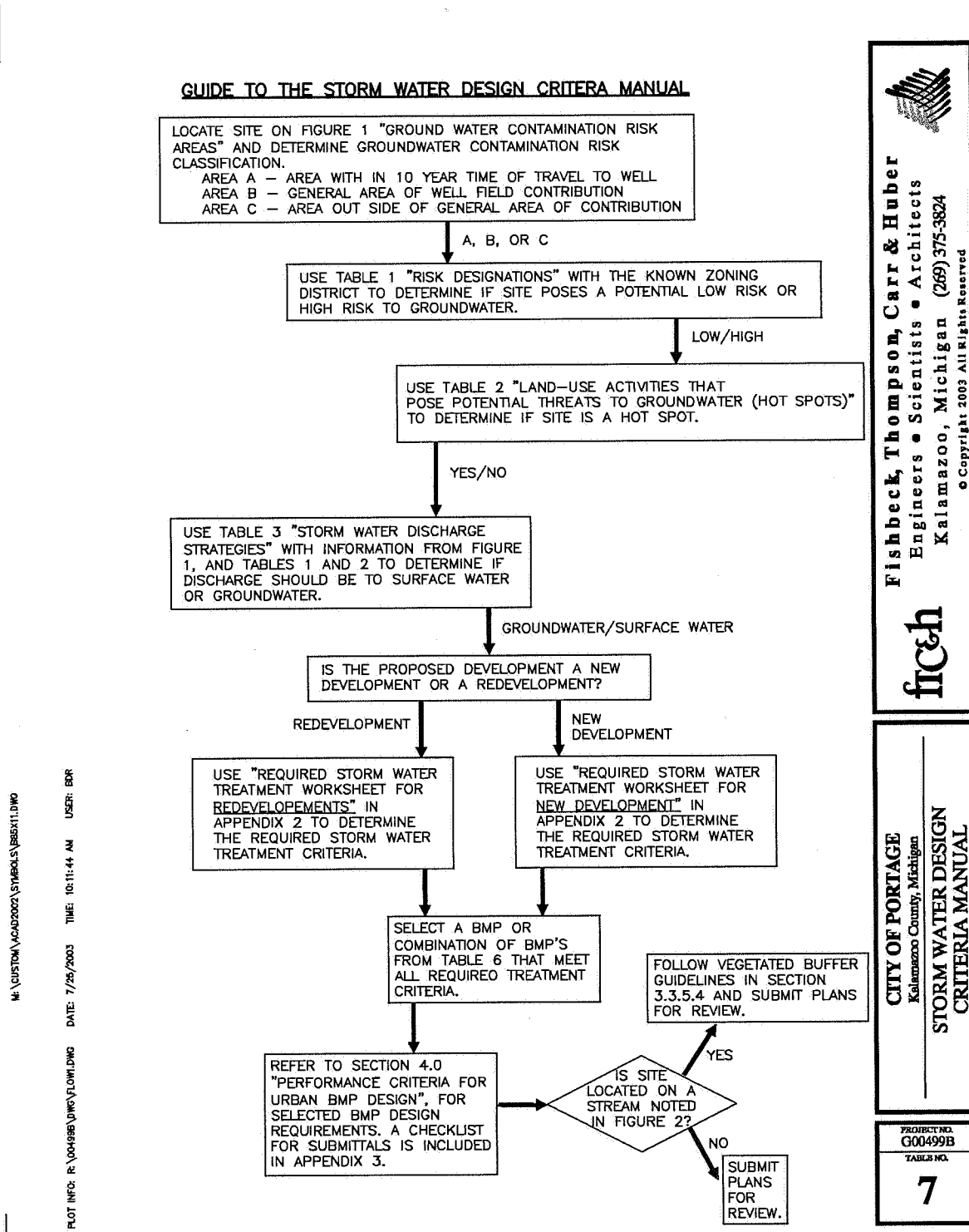
A conservation easement shall be granted to the City over the buffer area. This does not mean the general public has the right to access the area.

Buffer width may be reduced at some points, as long as the average width meets minimum requirements.

3.4

PROCEDURE FOR BMP SELECTION

Table 7 is a flow chart that can be used as a guide for using this Design Criteria Manual.



Design calculations for an example project are summarized in Appendix 10. The following steps shall be taken to determine the criteria for a project.

3.4.1 DETERMINE STORM WATER DISCHARGE STRATEGY

Tables 1, 2, and 3 are used in conjunction with Figure 1 to determine the preferred storm water discharge strategy to be used in any particular section of the City. The step-by-step procedure is described below:

- Step 1: Locate the site on Figure 1: Groundwater Contamination Risk Area map. Determine the risk designation from Figure 1 (groundwater contamination risk area A, B, or C). If the site is located in more than one risk designation area, the risk classification will be based upon the more stringent designation.
- Step 2: Determine the risk designation of the land-use zoning in Table 1: Risk Designations. The risk classification will also be based on the actual use of the site (refer to Table 2, High-Risk Land-Use Activities that Pose Potential Threats to Groundwater (Hot Spots). If a particular use is not identified, the City will determine the appropriate risk classification.
- Step 3: Using the information from Figure 1 and Tables 1 and 2, determine the preferred storm water discharge strategy (surface or groundwater) from Table 3, Storm Water Discharge Strategies. Roman numeral I indicates the preferred strategy to be applied, unless soil or groundwater conditions or the availability of a surface water outlet prohibit the use of the preferred strategy. In which case, the strategy indicated by Roman numeral II will be allowed.

3.4.2 DETERMINE REQUIRED TREATMENT

- Step 4: Required treatment for water quality, stream protection, flood control, and spill containment is dependent upon the storm water discharge strategy and the GROUNDWATER CONTAMINATION RISK designation for the site determined in the previous steps; also taken into account is the size of the site, and whether it is a new development or redevelopment. For new developments and redevelopments, use the appropriate worksheets in Appendix 2 to determine the types of treatment required.

3.4.3 SELECT APPROPRIATE STORM WATER BMPs

Step 5: Table 6 is used to select appropriate storm water BMPs, after the required types of treatment are determined for the site. A single BMP, or a combination of BMPs, must be used to meet all required treatment criteria.

3.4.4 DESIGN THE STORM WATER BMPs

Step 6: Refer to section 4.0, Performance Criteria for Urban BMP Design, for specific direction to design the storm water management system. A checklist for submittals is included as Appendix 3.

4.0 PERFORMANCE CRITERIA FOR URBAN BMP DESIGN

4.1 DETERMINATION OF SURFACE RUNOFF

4.1.1 METHOD

The proprietor's engineer may be required to use the SCS TR-20 hydrologic method to generate hydrographs and to perform reach and reservoir routing for large sites and/or smaller sites of sufficient complexity. However, the Rational Method of calculating storm water runoff is generally acceptable for sites less than 120 acres and is given by the equation:

$$Q = CIA$$

Where:

Q =	Peak Discharge (cfs)
C =	Runoff Coefficient
I =	Rainfall Intensity (in/hr)
A =	Contributing Drainage Area (acres)

For sites with a water course conveying runoff from an upstream watershed equal to or greater than 2 square miles, approval by the MDEQ is required, pursuant to the Floodplain Control Section (Part 31) of Act 451, PA 1994. The MDEQ will compute flood frequency discharges for the watercourse upon request.

Values of runoff curve number and average percent impervious for various development types for use with SCS methods are included in Appendix 4, Design Parameters. Values of runoff coefficients for various development types, for use with the Rational Method, are included in Appendix 4.

The minimum time of concentration value shall be 15 minutes. Guidelines for estimating the time of concentration are included in Appendix 4.

An antecedent moisture condition of II, reflective of normal soil moisture, shall be used with the SCS method.

4.1.2 DESIGN RAINFALL

The 24-hour rainfall amounts in Bulletin 71, located in Appendix 4, shall be used with the SCS method to calculate peak runoff rates. The rainfall duration-frequency table from Bulletin 71 shall be used with the Rational Method, to determine a rainfall intensity for a rainfall duration equal to the time of concentration.

A Type II rainfall distribution shall be used with the SCS method.

4.2 STORM SEWERS

4.2.1 SIZING

The storm sewer system shall be designed to convey runoff from a 10-year frequency rainfall event.

Storm sewer design velocities, capacities, and friction losses shall be based on Manning's equation:

$$Q = \frac{1.49 A R^{\frac{2}{3}} S^{\frac{1}{2}}}{n}$$

Where:

Q =	Discharge (cfs)
A =	Wetted Area (sft)
R =	Hydraulic Radius (ft)
S =	Slope (ft/ft)
n =	Manning's Coefficient

Manning's coefficients for closed conduit are included in Appendix 4.

Acceptable slopes for circular pipe ($n=0.013$) are included in Appendix 4. Minimum and maximum grade for other Manning's n values must be calculated based on allowable minimum and maximum velocities.

As a general rule, surcharging the pipe will be allowed to 1 foot below the top of casting. However, minor losses must be considered in hydraulic grade-line calculations.

Storm sewer pipe shall have a minimum diameter of 12 inches.

The minimum depth of cover shall be 24 inches from grade to the top of pipe.

Restricted conveyance systems designed to create backflow into storm water storage facilities are not permitted.

4.2.2 END TREATMENT

Outlet protection shall be provided, as necessary, to prevent erosion based on the maximum velocities given in section 4.4, Grassed Waterways.

4.2 STORM SEWERS

4.2.3 MANHOLES AND CATCH BASINS

Manhole spacing shall not exceed 400 feet for sewers less than 42 inches in diameter and 600 feet for larger sewers.

Manholes shall be placed at all changes in pipe direction, pipe size, all inlet connection locations, and at the end of the storm sewer.

Pipe inverts at junctions shall be designed to minimize junction losses (match 0.8 point of pipe diameters).

Minimum inside diameter of all manholes, catch basins, and inlet structures shall be 48 inches, except crossover inlets and upstream inlets, which can be 24 inches in diameter.

Inlet structures shall be placed at low points of streets and yards and be spaced a maximum of 400 feet apart. Spacing and/or number of inlet structures required to accommodate the design flows in streets, private drives, and parking areas shall be provided based on inlet capacity, with no ponding occurring during a 10-year storm.

No more than 150 feet of street drainage will be allowed to flow around a corner. No flow will be allowed across a street intersection.

4.2.4 MATERIAL

Storm sewer pipe shall be in accordance with the *City of Portage Contract Conditions and Specifications*.

Pipe joints shall be designed to prevent excessive infiltration or exfiltration. Premium joints to provide watertight seal (rubber or slip seal) shall be used for solid wall pipe.

Manholes and catch basins shall be in accordance with the *City of Portage Contract Conditions and Specifications*.

Connections to manholes shall be made with a resilient connector for pipe diameters of 24 inches or less.

4.3 CULVERTS AND BRIDGES

4.3.1 SIZING

For drainage areas of 2 square miles or more, waterway crossings must meet the requirements of the Floodplain Control Section (Part 31) of Act 451, PA 1994.

Bridges shall be designed to provide a 2-foot-minimum freeboard to the underside (low chord) of the bridge for a 100-year flood. Footings shall extend at least 4 feet below the bottom of the channel.

Culverts serving a drainage area of less than 2 square miles shall be designed for a minimum 10-year storm in the developed watershed, with a maximum outlet velocity of 8 ft/s. The effect of the 25-year storm shall be reviewed to assure no adverse increase in water elevation off the development property, or flooding of structures within the development.

Sizing of culverts and bridges shall include consideration for entrance and exit losses and tailwater condition.

Minimum diameter of a drive culvert shall be 12 inches.

Minimum diameter of a road-crossing culvert shall be 18 inches or equivalent pipe arch.

4.3.2 END TREATMENT

Headwalls, wingwalls, and all other end treatments shall be designed to assure the stability of the surrounding soil. *MDOT Standard Specifications* or *City of Portage Contract Conditions and Specifications* shall be met.

4.3.3 MATERIAL

Culverts may be reinforced concrete pipe, corrugated steel pipe, or pipe arch in accordance with *MDOT Standard Specifications* or *City of Portage Contract Conditions and Specifications*.

4.4 GRASSED WATERWAYS

4.4 GRASSED WATERWAYS

4.4.1 SIZING

The minimum required discharge capacity shall be for a 10-year frequency rainfall event with 0.5 foot of freeboard to top of bank.

Velocities, capacities, and friction losses shall be based on Manning's formula. Typical Manning's coefficients for open channels, swales, and ditches are included in Appendix 4.

A minimum n value of 0.035 shall be used as the roughness coefficient for open channels, unless special treatment is given to the bottom and sides (riprap, paving, or mown sod).

Minimum bottom width for grassed waterways shall be 1 foot. Minimum bottom slope shall be 0.50%.

Side slopes shall be no steeper than 3:1 (H:V).

4.4.2 SOIL EROSION AND SEDIMENTATION CONTROL

Grassed waterway flow velocities shall be neither siltative nor erosive. The minimum velocity for vegetated channels shall be 1.5 ft/s. The maximum velocity shall be 4 ft/s. Riprap protection or equivalent erosion control measures shall be used where the velocity exceeds 4 ft/s, up to maximum allowable design velocity of 8 ft/s.

Where maximum velocities are exceeded due to channel slope, rock check dams, or grade control, structures shall be used to reduce overall flow velocities.

Erosion control blankets shall be used to protect bare channels.

4.4.3 LAYOUT

Outlets into the grassed waterway shall enter at an angle of 90 degrees or less, with the direction of flow.

A minimum clearance of 4 feet is required between vegetated swale and ditch inverts and underground utilities, unless special provisions are approved. In no case will less than 2 feet of clearance be allowed.

4.5 INFILTRATION BASINS

4.5 INFILTRATION BASINS

- Dry infiltration basin (see Figure 3)
- Retention pond

4.5.1 PHYSICAL FEASIBILITY

See Section 3.4 for suitability of this BMP for a specific site.

Minimum recommended setback for storm water infiltration basins shall be 30 feet downgradient from buildings. Minimum isolation distances from drain fields and water supply wells shall be in accordance with Kalamazoo County Environmental Health.

Infiltration basins will be permitted only with adequate soil data to ensure the City's infiltration basin will have a minimum infiltration capacity of 1.04 in/hr. The geotechnical investigation shall follow the procedure outlined in Appendix 5.

The permeability test requirement can be waived, if the soils encountered below the level of the proposed infiltration area consist of soils meeting the Unified Soils Classification System gradation requirements of SP, GP, SW, or GW without clay or silt seams, layers, or partings, as determined by a qualified geotechnical consultant. Soil samples must be submitted for review to waive the permeability test requirement. If testing is waived, the minimum design infiltration rate of 0.52 in/hr shall be used.

The bottom of dry infiltration basins shall be a minimum of 4 feet above the highest known water table elevation.

4.5.2 TREATMENT CRITERIA

4.5.2.1 FLOOD CONTROL VOLUME (VFC)

Infiltration basins shall be sized to store and infiltrate a minimum of 3,630 cft per acre, or the runoff produced from a 2-year, 24-hour rainfall event assuming zero outflow, whichever is greater. The latter method shall be calculated according to the formula:

4.5 INFILTRATION BASINS

$$V_{fc} = CAP_2(3,630)$$

Where: V_{fc} = Total required volume of the infiltration basin (cft)
 C = Runoff coefficient
 A = Area (acres)
 P_2 = 2-year rainfall amount = 2.4 inches
3,630 = Factor to convert ac.in to cft

This corresponds to the storage required for a 25-year rainfall event within a basin infiltration rate of 0.52 in/hr and a total retention time of 72 hours.

A minimum flood control volume of 3,630 cft per acre shall be provided.

Where a basin overflow could cause downstream flooding, due to the absence of an acceptable conveyance route, the flood control volume shall be doubled.

4.5.2.2 MAXIMUM DRAIN TIME

Dry infiltration basins shall be designed to drain completely within 72 hours. A design infiltration rate of 0.5 times the infiltration rate determined by geotechnical investigation, or a minimum infiltration rate of 0.52 in/hr, shall be used to calculate the maximum storage depth by the equation:

$$D \leq \frac{72(I)}{12}$$

Where: D = Basin depth (ft)
72 = Maximum allowable drain time (hrs)
 I = Design infiltration rate (in/hr)
12 = Factor to convert inches to feet

4.5.2.3 WATER QUALITY VOLUME (VWQ)

The water quality volume shall be defined as 0.5 inch of runoff from the directly connected impervious area and is given by the equation:

4.5 INFILTRATION BASINS

$$V_{wq} = 1,815(\text{DCIA})$$

Where: V_{wq} = Water quality volume (cft)
1,815 = 0.5 inch of runoff x 3,630 to convert ac.in to cft
DCIA = Directly connected impervious area (acres)

A minimum water quality volume of 550 cft/ac shall be used if less than 30% of the site is composed of DCIA.

Water quality volume is provided through infiltration.

4.5.3 PRETREATMENT CRITERIA

4.5.3.1 SEDIMENT FOREBAY

Sediment forebays or equivalent upstream pretreatment shall be provided for all storm water detention basins to provide energy dissipation and to trap and localize incoming sediments. A spill containment cell can be used in place of a forebay, where required.

The forebay shall be a separate sump, which can be formed by grading a compacted earthen berm or other suitable structure.

Where more than one inlet pipe is required, the calculated forebay volume shall be prorated by flow contribution of each inlet.

The length to width ratio shall be a minimum of 1.5:1 and a maximum of 4:1.

For infiltration basins, the capacity of the sediment forebay shall be equivalent to 30% of the water quality volume, as defined in Section 4.5.2.3.

Where more than one inlet pipe is required, multiple forebays are necessary. Each forebay's volume shall be calculated as follows:

4.5 INFILTRATION BASINS

$$V_i = \frac{Q_i}{Q_T} 30\%(V_{wq})$$

Where: V_i = Forebay volume for a specific inlet
 Q_i = Peak flow of a specific inlet
 Q_T = Total peak flow from all inlets

4.5.3.2 SPILL CONTAINMENT CELL

Figure 4 shows a dimensioned spill containment cell.

General. A spill containment cell shall be used to trap and localize incoming sediments and to capture slug pollutant loads from accidental spills of toxic materials (spill containment volume).

The spill containment cell shall be a wet basin with an impermeable bottom and sides to the design high water level.

Sizing. The spill containment volume shall be calculated as 30% of the water quality volume, as defined in Section 4.5.2.3.

The minimum surface area shall be 25% of the required volume.

The length to width ratio shall be a minimum of 3:1 and a maximum of 4:1 to allow for adequate hydraulic length, yet minimize scour velocities.

The minimum hydraulic length shall be equal to the length specified in the length to width ratio.

The minimum diameter of the transfer pipe, between the spill containment cell and the infiltration basin, shall be 12 inches.

The overflow structure from the spill containment cell shall be sized for the peak inflow from a 10-year rainfall event.

The top-of-berm elevation between the spill containment cell and the basin shall be a minimum of 1 foot below the outer berm elevation.

4.5 INFILTRATION BASINS

The spill containment cell shall have a minimum 1-foot-deep sump below the inlet pipe for sediment accumulation.

