
**SAGINAW COUNTY PUBLIC WORKS
COMMISSIONER
STORMWATER MANAGEMENT DESIGN
REQUIREMENTS**



Prepared on behalf of:

**SAGINAW COUNTY
SAGINAW COUNTY PUBLIC WORKS COMMISSIONER (SCPWC)**

**Brian J. Wendling
Saginaw County Public Works Commissioner
Saginaw County Courthouse
Address: 111 S. Michigan Ave, Saginaw, MI 48602
Telephone: (989) 790-5258**

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I. INTRODUCTION

A. NPDES Phase II Requirements for Stormwater

The Saginaw County Public Works Commissioner (SCPWC), Saginaw County, and the following municipalities have implemented their own Stormwater Management Plans and/or Stormwater Management Design Requirements (PCC) for new development and/or re-development and have the following NPDES stormwater discharge permits:

Table 1. Stormwater Management Plans and/or Stormwater Management Design Requirements

Member	Old NPDES Permit #
Saginaw County (SCPWC)	MIG610171
Saginaw County Road Commission	MIG610178
Carrollton Township	MIG610165
City of Saginaw	MIG610161
Saginaw Charter Township	MIG610166
Thomas Township	MIG610174
Bridgeport Charter Township	MIG610181

Saginaw County Public Works Commissioner serves as a secondary reviewer for compliance of the ultimate outlet discharge into any county drain within Saginaw County from sites which meet review criterion for all municipalities with implemented Stormwater Management Plans, listed above.

These members must attain compliance with the National Pollutant Discharge Elimination System (NPDES) Phase II requirements as they relate to stormwater discharge in Saginaw County’s jurisdictional area within the urbanized area based on the most recent Census Data. Members of the Saginaw Area Storm Water Authority (SASWA) who do not have established post construction controls in their jurisdictional boundary may adopt these stormwater design requirements by resolution. They must provide the resolution to the SCPWC.

These Stormwater Management Design Requirements are only for industrial, commercial, non-residential development, or platted subdivisions or condominium complex development or re-development. These Design Requirements are not to be applied to single family or duplex residential structure or other multi-family residences that are constructed on a parcel that is less than an acre and not part of a subdivision or condominium project. Any questions regarding this should be referred to the Saginaw County Public Works Commissioner’s office for clarification.

These Design Requirements for Saginaw County are adopted pursuant to the general authority granted under the Michigan Drain Code of 1956, Public Act No. 40 of 1956, as amended, M.C.L. §§ 280.1 – 280.630 (hereinafter “Drain Code”) and other applicable laws, to protect the public health, safety, and welfare regarding drainage matters over which the Saginaw County Public Works Commissioner has jurisdiction. These requirements are meant to assist in maintaining the County’s stormwater drainage systems, waterways and watersheds, focusing on the legally established drainage districts and drains within Saginaw County.

Specifically, these Requirements are designed to provide guidance in order for project design to minimize flood damage, to preserve farm drainage, to promote best management practices relating to drainage, to protect the quality of surface and ground waters, to protect Saginaw County residents’ natural flow rights under common law and to manage the County’s drains, drainage resources, and drainage districts for multiple purposes including drainage, sustainable development, recreation, scenic beauty, and fish and wildlife habitats. These Requirements are applicable to **all development or re-**

development projects that disturb at least one or more acres, including projects less than an acre that are a part of a larger common plan of development or sale and discharge into the applicant's MS4 and are within the current census defined Urbanized Areas within the jurisdictional boundary of Saginaw County. These proposed developments are subject to review and approval and either the Saginaw County Public Works Commissioner has jurisdiction, or the local jurisdiction has adopted these design requirements by resolution and have an agreement with the Saginaw County Public Works Commissioner to act as their review agency for water quality Best Management Practices (BMPs).

Additionally, if a project takes place in a township outside of the Urbanized Area which has adopted these stormwater Design Requirements by resolution, the SCPWC will provide review services as needed to assure the development meets the requirements.

Other communities within the Urbanized Area which have adopted their own Stormwater Design Guidelines will be doing their own site plan reviews per their own standards or using the SCPWC design standards. The SCPWC will only oversee the allowable discharge rate and detention volumes in these situations, the community will review for water quality treatment trains, water quality BMPs along with the allowable discharge rate and detention volumes.

These Requirements provide minimum requirements for developments covered under the Stormwater Management Design Requirements. However, the Saginaw County Public Works Commissioner reserves the right to deviate from the specific design requirements set forth when, on a case-by-case basis, such deviation is appropriate or necessary in order to accommodate the goals and purposes underlying these Design Requirements. For example: 1. A site which has an existing storm water management plan in place, but is just re-doing their paved parking lot with a new surface (0% change in impervious area); 2. A site which has a storm water management plan in place and is removing impervious areas to add green space, or 3. A site which is discharging to an MDOT MS4 where the County Public Works Office has no jurisdiction.

The Design Requirements and their implementation are designed to promote low impact designs such as green infrastructure or other site controls of stormwater. The Saginaw County Public Works Commissioner is committed to working with those developing projects or applying for permits to use alternative drainage methods which help meet local landscape ordinance requirements and improve the quality of water in our environment. The review of these procedures is the same as it is for any site review process. The submittal of the deviations is accepted and reviewed by the SCPWC engineer or designee and then a final decision is made as to whether this proposed design will be accepted.

The following outlines basic ideas and principals of stormwater management, and provides a conceptual foundation for the design requirements contained in this document:

1. Impacts of Development on Water Quantity

The hydrology of a watershed changes in response to site clearing and development of the natural landscape displays itself with an increase in the **quantity** of runoff. A site's existing stormwater storage capacity can be lost as vegetation is removed, natural depressions are graded and both topsoil and wetlands are eliminated. As the soil is compacted and resurfaced with impervious materials such as concrete and asphalt, rainfall may no longer penetrate into the ground and runs off of the land. These modifications, along with the installation of drainage facilities, alter natural drainage patterns within the area drained. The following are just a few examples of changes in hydrology in site development:

- Increases in runoff volume from a site.

- Increases in bankfull events creating erosion issues in streams, rivers and open drains.
- Increases in flow velocities, smoother hydraulic surfaces which can result in shorter times of concentration.
- Dramatic stream flow fluctuations from concentrated runoff from improperly designed sites.
- Less infiltration into the underlying groundwater table which can reduce base flow to rivers and streams.
- Increased sediment loads from construction sites into drains, streams or rivers, with resultant effects on aquatic habitats.

2. Impacts of Development on Water Quality

As development occurs, changes in land use may contribute new or additional pollutants to storm-water runoff ... In addition, some accompanying impervious surfaces may provide efficient delivery of these pollutants into receiving waterways. Leaves, litter, animal droppings, exposed soil from construction sites, fertilizer and pesticides are all washed off the land. Vehicles and deteriorating urban surfaces deposit trace metals, oil, and grease onto streets and parking lots. These and other toxic substances may be carried by stormwater and conveyed through creeks, ditches and storm drains into our rivers and lakes.

In short, the ecology of drains and waterways may be re-shaped by the shifts in hydrology, morphology and water quality that can accompany the development process. The stresses that these changes place on the environment are often gradual and invisible, yet they may produce significant effects over time. The Michigan Department Environment, Great Lakes, and Energy (EGLE) has identified streams in the urban and urbanizing areas as requiring special initiatives to restore degraded habitats, and to improve water quality.

3. Strategy for Design of Stormwater Management Systems

Comprehensive site planning can substantially reduce environmental and drainage impacts associated with site development. To achieve this, communities, regulatory agencies, and designers must evaluate the impact of each individual development project over the long term and on a watershed scale. Such an approach requires consideration of Best Management Practices (BMPs) that function together as a system to ensure that the volume, rate, timing and pollutant load of runoff remains stable and sustainable. A “BMP” is a practice or combination of practices that prevent or reduce stormwater runoff and/or associated pollutants. This can be achieved through a coordinated network of structural and nonstructural BMPs. In such a system, each BMP by itself may not provide major benefits, but becomes very effective when developed as a treatment train on the site.

4. Source Controls

Source controls reduce the volume of runoff generated on-site and eliminate initial opportunities for pollutants to enter the drainage system. By working to prevent problems, source controls are the best option for controlling stormwater, and include the following key practices:

- Use of existing on-site natural features that perform stormwater management functions, such as depressions, wetlands, woodlands and vegetative buffers along drains or stream banks.
- The minimization of impervious surface area through site planning that makes efficient use of paved, developed areas and maximizes open space. Encouraging flexible street and parking standards and the use of permeable ground cover materials can also reduce impervious surfaces.

- Direction of stormwater discharges to open grassed areas such as swales and lawns rather than allowing stormwater to run off from impervious areas directly into the stormwater conveyance system.
- Careful design and installation of erosion control mechanisms and rigorous maintenance throughout the construction period. Effective erosion control measures include minimizing the area cleared, leaving a minimum ten (10) foot wide vegetated buffer between drains/streams (with appropriate additional BMPs as needed) and the site construction area, minimizing the length of time that a site is cleared and graded, and the timely vegetative stabilization of disturbed areas.

5. *Site Controls*

Site controls are the subject of this document. After the implementation of source controls, site controls are then required to convey, pre-treat, and treat (e.g., detain, retain or infiltrate) the stormwater runoff generated by development. The range of engineering and design techniques available to achieve these objectives is to some degree dictated by site configuration, soil type, and the receiving waterway. For example, flat or extremely steep topography may preclude the use of grassed swales, which are otherwise preferable to curb and gutter systems. But while each site will be unique, some universal guidelines for controlling stormwater quality and quantity can be utilized.

6. *“Drain” and “Drainage District” Defined*

The term “Drain” as used in these Design Requirements shall have the meaning as proscribed in Section 3 of the Drain Code as follows:

The word ‘drain’, whenever used in this act, shall include the main stream or trunk and all tributaries or branches of any creek or river, any watercourse or ditch, either open or closed, any covered drain, any sanitary, storm, or combined sewer or conduit composed of tile, brick, concrete, or other material, any structures or mechanical devices, that will properly purify the flow of such drains, any pumping equipment necessary to assist or relieve the flow of such drains and any levee, dike, barrier, or a combination of any or all of same constructed, or proposed to be constructed, for the purpose of drainage or for the purification of the flow of such drains, but shall not include any dam and flowage rights used in connection therewith which is used for the generation of power by a public utility subject to regulation by the public service commission.

The term “Drainage District” as used in these Design Requirements shall have the following meaning:

A Drainage District is any county or inter-county drainage district legally established pursuant to applicable provisions of the Drain Code. Drain Code Section 5 provides that each such drainage district is a body corporate with the power to contract, to sue and be sued, and to hold, manage, and dispose of real property, in addition to any other powers conferred by law. Generally, a drainage district is comprised of all lands which drain to a legally established Drain.

7. *Goals of these Design Requirements*

It is the goal of these site development requirements minimize impacts on communities and/or adjacent properties. The goal is to establish minimum stormwater management requirements to meet the following objectives:

- Ensure that stormwater drainage systems and BMPs for water quality and quantity are in place at site developments.
- Reduce the risk of urban flood damage from site developments.
- Minimize impacts on county drains and natural stream courses where storm systems may discharge.
- Reduce non-point source pollution from site developments.
- Maintain existing site hydrology to avoid environmental impacts.
- Ensure compliance with site planning efforts and compliance with the National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit.
- Ensure adequate drainage systems are being constructed for future development in which the Saginaw County Public Works Commissioner has jurisdiction over, including projects which **disturb at least one or more acres, and projects less than an acre which are a part of a larger common plan of development or sale and discharge into the SCPWC drainage system or MS4 under these design guidelines by resolution.**

Measurable goals will be implemented and assessed on a yearly basis to determine the effectiveness of the Design Requirements. The following measurable goals will be reviewed annually:

- How many site design plans are reviewed,
- The number of SESC permits that are issued by the Saginaw County Public Works Commissioner (CEA),
- The Low Impact Development practices implemented and the effectiveness of each,
- The number of any complaints received, investigated and/or passed on to the Saginaw County Public Works Commissioner, CEA, that are related to site development and stormwater issues from that development.

Further documentation of the impacts of development on land and water resources and the importance of stormwater management can be found in Chapter 2 of the Low Impact Development Manual for Michigan (SEMCOG, 2008).

<https://semcog.org/Reports/LID/files/assets/basic-html/page-1.html#>

OR, the following:

<https://www.semcog.org/Green-Infrastructure>

8. *Enforcement of Stormwater Management Design Requirements*

Each municipality or township that has adopted these design requirements for stormwater must initiate the action of enforcement through their zoning regulations or another regulatory mechanism.

FOR NEW DEVELOPMENTS or RE-DEVELOPMENTS of 1 acre or more in area (*including projects less than an acre that are a part of a larger common plan of development or sale and discharge into the applicant's MS4*):

If a site is not in compliance with the design requirements and has not completed the site review process successfully, the county will rely on the local building inspector to withhold an occupancy permit for the structure until it is in compliance with the requirements.