The outlet structure from the spill containment cell shall be designed to draw water from the central portion of the water column within the cell, to trap floatables and contain sediments. The crown of the inlet end of the transfer structure pipe shall be located vertically, a minimum of 1 foot below the normal water level, and a minimum of 1.5 feet from the bottom of the spill containment cell (minimum depth of the permanent pool is 2.5 feet).

Material. The spill containment cell shall be lined with impermeable materials extending up to the design high water elevation. A minimum 18-inch-thick clay layer or an impermeable liner protected with a minimum 12 inches of soil cover are acceptable alternatives. Maximum allowable permeability shall be 1×10^{-7} cm/sec as determined by the geotechnical consultant for clay placement, or manufacturer's certificate for liner products. A 40-mill polyvinyl chloride liner is an acceptable impermeable material.

A proprietary storm water treatment system can be located upstream from a basin to provide spill containment in place of a spill containment cell (see section 4.8, Proprietary Storm Water Treatment System).

4.5.4 CONTROLS

4.5.4.1 INLET DESIGN

Inlet pipes shall not be fully submerged at normal water surface elevations.

A sediment forebay shall be provided at each inlet, unless the inlet supplies less than 10% of the total design flow into the infiltration basin. Storm water from roof drains can enter an infiltration basin without passing through a forebay sediment.

Where a spill containment cell is required, all inlet pipes must enter this cell for pretreatment.

4.5.4.2 EMERGENCY OVERFLOW

All infiltration facilities must have a provision for overflow at the high water level. A spillway shall be designed for the 10-year inflow from the fully developed watershed, with a maximum flow depth of 1 foot. The spillway shall be sized using the weir equation:

4.5 INFILTRATION BASINS

$$Q = 2.6LH^{\frac{3}{2}}$$

Where: Q = Discharge (cfs)
 2.6 = Coefficient of discharge
 L = Length of spillway crest (ft)
 H = Total head measured above spillway crest (ft)

The top-of-berm elevation shall be a minimum of 1 foot above the design maximum water level.

4.5.4.3 EROSION CONTROL

Upland construction areas shall be completely stabilized prior to final infiltration basin construction.

Infiltration basins shall not be used as sediment basins during construction.

Overflow spillways shall be protected with riprap or a permanent erosion control blanket to prevent erosion of the structure.

Inlets require energy dissipation and transition from outlet to open channel, based on the maximum velocities given in section 4.4, Grassed Waterways.

Basin inlets shall have a riprap apron to dissipate the velocity of incoming storm water runoff. The following minimum square yards of riprap shall be provided based on pipe diameter.

<u>Pipe Diameter (inches)</u>	<u>Riprap (square yards)</u>
12 to 18	4
21 to 36	12
42 to 60	24

Riprap shall be placed in accordance with *City of Portage Standard Conditions and Specifications*.

4.5 INFILTRATION BASINS

4.5.5 GEOMETRY

The floor of dry infiltration basins shall be flat to encourage uniform ponding and infiltration and shall be scarified to a depth of 4 to 6 inches after final grading has been established.

A minimum of 1 foot of freeboard shall be provided between the top of bank and flood control volume surface elevation.

4.5.6 PUBLIC SAFETY

Fencing shall be provided for all City owned and operated basins.

Fencing shall be in accordance with *City of Portage Fencing Requirements*, included in Appendix 6.

Privately owned basins may forego the fencing requirement, but must provide side slopes no steeper than 4:1 (H:V) and minimum signage reading "No Trespassing."

Private basins shall be located a minimum of 10 feet outside public road rights-of-way.

4.5.7 LANDSCAPING

Landscaping shall be required as indicated in Appendix 7.

4.5.8 MAINTENANCE

Maintenance responsibilities shall be vested with the owner or authorized operator.

A minimum 12-foot-wide maintenance access route from a public or private right-of-way to the basin shall be provided. The access way shall have a slope of no greater than 6:1 (H:V) (17%) and shall be constructed to withstand the passage of heavy equipment. Direct access to the forebay, control structures, and the overflow shall be provided. Access lanes for basins owned or operated by the City shall be paved from the street to the gate.

Infiltration basin maintenance plans will require that sediment be removed from the forebay when it reaches a depth equal to 50% of the depth or 12 inches, whichever is less. At a minimum, a visual inspection shall be conducted annually. Light equipment shall be used for maintenance to avoid overcompaction of the soils. The bottom shall be deeply tilled afterward to restore infiltration rates.

4.5 INFILTRATION BASINS

Eroded and barren areas shall be revegetated, as soon as possible. Trash and debris shall be removed on a regular schedule.

4.6 DETENTION BASINS

- Dry detention basin (see Figure 5).
- Extended dry detention basin (see Figure 6).
- Wet detention basin (storm water pond) (see Figure 7).

4.6.1 PHYSICAL FEASIBILITY

See section 3.4 for suitability of this BMP for a specific site.

Minimum recommended setback for storm water detention basins shall be 30 feet from buildings. Minimum isolation distances from drain fields and water supply wells shall be in accordance with Kalamazoo County Environmental Health.

A reliable supply of base flow is required for wet basins to prevent excessive drawdown of the permanent pool during extended periods of low precipitation.

4.6.2 TREATMENT CRITERIA

4.6.2.1 WATER QUALITY VOLUME (VWQ)

The water quality volume shall be defined as 0.5 inch of runoff from the directly-connected impervious area and is given by the equation:

$$V_{wq} = 1,815(DCIA)$$

Where: V_{wq} = Water quality volume (cft)
 1,815 = 0.5 inch of runoff x 3,630 to convert ac.in to cft
 DCIA = Directly-connected impervious area (acres)

A minimum water quality volume of 550 cft/ac shall be used if less than 30% of the site is composed of DCIA.

Water quality volume may be provided by a permanent pool or extended detention.

4.6 DETENTION BASINS

When extended detention is used, the maximum release rate to detain this volume for 24 hours is given by the equation:

$$Q_{out} = \frac{V_{wq}}{24\text{hrs}(3,600)\text{s/hr}}$$

4.6.2.2 STREAM PROTECTION VOLUME (VSP)

The stream protection volume shall be defined as the routed volume of runoff from the 1.5-year, 24-hour, SCS Type II rainfall event (2.06 inches) with postdevelopment conditions. The minimum required stream protection volume is calculated as:

$$V_{sp} = 5,000 \text{ cft per impervious acre}$$

Stream protection volume is not required for sites where $C \times A < 1$ acre.

The maximum release rate to detain this volume for at least 24 hours is 0.05 cfs per impervious acre.

Where stream protection volume is necessary, a separate outlet for water quality volume is not required.

4.6.2.3 FLOOD CONTROL VOLUME (VFC)

The standard flood control volume shall be sized to detain the 25-year rainfall event, with a maximum release rate of 0.15 cfs per acre by the Rational Method (Modified Chicago Method) or by pond routing using the SCS Method. For the Rational Method, the maximum storage volume shall be multiplied by 1.25 to obtain the minimum required flood control volume. The minimum standard flood control volume required per acre can be read directly from the table included in Appendix 4.

The water quality and stream protection volume may be included in the flood control volume.

4.6.2.4 DRY BASINS

Dry detention basins must be combined with other BMPs to meet water quality volume criteria. Extended detention basin design, with a shallow marsh incorporated into the lower stage, is an acceptable way to meet the water quality criteria.

4.6 DETENTION BASINS

4.6.2.5 WET BASINS

Flood control and stream protection volumes must be provided above the permanent pool elevation. Any volume provided below the invert of the outlet is considered dead storage and will not be considered as detention volume.

4.6.3 PRETREATMENT CRITERIA

4.6.3.1 SEDIMENT FOREBAY

Sediment forebays or equivalent upstream pretreatment shall be provided for all storm water detention basins to provide energy dissipation and to trap and localize incoming sediments. A spill containment cell can be used in place of a forebay, where required.

The forebay shall be a separate sump, which can be formed by grading a compacted earthen berm or other suitable structure.

The capacity of the forebay(s) shall be equivalent to 5% of the 25-year flood control volume. Where more than one inlet pipe is required, multiple forebays are necessary. Each forebay's volume shall be calculated as follows:

$$V_i = \frac{Q_i}{Q_T} 5\%(V_{FC})$$

Where:

V_i =	Forebay volume for a specific inlet
Q_i =	Peak flow of a specific inlet
Q_T =	Total peak flow from all inlets

The length to width ratio shall be a minimum of 3:1 and a maximum of 4:1.

4.6.3.2 SPILL CONTAINMENT CELL

Figure 4 shows a dimensioned spill containment cell.

General. A spill containment cell or equivalent storm water filter shall be used to trap and localize incoming sediments and to capture slug pollutant loads from accidental spills of toxic materials (spill containment volume).

4.6 DETENTION BASINS

The spill containment cell shall be a wet basin with an impermeable bottom and sides to the design high water level.

Sizing. The spill containment cell volume shall be calculated as 30% of the water quality volume, as defined in section 4.6.2.1.

The minimum surface area shall be 25% of the required volume.

The length to width ratio shall be a minimum of 3:1 and a maximum of 4:1 to allow for adequate hydraulic length, yet minimize scour velocities.

The minimum hydraulic length shall be equal to the length specified in the length to width ratio.

The minimum diameter of the transfer pipe between the spill containment cell and the detention basin shall be 12 inches.

The overflow structure from the spill containment cell shall be sized for the peak inflow from a 10-year rainfall event.

The top-of-berm elevation between the spill containment cell and the basin shall be a minimum of 1 foot below the outer berm elevation.

The spill containment cell shall have a minimum 1-foot-deep sump, below the inlet pipe, for sediment accumulation.

The outlet structure from the spill containment cell shall be designed to draw water from the central portion of the water column, within the cell, to trap floatables and contain sediments. The crown of the inlet end of the transfer structure pipe shall be located vertically, a minimum of 1 foot below the normal water level. The invert of the transfer structure pipe shall be a minimum of 1.5 feet above the bottom of the spill containment cell (minimum depth of the permanent pool is 3.5 feet).

Material. The spill containment cell shall be lined with impermeable materials extending up to the design high water elevation. A minimum 18-inch-thick clay layer or a 40-mil high-density polyethylene impermeable liner protected with a minimum 12 inches of soil cover are acceptable alternatives. Maximum allowable permeability shall be 1×10^{-7} cm/sec, as determined by the geotechnical consultant for clay placement or manufacturer's certificate for liner products.

4.6 DETENTION BASINS

A proprietary storm water treatment system can be located upstream from a basin to provide spill containment in place of a spill containment cell (see section 4.8, Proprietary Storm Water Treatment System).

4.6.4 CONTROLS

4.6.4.1 INLET DESIGN

Inlet pipes shall not be fully submerged at normal pool elevations.

A sediment forebay shall be provided at each inlet, unless the inlet supplies less than 10% of the total design flow into the detention basin.

Where a spill containment cell is required, all inlet pipes must enter this cell for pretreatment.

4.6.4.2 OUTLET DESIGN

The outlet may be designed using the orifice equation, rearranged to solve for area:

$$A = \frac{Q}{c \sqrt{2gH}}$$

Where:

A =	Required area (sft)
Q =	Required outflow (cfs)
c =	Orifice coefficient (approximately 0.6)
2g =	Two times the gravitation constant (g = 32.2 ft/s)
H =	Height of design high water level above center of orifice outlet

Other types of outlet devices shall have full design calculations provided for review.

The outlet shall be designed to prevent clogging.

Pipes or orifice plates shall have a minimum diameter of 4 inches.

Riser pipes, with holes or slits less than 4 inches in diameter, shall have a stone and gravel filter placed around the outside of the pipe.

4.6 DETENTION BASINS

Hoods and trash racks shall be placed on riser pipes. Grate openings shall be a maximum of 3 inches on center.

Orifices used to maintain a permanent pool shall be designed to withdraw water a minimum of 1 foot below the surface of the pond.

Riser pipes shall have a minimum diameter of 24 inches. Riser pipes greater than 4 feet in height shall be 48 inches in diameter.

Riser pipes shall be constructed of reinforced concrete or corrugated metal and be set in a concrete base. Plastic is not acceptable as a riser material.

Outlet control structures shall be placed near or within the embankment to facilitate maintenance access.

A drain for completely dewatering the detention facility shall be installed for maintenance purposes.

4.6.4.3 EMERGENCY OVERFLOW

All detention facilities must have a provision for overflow at the high water level. A spillway shall be designed for the 10-year inflow from the fully developed watershed, with a maximum flow depth of 1 foot. The spillway shall be sized using the weir equation:

$$Q = 2.6LH^{\frac{3}{2}}$$

Where:

Q =	Discharge (cfs)
2.6 =	Coefficient of discharge
L =	Length of spillway crest (ft)
H =	Total head measured above spillway crest (ft)

The top-of-berm elevation shall be a minimum of 1 foot above the design maximum water level.

4.6.4.4 EROSION CONTROL

Upland construction areas shall be completely stabilized prior to final detention basin construction. The detention basin may be constructed first, as a temporary erosion control measure during construction.

4.6 DETENTION BASINS

Overflow spillways shall be protected with riprap or a permanent erosion control blanket to prevent erosion of the structure.

Inlets and outlets require energy dissipation and transition from outlet to open channel, based on the maximum velocities given in section 4.4, Grassed Waterways.

Basin inlets shall have a riprap apron to dissipate the velocity of incoming storm water runoff. The following minimum square yards of riprap shall be provided based on pipe diameter.

<u>Pipe Diameter (inches)</u>	<u>Riprap (square yards)</u>
12 to 18	4
21 to 36	12
42 to 60	24

Riprap shall be placed in accordance with *City of Portage Standard Conditions and Specifications*.

4.6.5 GEOMETRY

The distance between inlets and outlets shall be maximized. If possible, inlets and outlets should be offset at opposite longitudinal ends of the facility. The length of the flow path across the basin can be maximized by:

- Increasing the length to width ratio of the entire design. A minimum length to width ratio of 3:1 shall be used, unless structural measures are used to extend the flow path.
- Adding bends and curves to the dry-weather flow path.

The bottom of dry detention basins shall be graded to provide positive flow to the pipe outlet. A minimum flow line bottom slope of 1% should be provided. Cross slopes should be 2% minimum. If continuous flow is anticipated, a low-flow channel shall be provided, with necessary crossings, and sloped to eliminate standing water.

Permanent pools for wet basins shall be a minimum of 3 feet deep in the center of the basin.

Storm water ponds shall be wedge-shaped, narrower at the inlet and wider at the outlet. Irregular shorelines are preferred.

4.6 DETENTION BASINS

A minimum of 1 foot of freeboard shall be provided between the top-of-bank and flood control volume surface elevation.

4.6.6 PUBLIC SAFETY

Detention basins that have an impoundment area of 5 acres or more, and a hydraulic head of 6 feet or more, must meet the requirements of the Dam Safety Section (Part 315) of Act 451, PA 1994.

Side slopes for dry basins shall not be steeper than 4:1 (H:V) to eliminate the need for safety ledges, facilitate mowing, and ensure stable side slopes.

Side slopes for wet basins shall not be steeper than 3:1 (H:V) and terminate at a safety ledge.

A minimum 5-foot-wide safety ledge, with a maximum slope of 6%, shall be provided around the perimeter of wet basins and shall be located 1 foot below the normal water level.

Where steeper side slopes are unavoidable, safety railing, fencing, or other access barriers shall be used.

"No trespassing" signs shall be posted for wet basins.

Fencing shall be provided for all City owned and operated basins.

Fencing shall be in accordance with *City of Portage Fencing Requirements*, included in Appendix 6.

Privately owned basins may forego the fencing requirement, but must provide side slopes no steeper than 4:1 (H:V) and minimum signage reading "No Trespassing."

Private basins shall be located outside public road rights-of-way.

4.6.7 LANDSCAPING

Landscaping shall be required as indicated in Appendix 7.

4.6 DETENTION BASINS

4.6.8 MAINTENANCE

Maintenance responsibilities shall be vested with the owner or authorized operator.

A minimum 12-foot-wide maintenance access route from a public or private right-of-way to the basin shall be provided. The access way shall have a slope of no greater than 6:1 (H:V) (17%) and shall be stabilized to withstand the passage of heavy equipment. Direct access to the forebay, control structures, and the outlet shall be provided. Access lanes for basins owned or operated by the City shall be paved from the street to the gate.

Detention basin maintenance plans will require that sediment be removed when it reaches a depth equal to 50% of the depth of the forebay, or 12 inches, whichever is less. At a minimum, a visual inspection shall be conducted annually. Light equipment shall be used for maintenance to avoid overcompaction of the soils. Eroded and barren areas shall be revegetated as soon as possible. Trash and debris shall be removed on a regular schedule. Outlet structures shall be inspected a minimum of once a year.

4.7 STORM WATER WETLANDS

4.7 STORM WATER WETLANDS (See Figure 8.)

All of the detention basin design criteria also apply to the design of storm water wetlands (see section 4.6, Detention Basin). Additional criteria exclusive to storm water wetlands is presented in this section.

4.7.1 PHYSICAL FEASIBILITY

See section 3.4 for suitability of this BMP for a specific site.

A water balance must be performed to demonstrate that a storm water wetland can withstand a 30-day drought, at summer evaporation rates, without completely drawing down. A short cut assessment method for calculating water balance is included in Appendix 8.

Soil borings shall be taken to confirm the depth to the seasonally high groundwater table, and the soil classification, as an indicator of permeability. The geotechnical investigation shall follow the procedure outlined in Appendix 5.

Setback and base flow requirements are identical to those specified for detention basins (see section 4.6, Detention Basin).

4.7.2 TREATMENT CRITERIA

The surface area of the entire storm water wetland shall be at least 1% of the total drainage area to the facility.

At least 25% of the total water quality volume shall have a minimum depth of 4 feet, under normal water surface elevation conditions (deep water). The forebay and micropool may meet this requirement.

A minimum of 35% of the total surface area shall have a depth of 6 inches or less (high marsh), and at least 65% of the total surface area shall be shallower than 18 inches (low marsh).

Water level fluctuations, associated with water quality or stream protection volumes, shall not exceed 3 feet.

Additional treatment criteria area identical to those specified for detention (see section 4.6, Detention Basin).

4.7 STORM WATER WETLANDS

4.7.3 PRETREATMENT CRITERIA

No additional criteria beyond the detention basin design criteria for pretreatment shall apply to the design of storm water wetlands.

4.7.4 CONTROLS

No additional criteria beyond the detention basin design criteria for controls shall apply to the design of storm water wetlands.

4.7.5 GEOMETRY

An overall length to width ratio of 1.5:1 is recommended.

Irregular flow paths shall be used to maximize flow length from inflow to outflow points. These paths may be achieved by constructing internal berms (high marsh wedges or rock filters) (see Figure 8).

The bed of the storm water wetland shall be graded to create the maximum possible microtopography (irregular shoreline, islands, mud flats, deeper channels, benches, etc.) to enhance wetland diversity.

A micropool shall be located at the outlet of the storm water wetland to protect the low-flow pipe from clogging and prevent sediment resuspension. The micropool shall be 3 to 6 feet deep and have a minimum surface area equivalent to the forebay.

Additional geometry requirements are identical to those specified for detention basins (see section 4.6, Detention Basin).

4.7.6 PUBLIC SAFETY

No additional criteria beyond the detention basin design criteria for public safety shall apply to the design of storm water wetlands.

4.7.7 LANDSCAPING

A landscape plan shall be prepared by a qualified wetland consultant and indicate methods used to establish and maintain wetland coverage. Minimum elements of the plan include:

4.7 STORM WATER WETLANDS

- Delineation of pondscape zones.
- Selection of corresponding plant species (see Appendix 9).
- Planting configuration.
- Sequence for preparing wetland bed.
- Schedule for planting.
- Measures to ensure wetland plants grow.

Landscaping shall be required as indicated in Appendix 7.

4.7.8 MAINTENANCE

If a minimum coverage of 50% is not achieved in the planted wetland zone after the second growing season, a reinforcement planting will be required.

Maintenance requirements are identical to those specified for detention basins (see Section 4.6 - Detention Basins).

4.8 PROPRIETARY STORM WATER TREATMENT SYSTEMS

4.8 PROPRIETARY STORM WATER TREATMENT SYSTEMS

4.8.1 PHYSICAL FEASIBILITY

See section 3.4 for suitability of this BMP for a specific site.

Many proprietary storm water systems may not meet the criteria specified in section 3.2, to be used as stand-alone practices and achieve full water quality or spill containment volumes. Proprietary storm water treatment systems can be used alone or in combination with other BMPs to meet the treatment criteria. Septic tanks and other proprietary systems that do not prevent resuspension of solids or oils are not allowed.

4.8.2 TREATMENT CRITERIA

4.8.2.1 WATER QUALITY VOLUME

The water quality volume is given by the equation.

$$V_{wq} = 1,815(DCIA)$$

Where: V_{wq} = Water quality volume (cft)
 1,815 = 0.5 inch of runoff x 3,630 to convert ac.in to cft
 DCIA = Directly-connected-impervious area (acres)

A minimum water quality volume of 550 cft/ac shall be used if less than 30% of the site is composed of DCIA.

A proprietary storm water treatment system can be used in place of a sediment forebay, if sized to contain 30% of the water quality volume.

4.8.2.2 SPILL CONTAINMENT VOLUME (V_{sc})

A proprietary storm water treatment system can be used in place of a spill containment cell.

The proprietary storm water treatment system shall be sized to contain the spill containment volume without release. The spill containment volume shall be calculated as 30% of the water quality volume.

4.8 PROPRIETARY STORM WATER TREATMENT SYSTEMS

4.8.3 PRETREATMENT CRITERIA

None.

4.8.4 CONTROLS

4.8.4.1 BYPASS OVERFLOW

The bypass overflow shall be designed to convey, at a minimum, the 10-year storm. The outlet from the device shall not be submerged under normal conditions.

4.8.5 GEOMETRY

The geometry of the proprietary storm water treatment system shall promote the trapping of sediments and capture slug pollutant loads from accidental spills of toxic materials.

The portion of the device used for spill containment shall be a wet basin with waterproof bottom and sides to the design volume elevation.

The overflow control for the proprietary storm water treatment system shall be sized to pass the 10-year rainfall event without releasing trapped sediments and captured pollutants.

The proprietary storm water treatment system shall be designed to prevent surcharging in pipes upstream from the system, in accordance with criteria established in section 4.2, Storm Sewers.

4.8.6 PUBLIC SAFETY

Proprietary storm water treatment systems shall be reviewed by the City for public safety.

4.8.7 LANDSCAPING

None.

4.8.8 MAINTENANCE

Maintenance responsibilities shall be vested with the owner or authorized operator.

4.8 PROPRIETARY STORM WATER TREATMENT SYSTEMS

At a minimum, a maintenance agreement shall include the following components:

- The device shall be inspected quarterly for sediment buildup and spill accumulations.
- Semiannual cleaning shall be conducted by an approved vacuum truck service or in accordance with manufacturer's recommendations.
- Documentation of inspections and maintenance of the device shall be submitted to the City annually and after spill events.

4.9 WATER QUALITY SWALES (See Figure 9.)

4.9.1 PHYSICAL FEASIBILITY

See section 3.4 for suitability of this BMP for a specific site.

Water quality swales are used for the capture and treatment of storm water runoff and/or spill containment on small sites of less than one acre.

4.9.2 TREATMENT CRITERIA

4.9.2.1 WATER QUALITY VOLUME

The water quality volume is given by the equation:

$$V_{wq} = 1,815(DCIA)$$

Where: V_{wq} = Water quality volume (cft)
 1,815 = 0.5 inch of runoff x 3,630 to convert ac.in to cft
 DCIA = Directly-connected impervious area (acres)

A minimum water quality volume of 550 cft/ac shall be used if less than 30% of the site is composed of DCIA.

A water quality swale can be used in place of a sediment forebay, if it is sized to contain 30% of the water quality volume.

4.9.2.2 SPILL CONTAINMENT VOLUME (V_{sc})

A water quality swale can be used in place of a spill containment cell. The water quality swale shall be sized to contain the spill containment volume without release. The spill containment volume shall be calculated as 30% of the water quality volume.

4.9 WATER QUALITY SWALES

4.9.3 PRETREATMENT CRITERIA

A 20-foot vegetated buffer is required between directly-contributing impervious surfaces and the water quality swale.

4.9.3.1 SEDIMENT FOREBAY

If a water quality swale is used to provide the water quality volume, a forebay sized to contain 30% of the water quality volume is required for pretreatment of storm water conveyed by a storm sewer system.

4.9.4 CONTROLS

4.9.4.1 INLET CONTROLS

Inlet pipes shall not be fully submerged at normal pool elevations.

A sediment forebay shall be provided at each inlet, unless the inlet supplies less than 10% of the total design flow into the detention basin.

Where a spill containment cell is required, all inlet pipes must enter this cell for pretreatment.

4.9.4.2 OUTLET CONTROL

A manhole or catch basin shall be required immediately downstream of the water quality swale.

The rim elevation of the downstream manhole shall be designed high enough to contain the water quality volume in the water quality swale.

The swale and the outlet shall be sized to pass the 10-year design flood.

4.9.4.3 UNDERDRAIN CONTROL

A 4-inch perforated pipe underdrain shall be placed along the center length of the swale and bedded in course aggregate.

4.9 WATER QUALITY SWALES

4.9.4.4 EROSION CONTROL

Upland construction areas shall be completely stabilized prior to final detention basin construction. The detention basin may be constructed first, as a temporary erosion control measure during construction.

Inlets and outlets require energy dissipation and transition from outlet to open channel, based on the maximum velocities given in section 4.4, Grassed Waterways.

Basin inlets shall have a riprap apron to dissipate the velocity of incoming storm water runoff. The following minimum square yards of riprap shall be provided based on pipe diameter.

<u>Pipe Diameter (inches)</u>	<u>Riprap (square yards)</u>
12 to 18	4
21 to 36	12
42 to 60	24

Riprap shall be placed in accordance with *City of Portage Standard Conditions and Specifications*.

4.9.5 GEOMETRY

The swale shall have a minimum bottom width of two feet.

Side slopes shall be 3:1 or flatter.

Sand filter shall be placed to a depth of 24 inches below the swale invert.

The sand filter media shall at least meet MDOT Class II requirements for granular materials.

Six inches of course aggregate shall be placed below the sand filter.

The filter fabric shall be a nonwoven geotextile with a minimum weight of 3.5 ounces per square yard, a minimum coefficient of permeability of 0.02 cm/sec, and apparent opening size ranging between 70 to 120 U.S. standard sieve size.

The infiltration trench shall be constructed of washed, rounded stone aggregate 1.5 to 3 inches in diameter, or other City-approved aggregate with void ratio adjusted accordingly (i.e., MDOT 6A, $V_e=0.33$).

4.9 WATER QUALITY SWALES

The bottom and sides of the swale shall be lined with an impermeable liner.

4.9.6 PUBLIC SAFETY

The swale shall be designed for a maximum depth of 2 feet of water.

An emergency response plan shall be developed if the water quality swale receives runoff from a groundwater hot spot as indicated in section 3. The plan shall indicate actions to be taken to contain the spill prior to leaving the downstream manhole/catch basin and the responsible parties. The plan must be recorded with the maintenance plan.

4.9.7 LANDSCAPING

Swale side slopes and bottom shall be fully vegetated (see Appendix 7 for appropriate seed mixtures).

4.9.8 MAINTENANCE

Maintenance responsibility shall be vested with the owner or authorized operator.

Sediment shall be removed when it reaches a depth equal to 50% of the water quality depth. A visual inspection shall be conducted, at a minimum, annually.

The sand filter shall be replaced if the swale fails to infiltrate.

If a pollutant spill occurs, permeable soil shall be removed and disposed in accordance with applicable regulations. Clean permeable fill shall replace it.

Eroded and barren areas shall be revegetated as soon as possible. Trash and debris shall be removed on a regular schedule. Outlets and underdrain outlets shall be inspected annually.

410 INFILTRATION TRENCHES AND LEACHING BASINS

4.10 INFILTRATION TRENCHES AND LEACHING BASINS

4.10.1 PHYSICAL FEASIBILITY

See section 3.4 for suitability of this BMP for a specific site.

The use of solid wall pipe and catch basins routed to a centralized infiltration basin is the preferred method of storm water disposal. When this is not practical due to site constraints or other relevant factors (i.e., land use, aesthetics, etc.), leaching basins and infiltration trenches may be used.

Leaching basins shall not be utilized as storm water inlet structures.

Minimum setback for infiltration trenches and leaching basins shall be 30 feet or far enough away to ensure no adverse impact on building foundations.

Minimum isolation distances from drain fields and water supply wells shall be in accordance with Kalamazoo County Environmental Health.

Infiltration trenches and leaching basins will be permitted only with adequate soil data to assure the City that the infiltration basin will have a minimum infiltration capacity of 1.04 in/hr. The geotechnical investigation shall follow the procedure outlined in Appendix 5.

The permeability test requirement can be waived, if the soils encountered below the level of the proposed infiltration area consist of soils meeting the Unified Soils Classification System gradation requirements of SP, GP, SW, or GW without clay or silt seams, layers, or partings, as determined by a qualified geotechnical consultant. Soil samples must be submitted for review to waive the permeability test requirement. If testing is waived, the minimum design infiltration rate of 0.52 in/hr shall be used.

The bottom of infiltration trenches and leaching basins shall be a minimum of 4 feet above the highest known water table elevation.

410 INFILTRATION TRENCHES AND LEACHING BASINS

4.10.2 TREATMENT CRITERIA

4.10.2.1 FLOOD CONTROL VOLUME (VFC)

Infiltration trenches and leaching basins shall be sized to store and infiltrate a minimum of 3,630 cft per acre or the runoff produced from a 2-year, 24-hour rainfall event assuming zero outflow, whichever is greater. The latter method shall be calculated according to the formula:

$$V_{fc} = CAP_2(3,630)$$

Where:

- V_{fc} = Total required volume of the infiltration basin (cft)
- C = Runoff coefficient
- A = Area (acres)
- P_2 = Adjusted 25-year rainfall amount = 3.53 inches
- 3,630 = Factor to convert ac.in to cft

This corresponds to the storage required for a 25-year rainfall event with a basin infiltration rate of 0.52 in/hr and a total retention time of 72 hours.

A minimum flood control volume of 3,630 cft per acre shall be provided.

Where an overflow would cause downstream flooding due to the absence of an acceptable conveyance route, the volume shall be sufficient to store 1.5 times the flood control volume.

Sites that use infiltration trenches must provide the same amount of runoff storage capacity as those using an infiltration basin. If desired, a combination of surface/subsurface storage may be used to provide the required storage volume.

Infiltration trench design volume shall be calculated by the formula:

$$V = 0.33WHL$$

Where:

- V = Volume (cft)
- 0.33 = 33% aggregate void ratio
- W = Width (ft)
- H = Depth (ft)
- L = Length (ft)

410 INFILTRATION TRENCHES AND LEACHING BASINS

Where perforated pipe is used in the trench design, the formula is modified:

$$V = V_{\text{pipe}} + [0.33(WHL - V_{\text{pipe}})]$$

Where:

- V = Volume (cft)
- V_{pipe} = Volume of pipe (cft)
- 0.33 = 33% aggregate void ratio
- W = Width (ft)
- H = Depth (ft)
- L = Length (ft)

The pipe shall be placed a minimum of 1 foot above the trench bottom and 6 inches from either side.

4.10.2.2 MAXIMUM DRAINING TIME

The maximum draining time for the infiltration trench shall be 72 hours. The perimeter wall area of the infiltration trench shall be used to calculate drain time. The maximum draining time is described by the following relationship:

$$72 \geq \frac{12V}{AI}$$

Where:

- 72 = Maximum allowed drainage time (hrs)
- 12 = Factor to convert inches to feet
- V = Design volume (cft)
- A = Perimeter wall area (sft)
- I = Design infiltration rate (in/hr)

4.10.3 PRETREATMENT CRITERIA

A 20-foot-wide vegetated buffer is required between directly contributing impervious surfaces and the infiltration trench.

410 INFILTRATION TRENCHES AND LEACHING BASINS

4.10.3.1 SEDIMENT FOREBAY

A sediment forebay, as defined in section 4.5.3.1, is required for pretreatment of storm water conveyed by a storm sewer system. A spill containment cell can be used in place of a forebay, where required.

4.10.3.2 SPILL CONTAINMENT CELL

A spill containment cell shall be provided where required, according to Section 3. The spill containment cell shall meet the standards described in section 4.5.3.2.

4.10.4 CONTROLS

4.10.4.1 INLET CONTROLS

Inlet pipes shall not be fully submerged at normal pool elevations.

A sediment forebay shall be provided at each inlet, unless the inlet supplies less than 10% of the total design flow into the detention basin.

Where a spill containment cell is required, all inlet pipes must enter this cell for pretreatment.

4.10.4.2 EROSION CONTROL

Upland areas shall be completely stabilized prior to final trench construction.

4.10.5 GEOMETRY

The sand filter shall meet MDOT Class II requirements for granular materials.

The filter fabric shall be a nonwoven geotextile with a minimum weight of 3.5 ounces per square yard, a minimum coefficient of permeability of 0.02 cm/sec, and apparent opening size ranging between 70 to 120 U.S. standard sieve size.

The infiltration trench shall be constructed of washed, rounded stone aggregate (i.e., MDOT 6A).

Leaching basins shall have a minimum diameter of 4 feet, with a maximum spacing of 400 feet between basins.

410 INFILTRATION TRENCHES AND LEACHING BASINS

4.10.6 PUBLIC SAFETY

The City will review plans for public safety.

4.10.7 LANDSCAPING

None.

4.10.8 MAINTENANCE

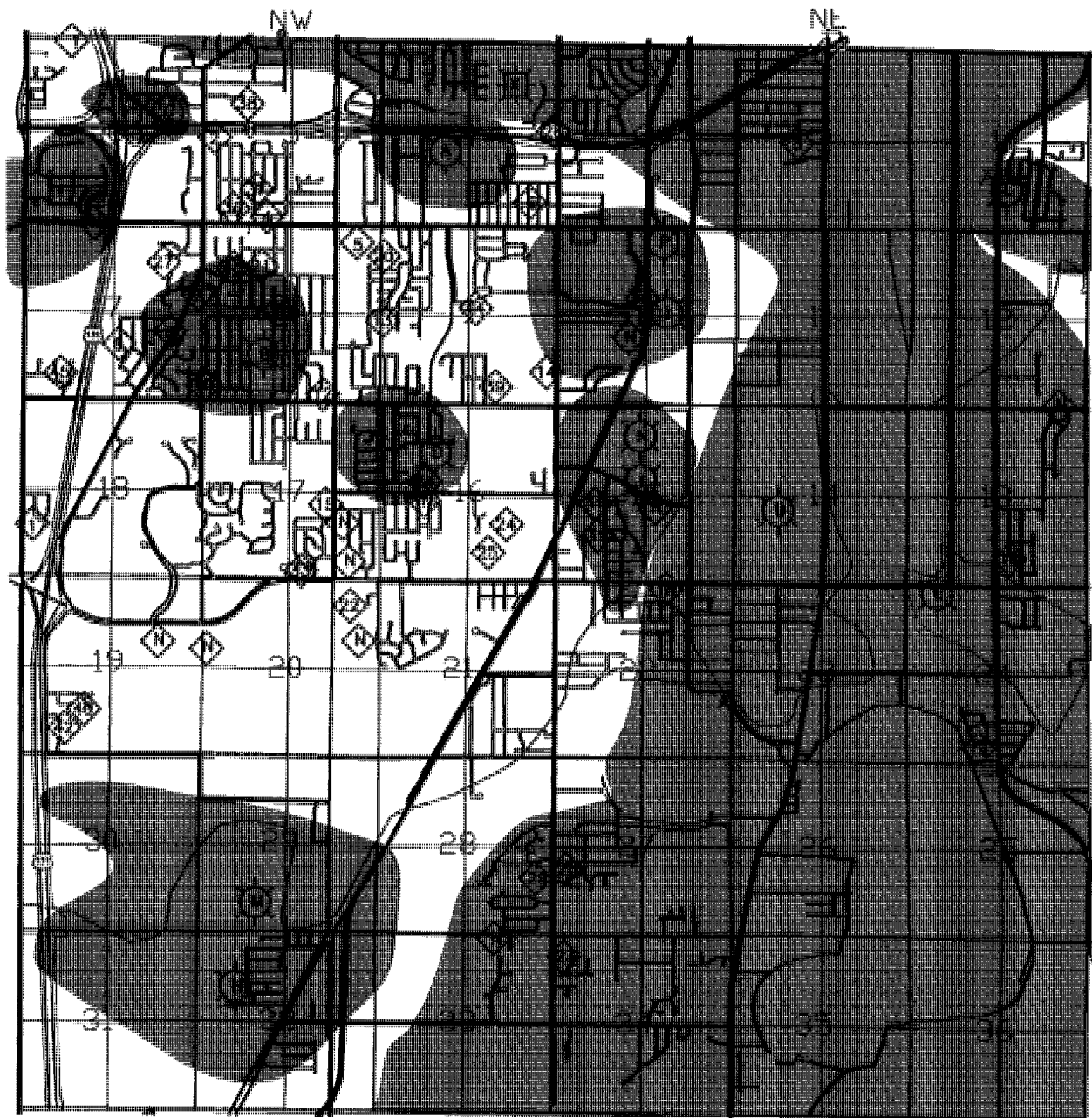
Maintenance, including observation, shall be the responsibility of the property owner.

An observation well consisting of a perforated vertical pipe with locking cover shall be installed in the infiltration trench.

At a minimum, the water level in the observation well shall be recorded several times within the first few months of operation, and annually thereafter, to ensure adequate hydraulic performance.