If the site is already occupied, then a letter will be issued from the municipality’s zoning enforcement staff to bring the site into compliance within the specified period dictated on the letter. If the site is a **High Priority** site (*human health and safety hazard*) it must be brought into compliance immediately upon receiving either verbal or written notice. If the site is considered a **Medium Priority** (*flood and property damage hazard to nearby parcels/structures*) action must start within 5 days of receiving written or verbal notice and be completed within 10 days after action has started. If the site is **Low Priority** (*nuisance site, no imminent property damage can occur, no water quality issues*) the site must come into compliance within 30 days of receiving written or verbal notice.

9. Goals for Water Quality Requirements

Table 2. Stormwater Management Criteria

Stormwater Management Criteria	Description
A. Water Quality (WQ)	All site development projects are required to detain the water quality (first flush) volume. The WQ Volume is determined by the Saginaw County Public Works Commissioner’s guidelines and site applicability. Design for a minimum removal of 80% of TSS as compared to uncontrolled runoff or a discharge concentration not to exceed 80 mg/L Total Suspended Solids (TSS). This criterion is assumed to be met if extended detention time of the Channel Protection (CP) Volume is provided.
B. Channel Protection (CP)	The Channel Protection (CP) Criteria was developed to prevent or minimize the channel enlargement process in streams and rivers. The post construction runoff rate and volume for a site must not exceed up to the 2-yr 24-hr storm event. In areas with C/D soils, the site should be maximized for opportunities to reduce runoff (i.e., amended soils, harvesting, reuse) prior to allowing the option for extended detention. HOWEVER; in Saginaw County with its high seasonal water table and the effects of Lake Huron’s water level these methods will need to be proven to work in HIGH WATER conditions with NO ADVERSE effects to neighboring properties ¹ . Extended detention should focus on maximizing the volume reduction onsite and then detaining the remaining volume of the 2-yr 24-hr storm event with the release rate of 0.2 cfs per acre or the 1-yr 24-hr storm whichever is the lower rate. The CP is NOT required for the following waterbody: <ul style="list-style-type: none"> • Saginaw River

NOTE: See Engineered drains; see table 1 in Section II - Definitions

¹The SCPWC will require ground borings for determination of groundwater table on sites they feel may have issues with extended detention. This will be especially in times when the Lake Huron WSEL is above 579-ft (IGLD85). Also, use of the NRCS/USDA soils data banks and soils descriptions in the Saginaw Valley must be used to evaluate the groundwater table. This data will indicate seasonal water tables.

10. Design Criteria for Existing and Proposed Stormwater Collection

Proper sizing of storm sewers and open drains is accomplished by examining past rainfall data and projecting the amount of surface water runoff that can be expected from a precipitation event. In this study, the design rainstorm was chosen with a recurrence frequency of 10-years (10% recurrence interval). The amount of surface water runoff to be collected in storm sewers and open drains will be estimated using the Modified Rational Method.

11. Tampering or Removal of Stormwater Controls or Best Management Practices

No property owner or other party shall remove or modify any stormwater device or best management practice designed to restrict the flow of stormwater into a stormwater conveyance system or waters of the State. The removal or modification of a device or best management practice to restrict flows of stormwater can only be performed if the party responsible for the removal has had a detailed hydrology & hydraulic study done that provides proof of no significant impact on neighboring properties upstream or downstream of the site. The County Engineer, or other appointed designee, must approve this study. The party removing such a restrictor will be held liable for any water damage incurred on neighboring properties.

No property owner or other party shall remove or modify a best management practice that protects, preserves, or improves stormwater quality. The owner or their designee must obtain permission from the County to remove or modify a best management practice. If permission is not received in writing from the County, the owner or other party must replace the best management practice at their expense. It is the responsibility of every parcel owner to discharge the cleanest possible stormwater from their site as this water drains to the Great Lakes, and we all must take care to protect this water resource to the maximum extent possible.

B. Codes / Laws for Enforcement of Stormwater Management Requirements for Pollution of Surface Waters or MS4

Municipalities within Saginaw County have adopted or have the following as commercial / residential building enforcement procedures:

- 2012 or newer versions of the Michigan Plumbing Code,
- 2009 or newer versions of the Michigan Residential Code, or
- The International Property Maintenance Code of 2012, or newer versions.

These administrative procedures when adopted by a community provide the “**right of entry**” for the municipality’s inspector, code enforcement staff, or their designee to enter private property if a violation of the code is witnessed, visible, or quantifiable evidence is present to suggest that a violation exists on the property. If access is denied, and evidence of violation is present, then staff will obtain a warrant for entry if necessary.

Enforcement Venues for Townships, Cities and Villages:

PA245-1999 which amended PA230-1972 (the Stille-Derossett-Hale Single State Construction Code Act) established the “Single State Construction Code” whereby the entire state of Michigan is subject to a single “family” of construction codes **without** exception. This means that every portion of the State is subject to the 2012 Michigan Plumbing Code or most recently adopted version, and the 2009 Michigan Residential Code, or most recently adopted version, enforced either locally (as an authorized enforcing agency) or by the State Bureau of Construction Codes (BCC).

Since Code Enforcement and Property Maintenance is not a function enabled by PA230-72 and not otherwise mandated by state law, a local governmental unit would have to locally adopt the International Property Maintenance Code (IPMC) to lawfully enforce its provisions. If a municipal member has adopted, by ordinance, the IPMC then it enforces the IPMC through its Code Enforcement Program. See Table 1 below.

Additionally, if the municipality has a Code Enforcement Log that is marked above also. The Code Enforcement Log is a tracking mechanism used by communities to track violations and their outcome and will be used by that community as its tracking mechanism.

Table 1: Communities with Regulatory Mechanisms in place. NOTE: these can be found in the Collaborative Enforcement Response Procedure of the SASWA.

Community/County Agency	Building Code/Ordinances/ Code Enforcement	Code Enforcement Log	Ordinance or Code
<i>Municipalities</i>			
Bridgeport Charter Township	<i>Yes</i>	<i>Yes</i>	<i>Chap. 8, 14, 20, 32</i> http://www.bridgeportmi.org/index.php/code-of-ordinances?task=document.viewdoc&id=99
Buena Vista Charter Township	<i>Yes</i>	<i>Yes</i>	http://www.bvct.net/wp-content/uploads/2015/03/ord-inter.prop-code.updated.1.23.15.pdf <i>Chapter 34</i>
Carrollton Township & School District	<i>Yes</i>	<i>Yes</i>	https://www.municode.com/library/mi/carrollton_township_(saginaw_co.)/codes/code_of_ordinances <i>Section 14 & 58</i>
City of Saginaw	<i>Yes</i>	<i>Yes</i>	http://library.amlegal.com/nxt/gateway.dll/Michigan/saginaw/cityofsaginawcodeofordinances?f=templates\$fn=default.htm\$3.0\$vid=amlegal:saginaw_mi <i>Chapter 51, 52, 94</i>
City of Zilwaukee	<i>Yes</i>	<i>Yes</i>	https://www.municode.com/library/mi/zilwaukee/codes/code_of_ordinances?nodeId=COORZIMI <i>Chapters 6, 10, 30</i>
Saginaw Charter Township	<i>Yes</i>	<i>Yes</i>	https://www.municode.com/library/mi/saginaw_charter_township_(saginaw_co.)/codes/code_of_ordinances <i>Chapters 2, 14, 26, 78</i>
Thomas Township	<i>Yes</i>	<i>Yes</i>	https://www.municode.com/library/mi/thomas_township_(saginaw_co.)/codes/code_of_ordinances <i>Title 1, 8 and 9 (chap.8)</i>
Tittabawassee Township & School District	<i>Yes</i>	<i>Yes</i>	http://www.tittabawassee.org/code-of-ordinances.html <i>Chap. 14, 38,42, 66</i>
Saginaw County / SCPWC	<i>Yes, at local level</i>	<i>Yes, at local level</i>	<i>Use of Local Ordinance, Drain Code, or County Health Code</i>
Saginaw County Road Commission	<i>Yes, at local level</i>	<i>Yes, at local level</i>	<i>Use of Local Ordinance or County Health Code</i>

<i>Educational Institutions*</i>			
Bridgeport-Spaulding School District	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Saginaw ISD	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Saginaw Township Community Schools	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Saginaw Valley State University	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Swan Valley School District	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

Enforcement Venues for County Agencies/Departments:

The Saginaw County Road Commission (SCRC) and the Saginaw County Public Works Commissioner (SCPWC) do not have ordinance authority. However, the SCPWC has some authority to control water pollution in county drains provided by the State of Michigan Drain Code of 1956. The following are pertinent excerpts:

The Michigan Drain Code Public Act 40 of 1956 states:

Sec. 423. (1) A person shall not continue to discharge or permit to be discharged into any county drain or inter-county drain of the state any sewage or waste matter capable of producing in the drain detrimental deposits, objectionable odor nuisance, injury to drainage conduits or structures, or capable of producing such pollution of the waters of the state receiving the flow from the drains as to injure livestock, destroy fish life, or be injurious to public health.

(10) Failure to comply with any of the provisions of this section subjects the offender to the penalties described in section 602.

Sec. 602. If any person shall willfully or maliciously remove any section or grade stake set along the line of any drain, or obstruct or injure any drain, he shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding \$100.00 and the costs of prosecution, or in default of the payment thereof, by imprisonment in the county jail not exceeding 90 days.

The SCRC has limited authority under state law to control water pollution in statutory road right-of-ways. When evidence of an illicit discharge to a Road Commission ditch or drain is found, and voluntary correction is not forthcoming, the SCRC will contact the appropriate agency, depending on the nature of the illicit discharge, and work with the Saginaw County Public Works Commissioner, the County Health Department, the local unit of government, the local policing authority and/or the Department of Environment, Great Lakes, and Energy (EGLE) to require elimination. The EGLE has broad authority to control pollution, either directly or indirectly, to waters of the state provided by Part 31 of Act 451 of 1994.

Additionally, the Saginaw County Health Department has an enforceable County Public Health Code, as follows:

Excerpts from the SAGINAW COUNTY PUBLIC HEALTH CODE:

Section 2 — Authority, Jurisdiction and Administration

2.1 Authority. By virtue of the power vested in the Saginaw County Department of Public Health under Act 368, P.A. 1978, as amended, there are hereby provided regulations affecting the public health, safety, welfare and environmental quality of Saginaw County, including the provisions for violations of said regulations.

2.2 Jurisdiction. The Saginaw County Department of Public Health shall have jurisdiction throughout the County of Saginaw, including all cities, villages and townships in the administration and enforcement of these regulations and relevant State Laws including all regulations or amendments hereafter adopted unless otherwise specifically stated.

2.3 Enforcement. All premises affected by the requirements of these regulations shall be subject to the inspection by the Health Officer and the Health Officer may collect such samples for laboratory examination, make tests or take such photographs as he deems necessary for the enforcement of these regulations.

2.4 Right of Entry. No person shall refuse to permit the Health Officer, after proper identification, to inspect as deemed necessary in the enforcement of this Code, any property, public or private, located in the County of Saginaw for the purpose of obtaining information, conducting surveys or inspections, collecting samples, inspecting sewage disposal or water supply systems, or evaluating a premise to ensure compliance with any permits, requirements, codes, regulations, and enforcement actions at reasonable times nor shall any person molest, interfere, or resist the Health Officer in the discharge of his duty.

2.5 Abatement of Nuisances. Nothing stated in these regulations shall be construed to limit the power of the Health Officer toward the immediate abatement of a public nuisance or menace to the public health or of a condition, which in the opinion of the Health Officer may become a menace to the health of the community.

2.6 Interference with Notices. No person shall remove, mutilate, or conceal any notice or placard posted by the Health Officer, except by written permission of the Health Officer.

2.7 Validity. If any section, subsection, clause or phrase of these regulations is for any reason adjudged unconstitutional or invalid, it is hereby provided that the remaining portions of these regulations shall not be affected.

CHAPTER II Penalties Section 1 — Penalties

1.1 Any person who shall intentionally fail to comply with the provisions of these regulations as set forth in the Code or any part thereof shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding the sum of \$200.00 or by imprisonment in the County jail, not exceeding 30 days or both such fine and imprisonment at the discretion of the Court. Each day a violation is permitted to exist shall constitute a separate and distinct violation.

CHAPTER IV. – Sewage (wastewater) Disposal Regulations

Under Section 2 - Definitions:

2.10 Nuisance. “Nuisance” shall include but not be limited to any condition where effluent from any sewage disposal facilities is exposed to the surface of the ground or is permitted to drain on or to the surface of the ground, into any ditch, storm sewer, lake or stream, or when the odor, appearance or presence of this material has an obnoxious or detrimental effect on or to the senses or health of persons or when it shall obstruct the comfortable use or sale of adjacent property.