Replacement of the structure or permeable soil may be necessary if the system becomes clogged with sediment.

FIGURES



GROUND WATER CONTAMINATION RISK AREAS

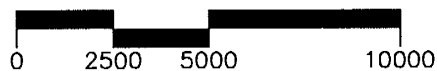
- INFILTRATION BASIN
- NATURAL RECHARGE BASIN
- PORTAGE WELL FIELD
- KALAMAZOO WELL FIELD
- SURFACE WATER DIVIDE
- SECTION LINE

- AREA A AREA WITH IN 10 YEAR TIME OF TRAVEL TO WELL
- AREA B GENERAL AREA OF WELL FIELD CONTRIBUTION
- AREA C AREA OUT SIDE OF GENERAL AREA OF CONTRIBUTION



SOURCE:
CITY OF PORTAGE WELLHEAD
PROTECTION AREA DELINEATION

SCALE: 1" = 5000'



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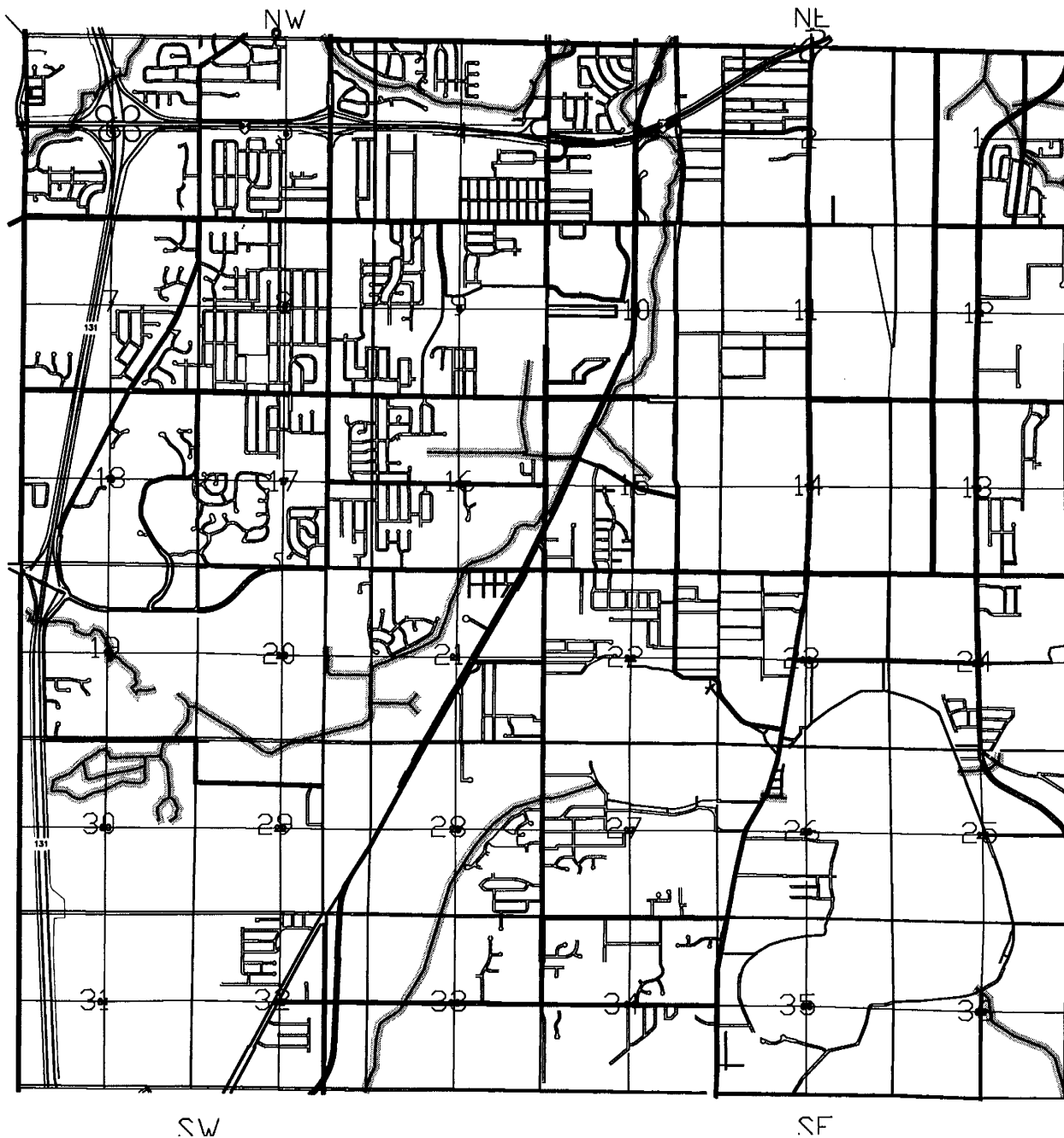
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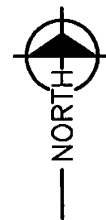
PROJECT NO.
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FIGURE NO.

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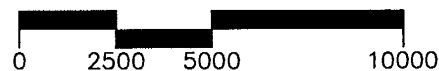


REQUIRED STREAM BUFFER LOCATION MAP

— BUFFER



SCALE: 1" = 5000'



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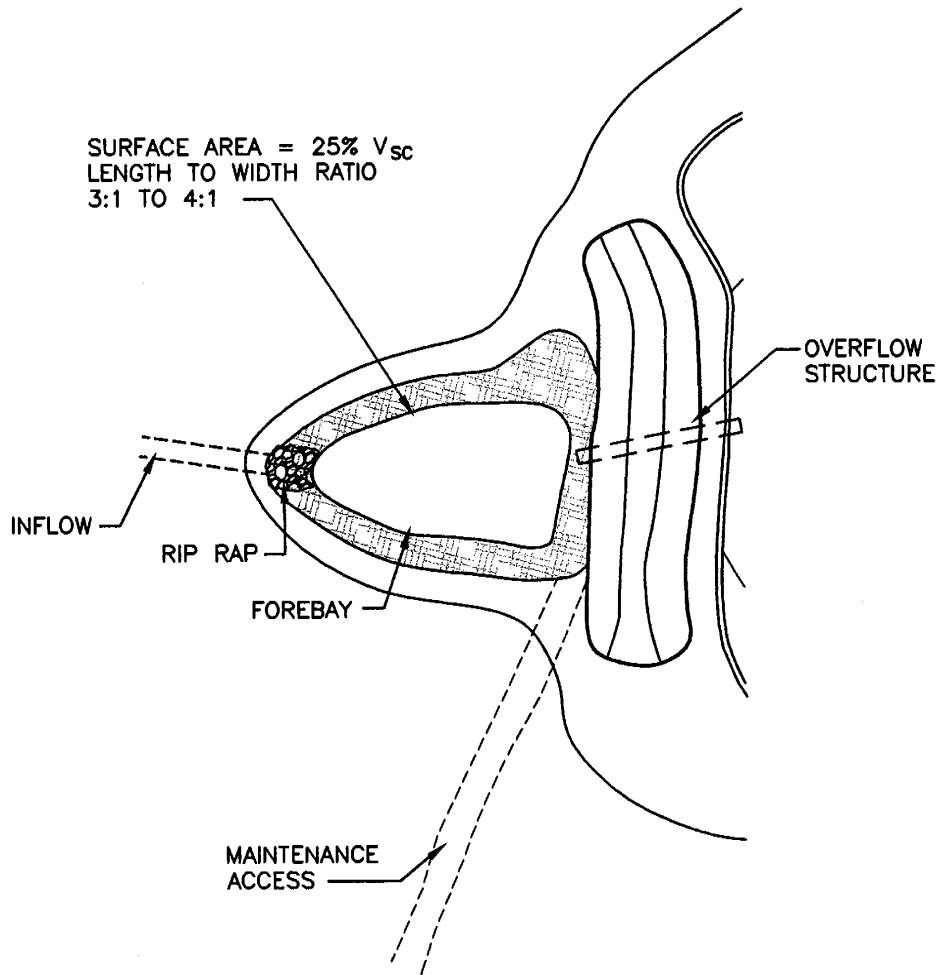
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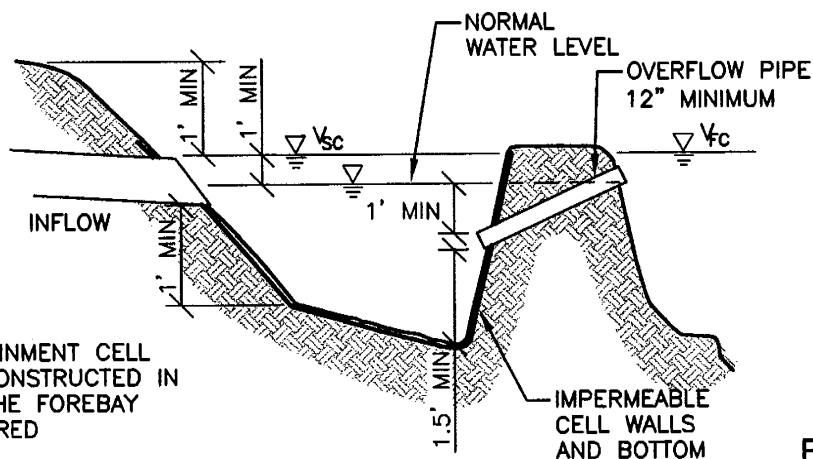
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FIGURE NO.

2

SPILL CONTAINMENT CELL



PLAN VIEW



NOTE:
SPILL CONTAINMENT CELL
SHALL BE CONSTRUCTED IN
PLACE OF THE FOREBAY
WERE REQUIRED

PROFILE



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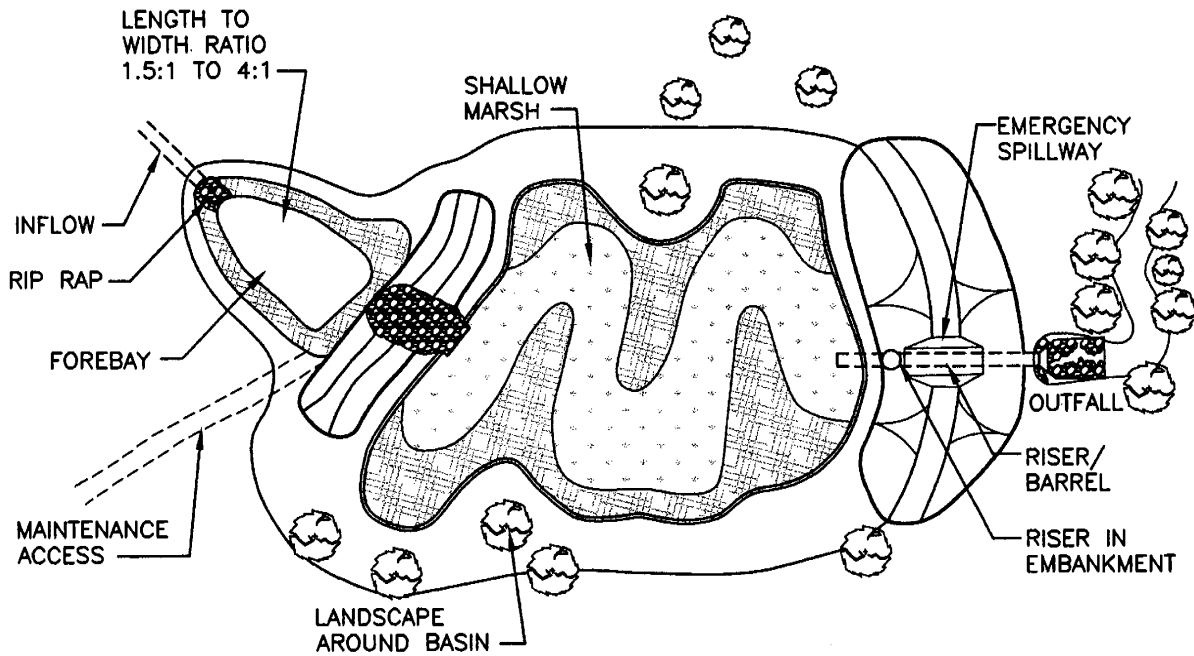
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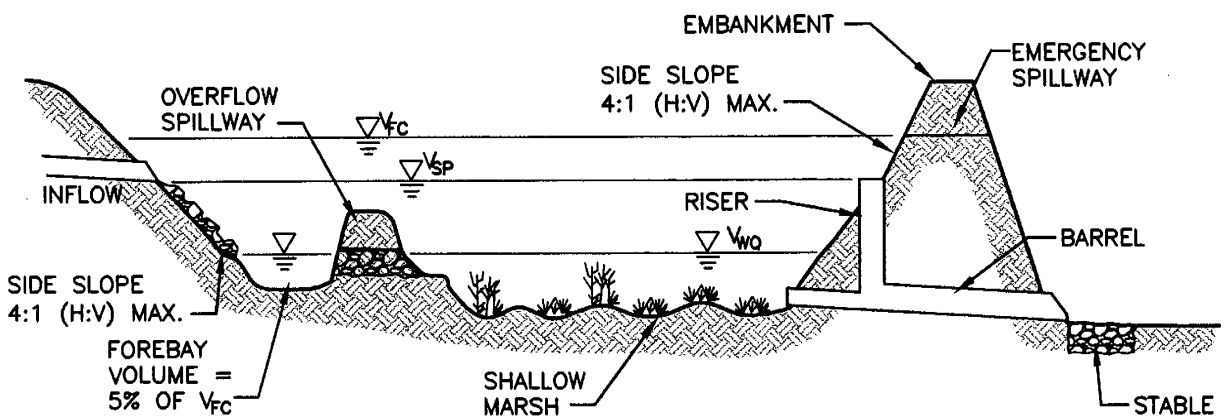
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FIGURE NO.

4

EXTENDED DRY DETENTION BASIN



PLAN VIEW



PROFILE



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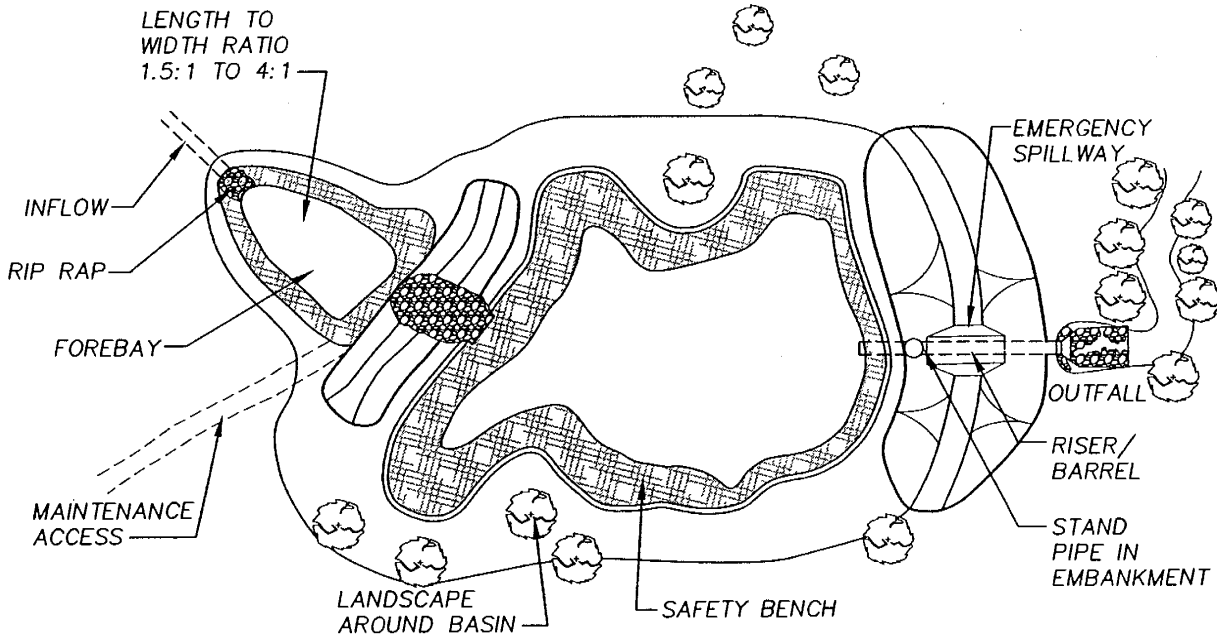
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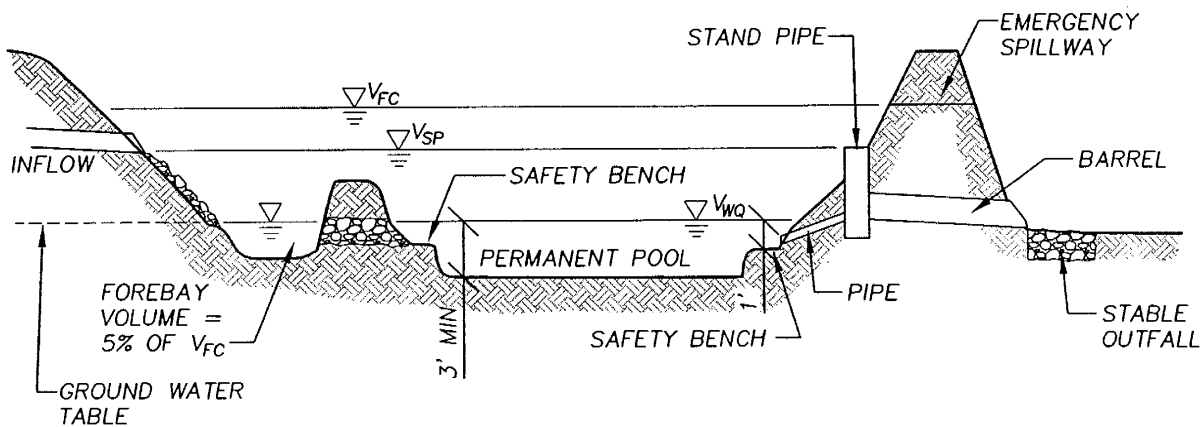
PROJECT NO.
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FIGURE NO.

6

WET DETENTION BASIN (STORM WATER POND)



PLAN VIEW



PROFILE



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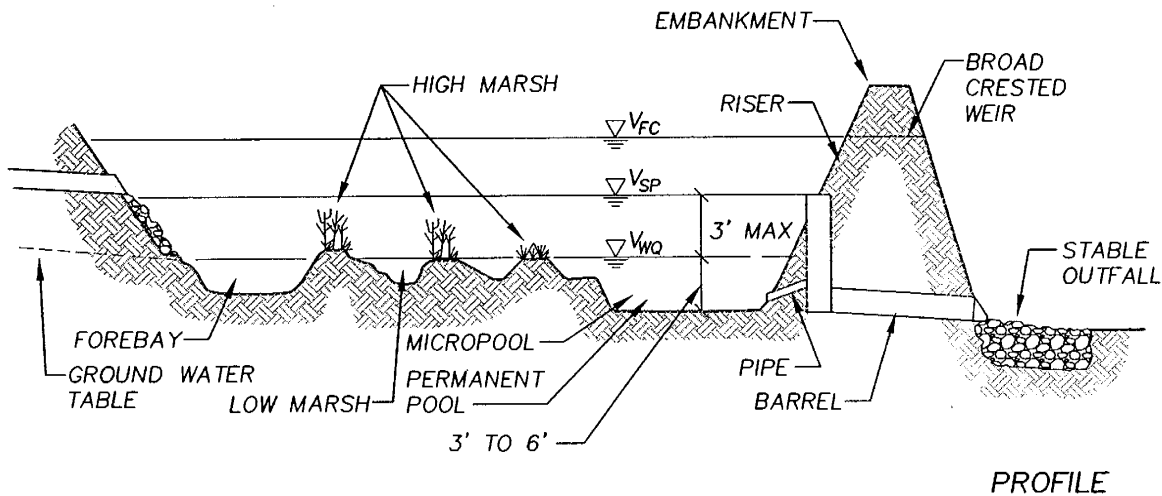
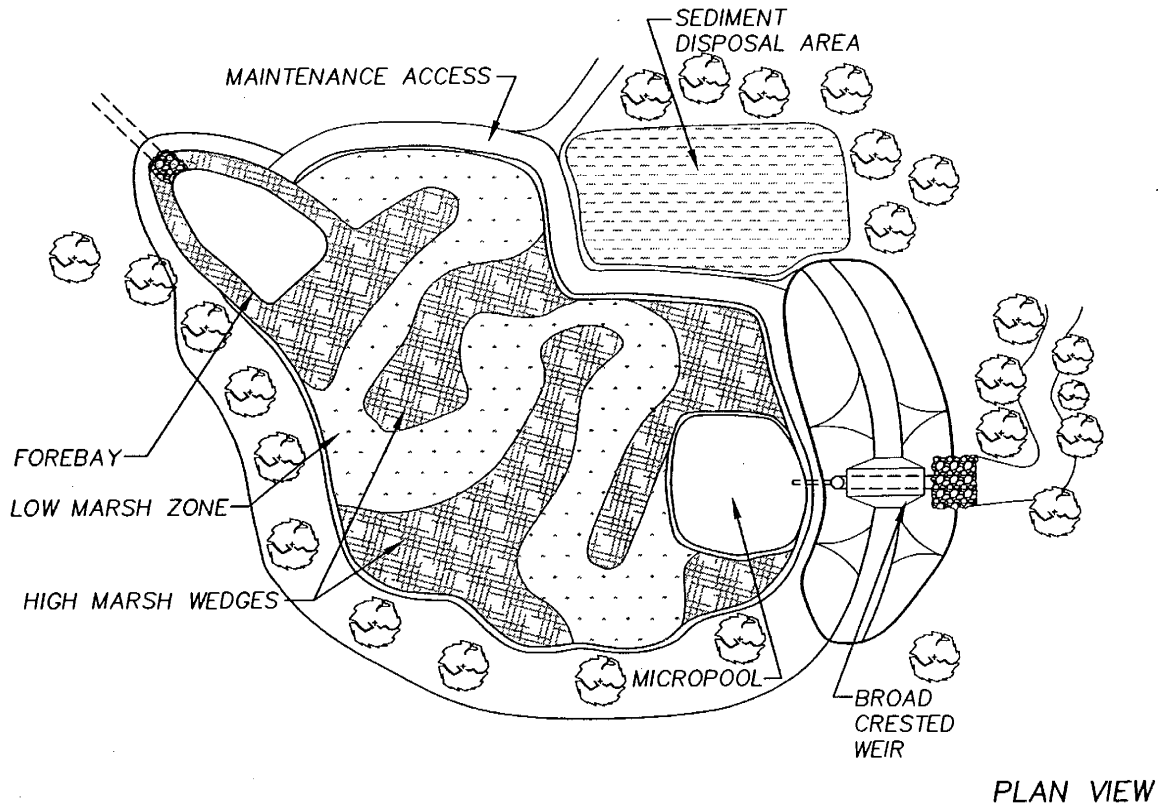
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7

STORM WATER WETLAND



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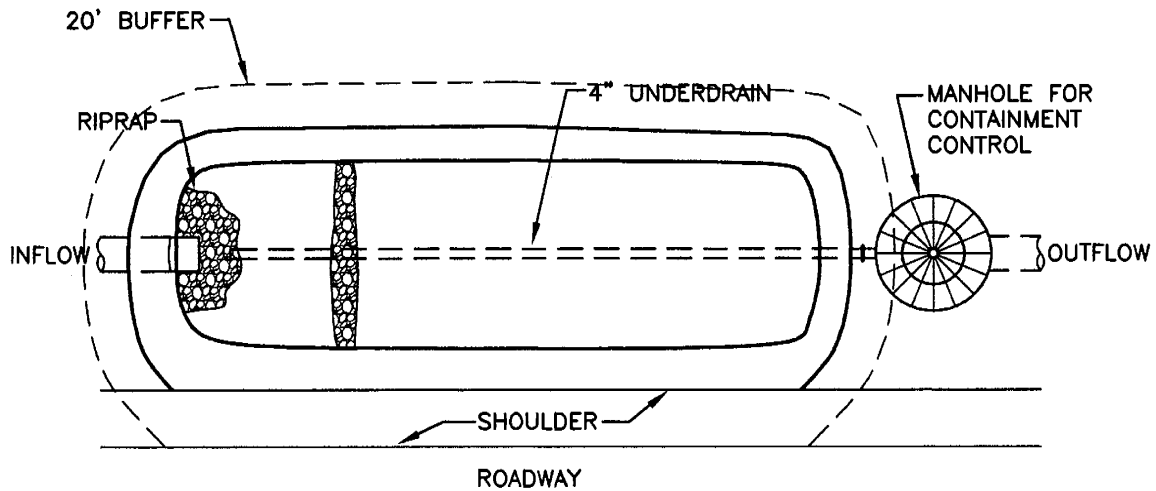
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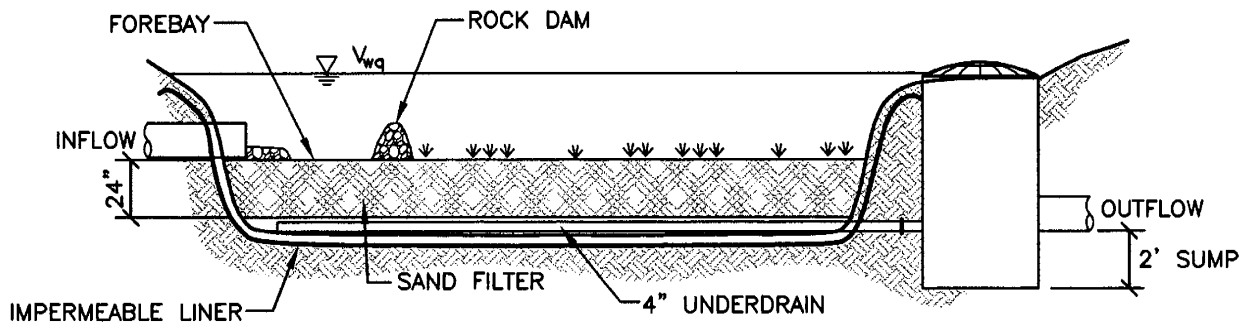
PROJECT NO.
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FIGURE NO.

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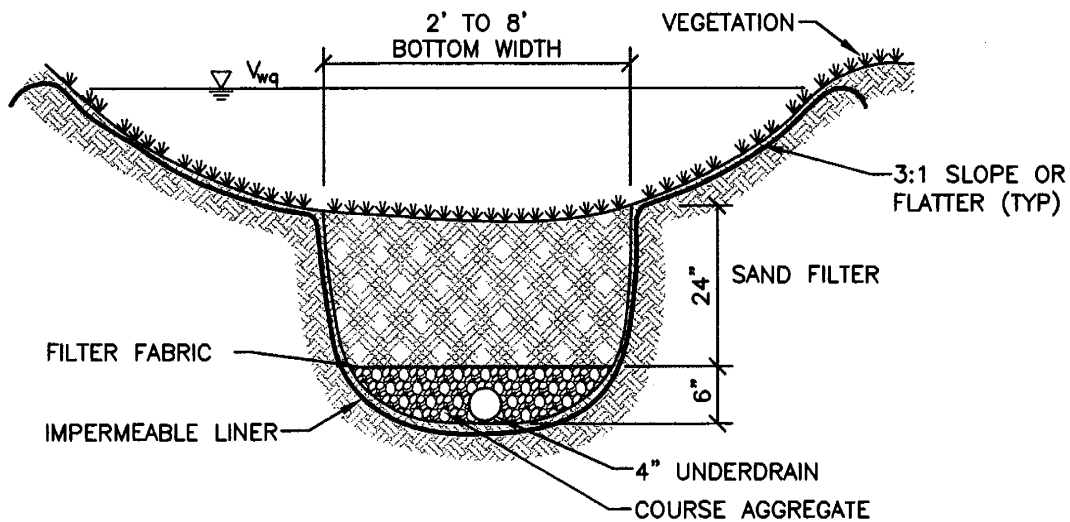
WATER QUALITY SWALE



PLAN VIEW



PROFILE



SECTION



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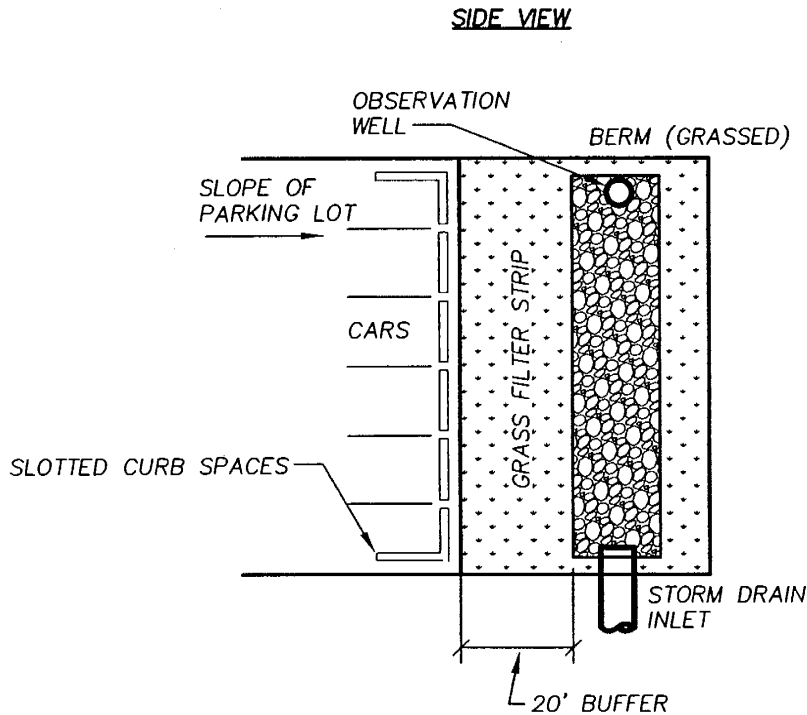
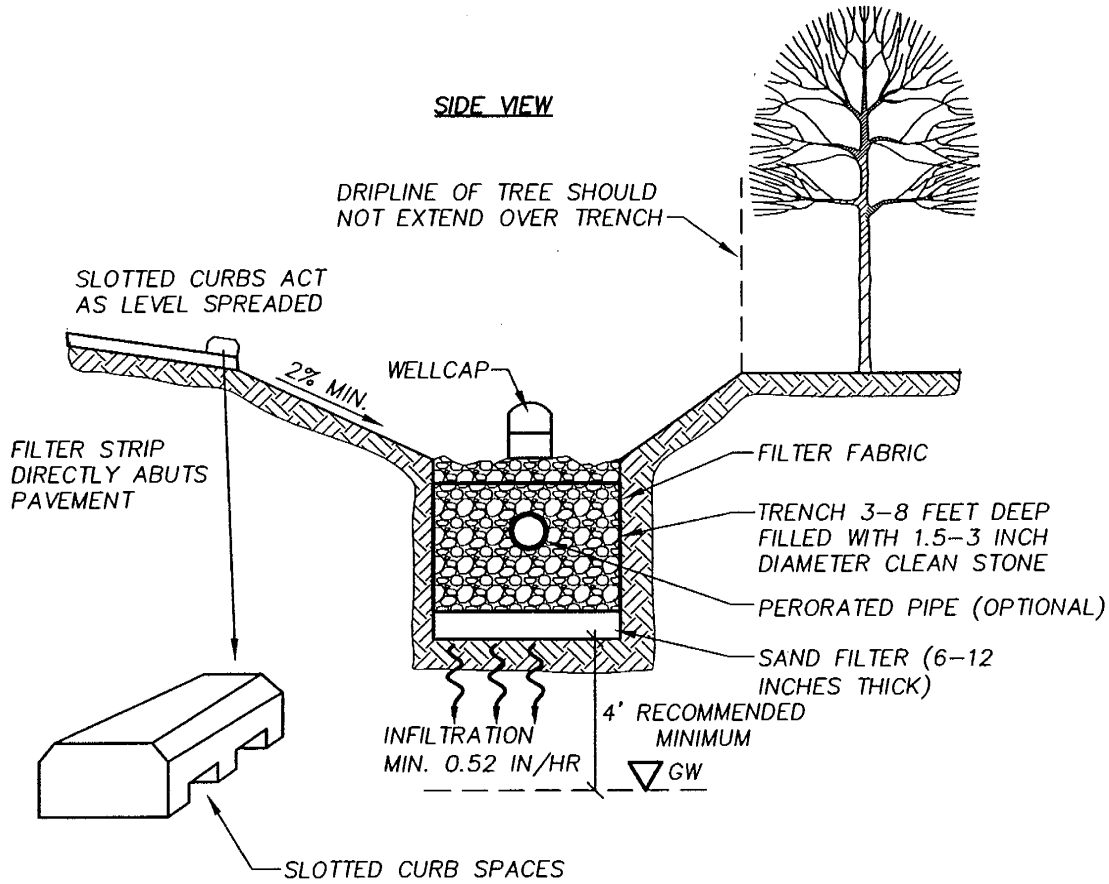
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 FIGURE NO.

9

INFILTRATION TRENCH



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PROJECT NO.
00499B
FIGURE NO.

10

TABLES

Table No. 1 – Risk Designations
Storm Water Design Criteria Manual
City of Portage

Groundwater Travel Time Regional Areas	High-Risk Zoning Districts	Low-Risk Zoning Districts
Area A	All zoning districts	None
Areas B and C	<p>Commercial (B-2, B-3, PD, and CPD).</p> <p>Industrial (I-1, I-2 and PD).</p> <p>Multi-family residential (RM-1, RM-2 and PD with greater than 30 residential units).</p> <p>Community facilities (including public services, service centers, schools, fire and police departments, public transportation facilities, vocational shops, and landfills).</p> <p>Office and local business (OS-1, PD and B-1 with greater than 20,000 square feet of paved area).</p> <p>Research/office parks (OTR and PD).</p> <p>Parking (P-1 with greater than 20,000 square feet of paved area).</p> <p>Transportation corridors (including state truckline, major arterial and minor arterial roadways, and collector roadways).</p>	<p>*Single and two-family residential (R-1A, R-1B, R-1C, R-1D, R-1E, R-1T and PD).</p> <p>*Multi-family residential (RM-1, RM-2 and PD with 30 residential units or less).</p> <p>*Recreation/open space (including parks and cemeteries).</p> <p>*Office and local business (OS-1, PD and B-1 with 20,000 square feet or less of paved area).</p> <p>*Community facilities (including churches, city hall, and library).</p> <p>*Parking (P-1 with 20,000 square feet or less of paved area).</p> <p>*Transportation corridors (including city local roadways).</p>

*See Table 2 for high-risk land uses to determine the associated risk designation.

Table No. 2 – High-Risk Land-Use Activities that Pose Potential Threats to Groundwater (Hot Spots)

Storm Water Design Criteria Manual
City of Portage

Commercial
Analytical and clinical laboratories
Auto rustproofers/engine repair
Auto washes
Boat builders/refinishers
Car rental and service stations/automotive repair
Commercial establishments with fleets of trucks and cars
Concrete/asphalt/coal/tar companies
Equipment repair
Food processors/meat packers/slaughter houses
Fuel oil distributors/stores
Furniture strippers/finishers/painters
Gas stations
Junkyards
Laundries and dry cleaners
Pesticide application services/pesticide storers/retailers
Petroleum bulk storage (wholesale)
Photographic development
Printing
Salvage yards/impoundment lots
Wood preserving and treatment
Industrial
Analytical and clinical laboratories
Governmental agencies with fleets of trucks and cars
Salt piles/sand-salt piles
Vehicle maintenance operations (transportation/trucking; contractors/construction; auto dealers)
Manufacturing
Chemical, paint, and plastics manufacturing
Furniture manufacturing
Metal manufacturing (including metal plating)
Mining operations/injection wells
Other manufacturing (textiles, rubber, glass, etc.)
Pulp and paper industry
Transportation
Airport maintenance/fueling areas
Salt piles/sand-salt piles
Vehicle maintenance operations (transportation/trucking; contractors/construction; auto dealers)
Utilities
Aboveground oil pipelines
Electric power generation substations
Waste Disposal
Landfills/dumps/transfer stations

Table No. 3 – Storm Water Discharge Strategies

Storm Water Design Criteria Manual

City of Portage

Storm Water Strategy	Area A	Area B		Area C	
	High-Risk	High-Risk	Low-Risk	High-Risk	Low-Risk
Groundwater discharge	N/A	II	I	I	I
Surface water discharge	I	I	II	II	II

I = Preferred storm water strategy.

II = Second strategy, to be employed only if site constraints prohibit the use of the preferred strategy.

N/A = Not allowed without City approval on a site-by-site basis.

Table No. 4 – Summary of Uniform Storm Water Treatment Criteria
Storm Water Design Criteria Manual
City of Portage

Treatment Criteria	Description
Water quality volume, V_{wq} (cft)	$V_{wq} = 1,815$ cft per impervious acre provided as permanent pool, extended detention, or infiltration. Equivalent to 0.5 inch of runoff per impervious acre.
Stream protection volume, V_{sp} (cft)	$V_{sp} = 5,000$ cft per impervious arce. Released at 0.05 cfs per impervious acre to provide 24-hour extended detention. Equivalent to a routed 1.5-year, 24-hour SCS Type II rainfall detained for 24 hours.
Flood control volume, V_{fc} (cft)	Infiltration: $V_{fc} = 2$ -year, 24-hour rainfall with zero outflow or 3,630 cf/acre, whichever is greater. Detention: $V_{fc} = 25$ -year storage volume released at 0.15 cfs per contributing catchment acre.
Spill containment volume, V_{sp} (cft)	$V_{sp} = 30\%$ of V_{wq} .