Section 6. – Individual Sewage Disposal Systems:

6.3 In the event of a failure of an existing onsite sewage disposal system, the Health Officer must be notified of the failure. Upon investigation of the cause of failure, the Health Officer may require repair specifications necessary to correct the problem and upgrade the system to be in compliance with this Code. At the discretion of the Health Officer, modifications to the required isolation distances, materials or size as stated in this Code may be applied if local conditions warrant and in cases where dimensions, site development, features, or site suitability create a challenge to comply with the requirements of this Code. In such event, modifications will be applied if the Health Officer finds that the public health would not be jeopardized.

Section 9 – Sewage of Unknown Origin

9.1 Whenever the Health Officer shall determine that improperly treated sewage is flowing or is being discharged from the outlet of any public or private drain into any public drainage system or surface water body so as to create a public health hazard, water pollution or nuisance, he shall notify in writing the person owning, leasing, or residing on such premises from which such sewage originates to connect such sewage flow to a sewage disposal system which complies with these regulations. At the end of such reasonable time as specified in the written notice, which has been served on the owner, lessee, or resident, the Health Officer shall cause the outlet of such drain carrying sewage to be plugged until such time as the source(s) of sewage have been eliminated or the sewerage system complies with the provisions of this Code.

Section 11 – Injunction

11.1 Notwithstanding the existence and pursuit of any other remedy, the Health Officer may maintain an action in the name of the County for injunction or other process against any person, firm, or corporation to restrain or prevent the construction, enlargement, or alteration of a sewage disposal system without a permit therefore, or the operation or conduct of a residence of a habitable building, structure or premise contrary to this regulation or the discharge of waste actually or potentially unsafe or hazardous to public health, life, property values or the public welfare into public stream, county drain, road ditch or upon the ground surface, creating a health hazard or nuisance.

STATE OF MICHIGAN - Responsibility

Public Act 451 of 1994 (NREPA) – Part 31 Water Resources

324.3103 Department of environmental quality; powers and duties generally; rules; other actions.

Sec. 3103.

(1) The department shall protect and conserve the water resources of the state and shall have control of the pollution of surface or underground waters of the state and the Great Lakes, which are or may be affected by waste disposal of any person. The department may make or cause to be made surveys, studies, and investigations of the uses of waters of the state, both surface and underground, and cooperate with other governments and governmental units and agencies in making the surveys, studies, and investigations. The department shall assist in an advisory capacity a flood control district that may be authorized by the legislature. The department, in the public interest, shall appear and present evidence, reports, and other testimony during the hearings involving the creation and organization of flood control districts. The department shall advise and consult with the legislature on the obligation of the state to participate in the costs of construction and maintenance as provided for in the official plans of a flood control district or inter-county drainage district.

(2) The department shall enforce this part and may promulgate rules as it considers necessary to carry out its duties under this part. However, notwithstanding any rule-promulgation authority that is provided in this part, except for rules authorized under section 3112(6), the department shall not promulgate any additional rules under this part after December 31, 2006.

(3) The department may promulgate rules and take other actions as may be necessary to comply with the federal water pollution control act, 33 USC 1251 to 1387, and to expend funds available under such law for extension or improvement of the state or interstate program for prevention and control of water pollution. This part shall not be construed as authorizing the department to expend or to incur any obligation to expend any state funds for such purpose in excess of any amount that is appropriated by the legislature.

(4) Notwithstanding the limitations on rule promulgation under subsection (2), rules promulgated under this part before January 1, 2007 shall remain in effect unless rescinded.

History: 1994, Act 451, Eff. Mar. 30, 1995; -- Am. 2004, Act 91, Imd. Eff. Apr. 22, 2004; -- Am. 2005, Act 33, Imd. Eff. June 6, 2005

Compiler's Notes: For transfer of authority, powers, duties, functions, and responsibilities of the Environmental Assistance Division to the Director of the Michigan Department of Environmental Quality, see E.R.O. No. 1995-16, compiled at MCL 324.99901 of the Michigan Compiled Laws. For transfer of authority, powers, duties, functions, and responsibilities of the Surface Water Quality Division to the Director of the Michigan Department of Environmental Quality, see E.R.O. No. 1995-16, compiled MCL 324.99901 of the Michigan Compiled Laws. For transfer of authority, powers, duties, functions, and responsibilities of the Waste Management Division to the Director of the Michigan Department of Environmental Quality, see E.R.O. No. 1995-16, compiled at MCL 324.99901 of the Michigan Compiled Laws.

Popular Name: Act 451

Popular Name: NREPA

Admin Rule: R 323.1001 et seq. and R 323.2101 et seq. of the Michigan Administrative Code.

II. DEFINITIONS

For the purpose of this Stormwater Management Design Requirements for the Saginaw County Public Works Commissioner, the following definitions are adopted:

1. *Allowable Discharge*: The maximum flow rate that can be discharged from a site, as calculated for design criteria in accordance with this Stormwater Management Plan.
2. *Base Flood Elevation*: The 100-year flood elevation as determined from Flood Insurance Rate Maps (FIRMs) or the best available information.
3. *Bankfull or Channel Protection*: The purpose of bankfull or channel protection criteria is to prevent habitat degradation and erosion in urban streams caused by an increased frequency of bankfull and sub bankfull stormwater flows. Channel protection seeks to minimize downstream channel enlargement and incision that is a common consequence of urbanization. The post construction runoff rate and volume for a site must not exceed up to the 2-yr 24hr storm event. In areas with C/D soils, the site should be maximized for opportunities to reduce runoff (i.e., amended soils, harvesting, reuse) prior to allowing the option for extended detention. HOWEVER; in Saginaw County with its high seasonal water table and the effects of Lake Huron's water level during high water level cycles (WSELs above 579-ft IGLD-85) these methods will need to be proven to work in HIGH WATER conditions with NO ADVERSE effects to neighboring properties. For additional evaluation designers need to determine historical situation on the sites, especially near the rivers. Also, use of soils drainage data and groundwater tables from the soil's descriptions from the NRCS/USDA soils data bases. Extended detention could focus on maximizing the volume reduction onsite and then detaining the remaining volume of the 2-yr 24-hr storm event with the release rate of 0.2 cfs per acre of the 1-yr 24-hr storm whichever is the lower rate Typical design is not to exceed the pre-development rate and volume for all storms up to the 2-yr, 24-hr storm at the site. At a minimum, pre-development is the last land use prior to the planned new development or re-development. Exclusions to this standard are the following; The Great Lakes or connecting channels of the Great Lakes; Rouge River downstream of the Turning Basin; Saginaw River; Mona Lake and Muskegon Lake (Muskegon County); and Lake Macatawa and Spring Lake (Ottawa County). Source: *MDEQ WRD – MS4 Program – Post Construction Stormwater Runoff Controls Program, compliance assistance document, pg 12*
4. *Best Management Practices (BMPs)*: Structural, vegetative, or managerial practices used to protect and improve the quality of surface water and groundwater.
5. *Bio-filtration*: A system comprised of native plants and amended soils with an underdrain that goes to a detention area. The system is designed to receive stormwater runoff and clean it via a filtration process and slow the runoff by letting it percolate through the amended soils to reach an underdrain, which then conveys it to a detention area. The system is designed to remove sediment and pollutants from stormwater before discharge.
6. *Bio-swales*: Drainage channels that divert runoff water from the storm sewer into a natural area where native wetland plants help absorb and recycle it. Plants like grasses, rushes, native plants, other water and drought tolerant flowers and bushes are commonly found in bio-swales because they help to trap the water and force it to absorb, rather than flowing through the bio-swale to the other side. It should be noted that these systems are generally

dry most of the time and do not have standing water in them.

7. *Conduit*: Any channel, pipe, sewer, or culvert used for the conveyance or movement of water, whether open or closed.
8. *Control Elevation*: Contour lines and points of predetermined elevation used to denote a detention storm area on a plat or site drawing.
9. *Detention Facility*: A facility constructed to provide detention storage.
10. *Detention Storage*: The temporary detaining or storage of stormwater in a storage basin, on rooftops, in streets, parking lots, school yards, parks, open space, or other areas under predetermined and controlled conditions, with the rate of drainage regulated to the allowable discharge by appropriately installed devices. These detention storage areas shall not be considered regulated wetlands as there is no connectivity other than man-made.
11. *Developer/Owner Engineer*: The engineering company formally designated by the Developer/Owner to act as their Engineer.
12. *Development*: The construction of a building, parking lot, structure, etc. on a piece of land or otherwise changing the use of a piece of land.
13. *Discharge*: The release or outflow of water from any source.
14. *Drainage Area*: The area from which stormwater runoff is conveyed to a single outlet (i.e. a watershed or catchment area).
15. *Easement*: A parcel of land on which the owner has granted rights-of-way to make surveys, construct, maintain, operate, alter, replace, repair, and remove at any time that part of the storm drainage system located within the easement. The landowner will not be allowed to construct buildings or other structures on said easement without the written consent of the easement grantee.
16. *Emergency Overflow*: A hydraulic control structure used to control the location and flow direction of stormwater which is either in excess of the required detention storage or is due to a failure in the site's stormwater management system. The emergency overflow shall be directed to a public road right-of-way or to an available municipal storm drainage system. This feature must be labeled on the design plans and an elevation provided. It is the design engineer's responsibility to assure no detrimental effects to neighboring parcels.
17. *Emergency Overflow Elevation*: The elevation at which emergency overflow is activated. This elevation is recommended to be at least one foot below finished floor elevation of nearby buildings, even if on adjacent parcels. This elevation must be labeled on the design plans.
18. *Engineer*: A civil engineer that is licensed to work in the state of Michigan or a person who is working under the direct supervision of a civil engineer licensed to work in Michigan.
19. *Engineered Drains*: These are designed or engineered drains in Saginaw County which are in extremely flat areas with little slope and discharge into the Saginaw River by pump stations, they are linear detention areas and in periods of high-water elevations only flow when pumps

are activated. If the pumps are shut off the only flow may be as the linear detention is filling or if the flap valve can allow water to flow out of the drain into the river during low water levels. The following is a list of those drains in Saginaw County.

Table 1. Engineered Drains in Saginaw County

Drain	Location	Latitude (N)	Longitude (W)
Bridgeport Drain	Bridgeport Charter Township	43.356222	-83.880870
Gage No. 1 Drain	Buena Vista Township	43.469995	-83.907335
Saginaw Zilwaukee Drain	City of Zilwaukee	43.493830	-83.906618
Universal Drain	City of Zilwaukee	43.468888	-83.917127

These drains are also considered waters of the state and direct discharges from new development or re-development are not subject to the MS4 permit requirements and therefore the post construction control requirements.

20. *Excess Stormwater Runoff*: The volume and rate of flow of stormwater discharged from a drainage area, which is in excess of the allowable discharge.
21. *Floodplain*: The special flood hazard lands adjoining a watercourse, the surface elevation of which is lower than the Base Flood Elevation and is subject to periodic inundations determined from Flood Insurance Rate Maps (FIRMs), or the best available information. A parcel of land can be located within a floodplain without being shown on a FIRM map.
22. *Impervious Factor (IF)*: The percentage of impervious surface specific to a site that the existing storm drain outlet has been historically designed to convey. The **IF** is used to calculate the allowable discharge from a site. Proposed developments or re-developments will not be allowed to discharge stormwater at a rate, which is greater than the runoff that would occur from the site with the percentage of impervious surfaces defined by the impervious factor. Refer to the County for established **IF values**, if applicable.
23. *Impervious Surface*: A surface that does not easily allow the infiltration or penetration of water. During rainstorm events, a large percentage of water will runoff. (Typically considered as rooftops, paved walks, roadways, driveways, sidewalks, parking lots, etc.)
24. *Low Impact Development*: Implementation of developmental strategies or best management practices in a manner that maintains pre-development hydrology, or decreases runoff quantity, and improves runoff quality. It is recommended that the *Low Impact Development Manual of Michigan* be used as a design standard. This document is available for download from the following website: <http://www.semcog.org/LowImpactDevelopment.aspx>
25. *NPDES*: National Pollutant Discharge Elimination System. In 1987 the Clean Water Act (CWA) was amended and required to implement a program that would address pollutants being discharged to the nation's waters. This now includes stormwater discharges into waters of the nation/state. The Saginaw County Public Works Commissioner has an NPDES stormwater discharge permit as required by the State of Michigan in compliance with the CWA.