Table No. 5 – Storm Water Treatment Required for Redevelopment
Storm Water Design Criteria Manual
City of Portage

Treatment	Groundwater Discharge	Surface Water Discharge
Water quality volume, V_{wq}	Yes	Yes, if additions to parking lots, roadways, and/or driveways result in >20,000 sft of paved area. ⁺
Stream protection volume, V_{sp}	No	Yes, if total site C x A >1 acre.
Flood control volume, V_{fc}	Yes	Yes
Spill containment volume, V_{sc}	Yes, if 1. Storm water hot spot. 2. High-risk zoning district with >20,000 sft of paved area. ⁺	Yes, if storm water hot spot.

Note: The 20,000-sft limit is based on water quality modeling, and the 1-acre limit is based on the minimum practical orifice size.

⁺Developments conducted in phases will be regulated according to the total paved areas in all phases.

Table No. 6 – Treatment Suitability of Urban Storm Water Practices
Storm Water Design Criteria Manual
City of Portage

Control	Urban Storm Water Practice	Volume			
		Water Quality	Stream Protection	Flood Control	Spill Containment
Runoff reduction	Rooftop storage			✓	
	Parking lot storage			✓	
	In-line storm sewer storage			X	
	Infiltration trench	X	X ¹	X	
	Leaching basin/dry well	X	X ¹	X	
	In-line oil-and-grit separator	✓			X
	Water quality swale	X			X
	Reduced lot grading		✓	✓	
	Disconnect roof drains		✓	✓	
	Impervious cover reductions		✓	✓	
Conveyance	Storm sewers				
	Perforated storm sewers				
	Catch basins	✓			
	Grassed waterways	✓			
Storm water facility	Dry detention basin		X	X	
	Extended detention basin	X	X	X	
	Wet detention basin (storm water pond)	X		X	
	Dry infiltration basin	X	X ¹	X	
	Retention pond	X	X ¹	X	
	Storm water wetland	X	X	X	
Pretreatment	Spill containment cell	X			X
	Sediment forebay	✓			

Empty space = Volume criteria not applicable to BMP, or does not provide treatment volume.

X = Fully meets or can be designed to meet treatment volume.

X¹ = If infiltration is used exclusively, stream protection volumes are not required, and therefore shown as met.

✓ = Can be used with other BMPs to help meet uniform treatment criteria.

GUIDE TO THE STORM WATER DESIGN CRITERA MANUAL

LOCATE SITE ON FIGURE 1 "GROUND WATER CONTAMINATION RISK AREAS" AND DETERMINE GROUNDWATER CONTAMINATION RISK CLASSIFICATION.

- AREA A - AREA WITH IN 10 YEAR TIME OF TRAVEL TO WELL
- AREA B - GENERAL AREA OF WELL FIELD CONTRIBUTION
- AREA C - AREA OUT SIDE OF GENERAL AREA OF CONTRIBUTION

A, B, OR C

USE TABLE 1 "RISK DESIGNATIONS" WITH THE KNOWN ZONING DISTRICT TO DETERMINE IF SITE POSES A POTENTIAL LOW RISK OR HIGH RISK TO GROUNDWATER.

LOW/HIGH

USE TABLE 2 "LAND-USE ACTIVITIES THAT POSE POTENTIAL THREATS TO GROUNDWATER (HOT SPOTS)" TO DETERMINE IF SITE IS A HOT SPOT.

YES/NO

USE TABLE 3 "STORM WATER DISCHARGE STRATEGIES" WITH INFORMATION FROM FIGURE 1, AND TABLES 1 AND 2 TO DETERMINE IF DISCHARGE SHOULD BE TO SURFACE WATER OR GROUNDWATER.

GROUNDWATER/SURFACE WATER

IS THE PROPOSED DEVELOPMENT A NEW DEVELOPMENT OR A REDEVELOPMENT?

REDEVELOPMENT

NEW DEVELOPMENT

USE "REQUIRED STORM WATER TREATMENT WORKSHEET FOR REDEVELOPMENTS" IN APPENDIX 2 TO DETERMINE THE REQUIRED STORM WATER TREATMENT CRITERIA.

USE "REQUIRED STORM WATER TREATMENT WORKSHEET FOR NEW DEVELOPMENT" IN APPENDIX 2 TO DETERMINE THE REQUIRED STORM WATER TREATMENT CRITERIA.

SELECT A BMP OR COMBINATION OF BMP'S FROM TABLE 6 THAT MEET ALL REQUIRED TREATMENT CRITERIA.

REFER TO SECTION 4.0 "PERFORMANCE CRITERIA FOR URBAN BMP DESIGN", FOR SELECTED BMP DESIGN REQUIREMENTS. A CHECKLIST FOR SUBMITTALS IS INCLUDED IN APPENDIX 3.

IS SITE LOCATED ON A STREAM NOTED IN FIGURE 2?

FOLLOW VEGETATED BUFFER GUIDELINES IN SECTION 3.3.5.4 AND SUBMIT PLANS FOR REVIEW.

YES

NO

SUBMIT PLANS FOR REVIEW.



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CITY OF PORTAGE
Kalamazoo County, Michigan
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PROJECT NO.
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TABLE NO.

7

APPENDICES

APPENDIX 1

Related Laws and Regulations

ENVIRONMENTAL LAWS AND REGULATIONS RELATED TO STORM WATER ACTIVITIES WITHIN THE CITY OF PORTAGE

LAW/REGULATION	APPLICATION	ENFORCING AGENCY
Federal		
National Pollutant Discharge Elimination System (NPDES) Industrial Storm Water permits under the Clean Water Act (CWA)	Point source discharges to surface waters from industrial activities, including construction sites over 1 acre.	Michigan Department of Environmental Quality (MDEQ) Surface Water Quality Division Storm Water Permits Unit Lansing, Michigan
NPDES Phase II Municipal Storm Water permits under the CWA	Regulates quality of point source discharges to surface waters from small municipal separate storm sewer systems (MS4s) through development of local programs.	MDEQ Surface Water Quality Division Kalamazoo, Michigan
Total Maximum Daily Loads (TMDLs) under the CWA	May be imposed to reduce pollutants loads to surface water bodies on CWA Section 303(d) nonattainment list.	MDEQ Surface Water Quality Division Kalamazoo, Michigan
Superfund Amendments and Reauthorization Act (SARA) Title III	Regulates and requires reporting of critical material spills.	Environmental Protection Agency (EPA)
Spill Prevention, Countermeasures and Control (SPCC)	Regulates oil-based materials stored onsite and requires reporting of critical material spills.	EPA Emergency Response Branch Oil Planning and Response Section
National Flood Insurance Program (NFIP)	Prohibits new construction within floodway. Lowest floor for new construction may be at or above the 100-year floodplain elevation. Existing structures eligible for flood insurance in participating communities.	City of Portage, Community Development; Federal Emergency Management Agency (FEMA) Region V Chicago, IL
State		
Pollution Incident Prevention Plan	Critical materials released to the soil, air, or waters of the state have to be reported. A pollution	MDEQ Waste Management Division

ENVIRONMENTAL LAWS AND REGULATIONS RELATED TO STORM WATER ACTIVITIES WITHIN THE CITY OF PORTAGE

LAW/REGULATION	APPLICATION	ENFORCING AGENCY
(Part 31, Act 451, PA 1994)	prevention plan needs to be made if any critical materials are stored at a site. These facilities are required to have secondary containment of critical materials. A critical materials list is available from MDEQ.	Kalamazoo, Michigan
Inland Lakes and Streams Act (Part 301, Act 451, PA 1994)	Construction activities within 500 feet of the ordinary high water mark of inland lakes and streams.	MDEQ Land and Water Management Division Kalamazoo, Michigan
Soil Erosion and Sedimentation Control Act (Part 91, Act 451, PA 1994)	Erosion control for earth change activities disturbing 1 or more acres of land or within 500 feet of a lake or stream.	City of Portage, Transportation and Utilities Department (LEA) MDEQ Land and Water Management Division Soil Erosion and Sedimentation Control Unit Lansing, Michigan
Wetland Protection Act (Part 303, Act 451, PA 1994)	Construction activities in regulated wetlands over 5 acres in surface area or contiguous to a lake or stream.	MDEQ Land and Water Management Division District 12 Office Kalamazoo, Michigan U.S. Army Corps of Engineers Detroit District Engineers Office
Floodplain Protection Act (Part 31, Act 451, PA 1994)	Construction or fill within the 100-year floodplain of watercourses with a drainage area over 2 square miles.	MDEQ Land and Water Management Division Lansing, Michigan
State		
Dam Safety Act (Part 315, Act 451, PA 1994)	Detention and retention basins impounding more than 5 acres and with a height (hydraulic head) of 6 feet or more	MDEQ Land and Water Management Division Dam Safety Unit Lansing, Michigan

ENVIRONMENTAL LAWS AND REGULATIONS RELATED TO STORM WATER ACTIVITIES WITHIN THE CITY OF PORTAGE

LAW/REGULATION	APPLICATION	ENFORCING AGENCY
Local		
City Ordinances	Construction activities within the City limits.	City of Portage, Community Development or Transportation and Utilities Department
City Specifications	Construction activities within the City limits.	City of Portage, Transportation and Utilities Department
County and State Highway Authorities	Construction activities within county or state road rights-of-way	Michigan Department of Transportation Southwest Region Kalamazoo, Michigan Kalamazoo County Road Commission
This list is provided as a summary of the most common environmental laws and regulations related to storm water activities applicable within the City of Portage, and is not all inclusive.		

APPENDIX 2

Required Storm Water Treatment Worksheets for New Developments and Redevelopments

**REQUIRED STORM WATER TREATMENT WORKSHEET
FOR
NEW DEVELOPMENTS**

WATER QUALITY VOLUME REQUIRED? YES ☒

- Water quality volume is required for all sites.

STREAM PROTECTION VOLUME REQUIRED? YES__ NO__

If both of the following are checked "yes," stream protection volume is required.

- Discharge to any watercourse. Yes ____ No ____
- Site C x A > 1 acre. Yes ____ No ____

FLOOD CONTROL VOLUME REQUIRED? YES__ NO__

If the following is checked "yes," flood control volume is not required.

- Direct discharge to a lake. Yes ____ No ____

SPILL CONTAINMENT VOLUME REQUIRED? YES__ NO__

If any of the following are checked "yes," spill containment volume is required.

- Surface water discharge from a storm water hot spot. Yes ____ No ____
- Groundwater discharge from a high-risk zoning district in GCR Areas B and C. Yes ____ No ____
- Groundwater discharge in GCR Area A. Yes ____ No ____

**REQUIRED STORM WATER TREATMENT WORKSHEET
FOR
REDEVELOPMENTS**

WATER QUALITY VOLUME REQUIRED?	YES__	NO__
---------------------------------------	--------------	-------------

(If any of the following are checked "yes," water quality volume is required.)

- Groundwater discharge. Yes ____ No ____
- Surface water discharge from an addition to a parking lot, roadway, and/or driveway with greater than 20,000 square feet of paved area. + Yes ____ No ____

STREAM PROTECTION VOLUME REQUIRED?	YES__	NO__
---	--------------	-------------

(If both of the following are checked "yes," stream protection volume is required.)

- Discharge to any watercourse. Yes ____ No ____
- Site C x A > 1 acre. Yes ____ No ____

FLOOD CONTROL VOLUME REQUIRED?	YES__	NO__
---------------------------------------	--------------	-------------

(If the following is checked "yes," flood control volume is not required.)

- Direct discharge to a lake. Yes ____ No ____

SPILL CONTAINMENT VOLUME REQUIRED?	YES__	NO__
---	--------------	-------------

(If any of the following are checked "yes," spill containment volume is required.)

- Site is a storm water hot spot. Yes ____ No ____
- Groundwater discharge from a high-risk zoning district with greater than 20,000 square feet of paved area. + Yes ____ No ____

* Phased developments are regulated by the total square feet of paved area in all phases.

APPENDIX 3

Checklist for Submittals

Storm Water/Final Plan Information

Address:

Project Name:

These requirements are intended to assist the applicant in the storm water plan review process. The applicant is responsible for being sufficiently familiar with the Storm Water Design Criteria Manual of the City of Portage.

Plan Preparation and Guidelines

Yes No N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|---|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. All plans will be drawn on uniform sheets no greater than 24" x 36". | COMMENTS

_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. All plans will be drawn to an engineering scale not to exceed 1" = 50' or less than 1" = 20', with a north arrow oriented to the top of the sheet. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. All plans and notations will be clear, legible, and accurately scaled. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. If more than one sheet per set, all required plans stapled along the left margin into sets. Please fold to a size not greater than 8½" x 14". | |

General

Yes No N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|---|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Development name/subdivision number. | COMMENTS

_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Description of location (including section and fractional portion thereof, Town and Range, township, city or village, and county, Michigan). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Location map. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Name, address, and telephone number of proprietor. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Name, address, and telephone number of engineer or surveyor. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. North arrow and scale. | |

Parcel Boundaries

Yes No N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Development boundary. | COMMENTS

_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Identification of all adjoining parcels (for subdivisions show lot number, subdivision name, liber, and page numbers; for metes-and-bounds parcels show permanent parcel number). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Overall property description metes and bounds (with ties to government corner). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Lot dimensions (scaled or computed). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Lot numbers. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Building setback lines. | |

Topographical

Yes No N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Existing buildings. | COMMENTS

_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Proposed buildings. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Existing roads (with name, ROW width, and type of surface). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Proposed roads (with name, ROW width, and type of surface). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Proposed paved areas (include tabulation of total paved area). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Existing contours (no greater than a 2-foot interval inside the plat; no greater than a 10-foot interval outside the plat). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Proposed contours. | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Typical grading plan (detail, statement, or drainage arrows). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9. Soils data, soil boring logs, and locations (include ground elevation and water table information). | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10. Location of all buildings on adjacent properties within 200 feet. | |

Drainage

Yes No N/A

COMMENTS

- | | | | | | |
|--------------------------|--------------------------|--------------------------|-----|---|-------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | Offsite watershed areas (with boundaries and acreage to be shown on location map). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. | All existing drainage courses and structures (with proper labeling as to type, size, and invert elevations). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. | County drains (proof of permission to connect). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. | Proposed drainage systems (clearly identify all open and enclosed portions). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. | Floodplain contour (existing and proposed). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. | Wetlands (existing and proposed). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. | Buffers provided. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. | Proposed storm water facilities (detention/infiltration). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9. | Landscaping for storm water facilities. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10. | Note specifying that all work shall be completed in accordance with City of Portage Contract Conditions and Specifications. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11. | Professional engineer's seal for all public improvement projects. | _____ |

Storm Water Management System Design

Yes No N/A

COMMENTS

- | | | | | | |
|--------------------------|--------------------------|--------------------------|-----|--|-------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | Calculation of runoff (boundaries of contributing areas to each structure shall be shown). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. | Effective layout. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. | Inlet capacity/spacing. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. | Adequate size/slopes. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. | Pipe material, length, diameter, and slope. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. | Submergence. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. | Invert and rim elevations for each structure. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. | High water level in relation to low top-of-casting elevation (hydraulic grade line). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9. | Storm water facilities appropriately selected. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10. | Minimum basement floor elevations/openings in structures. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11. | Ensure proper siting. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12. | Required volume/release rate. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 13. | Pretreatment. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 14. | Adequate volume provided (high water levels indicated). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15. | Hydraulic calculations for transfer or outlet pipe. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 16. | Overflow spillway. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 17. | Outlet structure dimensions. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 18. | Dimensions of storm water facility shown in plan and profile. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 19. | Side slopes. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 20. | Soil erosion controls. | _____ |

Easements

Yes No N/A

COMMENTS

- | | | | | | |
|--------------------------|--------------------------|--------------------------|----|--|-------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | Utility easements (with dimensions and type of utility). | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. | Existing and proposed drainage easements. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. | Offsite drain easements or rights-of-way. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. | Buffer conservation easements. | _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. | Recorded easement forms. | _____ |

Maintenance

Yes No N/A

COMMENTS

- | | | | | | |
|--------------------------|--------------------------|--------------------------|----|------------------------------|-------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | Recordable maintenance plan. | _____ |
|--------------------------|--------------------------|--------------------------|----|------------------------------|-------|

APPENDIX 4

Design Parameters

Runoff Curve Numbers For Selected Agricultural, Suburban, and Urban Land Use.

(Antecedent Moisture Condition 2 and $I_a = 0.2S$)

Land Use Description	Hydrologic Soil Group			
	A	B	C	D
Cultivated land ¹ : Without conservation treatment	72	81	88	91
With conservation treatment	62	71	78	81
Pasture or range land: Poor condition	68	79	86	89
Good condition	39	61	74	80
Meadow: Good condition	30	58	71	78
Wood or forest land: Thin stand, poor cover, no mulch	45	66	77	83
Good cover ²	25	55	70	77
Open spaces, lawns, parks, golf courses, cemeteries, etc.				
Good condition: Grass cover on 75% or more of the area	39	61	74	80
Fair condition: Grass cover on 50% to 75% of the area	49	69	79	84
Commercial and business areas (85% impervious)	89	92	94	95
Industrial districts (72% impervious)	81	88	91	93
Residential: ³ (house + drive + lawn)				
<u>Average lot size</u> <u>Average % Impervious⁴</u>				
1/8 acre or less 65	77	85	90	92
1/4 acre 38	61	75	83	87
1/3 acre 30	57	72	81	86
1/2 acre 25	54	70	80	85
1 acre 20	51	68	79	84
Paved parking lots, roofs, driveways, etc. ⁵	98	98	98	98
Streets and roads:				
Paved with curbs and storm sewers ⁵	98	98	98	98
Gravel	76	85	89	91
Dirt	72	82	87	89

¹ For a more detailed description of agricultural land use curve numbers, refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, Aug. 1972.

² Good cover is protected from grazing and litter and brush cover soil.

³ Curve numbers are computed assuming the runoff from the house and driveway.

⁴ The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

⁵ In some warmer climates of the country, a curve number of 95 may be used.

Source: Soil Conservation Service, 1986.

Rational Method Runoff Coefficients

Type of Development	Runoff Coefficients
Business	
Downtown	0.70 to 0.95
Neighborhood	0.50 to 0.70
Residential	
Single family	0.30 to 0.50
Multi-units (detached)	0.40 to 0.60
Multi-units (attached)	0.60 to 0.75
Residential (suburban)	0.25 to 0.40
Apartment	0.50 to 0.70
Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Park, Cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad Yard	0.20 to 0.35
Unimproved	0.10 to 0.30
Character of Surface	
Pavement	
Asphalt and Concrete	0.70 to 0.95
Brick	0.70 to 0.85
Roofs	0.75 to 0.95
Lawns, Sandy Soil	
Flat 2%	0.05 to 0.10
Average 2% to 7%	0.10 to 0.15
Steep 7%	0.15 to 0.20
Lawns, Heavy Soil	
Flat 2%	0.13 to 0.17
Average 2% to 7%	0.18 to 0.22
Steep 7%	0.25 to 0.35

Source: Design and Construction of Sanitary and Storm Sewers, American Society of Civil Engineers and the Water Pollution Control Federation, 1969.