26. *Peak Flow*: The maximum rate of flow of stormwater runoff at a given location.
27. *Percent Imperviousness (IMP)*: The actual proposed percentage of impervious surface for a proposed development or re-development. The **IMP** is used to calculate the design discharge (**Q_a**). The design discharge is used to determine storm sewer sizes and required detention volumes.
28. *Pervious Surface*: A surface that allows infiltration or penetration of water. During rainstorm events, a percentage of water will infiltrate into the surface with the remaining stormwater running off. The percentage of runoff is dependent on the type, slope, percent saturation, etc. of the surface. (i.e. lawns, farm fields, parks, wooded areas, golf courses, etc.). Design personnel should attempt to maximize these surfaces as much as possible.
29. *Rain Gardens*: A depressed area of a size that is determined by specified engineering guidelines with amended soils and specific plants, shrubs, and trees that have a specific volume to store stormwater runoff. The site can be underdrained to increase performance. Use of Michigan's Low Impact Development Design Manual is recommended for design purposes, located at: <http://www.semcog.org/LowImpactDevelopment.aspx>
30. *Rear lot drainage*: A stormwater system designed to provide drainage in rear lot areas to prevent water from ponding for extended periods of time. It must be noted that these systems are not designed to convey stormwater in a rapid manner. These systems are NOT part of the MS4 or a county drain. This system is a deliberately designed system which can provide additional detention capabilities during severe runoff conditions. It is a system that in condos or subdivisions is the responsibility of the homeowner's / condo association to maintain. It is constructed for the benefit of homeowners to assist with property drainage. It is not the Saginaw County Public Works Commissioner's responsibility. However, the township or municipality may repair the system if necessary, to prevent damage to neighboring properties, but all associated repair costs, plus a 25% administrative fee will be assessed to the owner or homeowner / condo association.
31. *Restrictor*: A hydraulic control structure used to restrict the stormwater discharge from the site to the allowable discharge of the site as determined by this plan. Simple restrictors such as the orifice or metering line are outlined in this plan. For more complex restrictors a stage/storage/discharge relation shall be required in the complete submittal and may alter the storage requirements for the site.
32. *Re-development*: Altering, improving, reconstructing or otherwise changing the use of an existing developed property. A site will be considered a re-development for this Stormwater Management Design Requirements when an area greater than or equal to 5% of the existing developed portion of the site (i.e. roof, gravel, & paved surfaces) or, an area greater than 20,000 square feet is increased or reconstructed with roof, pavement, or any other impervious surface.
- NOTE:** this percentage is cumulative. If re-development is 2% one year and 3% at another time, this will meet the 5% rule. Also, at times, less than 5% can create drainage problems, and the County Engineer or designated designee may require additional detention or storage based on historical or anecdotal problems on a site.
33. *Retention Storage*: The permanent retaining or storage of stormwater in a storage basin, on rooftops, in streets, parking lots, schoolyards, parks, open space, or other areas under

- predetermined and controlled conditions. The only discharge of stormwater from the retention storage area is by ground infiltration, evaporation, etc. An emergency overflow must be provided in the event the capacity of the retention facility is exceeded. These retention storage areas shall not be considered regulated wetlands, as there is no connectivity to surface waters.
34. *Saginaw Area Storm Water Authority (SASWA)*: The SASWA was formed by the NPDES Phase II communities in Saginaw County. The Authority provides communities with information on stormwater education, issues and regulations. The website address is: www.saswa.org
 35. *Stormwater Management Plan (SWMP)*: Also known as post construction controls, this is a site specific stormwater runoff drainage plan developed specifically for individual sites. The plan includes calculation of allowable and restricted discharge rates, detention/retention volume, restrictor sizing, size of pipes, or conveyance devices and a train of best management practices to provide for discharge of clean stormwater runoff from a site.
 36. *Stormwater Runoff*: The water from a rainstorm or snowmelt, which flows over the surface of the ground or is collected in a drainage system.
 37. *Sub-Surface Detention Storage*: Detention storage that is provided in underground storage facilities such as pipes, arch systems (Cultec, Stormtech, or similar), or tanks. Detention storage within aggregate bedding will not be accepted unless geo fabric is used to keep sediment out of the void spaces. Use of underground storage facilities warrants calculations submitted for the system along with maintenance of the system included in the submitted Operation and Maintenance Plan and signed agreement.
 38. *Ten-Year Design Storm*: A precipitation event with a duration equal to the time of concentration, having a ten percent probability of occurring in any given year or occurring once every 10 years on average. This amounts to approximately 3.46 inches of rain in 24 hours. But, brief, intense storms of 10-year design can range from 1.71 inches in 1 hour to 3.05 inches in 12 hours. (Source: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mi)
 39. *Time of Concentration (T_c)*: The elapsed time for stormwater runoff to flow from the most hydraulically distant point in a drainage area to the outlet or other predetermined point.
 40. *Engineer*: The civil engineer or civil engineering firm formally designated by the Saginaw County Public Works Commissioner or another designated designee to act as their Engineer. This person or firm must have qualifications suitable for review of stormwater management plans and knowledgeable with NPDES Phase II regulations in the State of Michigan.
 41. *Underdrain*: Consists of perforated drainage tile with either slot cuts or holes along the lateral haunch and covered with a sock or other means to prevent sediment from entering the pipe. These drains are placed below the grade of detention basins that have flat slopes to assure complete drainage of the detention basin or other structure. This will prevent the basin from being continuously wet and allow for mowing of the basin or care of the structure. Also used in underground storage systems to prevent ground water from taking up storage volumes. This will apply to basins that do not meet the 1% minimum slopes for the bottom of the basin.

42. *Upland Area:* Land located in the upper portion of a watershed whose surface drainage flows toward the area being considered for development.
43. *Urbanization:* The development, change, or improvement of any parcel of land consisting of one or more lots for residential, commercial, industrial, institutional, recreational, or public utility purposes.
44. *Urbanized Area:* An area designated by the US Census Bureau, which has specific rules and regulations concerning stormwater under the NPDES Phase II regulations. This regulated area may require adherence to specific water quality requirements.
45. *Watercourse:* Any natural or artificial stream, river, creek, channel, ditch, canal, conduit, culvert, drain, waterway, gully, ravine, street, roadway, swale, or wash in which water flows in a definite direction, either continuously or intermittently.
46. *Waters of the State:* Means any of the following: The Great Lakes bordering the State and their connecting waters, all inland lakes, rivers, streams, impoundments, open drains, wetlands, and other surface bodies of water within the jurisdiction of the state, including wetlands as defined by Part 303 of PA 451 of 1994. In Saginaw County, that would include streams that have a defined bed and bank, and established flow, naturally established and engineered county drains, and including but not limited to, the Saginaw River, Cass River, Flint River, Bad River, Swan Creek, and the Tittabawassee River.
47. *Water Quality volume:* Is the volume of one (1) inch of rain from the area contributing storm runoff. The water quality volume (aka first flush) of a rain event typically carries the most pollutants to our storm sewer system and ultimately to our rivers, lakes and streams. This water quality volume must be discharged over a 24-48-hour period of time to settle out pollutant loads (minimum 1-inch diameter) or discharge through an engineered infiltration system or treatment which can meet water quality goals. The Low Impact Design Manual for Michigan has an option to treat the first one inch of runoff from all impervious contributing areas and 0.25 inches of runoff from all disturbed contributing pervious areas.

III. REVIEW PROCESS AND PROCEDURES

A. Review Procedures

These Design Requirements are applicable to all development projects that disturb at least one or more acres, including projects less than an acre that are a part of a larger common plan of development or sale and discharge into the applicant's MS4 subject to review and approval of the Saginaw County Public Works Commissioner and over which the Saginaw County Public Works Commissioner has jurisdiction or the local jurisdiction has adopted these requirements and have an agreement with the Saginaw County Public Works Commissioner to act as their review agency. These Design Requirements are only for industrial, commercial, non-residential development, or platted subdivisions or condominium complex development or re-development. These Design Requirements are not to be applied to single family or duplex residential structure or other multi-family residences that are constructed on a parcel that is not part of a subdivision or condominium project. Any questions regarding this should be referred to the Saginaw County Public Works Commissioner's office for clarification. These Design Requirements provide minimum requirements for developments covered under the Stormwater Management Design Requirements, provided,

however, that the Saginaw County Public Works Commissioner reserves the right to deviate from the specific design requirements set forth in the Design Requirements when, on a case-by-case basis, such deviation is appropriate or necessary in order to accommodate the goals and purposes underlying these Design Requirements. These requirements and their implementation are designed to promote low impact designs such as bio-swales, rain gardens or other types of management of stormwater runoff.

The Saginaw County Public Works Commissioner, or another appointed designee, shall review all plans for development of subdivisions, multiple family projects, commercial, and industrial sites for compliance with the County's regulations for stormwater management, as recommended in the Stormwater Management Design Requirements.

The Saginaw County Public Works Commissioner, or another appointed designee, shall designate a review Engineer who will provide the services required to assure that all the requirements of the plan and the ordinance are being met. The Engineer shall review the Developer's plan and submit a report to the Saginaw County Public Works Commissioner showing the acceptance or rejection of the proposed site drainage plans, calculations, best management practices for discharge of clean stormwater and an operation and maintenance place with signed agreement.

A site will be considered in compliance with the Stormwater Runoff Regulation and Control Ordinance when an approval of the site's Stormwater Management Plan and post-construction stormwater runoff BMPs has been completed. The County will not accept runoff into drainage systems located within the County's jurisdictional areas from newly developed or re-developed sites without compliance with the Stormwater Management Design Requirements. **Developers or Builders should not install the stormwater system unless they are working from a set of plans that have been stamped as "APPROVED"** with appropriate signature from the Saginaw County Public Works Commissioner's Engineer or other appointed designee.

To comply with the Saginaw County Public Works Commissioner's Stormwater Management Design Requirements, complete the following process and deliver or mail all submittals to the **Saginaw County Public Works Commissioner, Saginaw County Courthouse at 111 South Michigan Avenue, Saginaw, MI 48602:**

A complete submittal package for a stormwater review consists of:

- Associated fee for stormwater review for the site
- A completed Stormwater Discharge Permit Application
- A completed Drainage Checklist
- One (1) set of Site Plans
- One (1) set of calculations
- One DIGITAL set of site plans and calculations, which may be emailed or delivered on a digital storage device (e.g. flash drive, CD, DVD, etc).
- If applicable, a signed Stormwater Management Operation and Maintenance Plan and Agreement. This will include the maintenance and schedule for all structural stormwater controls being implemented on the site (i.e. detention basins, underground storage detention basin systems, catch basins, vegetated swale, restrictors, spill plan, etc.).

1. Pre-Design Meeting/ Conceptual Review

This meeting, at a minimum, shall consist of the Developer's Engineer and the County's Engineer, or another appointed designee. The purpose of the meeting is to address the various stormwater

management proposals of the developer. Conceptual stormwater management alternatives can be discussed and potential problems addressed prior to the design phase of the project. The goal of the meeting is to eliminate potential problems up front and reduce the time and costs needed for the design and review of the project.

This meeting will be required for all platted developments, condominium projects, and site developments larger than five (5) acres. It is recommended other site development projects have this meeting or at a minimum correspond with the County's Engineer, or other designee, by phone, e-mail, and/or facsimile regarding conceptual design alternatives prior to submitting for formal review.

The Developer's Engineer and/or SCPWC's Engineer, or other appointed designee, should have in his/her possession, or have an understanding of, the following information prior to attending the pre-design meeting:

- a. The drainage district or area in which the proposed development is located and the outlet condition for the proposed development. This information can be obtained from the Saginaw County Public Works Commissioner.
- b. Small location map showing where the site is situated.
- c. Location and description of activities that may impact or be impacted by the proposed development or re-development both on and off the site.
- d. Acreage of the total site and an estimate of the area tributary to the proposed storm drainage system, including offsite runoff. (Include detention, retention, etc.)
- e. The size and location of the proposed storm drainage outlet and information on contributing area.
- f. If known, a conceptual layout of the proposed storm drainage system for the development or re-development.

If required, the Owner/Developer and his/her technical consultant shall attend a land development advisory committee (LDAC) meeting. The intention of this meeting is to obtain uniform direction and communication to minimize misdirection of early construction and minimize financial losses to proprietors, developers, and consultants.

If the conceptual layout of the storm drainage system is agreed upon by the County Engineer or other appointed designee and the Developer's Engineer, the Owner/Developer shall begin completing plans and calculations for formal review by the SCPWC or another appointed designee.

2. Formal Review

- a. The Owner/Developer or representative shall submit one (1) set of plans, one (1) set of calculations, one (1) digital copy of plans & calculations, a copy of the completed checklist, a completed Stormwater Discharge Permit Application, an **operation and maintenance plan with signed maintenance agreement** for the Stormwater Management Plan, if applicable, and any other supporting information for the site to the SCPWC's Engineer, or other appointed designee. The plans and calculations shall comply with the requirements of these Stormwater Management Design Requirements. The checklist, design calculations, and design

requirements that will be used during the formal review process are established by these Stormwater Management Design Requirements.

- b. Submit deposit/fee for Stormwater Management Plan review and inspection to the Saginaw County Public Works Commissioner's Office in accordance with the current fee schedule established by the SCPWC's Engineer.
- c. Formal review and approval will not begin until all items required for application have been received. The proposed drainage system will be either approved or rejected with reason and returned to the owner/ developer.
- d. The SCPWC's Engineer, or other appointed designee will review all plans, calculations, and other information for compliance with the County's design guidelines. All materials will be reviewed for completeness. Calculations will be checked. The minimum design calculations and design requirements outlined in this document and additional supporting documents pertaining to required calculations will be used for review. The drainage plan checklist will be reviewed.
- e. Furthermore, the SCPWC's Engineer, or other appointed designee, will review how the developer meets the performance standards and ensures long-term operation and maintenance of BMPs based on the signed maintenance plans submitted with all construction plans. The SCPWC's Engineer, or other appointed designee, will review the submitted evaluation of cost-effective structural and non-structural BMPs, if applicable, and the BMPs utilized on all new or re-development sites to minimize post construction impacts on water quality.
- f. A typical review will take approximately two (2) weeks to complete from the date the plan is submitted in complete form.

If the proposed drainage system is rejected, one (1) set of revised plans and one (1) set of revised calculations will need to be resubmitted; this can be done digitally via email. A completed checklist will also have to be resubmitted along with any revisions to the operation and maintenance plan with signed maintenance agreement, if applicable.

B. Plan Approval

Once the Stormwater Management Plan has been recommended for approval by the SCPWC's Engineer, or other appointed designee, a recommendation for approval letter will be sent to the Saginaw County Public Works Commissioner only if the review is performed by another designee. A copy of the letter will be forwarded to the Developer and local government's planning and building departments. The approval letter will include, if necessary, inspection and compliance requirements and any additional supporting information for the site. Additionally, an approved Stormwater Discharge Permit Application will be provided to the Developer by the Saginaw County Public Works Commissioner. It is the developer's/owner's responsibility to assure the APPROVED plans are provided to the contractor for construction. Any errors in resulting from the use of unapproved plans is the financial responsibility of the owner or developer and must be corrected to reflect the approved plans.

C. Changes to Plan after Approval

1. Any changes made to the approved plan after issuance of the stormwater permit shall require one (1) set of plans submitted to the SCPWC's, or other appointed designee, for review and approval.

2. Upon receipt of this information, it will be determined if additional information, such as calculations, revised checklist, updates to the operation and maintenance plan and signed agreement, if applicable, etc. will be required.
3. A building or occupancy permit will not be issued until all changes have been approved and the SCPWC, or other appointed designee, has received all review fees.

D. Inspection/Letter of Certification Requirement

Inspection of storm sewer systems and/or detention facilities (including underground storage detention basins/vaults) will be required on all development and re-development projects. The extent of the inspection will depend on the size and type of the development or re-development. Descriptions of these inspection requirements are outlined below. Specific inspection requirements, including the frequency of inspections, will be outlined on the approval letter. The fees associated with this inspection are included in the original deposit.

1. **Small Developments/ Re-developments** (*1 acre or more or less than 5 acres or less than one acre that is part of a larger common plan of development or sale*) - A general site inspection of the restrictor and the detention storage areas by the SCPWC's Engineer, or other appointed designee, will be required. This one-time inspection will be performed at the completion of the project. Subsequent inspections may be required if deficiencies exist. The fees for inspections will be established by the SCPWC.

A letter of certification will have to be completed by the developer's engineer indicating the stormwater drainage system and structural stormwater controls have been constructed as shown on the approved Stormwater Management Plans and all structural stormwater controls are included in the operation and maintenance plan with signed agreement. A building or occupancy permit will not be issued until a letter of certification has been received by the SCPWC's Engineer, or other appointed designee, and the final approved inspection of the site has been completed by the SCPWC's Engineer or designee.

2. **Large Developments/ Re-developments** (*5 acres and greater*) – Periodic site inspections of the storm sewer, outlet, restrictors, and detention storage areas may be required by the SCPWC's Engineer, or other appointed designee. Specific items needing inspection prior to the completion of the project will be identified in the approval letter (i.e. installation of restrictors, restricting pipes, etc.). The SCPWC's Engineer, or other appointed designee, shall be informed twenty-four (24) hours in advance of the placement of items requiring inspection as outlined on the stormwater management permit.

A final inspection of the restrictor and the detention storage areas by the SCPWC's Engineer, or other appointed designee, will be required. This one-time inspection will be performed at the completion of the project. Subsequent inspections may be required if deficiencies exist.

A letter of certification will have to be completed by the developer's engineer indicating the stormwater drainage system and structural stormwater controls has been inspected during construction, the drainage system was constructed as shown on the approved Stormwater Management Plans and all structural stormwater controls are included in the operation and maintenance plan with signed agreement. A building or occupancy permit will not be issued until the SCPWC's Engineer, or other appointed designee, has received a letter of certification and the SCPWC's Engineer, or other appointed designee, has completed the final approved

inspection of the site.

3. **Any Single Family, Two Family, or Multi-Family Development Projects (Plats)** – Weekly, bi-weekly, or as-needed inspections will be negotiated for inspections of the storm sewer and drainage system construction for platted subdivision or condominium developments. The municipality / township may require more inspection time. This inspection shall be performed by the SCPWC’s Engineer, or other appointed designee. Daily inspection reports shall be completed for all days on which construction of the stormwater drainage system and structural stormwater controls occurs. These daily inspection reports do not have to be submitted to the SCPWC’s Engineer, or other appointed designee. However, they should be on file with the design engineer and made available upon request.

A final inspection of the best management practices, structural controls, restrictor and the detention storage areas by the SCPWC’s Engineer, or other appointed designee, will be required. This one-time inspection will be performed at the completion of the project. Subsequent inspections may be required if deficiencies exist.

A letter of certification will have to be completed by the developer’s engineer indicating the stormwater drainage system and structural stormwater controls have been constructed as shown on the approved Stormwater Management Plans. A building or occupancy permit will not be issued until the SCPWC’s Engineer, or other appointed designee, has received a letter of certification and the SCPWC’s Engineer, or other appointed designee, has completed the final approved inspection of the site.

E. Fee Schedule

The fee schedule for reviewing storm drainage submittals and performing inspections of drainage system construction shall conform to the current fee structure established by the Saginaw County Public Works Commissioner. This fee schedule will be reviewed on an annual basis and fees may be adjusted if deemed necessary. Communities adopting these design standards may set up their own fee schedule to cover their costs as necessary and should be reviewed annually.

The fee schedule for reviewing storm drainage submittals and performing inspection of drainage system construction can be found in Appendix A.

IV. STORM DRAINAGE SYSTEMS WITHIN SAGINAW COUNTY

Within Saginaw County there are drains that fall under several different agencies jurisdiction. These include the following:

- A. **Established County Drains** - Work done directly on or connected to these drains falls under the jurisdiction of the Saginaw County Public Works Commissioner. Preliminary and final plat approval requires a signature and review from the Public Works Commissioner. However, many site plan developments, condominiums, etc. that impact established county drains are not submitted for review to the Saginaw County Public Works Commissioner, but are reviewed at the township or municipal level.
- B. **County Roadside Drains** - There are many drains that fall under the jurisdiction of the Saginaw County Road Commission. When a crossing is installed over a county roadside drain, a permit or

permission must be obtained from the Saginaw County Road Commission. A copy of this permit must be provided to the SCPWC and local municipality.

- C. Michigan Department of Transportation (MDOT) - There are several drains that are located along M-52, M-13, M-46, M-81, M-47, M-58, M-83 and M-84 which fall under the jurisdiction of MDOT. Any development that proposes to use these drains for a stormwater outlet must obtain a permit from MDOT. As part of this permit, stormwater detention and water quality BMPs may be required. A copy of this permit application is available at the website address located in Appendix B of this document. The Saginaw County Public Works Commissioner must additionally review the development and/or re-development as well for approval. The Developer must provide the SCPWC and local municipality a copy of the approved MDOT permit once it has been received.
- D. Michigan Department of Environment, Great Lakes, and Energy (EGLE) - The EGLE regulates any work done within the 100-year floodplain, wetland, and/or any inland lakes or streams. A copy of the EGLE /USACE Joint Permit application for a site to discharge to waters of the State of Michigan or within 500 feet of inland lakes or streams, as well as wetlands, is provided from a website address that can be found in Appendix B. These EGLE Joint Permit Applications must be completed and submitted on the EGLE's MiWaters online database system. A copy of this permit must be posted on the construction site and a copy should be provided to the SCPWC if it involves their drainage system and the local municipality.

Each of the agencies listed previously have their own design criteria for reviewing proposed developments, re-developments and drainage improvements. These criteria are not always consistent with the stormwater requirements of the County as a whole. For example, the MDOT is concerned about the proper drainage of the roadway and sub-base of the road; a permit may be obtained to discharge a large quantity of water to a road side drain not causing a problem now, but may not leave any additional stormwater outlet capacity for future development upstream. For these reasons, it is very important that the SCPWC's Engineer, or other appointed designee, review all proposed developments, re-developments and drainage improvements to assure that the proposed stormwater management is consistent with the future plans of the County or local municipality.

V. DESIGN CALCULATIONS

A. Allowable Discharge Rate (Q_a) and 10-Year Design Discharge (Q_{d10})

The NPDES Phase II program requires that the post-construction runoff rate and volume of discharges do not exceed the pre-development rate and volume for all storms up to the 2-year, 24-hour storm for the site. The peak stormwater discharge from any proposed development or re-development as required in these Design Requirements shall be restricted to an allowable discharge (Q_a). The allowable discharge from the proposed area of development or re-development cannot exceed the calculated discharge from the proposed site based on methods listed within the SCPWC's excel calculation spreadsheets. The method resulting in the lowest allowable discharge from the site shall be used in determining the required detention. If it is determined the existing runoff from the drainage district is at or exceeding the capacity of the downstream storm sewer or drain the proposed development or re-development will, at a minimum, have to be restricted to existing conditions.

The storm water discharge rate from any proposed development or redevelopment site in Saginaw County discharging to a county drain under jurisdiction of the SCPWC shall be restricted to an

allowable discharge rate (Qa). The allowable discharge required by Unit Allowable Discharge (qa) as provided herein.

Calculate the allowable discharge (Qa) in cubic feet per second (cfs):

$$Q_a = (qa)(A_{site})$$

a - Allowable Discharge Rate (cfs).

qa = 0.2 cfs/acre is the Unit Allowable Discharge rate¹

A_{site} - Proposed site area or contributing area in acres

The site's pipe sizes, and emergency overflow must be able to convey the 10-year storm event (Q_{d10}) under proposed conditions. This discharge can be determined using the rational or modified rational method.

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

Q is the runoff rate in cubic feet per second (cfs).

C is the coefficient of runoff.

I₁₀ is the intensity of rainfall in inches per hour (in. / hr.).

A is the contributing area of the site in acres (acres).

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to the Saginaw County Public Works Commissioner, or appointed designee. This is available at the following websites: <http://www.saginawcounty.com/PublicWorks/Default.aspx> (or contact the SCPWC's Engineer or appointed designee for the excel spreadsheet) and <http://www.saswa.org>.

¹NOTE: this rate is more restrictive than the 2yr-24hr discharge rate for a 1 acre parcel HSG of C and Open Space – RCN 74 (0.58 cfs).

B. Stormwater Detention Requirements

The stormwater detention storage required for a site is to be calculated using the Saginaw County Public Works Commissioner's excel spreadsheet; this can be obtained at the following websites:

<http://www.saginawcounty.com/PublicWorks/Default.aspx>

<http://www.saswa.org>

In order to meet the stormwater quality discharge requirements of Phase II of Section 10 of the Clean Water Act and to meet the Environmental Protection Agency's stormwater guidelines, designs must provide for stormwater treatment. This can be accomplished by implementation of one of the following measures:

1. On systems that utilize a stormwater detention basin, a sediment forebay retention area or engineered filtration can be utilized within the detention facility. This forebay area, if required, may be in addition to the stormwater 10-yr design detention requirements equal of 1-inch of runoff from the contributing area of the site (see the calculation spreadsheet). The forebay must be designed to remove a minimum 80% of total suspended solids.

2. Rain gardens or an equivalent low impact design approach can be utilized that provides a soil or media filter for the water prior to entering the storm drainage system or storm detention system. The utilization of this type of treatment measure does not require the additional capture of 1-inch of runoff from contributing surfaces above the detention requirement for the site.
3. Mechanical treatment devices designed to remove suspended solids and other debris. Mechanical treatment devices include specially designed treatment units that will remove 80% of the total suspended solids for a 2-year 24-hour storm event from the site's contributing area.

Discharge Restrictor Requirements

Restrictors are required to regulate the discharge of stormwater to the allowable discharge rate established for a site. The circular in-line restrictor is sized based on the orifice formula.

$$a = \frac{Q_a}{0.62 * (64.4 * \Delta h)^{0.5}}$$

a = area of orifice (sq. ft.)

Δh = head differential from center of orifice to Hydraulic Grade Line of detention pond at maximum capacity, (ft.).

Water Quality Requirements

All site development projects are required to detain the water quality volume, which is defined as 1-inch of runoff over the area contributing storm runoff (A) for new development or re-development. C_w is the weighted runoff coefficient for the site. Use Table 1, Appendix D to calculate this variable. This volume will be calculated as:

$$3630 \times A \times C_w = \text{WQ volume}$$

This volume must be held for more than 18 hours but not more than 24 hours. The average allowable release rate for runoff resulting from 1.0 inch of rain in 24 hours is calculated as follows:

$$Q_{\text{fr}} = \frac{\text{Volume}}{(24\text{hr}) * \left(\frac{3600\text{sec}}{1\text{hour}}\right)} = \frac{V}{86,400\text{sec}}$$

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to the Saginaw County Public Works Commissioner, or appointed designee. This is available at the following websites: <http://www.saginawcounty.com/PublicWorks/Default.aspx> (or contact the SCPWC's Engineer or appointed designee for the excel spreadsheet) and <http://www.saswa.org>.