DETERMINATION OF TIME OF CONCENTRATION

The variables needed to compute time of concentration for a proposed development are its length, slope, and surface retardants. These variables can be computed from field survey notes.

The length L is the distance from the extremity of the development area in a direction parallel to the slope until a defined channel is reached. The units are in feet. Overland flow will become channel flow within 1,200 feet in almost all cases. Time of concentration is the sum of overland flow and channel flow.

The slope S is the difference in elevation between the extremity of the drainage area and the point in question divided by the horizontal distance. The units are in feet/foot.

The surface retardants coefficient, n , is the average surface retardants value of the overland flow.

Rainfall Amounts Corresponding to Kalamazoo County from the Rainfall Frequency Atlas of the Midwest, Huff and Angel (1992)

Duration	2-month	3-month	4-month	6-month	9-month	1-year	2-year	5-year	10-year	25-year	50-year	100-year
10-day	1.81	2.18	2.51	2.95	3.39	3.69	4.33	5.23	5.96	7.39	8.63	10.03
5-day	1.48	1.77	2.00	2.32	2.67	2.90	3.45	4.27	4.95	6.16	7.28	8.46
72-hour	1.29	1.52	1.72	1.99	2.29	2.49	3.00	3.75	4.41	5.50	6.45	7.51
48-hour	1.14	1.33	1.48	1.72	1.98	2.15	2.63	3.32	3.91	4.93	5.83	6.82
24-hour	1.07	1.25	1.37	1.58	1.79	1.95	2.37	3.00	3.52	4.45	5.27	6.15
18-hour	1.01	1.17	1.28	1.48	1.68	1.83	2.23	2.82	3.31	4.18	4.95	5.78
12-hour	0.94	1.09	1.19	1.38	1.56	1.70	2.06	2.61	3.06	3.87	4.58	5.35
6-hour	0.80	0.93	1.02	1.18	1.34	1.46	1.78	2.25	2.64	3.34	3.95	4.61
3-hour	0.69	0.80	0.88	1.01	1.15	1.25	1.52	1.92	2.25	2.85	3.37	3.94
2-hour	0.62	0.72	0.79	0.92	1.04	1.13	1.37	1.74	2.04	2.58	3.06	3.57
1-hour	0.51	0.59	0.64	0.75	0.85	0.92	1.11	1.41	1.65	2.09	2.48	2.89
30-minute	0.40	0.46	0.50	0.58	0.66	0.72	0.88	1.11	1.30	1.65	1.95	2.28
15-minute	0.29	0.34	0.37	0.43	0.49	0.53	0.64	0.81	0.95	1.20	1.42	1.66
10-minute	0.23	0.26	0.29	0.33	0.38	0.41	0.50	0.63	0.74	0.93	1.11	1.29
5-minute	0.13	0.15	0.16	0.19	0.21	0.23	0.28	0.36	0.42	0.53	0.63	0.74

Rainfall (inches) for given recurrence interval.

Manning's Roughness Coefficients ("n")

Conduit	Manning's Coefficients
Closed Conduits	
Asbestos-Cement Pipe	0.011 to 0.015
Brick	0.013 to 0.017
Cast Iron Pipe Cement-lined and seal-coated	0.011 to 0.015
Concrete (Monolithic) Smooth forms Rough forms	0.012 to 0.014 0.015 to 0.017
Concrete Pipe	0.011 to 0.015
Corrugated-Metal Pipe (½- x 2½-inch corrtn.) Plain Paved invert Spun asphalt-lined	0.022 to 0.026 0.018 to 0.022 0.011 to 0.015
Plastic Pipe (Smooth)	0.011 to 0.015
Vitrified Clay Pipes Liner channels	0.011 to 0.015 0.013 to 0.017
Open Channels	
Lined Channels Asphalt Brick Concrete Rubble or riprap Vegetal	0.013 to 0.017 0.012 to 0.018 0.011 to 0.020 0.020 to 0.035 0.030 to 0.040
Excavated or Dredged Earth, straight and uniform Earth, winding, fairly uniform Rock Unmaintained	0.020 to 0.030 0.025 to 0.040 0.030 to 0.045 0.050 to 0.140
Natural Channels (minor streams, top width at flood stage <100 feet) Fairly regular section Irregular section with pools	0.030 to 0.070 0.040 to 0.100

Source: Design and Construction of Sanitary and Storm Sewers, American Society of Civil Engineers and the Water Pollution Control Federation, 1969.

Minimum and Maximum Slopes For Storm Sewers

(Manning's "n" = 0.013)

Pipe Size	Minimum % of Grade (V = 2.5 ft/sec)	Maximum % of Grade (V = 10 ft/sec)
12"	0.32	4.88
15"	0.24	3.62
18"	0.20	2.84
21"	0.16	2.30
24"	0.14	1.94
27"	0.12	1.66
30"	0.10	1.44
36"	0.08	1.12
42"	0.06	0.92
48"	0.06	0.76
54"	0.04	0.60
60"	0.04	0.54
66"	0.04	0.48

Minimum Required Standard Flood Control Volume

(For Standard Release Rate of 0.15 cfs/ac)

Rational Formula Runoff C"	Minimum Required Storage Volume (cft/ac)
0.10	430
0.15	870
0.20	1,330
0.25	1,790
0.30	2,260
0.35	2,750
0.40	3,210
0.45	3,680
0.50	4,500
0.55	5,490
0.60	6,230
0.65	6,970
0.70	7,720
0.75	8,460
0.80	9,210
0.85	9,950
0.90	10,710
0.95	11,500
1.00	12,280

Rainfall Source: Bulletin 71, Table 5, Section 8

DETENTION BASIN SIZING (RATIONAL METHOD)

LOCATION: City of Portage

CONTRIB. AREA (acres) = 1
 RUNOFF "C" VALUE = 0.35

RAINFALL FREQUENCY = 25

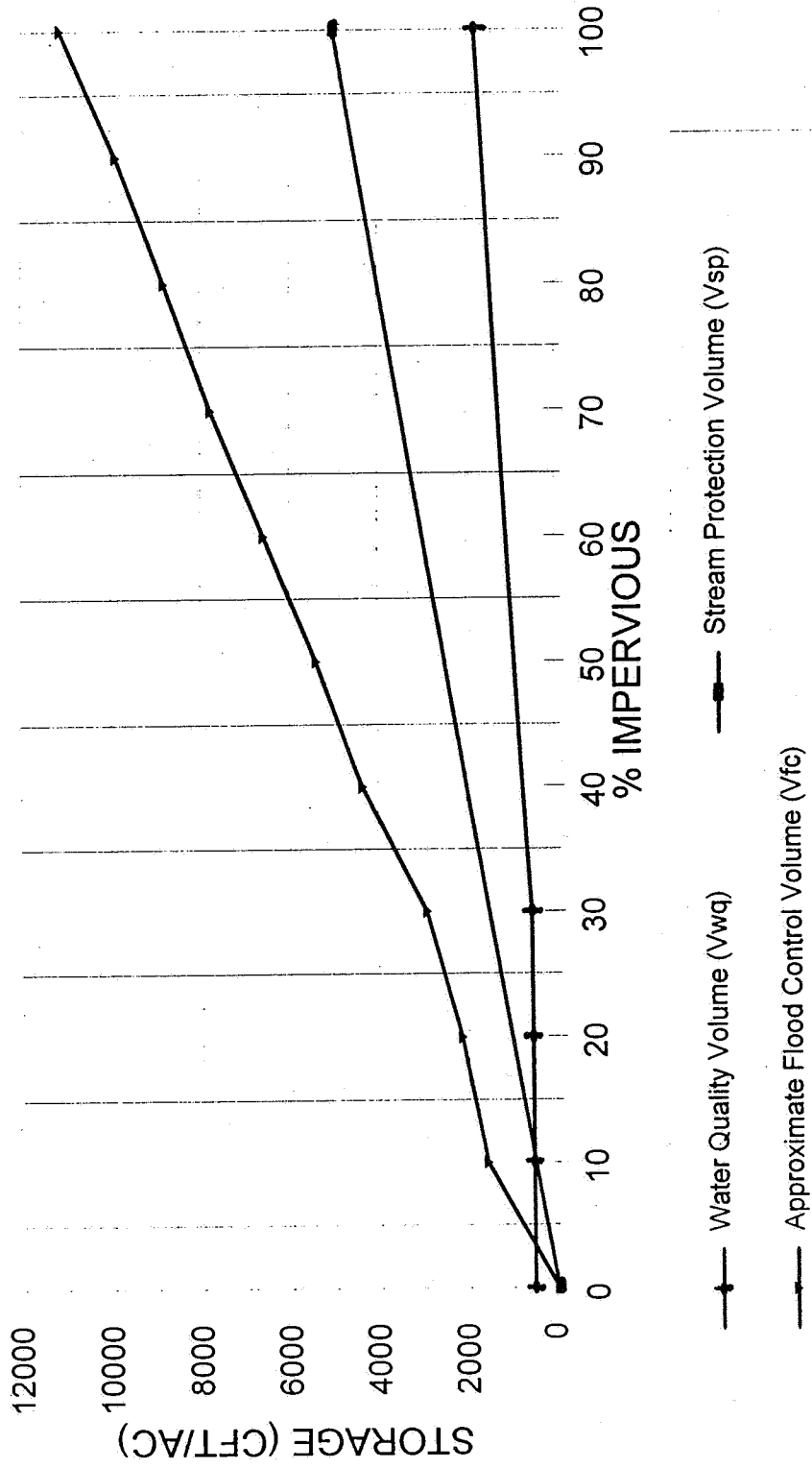
ALLOWABLE
 RELEASE RATE (cfs) = 0.15

TIME (hrs)	(1) RAINFALL INTENSITY (in/hr)	(2) RAINFALL RUNOFF (cft)	(3) DISCHARGE VOLUME (cft)	(4) STORAGE VOLUME (cft)	(5) STORAGE VOLUME (ac-ft)	(6) TIME TO EMPTY (hrs)
0.17	5.58	1,205	92	1,113	0.03	2.1
0.25	4.80	1,525	135	1,390	0.03	2.6
0.33	4.30	1,803	178	1,625	0.04	3.0
0.5	3.30	2,096	270	1,826	0.04	3.4
0.67	2.89	2,460	362	2,098	0.05	3.9
0.75	2.70	2,573	405	2,168	0.05	4.0
0.83	2.50	2,636	448	2,188	0.05	4.1
1	2.09	2,655	540	2,115	0.05	3.9
2	1.29	3,278	1,080	2,198	0.05	4.1
3	0.95	3,621	1,620	2,001	0.05	3.7
4	0.82	4,167	2,160	2,007	0.05	3.7
5	0.69	4,383	2,700	1,683	0.04	3.1
6	0.56	4,269	3,240	1,029	0.02	1.9
7	0.52	4,625	3,780	845	0.02	1.6
8	0.48	4,879	4,320	559	0.01	1.0
9	0.44	5,031	4,860	171	0.00	0.3
10	0.40	5,082	5,400	-318	-0.01	-0.6
12	0.32	4,879	6,480	(1,601)	-0.04	-3.0

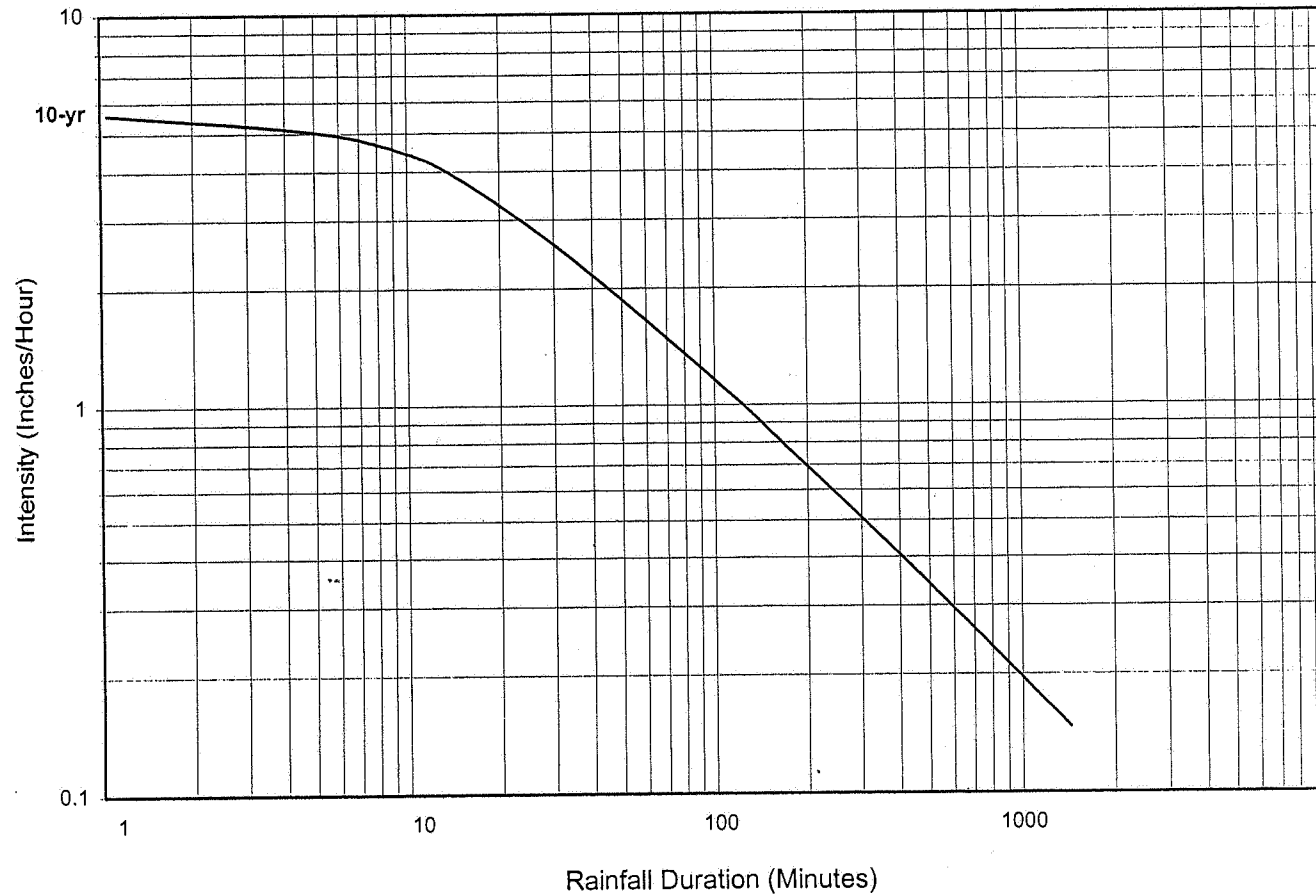
NOTES:

- (1) Input rainfall intensity, I, in in/hr for the specified design rainfall at each duration (time, t). $I = P/t$ where P is the rainfall in inches.
- (2) Rainfall runoff volume is calculated by multiplying the Rational Formula, $Q = CIA$, by the time, t: $V = (It)CA$
- (3) Discharge volume is calculated by multiplying the discharge rate by the time: $V_o = Q_o t$
- (4) Storage volume is calculated by subtracting the discharge volume from the runoff volume.
- (5) Storage volume is converted to acre-feet by dividing by 43,560 sft/acre
- (6) Time to empty is calculated by dividing the storage volume by the discharge rate.

RELATIONSHIP BETWEEN IMPERVIOUS COVER AND TREATMENT VOLUMES



10 Year Rainfall Intensity-Duration-Frequency Curve City of Portage, Michigan



Duration (min)	Intensity (in/hr)
15	3.8
30	2.6
60	1.7

Source: Rainfall Frequency Atlas of the Midwest, 1992
Bulletin 71, (MCC Research Report 92-03)

Storm Water Design Criteria Manual
City of Portage, Michigan

APPENDIX 5

Geotechnical Requirements for Storm Water Facilities

GEOTECHNICAL REQUIREMENTS FOR STORM WATER FACILITIES

1. QUALIFICATIONS

Soil testing by a qualified geotechnical consultant is required to determine the site soil infiltration characteristics and static groundwater elevation. The geotechnical consultant shall be either a registered professional engineer, soil scientist, or geologist licensed in the State of Michigan.

2. INITIAL FEASIBILITY INVESTIGATION

An initial feasibility investigation may be conducted to screen unsuitable sites. Initial investigation involves making use of any of the following resources:

- a. Soil survey prepared by the NRCS.
- b. Existing soil borings or geotechnical report on the site prepared by a qualified geotechnical consultant.
- c. Onsite septic percolation testing within 200 feet of the proposed infiltration basin location and on the same contour.

3. SOIL BORING REQUIREMENTS

- a. One soil boring is required per 5,000 square feet of storm water facility bottom area.
- b. Soil borings shall be located within the perimeter of the proposed storm water facility.
- c. Each boring shall extend a minimum of 5 feet below the proposed bottom elevation of the storm water facility.
- d. Groundwater elevations must be recorded during drilling, and again, upon completion of drilling.
- e. Standard penetration testing shall be performed at 2-foot intervals, and changes in soil type noted. Each soil type shall be classified using the Unified Soil Classification System.
- f. Soil boring logs shall be referenced to a top-of-ground elevation, and include the above information.

4. FIELD PERMEABILITY TESTING

A minimum of one test per storm water facility shall be performed, where required, by the following method:

Infiltration Rate of Soils in Field Using Double-Ring Infiltrometers (ASTM D-3385).

5. Laboratory Permeability Testing

A minimum of one test per storm water facility shall be performed, where required, by the following methods:

- *Standard Test Method for Permeability of Granular Soils (constant head)* ASTM D-2434.
- *Falling Head Permeability (fixed wall)* – EM 1110-4-1906.

APPENDIX 6

City of Portage Fencing Requirements

**CITY OF PORTAGE
STORM WATER INFILTRATION AND DETENTION BASIN
FENCING SPECIFICATIONS**

Install chain-link fence, as manufactured by American Steel and Wire Company, Continental Steel Corporation, Kokomo, Indiana, Page Steel and Wire Division, Monessen, Pennsylvania, or approved equal.

Fabric shall be 9-gage wire (before galvanization) woven in a 2-inch mesh with knuckled top and bottom salvage. Fabric shall be hot-dip galvanized after weaving.

Corner posts and gate posts shall be 3-inch outside diameter round hot-dip galvanized pipe and shall be braced and trussed. The corner posts shall conform to ASTM A 120 (Schedule 40) galvanized pipe.

Line posts shall be 2-1/2 inches outside-diameter round hot-dip galvanized pipe spaced at 10 feet 0 inches on center, with a minimal weight of 1.33 pounds per lineal foot.

Footings for corner and gate posts shall be 12 inches in diameter and shall be 40 inches deep with posts set 36 inches deep.

Footings for line posts shall be 12 inches in diameter and shall be 36 inches deep with posts set 36 inches deep.

Top rail and bottom shall be 1-5/8 inches outside-diameter round hot-dip galvanized pipe.