Channel Protection Criteria (Discuss with SCPWC Engineer if site needs this requirement)

The purpose of bankfull or channel protection criteria is to prevent habitat degradation and erosion in streams caused by an increased frequency of bankfull and sub-bankfull stormwater flows. Channel protection seeks to minimize downstream channel enlargement and incision that is a common consequence of urbanization. Typical design is not to exceed the pre-development rate and volume for all storms up to the 2-yr, 24-hr storm at the site. At a minimum, pre-development is the last land use prior to the planned new development or re-development. Waterbodies excluded to this channel protection performance standard are the following; Saginaw River, based on the

document sited in the definitions section. Contact the Saginaw County Public Works Commissioner's Engineer upon determination of bankfull flood requirements when dealing with Saginaw County drains. Drains which may be excluded are specifically engineered drains which discharge to the Saginaw River via pump stations, e.g. Universal, Gage, Saginaw Zilwaukee, etc, see Engineered Drains in definition section.)

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to the Saginaw County Public Works Commissioner, or appointed designee. This is available at the following websites: <http://www.saginawcounty.com/PublicWorks/Default.aspx> (or contact the SCPWC's Engineer or appointed designee for the excel spreadsheet) and <http://www.saswa.org>.

VI. DESIGN REQUIREMENTS

A. Requirements

1. General Requirements

- a. Stormwater detention requirements for any new construction development, re-development, or land use change occurring within Saginaw County will be determined according to these stormwater management design requirements and additional supporting documents pertaining to calculation requirements.
- b. The peak runoff rate during a 10-year storm event from a developed or improved site shall not exceed the allowable discharge rate (Q_a). This rate is determined as outlined in the design calculations section and additional supporting documents pertaining to calculation requirements.
- c. There shall be no detrimental effect on the floodway or the floodplain elevation during a 10-year design storm upstream or downstream of the proposed development area as a result of the proposed development.
- d. Engineering calculations must be submitted with the proposed stormwater drainage system plans. The calculations shall follow the procedures outlined in this document and the additional supporting documents pertaining to calculation requirements.
- e. Roof drains may be connected to a storm sewer system if the flow through the outlet to the SCPWC system is properly restricted. Unrestricted runoff from a roof drain directed off of the property onto an adjacent parcel will not be accepted; there are no exemptions.
- f. The developer and/or Saginaw County Public Works Commissioner shall make a determination as to whether any or all of the facilities proposed are to become private or part of the Saginaw County Drainage system or part of any other regulating agencies storm sewer system.
- g. The SCPWC Engineer shall in the case of a proposed subdivision, make a determination as to those control elevations that shall be entered on the final plat or make a determination as to the necessity for deed restrictions on any particular lot in said subdivision requiring the preservation of mandatory drainage facilities. Where a non-subdivided parcel of land is proposed for development, the SCPWC Engineer shall make a determination as to the need for covenants to maintain responsibility for mandatory drainage facilities. All the said facilities

shall be located in easements dedicated to the public, and shall be subject to continual inspection during the construction period.

- h. Proposed storm sewer enclosures must be designed so they will not adversely impact any adjacent properties, upstream or downstream, and must be designed to the impervious factors of the lands based upon zoning, not necessarily existing conditions.
- i. Soil erosion and sedimentation control measures must be implemented per Part 91 of Public Act 451 of 1994 (NREPA). SESC Part 91 permits are issued by the Saginaw County Public Works Commissioner (CEA).
- j. The use of infiltration BMPs will not be implemented for new development or re-development projects in areas of soil or groundwater contamination. When encountering these conditions, the SCPWC or municipality will contact and coordinate with local EGLE staff. The local EGLE must be made aware of the contamination. Any storm pipes used in these areas must have joints which prevent seepage of groundwater into the storm system.
- k. Best Management Practices will be implemented to address the associated pollutants in potential hot spots as part of meeting the water quality treatment and channel protection standards for new development or re-development projects. These hot spots include areas with the potential for significant pollutant loading such as gas stations, commercial vehicle maintenance and repair, auto recyclers, recycling centers, and scrap yards, whether existing currently or throughout the duration of the five year permit. Hot spots also include areas with the potential for contaminating public water supply intakes.

2. Storm Sewer Piping Requirements

- a. Proposed storm sewers shall be designed to have capacity to pass the 10-year design storm runoff rate (Q_{10}). Please refer to the Design Calculations section of this document along with the additional supporting documents pertaining to calculation requirements.
- b. Class III or IV concrete pipe must be used for the following:
 - i. Storm Sewers within township, county, and state right-of-way
 - ii. Combined sewers (Combined sewers must have premium joints)
- c. Provide 2-ft Minimum cover with minimum 5-ft cover in M.D.O.T. R.O.W.
- d. Provide 18-inch Vertical separation between all other utilities including, sanitary sewers and water mains. Provide 10-ft Horizontal separation from other utilities, such as sanitary.
- e. A minimum of 4-inch of sand bedding is required beneath the pipe and a minimum of 6-inch of sand backfill is required above the pipe.
- f. Manhole/catch basin shall be placed at a maximum distance of 300-ft from any other manhole/catch basin for access/maintenance purposes.
- g. Provide a sump discharge outlet for each individual property/lot in all developments. Sump leads shall not be connected to rear lot drainage systems unless they are designed to handle the flow and back flow valves are placed. This outlet shall be a catch basin (minimum 3-ft. diameter) or a storm sewer lead extended to the Right-of-Way/Property line of each lot

(minimum 6-inch diameter).

- h. Place a catch basin (minimum 3-ft diameter) between each pair of driveways, if curb and gutter, driveway culverts, and/or valley shaped ditches are not proposed.
- i. Minimum pipe grades must be such to produce minimum scouring velocity of 2.5 ft. /sec when pipe is flowing full without surcharging.
- j. Concrete pipe (C-76-III, IV) shall have fabric wrapped joints.
- k. For private storm sewer systems Plastic pipe may be used. This plastic pipe shall be either smooth walled HDPE or SDR 35 P.V.C. Pipe. If pipe is perforated a manufacturer's "Sock" shall be used over the pipe.
- l. Private storm systems in areas with contaminated soils or groundwater must have joints which prevent seepage into the storm system.
- m. Minimum pipe diameter for catch basin leads is 10-inch diameter.
- n. Minimum pipe size for sewer main is 12-inch diameter.
- o. When two pipes or more of different sizes come into a structure, the 8/10th flow lines shall match when possible.
- p. Catch basins will have a minimum sump depth of 18-inch. It should be noted that some new systems using "end of pipe" BMPs may require systems with no sumps. This type of system requires less maintenance of each individual catch basin, but requires routine maintenance of the BMP.

3. Detention Requirements

- a. If a separate lot or parcel is used for detention or retention, the outer limits shall be delineated on the Exhibit B drawings of a Condominium Development, or on the Final Plat.
 - i. Condominium Developments - Detention or Retention areas shall be designated as general common areas.
 - ii. Platted Developments - Detention or Retention areas shall be designated as a stormwater detention/retention area. (See State Requirements)
- b. Requirements for all Detention / Retention Areas
 - i. Proposed stormwater detention facilities shall be designed to detain the 10-year design storm runoff volume from the entire contributing area in excess of the allowable discharge from the site (See Design Calculations, Section V along with additional supporting documents pertaining to design calculation requirements).
 - ii. The maximum design storage elevation in a detention area must be a minimum of one (1) foot below the lowest ground elevation adjacent to the detention area.

- iii. The required volume in a detention basin must be achieved in the basin. At no time will volumes of stormwater stored in conveyance pipes be considered as part of the detention volume.
- iv. In areas of high water table, the detention volume must be calculated from the ground water elevation to the one foot freeboard elevation.

The design maximum storage elevation in a detention area must not exceed a coordinate Survey, fill out forms, develop plan for survey, mapping

- v. depth of nine (9) inches above any paved surfaced in non-residential developments. In residential developments the maximum ponding elevation in the detention pond shall not exceed the lowest rim elevation in the development.
- vi. If parking lot detention is used the owner or lessee must be aware of this detention and sign a letter of understanding that the parking lot will flood during design storms and be flooded for periods of time.
- vii. If common areas such as play lands, recreational fields, school yards are used for shallow detention areas the owner or home owner or property owner associations must be made aware of this storage area. This notification will prevent the owners from thinking something is wrong with the drainage system as it detains stormwater.
- viii. The design maximum storage elevation in a detention area must be minimally one (1) foot below the minimum finish floor elevation of the proposed structure(s) or existing facilities.
- ix. An emergency overflow shall be provided at the detention basin to insure the maximum ponding elevation does not exceed the depths outlined in items iv, v, and vii above. This overflow shall be able to allow drainage from the site in the event the 10-year storm is exceeded, or the restricted outlet is obstructed. The emergency overflow elevation shall be labeled and its location clearly shown on the plan set. The maximum elevation of the emergency overflow is one (1) foot below the surrounding top of elevation of the detention basin.

NOTE: Sites with no acceptable emergency overflow outlet available MUST hold the volume of two (2) 100-year design storm events. Please contact the SCPWC and/or designee if site needs this requirement.

- x. Designs of detention facilities shall incorporate safety features, particularly at inlets, outlets, on steep slopes, and at any attractive nuisances. These features may include, but not be limited to, landscaping, fencing, handrails, lighting, steps, grills, signs, and other protective or warning devices so as to restrict access as required by the SCPWC.
- xi. Side slopes and the bottom of detention basins must receive a minimum of 3 inches of topsoil, and seeded. Side slopes should have erosion control blankets placed to prevent erosion and establish vegetation faster.
- xii. The side slopes and bottom of the basins shall be shaped with maximum slopes of 1 vertical to 4 horizontal to allow mowing of these surfaces. NOTE: 1 vertical to 6 horizontal is preferable.

- xiii. Detention basins with bottom slopes less than 1% shall be underdrained.
- xiv. Detention basins shall be constructed with the top of banks a minimum of 5 feet from any pedestrian walkway (i.e. public and private sidewalks/ bike paths).
- xv. If a “Wet” detention pond is proposed, the bottom of the pond shall be a minimum of 5 feet below the proposed pond’s outlet elevation. Item x. shall not apply to “Wet” detention facilities, but local ordinances may have other requirements for “ponds” which must be met. Design must consider groundwater elevation and provide this elevation for the review.
- xvi. Use of underground storage facilities requires specific design calculations and an Operation & Maintenance Plan and signed agreement.

4. Rear Lot Drainage Requirements

- a. **NOTE: Rear lot drainage systems are not owned or maintained by the township(s) or the county; they are the sole responsibility of the subdivision’s homeowners association or condo association.** These systems are NOT part of a county or municipal storm system. There are easements in place are to assure these systems can be accessed when repairs are necessary. After any maintenance is completed in these drainage easements it is the responsibility of the person doing the maintenance to return the site to its previous existing condition.
- b. Minimum rear lot tile drain sizes and slopes have been determined assuming ponding will occur in rear yards for a duration 4 times the duration of a given 10-year design storm event. This time may range from 4 to 24 hours depending on drainage conditions. The following minimum pipe sizes and slopes apply:
 - i. Rear lot tile drains with contributing drainage areas up to 2 acres will have a minimum diameter of 6 inches and a minimum slope of 0.5 %.
 - ii. Rear lot tile drains with contributing drainage areas greater than 2 and less than 3 acres shall have a minimum diameter of 8 inches and a minimum slope of 0.4%.
 - iii. Rear lot tile drains with contributing drainage areas greater than 3 and less than 4 acres shall have a minimum diameter of 10 inches and a minimum slope of 0.32%.
- c. Rear lot tile drains with a contributing area greater than 4 acres shall be considered main line storm sewer and shall be designed according to corresponding storm sewer requirements (See the Design Calculations Section of these requirements along with additional supporting documents pertaining to design calculation requirements). Calculations shall be submitted to verify that rear lot drains have the capacity to pass the 10-year design storm event. Plastic pipe is acceptable for rear lot drainage systems draining more than 4 acres provided it is installed in landscaped/ lawn areas.
- d. Rear lot tile drains cannot connect to road underdrains.
- e. Rear lot drainage tiles shall have a minimum cover of 2 feet. A minimum of 4 inches of sand bedding is required beneath the pipe and a minimum of 6 inches of sand backfill is required above the pipe.

- f. Rear lot catch basins shall have a minimum diameter of 2 feet. Plastic structures may be used for rear lot drainage systems. Concrete structures are required for storm sewer systems. The catch basins shall be placed at a maximum distance of 300 feet from any other structure. A structure is required for any bends, turns, or dead ends. Each lot shall have access to a structure; these structures may be shared.
- g. If pipe is perforated, a manufacturer's "Sock" may be used over the pipe but is not required.
- h. A 20-foot easement will be required for all rear lot drainage systems. This easement should be centered along lot lines to allow for a 10-foot easement along adjacent lots and to provide access to the rear lot drainage system from either adjacent property owners. Said easements shall be written as to permit neighboring property and/or condominium owners to maintain the rear lot drainage system as it may affect their property.
- i. Rear lot drainage shall be large enough to convey all contributing area to the rear lot system, including off site drainage if it is not diverted around the development.
- j. Existing rear lot drainage systems abutting a proposed development may be used for the new development provided:
 - i. The existing rear lot drainage system has the capacity to convey stormwater runoff from the proposed rear lot drainage areas.
 - ii. A signed agreement is obtained from property owners located within the existing subdivision allowing the proposed subdivision's rear lot stormwater runoff to pass through their existing system.
- k. Phased developments owned by the same proprietor may utilize proposed rear lot drainage for a current development phase on future phases of the development provided:
 - i. Covenants shall be recorded into the deeds of the property owners affected in the current phase allowing for future phases of the development to drain into the current phase's rear lot drainage system.
 - ii. If covenants are not made as outlined above, future phases will require separate rear lot drainage systems or agreements from the current land-owners allowing for the use of their rear lot drainage system.
 - iii. The rear lot drainage system shall be constructed to convey rear lot drainage from both the existing and proposed rear lot drainage areas.
 - iv. Easements shall be provided allowing for maintenance by both abutting landowners in current and proposed phases of development.
- l. Rear lot drainage shall be shown on the preliminary plat (subdivisions) or site plan (condominiums).
- m. All rear lot drains shall connect to an approved stormwater drainage system.

B. General Compliance Guidelines

The following guidelines are **recommended** but are not a requirement of this plan. These guidelines are provided for reference.

1. The minimum surface slopes for overland drainage are as follows:
 - a. For bituminous paved surfaces, 1%.
 - b. For concrete paved surfaces, 0.5%.
 - c. For concrete curb and gutter, 0.32%.
 - d. For drainage swales and valley shaped ditches, 0.5%.
 - e. For rear lot drainage swales and valley shaped ditches, 0.5%.
 - f. Landscape grading, 2%.

2. The maximum surface slopes for overland drainage are as follows:
 - a. For bituminous, concrete paved surfaces, 5%.
 - b. For concrete curb and gutter, 5%.
 - c. For drainage swales and valley shaped ditches, 5%.
 - d. For rear lot drainage swales and valley shaped ditches, 5%.
 - e. Drainage swales and valley shaped ditches shall have maximum side slopes of 3 horizontal to 1 vertical.
 - f. Landscape grading, 4 horizontal to 1 vertical.

C. Variances from Requirements

The Saginaw County Public Works Commissioner may waive allowable discharge requirements and or detention requirements. All variances will be reviewed under the appeal procedures established in the stormwater management design requirements. Variances from these requirements shall require the approval of the County whose actions shall be conditioned upon the following:

1. A petition shall be submitted describing in detail the rationale for the proposed design changes including hydraulic and or hydrologic computations.
2. Special circumstances or conditions exist which will affect the property under consideration such that strict compliance with the provisions of the stormwater discharge permit would deprive the applicant of the reasonable use of their land.
3. A variance is necessary for the preservation and enjoyment of a substantial property right of the proprietor.
4. Granting of the variance will not be detrimental to the public health, safety or welfare, or injurious to other property in the territory in which said property is located. Nor, will there be a violation of any local ordinances.
5. An affirmative recommendation must be received from the SCPWC Engineer supporting such variance. In the event that the SCPWC Engineer does not submit an affirmative recommendation, a recommendation shall be received from the County.

D. Stormwater Management System Maintenance Plans for Subdivisions/ Condominiums

1. Signed maintenance plans will be submitted with all construction plans and included in the subdivision agreement or master deed documents of all businesses, subdivisions, and site condominiums. These maintenance plans are the responsibility of the private owner or home/condo owners association. **These plans are not to be construed as a responsibility of the county, city, village or township, nor will the county, city, village, or township be responsible for maintenance of private systems.** The plans may include, but not limited to, the following:
 - a. A projected annual maintenance budget itemized by task (for homeowners/condo associations only).
 - b. Proposed mechanism to finance maintenance (for homeowners/condo associations only).
 - c. A copy of the final approved drainage plan for the development that delineates the facilities and all easements, maintenance access, and buffer areas.
 - d. A listing of appropriate tasks defined for each component of the system, and a schedule for their implementation. The listing may include, but not limited to, the following:
 - 1) Long-term operation and maintenance of all structural and vegetative BMPs installed and implemented to meet the performance standards.
 - 2) Maintenance of facilities such as pipes, channels, outflow control structures, infiltration devices, emergency overflows, detention basins, BMPs, and other structures.
 - 3) Debris and sediment removal from catch basins, channels, and basins.
 - 4) Dredging operations for both channels and basins to remove sediment accumulation. Stormwater system maintenance plans shall require that sediment be removed when depth equal to 50% of a pond's forebay or 12" of sediment accumulates, whichever is less.
 - e. Identification of the party responsible for performing each of the various maintenance activities described. This will be recorded with final approved plans and plats.
 - f. A detailed description of the procedure for both preventative and corrective maintenance activities. Preventative maintenance shall include, but not be limited to, the following:
 - 1) Periodic inspections, adjustments, and replacements.
 - 2) Record keeping of operations, inspections, expenditures, and associated activities.
 - g. Provision for the routine and non-routine inspection of all components within the system described:
 - 1) SCPWC recommends regularly scheduled wet-weather inspections of structural elements. Inspection for sediment accumulation in detention basins (or underground storage basins/vaults) shall be conducted annually, with as-built plans in-hand for comparison. These inspections should be performed by a Professional Engineer reporting to the responsible

agency or owner.

- 2) Housekeeping inspections, such as checking for trash removal, should take place at least twice annually.
 - 3) Emergency inspections shall be completed on an as-needed basis. Upon identification of problems a professional engineer, with experience in stormwater systems, shall be contacted for inspection.
- h. A description of ongoing landscape maintenance is recommended to be included in the plan. Landscaping shall consist of low maintenance, regionally native species whenever possible. The proprietor will monitor the viability of plantings for at least two (2) years after establishment and replace plantings, as needed. Subsequent monitoring shall be the responsibility of the landowner, development association, or appointed designee (such as a landscaping company, lawn care provider, etc.). **The Saginaw County Public Works Commissioner, nor the local government (e.g. city, village, township), is not responsible for landscape maintenance.**
2. Provision for the maintenance of vegetative buffers by landowner, development associations, conservation groups, or public agencies. Buffers must be inspected annually for evidence of erosion or concentrated flows through or around the buffer.
 3. Property deed restrictions or condominium master deed documents will specify the time frame for action to address needed maintenance of stormwater management facilities. These restrictions or documents will also specify that, should the private entity fail to act within this time frame, the local or county governmental entity may take action against the property owners within the subdivision or condominium association, in accordance with Act 288 of the Public Acts of 1967.
 - a. Routine maintenance of stormwater management facilities will be completed per the schedule submitted with the construction plans or within 15 days of receipt of written notification by the local or county governmental entity that action is required, unless other acceptable arrangements are made with the supervising governmental entity.
 - b. Emergency maintenance will be completed within 36 hours of written notification unless a threat to public health, safety and welfare requires immediate action.
 4. The proprietor may fulfill the obligation to ensure that a governmental entity will be responsible for drainage system maintenance by establishing a county drain drainage district, or any other similar mechanism approved by the Saginaw County Public Works Commissioner, to provide for the permanent maintenance of stormwater management facilities and necessary funding.
 5. If a County Drain is not established, the proprietor will submit evidence of a legally binding agreement with another governmental agency who responsible for maintenance oversight.
 6. A legally binding maintenance agreement for subdivisions or condominium developments will be executed before final project approval is granted. The agreement shall be included in the property deed restrictions or condominium master deed documents so that it is binding on all subsequent property owners.

E. Evaluation of Cost – Effective structural and non-structural Best Management Practices (BMPs)

1. To meet Saginaw County’s NPDES Phase II regulatory requirements for stormwater, the SCPWC may request, and the developer must supply, the following:
 - a. Either preliminary or actual constructed cost of best management practices.
 - b. Projected or actual maintenance costs of best management practices.
 - c. A maintenance agreement from the developer, owner, or operator responsible for the long-term maintenance of structural and vegetative BMPs installed and implemented to meet the water quality performance standards. Please see an example of an operation & maintenance plan and agreement for various sites in Appendix C.
 - d. Any other pertinent information deemed necessary to meet NPDES Phase II regulations.
2. If the requested information is not provided in a timely manner the final occupancy permit will be held until compliance is attained and the information received in the requested format.
3. The information requested will be in a concise formatted manner.

F. BMPs To Minimize Post Construction Impacts On Water Quality

1. Saginaw County recommends that BMPs be utilized on all new or re-development sites to improve stormwater runoff quality in the post construction phase.
2. Saginaw County recommends BMPs to be designed on a site-specific basis to reduce post-development total suspended solids (TSS) loadings by 80 percent or achieve a discharge concentration of TSS not to exceed 80 milligrams per liter.
3. The BMPs used on a site must be reviewed and approved by the SCPWC Engineer, or other appointed designee, during the site plan review and approval process.
4. The site Designer, Engineer, or Architect must supply a list of BMPs being used on a site that will improve water quality of the runoff being discharged from a site for the review process.

VII. STORM SYSTEM OPERATION & MAINTENANCE PLANS

A. Operation & Maintenance Plans (O & M)

Operation and maintenance plans will be developed for new site developments and/or re-developments of **1 acre or more in area, including projects less than an acre that are a part of a larger common plan of development or sale and discharge into the applicant’s MS4**. These plans must address the implemented best management practices on the site. Additionally, this plan must address the long term operation and maintenance of all structural and vegetative BMPs installed and implemented to meet performance requirements. The property owner / developer is the sole responsible party for the BMPs on the site. **These plans are not to be construed as a responsibility of the County, City, Village or Township, nor will the County, City, Village, or Township be responsible for maintenance of private systems.**

These plans must be developed to be in perpetuity and, in situations of private or commercial development, must be transferred to the new owner. It is the owner's responsibility to transfer the document and make the new owners aware of the conditions of the O & M Plan. The owners must provide the transfer information to the Saginaw County Public Works Commissioner about the change in owner responsibility within **five (5) business days** of the transfer. *(In the case of subdivisions, platted or condominium developments the O & M Plans will be in the form of deed restrictions.)*

O & M Plans must have a provision in them to allow representatives from the local municipality to enter the property to inspect structural and vegetative BMPs which are not being maintained as stated in the O & M Plan. If the O & M plan is not being maintained to meet minimal performance requirements described in the Operation and Maintenance Plan for Stormwater Drainage Systems, Structural and Vegetative Best Management Practices (BMPs) document in the Appendix Section, then the local municipality has the option to obtain a contractor to complete the work and charge the owner / developer for costs incurred plus a 25% surcharge for administrative fees.

Additionally, the property owner / developer will provide an email address of the designated person responsible for assuring the O & M Plan is implemented. This email address must be updated when changed or when a new person assumes the maintenance responsibility position. This responsible party must annually inform the local municipality, if they have an NPDES MS4 Permit, that the O & M Plan has been carried out as described in the plan. All reports on this performance objective must be received by the local NPDES MS4 municipal permit holder or their designee (SASWA) on or before December 31st of each year. Failure to report will be construed as non-compliance with the design requirements. An email will be sent to the owner / developer for follow up response to determine compliance. No answer to this email within **five (5) business days** will result in further administrative action up to and including fines.

Please refer to Appendix C for the Long Term Maintenance Plan and Agreement Document that needs to be completed and submitted for development or re-development of all regular commercial, industrial and non-residential developments that disturb at least one (1) or more acres, including projects less than an acre that are part of a larger common plan of development or sale, are located within the areas designated by US Census as Urbanized Areas (see map in Appendix A) and require the operation and maintenance of stormwater drainage systems and/or structural and vegetative best management practices.