Fence shall be 6 feet high above grade, using 6-foot chain-link fabric.

The gate frames shall be made of 2-inch tubing and jointed at the corners in such a manner so as to form a rigid panel. The frame shall be filled with the same gage and mesh-size fabric as used on the fence. The fabric shall be fastened in the frame on all four sides, by means of adjustable hook bolts and tension rods. When barbed wire is used, three strands of barbed wire shall be fastened to the extended end bars of the gate frames.

The gate shall be 12 feet wide and capable of being opened and closed easily by one person.

The latches shall have a plunger-bar arrangement to engage the center stop. Latches shall be arranged for locking. The center stops shall consist of a device arranged to be set in concrete, and to engage the plunger-bar of the latch.

All public basin fencing shall be 6 feet high, vinyl-coated, chain-link fabric, brown in color.

APPENDIX 7

Storm Water Basin Landscaping

STORM WATER BASIN LANDSCAPING

Vegetation

All vegetation shall be provided and planted in accordance with the City of Portage Contract Conditions and Specifications, current edition.

Grasses shall consist of the seed mixtures provided in Table 8.

Table No. 7.1 – Seeding Mixtures

Application	Grass	Percent
Temporarily inundated areas and pond edges maintained as a lawn (coarse-textured soils).	Creeping Red Fescue*	55
	Kentucky Bluegrass	40
	Seaside Bentgrass	4
Temporarily inundated areas and pond edges maintained as a meadow (fine-textured soils).	Perennial Rye Grass	15
	Seaside Bentgrass	5
	Smooth Brome grass*	80
Buffer areas maintained as a lawn.	Manhattan Rye	40
	Creeping Red Fescue*	20
	Red Top*	20
	Common Bluegrass	20
Buffer areas maintained as a meadow.	Creeping Red Fescue*	40
	Red Top*	5
	Tall Fescue	40
	Timothy*	5
	Birdsfoot Trefoil*	10

*Indicates species best suited for wildlife cover.

A variety of trees and shrubs shall be included in the landscape plan, including those listed in Table 9.

Table No. 7.2 – Selected Trees and Shrubs

Application	Trees	Shrubs
Excessively wet mineral soils	Northern White Cedar* Green Ash Tamarack	Nannyberry Viburnum "Indigo" Silky Dogwood Redosier Dogwood American Cranberry Bush
Poorly drained organic soils	Northern White Cedar* White Spruce* Red Maple Green Ash Swamp White Oak* Pine Oak	Nannyberry Viburnum "Indigo" Silky Dogwood Redosier Dogwood American Cranberry Bush Gray Dogwood
Well-drained medium- to fine-textured soils	Norway Spruce* Black Locust White Spruce* Sugar Maple* Red Pine Cottonwood Jack Pine	Silky Dogwood Tatarian Honeysuckle Autumn Olive Crabapple Gray Dogwood
Well-drained sand and loamy sand	Austrian Pine Jack Pine* Red Pine Black Locust Cottonwood	Autumn Olive Hawthorn Crabapple Tatarian Honeysuckle Staghorn Sumac Service Berry

*Species best suited for wildlife food or cover.

Landscaping along fences shall include the use of a variety of vines shown in Table 10.

Layout

Publicly maintained basins shall be constructed as such:

Primarily for plat construction, the basin shall be internalized within the development whenever possible. For basins internalized within a plat, the fence shall be located 6 inches outside the property lines of adjacent properties and 15 feet from the street right-of-way line. A 3-foot-wide level area shall be provided along the interior of the fence for maintenance considerations. The side slopes shall be a maximum 3:1 (H:V), with a 6:1 (H:V) access drive provided to the basin bottom level. A level staging area approximately 20 by 20 feet shall be provided within the interior of the gate and at the approach to the sloped access drive, to provide a working platform for maintenance equipment. Screening shall meet the requirements stated and be installed upon the private lots within the development. Basin design shall specify the meadow seeding mixture provided in Table 7.1, for all basin area within the fence.

Screening

Storm water basins shall be screened from adjacent residential properties or when visible from a public right-of-way. In lieu of screening, the basin must be designed and landscaped in such a manner as to provide an attractive amenity to the surrounding area.

Screening shall consist of vegetated (trees, shrubs, and vines) berms and other landscaping features that will provide a year-round visual barrier from the storm water basin, inlet and outlet structures, overflow spillway and fencing.

Trees used for screening shall have a minimum height of 6 feet upon completion of construction and be spaced in a staggered row 10 feet on center. Berms shall be designed with undulating and natural-looking features. Maximum side slopes shall be 3:1 (H:V).

Plan

A landscape plan shall be submitted concurrent with the construction drawing submittal.

The plan shall illustrate the locations, types, and sizes of all landscape features.

The plan shall indicate the intended appearance of the storm water basin in accordance with the following general guidelines.

- Manicured - highly visible basins in, or adjacent to, residential areas.
- Natural - areas where long-term land use will result in minimal visibility.

APPENDIX 8

Shortcut for Wetland Drawdown Assessment

SHORTCUT FOR WETLAND DRAWDOWN ASSESSMENT

This appendix presents a simple method for calculating whether a storm water pond or wetland has an appropriate water balance to maintain a wet pool over a 30-day period without rainfall. When conducting this analysis, the following should be considered:

1. Calculate maximum drawdown during periods of high evaporation and during an extended period of no appreciable rainfall.
2. The change in storage within a pond (ΔV) = Inflows - Outflows.
3. Potential inflows: runoff, base flows, and rainfall.
4. Potential outflows: infiltration, surface overflow, and evaporation (and evapotranspiration).
5. Assume no inflow from base flow, no losses for infiltration, and because only the permanent pool volume is being evaluated, no losses for surface overflows.
6. Therefore, ΔV = runoff - evaporation.

As an example, given the conditions in Tables E.11.1 and E.11.2, a wetland drawdown assessment may be determined as follows:

Table E.11.1 • Site Data for Sample Water Balance Analysis

Drainage Area	38.0 acres
Post developed conditions, C [or CN for SCS method]	0.60 [90]
DCIA	22.8 acres
2-year, 24-hour design rainfall, P	2.27 inches
2-year, 24-hour design runoff (PxC) [or Q_p from SCS formulas*]	1.36 inches
Water quality volume (V_{wq})	0.95 acre/foot
Surface area of wetland, A (minimum 1% of drainage area to BMP)	0.38 acre
$Q_D = \frac{(P - 0.2S_R)^2}{P + 0.8S_R} \quad S_R = \frac{1,000}{CN} - 10$	

A storm water wetland will be designed to treat the water quality volume (V_{wq}). Therefore, the permanent pool volume = 0.95 acre/foot, and the acreage depth = $\frac{A}{V} = 0.38 \text{ acre} / 0.95 \text{ acre/foot} = 2.5 \text{ feet}$.

Table E.11.2 • Mean Monthly Precipitation by State Climatic Divisions
(Michigan, Southwest Lower*)
Evaporation Rates for Maryland Ponds (1990)

	April	May	June	July	August	September
Precipitation (ft)	0.25	0.32	0.32	0.24	0.26	0.28
Evaporation (ft)	0.36	0.44	0.52	0.54	0.46	0.35

*Based on period 1931 to 1955.

Calculate maximum drawdown during periods of high evaporation:

- Period of greatest evaporation occurs during the month of July (see Table E.11.2).
- Runoff volume = $P \times E$, where P = precipitation and E = runoff efficiency (ratio of 2-year storm runoff to rainfall depths).
- For $C = 0.60$ [$CN = 90$ for SCS method], volume of runoff (2-year storm) = 1.36 inches.
- 2-year storm rainfall = 2.27 inches.
- $E = 1.36/2.27 = 0.60$.
- Inflow = $P \times E \times A$.
 $0.24 \text{ foot} \times 0.6 = 0.14 \text{ foot}$.
over entire site area: $(0.14 \text{ foot}) (38 \text{ acres}) = 4.31 \text{ acre/foot}$.
- Outflow = surface area x evaporation losses.
 $= 0.38 \text{ acre} \times 0.54 \text{ foot (see Table E.11.2)}$.
 $= 0.20 \text{ acre/foot}$.
- Inflow (4.31 acre/foot) is greater than outflow (0.20 acre/foot); therefore, drainage area is adequate to support wet pond during normal conditions.

Check for drawdown over an extended period without rainfall:

- Use a 45-day interval using worst-case conditions.
- Highest evaporation occurs during July - 0.54 foot per month (see Table E.11.2).
- Calculate average evaporation per day = $0.54 \text{ foot}/31 \text{ days} = 0.017 \text{ foot/day}$.
- Over 45-day interval, evaporation loss = $45 \times 0.017 \text{ foot/day} = 0.78 \text{ foot}$.

- Assume surface of the permanent pool may drop up to 0.78 foot (9.4 inches) over this interval. Therefore to be safe, specify vegetation for the aquatic shelves (to 10 inches) that can tolerate periods of drawdowns.

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Maryland Department of the Environment, 2000, *2000 Maryland Stormwater Design Manual*, Water Management Administration, Baltimore, MD.

APPENDIX 9

Selected Herbaceous Wetland Plants for Storm Water Treatment

Selected Herbaceous Wetland Plants for Storm Water Treatment

Plant Name	Depth of Water to be Planted In	Soil Type	Notes	Plant Stock
Hardstem Bulrush (<i>Scirpus acutus</i>)	2-3 inches (once established, will grow 3.5 feet deep)	Peat or muck	Will tolerate some salt	Rootstock
Softstem Bulrush (<i>Scirpus validus</i>)	2-3 inches (once established, will grow 1 foot deep)	Sandy soils, peat, or muck		Rootstock
Three-Squared Bulrush (<i>Scirpus pungens</i>)	2-3 inches (once established, will grow 2.5 feet deep)	Peat or muck	Will tolerate some salt	Rootstock
Green Bulrush (<i>Scirpus atrovirens</i>)	2-3 inches	Peat or muck		Rootstock
River Bulrush (<i>Scirpus fluviatilis</i>)	2-3 inches	Sandy soils, peat, or muck	Drought tolerant	Bulbs
Soft Rush (<i>Juncus effusus</i>)	2-3 inches (once established, will grow deeper)	Sandy soils, peat, or muck	Evergreen	Sprouted clumps
Blue Water Iris (<i>Iris versicolor</i>)	1-2 inches	Sandy soils, peat, or muck	Blooming	Rootstock
Yellow Iris (<i>Iris pseud</i>)	1-2 inches	Sandy soils, peat, or muck	Blooming	Rootstock
Cattail (<i>Typha latifolia</i>)	6 inches (once established, will grow 1 foot deep)	Sandy soils, peat, or muck	Reproduce quickly to fill basin and overtake other plants	Plants
Pickerel Weed (<i>Pontaderia cordata</i>)	1 foot	Peat or muck	Blooming	Rhizomes
Arrow-arum (<i>Peltandra virginica</i>)	1 foot	Peat or muck	Shade tolerant to full sun	Ripened Seed
Detention Basin Cool Season Seed Mix	Plant in mud flats with damp surface conditions	Sandy soils, peat, or muck	Available from Lafayette Home Nursery 309-995-3311	Seed Mix

APPENDIX 10

Site Design Example

SITE DESIGN EXAMPLE

The following example demonstrates the design of a storm water management system for a hypothetical new development site in the City of Portage.

Site Specific Data

Location	- Section 14
Zoning	- Research/Office parks
Use	- Analytical and clinical laboratory
Lot size	- 5 acres
Proposed paved parking area	- 1.5 acres
Proposed building footprint	- 60,000 square feet (1.38 acres)
Proposed pond footprint	- 0.25 acre
Proposed lawn area	- 1.88 acres

Use the flowchart in Table 7 to determine each step in the design.

- A. Locate the site on Figure 1. It is in Groundwater Contamination Risk Area C.
- B. Use Table 1 to determine the Risk Designation. The land is zoned for Research/Office park, so it is a High Risk Zoning District for Area C.
- C. Use Table 2 to determine if the site is a groundwater hot spot. The proposed land use is an analytical and clinical laboratory, so it is considered a groundwater hot spot.
- D. Given the Risk Designation and Risk Area, Table 3 indicates that groundwater discharge is the preferred discharge strategy.
- E. Fill out the required Storm Water Treatment Worksheet for New Developments in Appendix 2, because this is a new development (see enclosed).
 1. Water quality volume is required.
 2. Stream protection volume is not required.
 3. Flood control volume is required.
 4. Spill containment volume is required.
- F. Select BMPs from Table 6 that provide required treatment for a groundwater discharge. An infiltration basin with a spill containment cell can provide water quality, flood control, and spill containment volumes.
- G. Based on Section 4.5, design an infiltration basin with a spill containment cell.
 1. Evaluate Physical Feasibility (4.5.1)
 - a. Site soil borings showed poorly-graded sand to a depth of 30 feet.
 - b. Waive permeability test (use 0.52 in/hr for infiltration).

2. Flood Control Volume (4.5.2.1)

a. $V_{fc} = CAP_2(3,630)$ or 3,630 cubic feet per acre (cft/ac) (choose the greater of the two).

b. $V_{fc} = (3,630)(5 \text{ acres}) = 18,150 \text{ cft}$.

c. Solve for total C over entire site, use Appendix 4.

$$C_{\text{Total}} = \frac{(1.37)_{\text{Roof Area}}(.95) + (1.5)_{\text{Paved Area}}(.95) + (.25)_{\text{Pond Surface}}(1.0) + (1.88)_{\text{Lawn Area}}(0.12)}{5_{\text{Total Area}}} = 0.64$$

d. Solve for V_{fc} (use 2.4 inches of rain for the two-year rainfall amount P_2).

$$V_{fc} = (0.64)(5)(2.4)(3,630) = 27,878 \text{ cft}$$

e. Since 27,878 cft > 18,150 cft, use the larger of the two.

f. Required Flood Control Volume for site = 27,878 cft.

3. Maximum Drain Time (4.5.2.2)

a. Solve for proposed basin flood control depth (assuming average basin footprint is 10,500 sft).

b. Check the design depth compared to the maximum allowable depth using a drain time of 72 hours and an infiltration rate of 0.52 in/hr as a minimum.

$$D = 2.6 \text{ ft} \leq \frac{(72)(0.52)}{12} = 3.12 \text{ ft}$$

Therefore, the design depth is acceptable.

4. Water Quality Volume (4.5.2.3)

a. Water quality volume is provided through the infiltration process so additional volume is not required.

5. Pretreatment Criteria (4.5.3)

a. Since the site is a proposed analytical and clinical laboratory in a high-risk zoning district in Groundwater Contamination Risk Area C, it will require spill containment (4.5.3.2).

b. Size of spill containment cell shall hold 30% of the required water quality volume.

c. Water quality volume is 0.5 inch of runoff over the impervious area directly connected to the basin. The parking and roof area are directly connected to the basin ($1.37 + 1.5 = 2.87$ acres).

$$V_{wq} = (1,815)(2.87) = 5,209 \text{ cft}$$

$$V_{\text{spill containment}} = (0.3)(5,209 \text{ cft}) = 1,563 \text{ cft}$$

**REQUIRED STORM WATER TREATMENT WORKSHEET
FOR
NEW DEVELOPMENTS**

WATER QUALITY VOLUME REQUIRED?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
---------------------------------------	--	------------------------------------

- Water quality volume is required for all sites.

STREAM PROTECTION VOLUME REQUIRED?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
---	-------------------------------------	---

If both of the following are checked "yes," stream protection volume is required.

- Discharge to any watercourse. Yes ☐ No ☒
- Site C x A > 1 acre. Yes ☒ No ☐

FLOOD CONTROL VOLUME REQUIRED?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
---------------------------------------	--	------------------------------------

If the following is checked "yes," flood control volume is not required.

- Direct discharge to a lake. Yes ☐ No ☒

SPILL CONTAINMENT VOLUME REQUIRED?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
---	--	------------------------------------

If any of the following are checked "yes," spill containment volume is required.

- Surface water discharge from a storm water hot spot. Yes ☐ No ☒
- Groundwater discharge from a high-risk zoning district in GCR Areas B and C. Yes ☒ No ☐
- Groundwater discharge in GCR Area A. Yes ☐ No ☒

GUIDE TO THE STORM WATER DESIGN CRITERA MANUAL

LOCATE SITE ON FIGURE 1 "GROUND WATER CONTAMINATION RISK AREAS" AND DETERMINE GROUNDWATER CONTAMINATION RISK CLASSIFICATION.

AREA A - AREA WITH IN 10 YEAR TIME OF TRAVEL TO WELL
AREA B - GENERAL AREA OF WELL FIELD CONTRIBUTION
AREA C - AREA OUT SIDE OF GENERAL AREA OF CONTRIBUTION

A, B, OR C

USE TABLE 1 "RISK DESIGNATIONS" WITH THE KNOWN ZONING DISTRICT TO DETERMINE IF SITE POSES A POTENTIAL LOW RISK OR HIGH RISK TO GROUNDWATER.

LOW/HIGH

USE TABLE 2 "LAND-USE ACTIVITIES THAT POSE POTENTIAL THREATS TO GROUNDWATER (HOT SPOTS)" TO DETERMINE IF SITE IS A HOT SPOT.

YES/NO

USE TABLE 3 "STORM WATER DISCHARGE STRATEGIES" WITH INFORMATION FROM FIGURE 1, AND TABLES 1 AND 2 TO DETERMINE IF DISCHARGE SHOULD BE TO SURFACE WATER OR GROUNDWATER.

GROUNDWATER/SURFACE WATER

IS THE PROPOSED DEVELOPMENT A NEW DEVELOPMENT OR A REDEVELOPMENT?

REDEVELOPMENT

NEW DEVELOPMENT

USE "REQUIRED STORM WATER TREATMENT WORKSHEET FOR REDEVELOPMENTS" IN APPENDIX 2 TO DETERMINE THE REQUIRED STORM WATER TREATMENT CRITERIA.

USE "REQUIRED STORM WATER TREATMENT WORKSHEET FOR NEW DEVELOPMENT" IN APPENDIX 2 TO DETERMINE THE REQUIRED STORM WATER TREATMENT CRITERIA.

SELECT A BMP OR COMBINATION OF BMP'S FROM TABLE 6 THAT MEET ALL REQUIRED TREATMENT CRITERIA.

REFER TO SECTION 4.0 "PERFORMANCE CRITERIA FOR URBAN BMP DESIGN", FOR SELECTED BMP DESIGN REQUIREMENTS. A CHECKLIST FOR SUBMITTALS IS INCLUDED IN APPENDIX 3.

IS SITE LOCATED ON A STREAM NOTED IN FIGURE 2?

FOLLOW VEGETATED BUFFER GUIDELINES IN SECTION 3.3.5.4 AND SUBMIT PLANS FOR REVIEW.

YES

NO

SUBMIT PLANS FOR REVIEW.



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fic&h

CITY OF PORTAGE
Kalamazoo County, Michigan
STORM WATER DESIGN
CRITERIA MANUAL

PROJECT NO.
G00499B

TABLE NO.

7

APPENDIX 11

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