APPENDIX A

1. SAGINAW COUNTY STORMWATER DISCHARGE PERMIT APPLICATION FORM
2. DESIGN CALCULATIONS
3. DRAINAGE PLAN CHECKLIST
4. TYPICAL INSPECTION REPORT FORM
5. NPDES SOIL EROSION SEDIMENT CONTROL PERMIT FOR CONSTRUCTION SITES
6. FINAL INSPECTION FORM
7. 2010 CENSUS DATA'S URBANIZED AREA MAPS

SAGINAW COUNTY STORMWATER DISCHARGE PERMIT APPLICATION

PROJECT NAME:	
Property Tax Identification #:	
Site Plan Review Date:	
Date Applied:	
Deposit Amount Submitted:	
NAME OF DEVELOPER/OWNER:	ENGINEER/ARCHITECT:
Contact Person:	Contact Person:
Street Address:	Street Address:
City, State, Zip:	City, State, Zip:
Telephone:	Telephone:
Email:	Email:
PROJECT LOCATION:	
Street Address:	
Name of Subdivision/Plat:	
Drainage District:	
STORMWATER DESIGN INFORMATION (*Calculations must be submitted for verification. Calculations must have clearly labeled headings, formulas, and units.)	
Type of Development (Circle): <i>COMMERCIAL SITE, INDUSTRIAL SITE, RESIDENTIAL PLATTED, RESIDENTIAL CONDOMINIUM, OTHER</i>	
*AREA OF DEVELOPMENT (acres):	
*AREA OF CONTRIBUTING DRAINAGE DISTRICT (acres):	
*AREA OF EXISTING IMPERVIOUS SURFACE (acres):	
*AREA OF PROPOSED IMPERVIOUS SURFACE (acres):	
*ALLOWABLE DISCHARGE RATE (Q _a) (cfs):	
*TOTAL VOLUME OF STORAGE REQUIRED (cu. ft.):	
*TOTAL VOLUME OF STORAGE DESIGNED (cu. ft.):	
10 YR DESIGN STORMWATER DETENTION STORAGE ELEVATION:	
EMERGENCY OVERFLOW/MAXIMUM STORAGE ELEVATION:	
LOWEST FINISHED FLOOR ELEVATION:	
OUTLET DRAIN SIZE AND DESIGN FLOW CAPACITY:	
OUTLET DRAIN INVERT ELEVATION:	
DESIGN IMPERVIOUS FACTOR (IMP):	
*10 YEAR DESIGN DISCHARGE (cfs):	
*HEAD DIFFERENTIAL THROUGH RESTRICTOR (ft.):	
*DIAMETER OF PROPOSED RESTRICTOR (in.):	
*ACTUAL RESTRICTED DISCHARGE (cfs):	
Latitude and Longitude of outfall to county drain or MS4	
AUTHORIZED SIGNATURE _____ DATE _____	PLEASE DRAINAGE PLAN CHECKLIST TO ASSURE ALL INFORMATION IS PRESENT FOR REVIEW

DRAINAGE PLAN CHECKLIST

In order for the Owner, Developer, or Builder to be in compliance with these guidelines he/she shall for review by the SCPWC Engineer or designee, two complete sets of the site drainage and grading plan, and two copies of the calculations for allowable discharge and on-site storage requirements, as prepared by a Registered Professional Engineer or Architect. A copy of the completed checklist will be sent with all submittals.

Each of the following items shall be included on the plan:

- _____ Total acres of site.
- _____ Total acres of watershed draining through the site outlet.
- _____ Drainage district lines including sub-district lines contributing to individual storm sewers and rear lot drainage systems.
- _____ Location of site including dimension to nearest intersection road or section line.
- _____ Existing ground elevations at maximum 50' centers, including shots on perimeter of site and 50' beyond or contour lines at 1 foot intervals extending 50 feet beyond the site limits.
- _____ Elevations of ground, edge of pavement, and buildings within 50' of site.
- _____ Top of curb, gutter, ditch line, and centerline of road elevation at maximum 50' intervals.
- _____ Existing storm catch basins, manholes, sewers, and culverts showing rim and invert elevation(s).
- _____ Proposed elevations showing parking lot grades and control and building elevations.
- _____ Lawn/landscape areas.
- _____ Location, size, length, slope, and type of proposed storm sewer and rear lot drains.
- _____ Rim and invert elevation(s) of proposed manholes and catch basins, including rear lot drainage.
- _____ Location of on-site storage showing contour line for the top of storage elevation.
- _____ Provide sufficient dimensions, cross-sections, profiles, tie downs, etc. to determine the location and size of proposed storm sewers and detention areas. This information will be used for verifying proposed detention volume calculations in grassed and paved areas.
- _____ Location of restrictor and proposed restrictor detail(s).
- _____ Location and elevation of the Emergency Overflow.
- _____ Latitude and Longitude of site's stormwater discharge point

DRAINAGE PLAN - CHECKLIST (Continued)

Each of the following items shall be included in the submitted calculations:

- _____ Drainage District and impervious factor (if applicable and already established for the location of the site).
- _____ Calculation of maximum allowable discharge (Obtain impervious factor from the SCPWC Engineer, if applicable).
- _____ Calculation of on-site storage required.
- _____ Calculation of storage volume provided.
- _____ Calculation of restrictor size.
- _____ Hydrologic & Hydraulic Calculations for sizing storm sewer systems, which will be maintained by a public agency.
- _____ Hydrologic and Hydraulic calculations showing there will be no adverse impacts upstream or downstream of the proposed development.

Beyond the Saginaw County Public Works Commissioner Stormwater Design Requirements, the Developer must submit applications for permits with all agencies that regulate stormwater within the area of development. These may include Michigan Department of Transportation, Michigan Department of Environment, Great Lakes, and Energy, Saginaw County Public Works Commissioner (SESC), or the Saginaw County Road Commission.

INSPECTION REPORT FORM

PROJECT NAME:		WORK ORDER NO.:		
CONTRACTOR:		REPORT NO.:		
SUPERINTENDENT:		DATE:		
WEATHER (CLEAR, CLOUDY, RAIN, SNOW):		TEMPERATURE:	INSPECTOR:	
WORK FORCE ON SITE:	NUMBER:	TRADE:	NUMBER:	TRADE:
EQUIPMENT IN USE (Number and Type):				
WORK DONE (Location, Amount, and Type): (Be Specific)				
TYPE OF UTILITY INSTALLED (Water, Sewer, Pavement, Size, Class, Description, Source):				
GROUND CONDITIONS ENCOUNTERED (Clay, Sand, Wet, Dry, Good Poor, or Other & Detail Further):				
BACKFILL INSTALLED:				
EXISTING UTILITIES ENCOUNTERED:				
RELOCATION OF PROPOSED UTILITIES AND REASON NECESSARY:				
MATERIAL DELIVERED TO SITE (Size, Class, Description, Source):				
VISITORS TO WORK SITE (Name, Affiliation):				
REMARKS:				

NOTE: Complete in ink. Use reverse side if necessary. Inspectors using digital systems should provide a copy to SCPWC

By: _____ Date: _____

SOIL EROSION AND SEDIMENT CONTROL FOR CONSTRUCTION SITES PROCEDURE

A general procedure for Soil Erosion and Sediment Control (SESC) and NPDES permits to discharge stormwater from construction sites:

There have been changes in the permitting for construction sites for contractors, developers, municipalities, and other public agencies. These rules took effect at the date listed below; everyone must adhere to these changes and be aware of them.

EFFECTIVE DATE – MARCH 10, 2003

General procedure to follow:

Site has a soil disturbance of 1 to <5 acres:

Apply for Soil Erosion Sediment Control permit from either the County Enforcement Agency (CEA) or Municipal Enforcement Agency (MEA). **The Saginaw County Public Works Commissioner is the County Enforcement Agency.**

The following site offers a direct link to the Soil Erosion and Sedimentation Control Permit:

http://www.saginawcounty.com/Docs/publicworks/FillInForms/Permit_Application_SESC.pdf

The NPDES discharge permit for this site is covered by the “permit by rule”; no permit or application needs to be filled out for the state. A certified stormwater operator is also required to inspect the site weekly and within twenty-four (24) hours of a rain event resulting in a discharge of stormwater from the site.

Note: If the client is an APA (Authorized Public Agency for soil erosion and sediment control) they still must follow the permit by rule, they do not need a SESC Permit as they have procedures approved by EGLE. The rules are at the following site:

http://www.michigan.gov/documents/deq/wb-sw-Construction-Rules-1to5acres_264064_7.pdf

Site has a soil disturbance of 5 or more acres:

Apply for Soil Erosion Sediment Control permit from either the county enforcement agency (CEA) or municipal agency (MEA) first. Then fill out the NPDES Notice of Coverage form for discharges from the construction site on the MiWaters website.

To apply, renew, or terminate permit coverage, go the MiWaters website at <https://miwaters.deq.state.mi.us> and log into your account. If you don't already have an account, [view the tutorial on how to establish your account](#). Once you have an account established, you may:

- apply for permit coverage by searching for Notice of Coverage Application,
- renew by searching for Notice of Coverage Renewal, or
- terminate your permit by searching for Notice of Termination.

Once the state receives the form, the site is covered.

Note: If client is an APA (authorized public agency for soil erosion and sediment control) they still must obtain and fill out the NPDES Notice of Coverage to discharge stormwater from a construction site; they do not need SESC Permit as they have procedures approved by MDEQ.

https://www.michigan.gov/documents/deq/wb-stormwater-ConstructionQA_248586_7.pdf

Once the project site is stabilized and has good vegetative cover, remember to fill out a project termination form on the MiWaters website.

Determine inspection responsibilities:

Make sure that SESC issues are an agenda item at the pre-bid meeting and at the pre-construction meeting. Do not just put a note on the plans that SESC is the contractor's responsibility; make sure they are fully aware of their site responsibilities. Remember that the owner of the project is ultimately the responsible party, the EGLE or enforcing agency will be fining them.

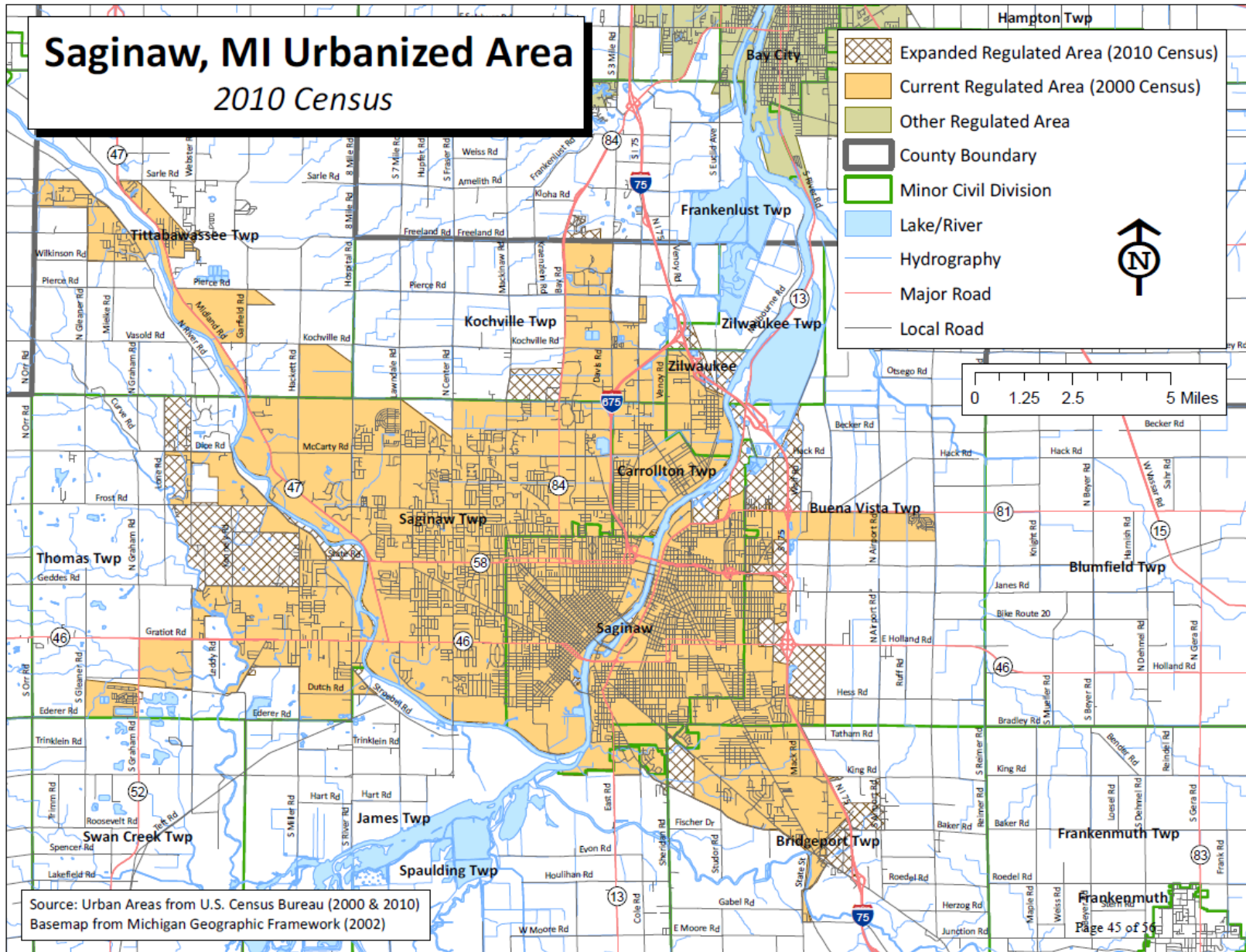
**SAGINAW COUNTY
DETENTION AND RESTRICTION FLOW
FINAL INSPECTION REPORT FORM**

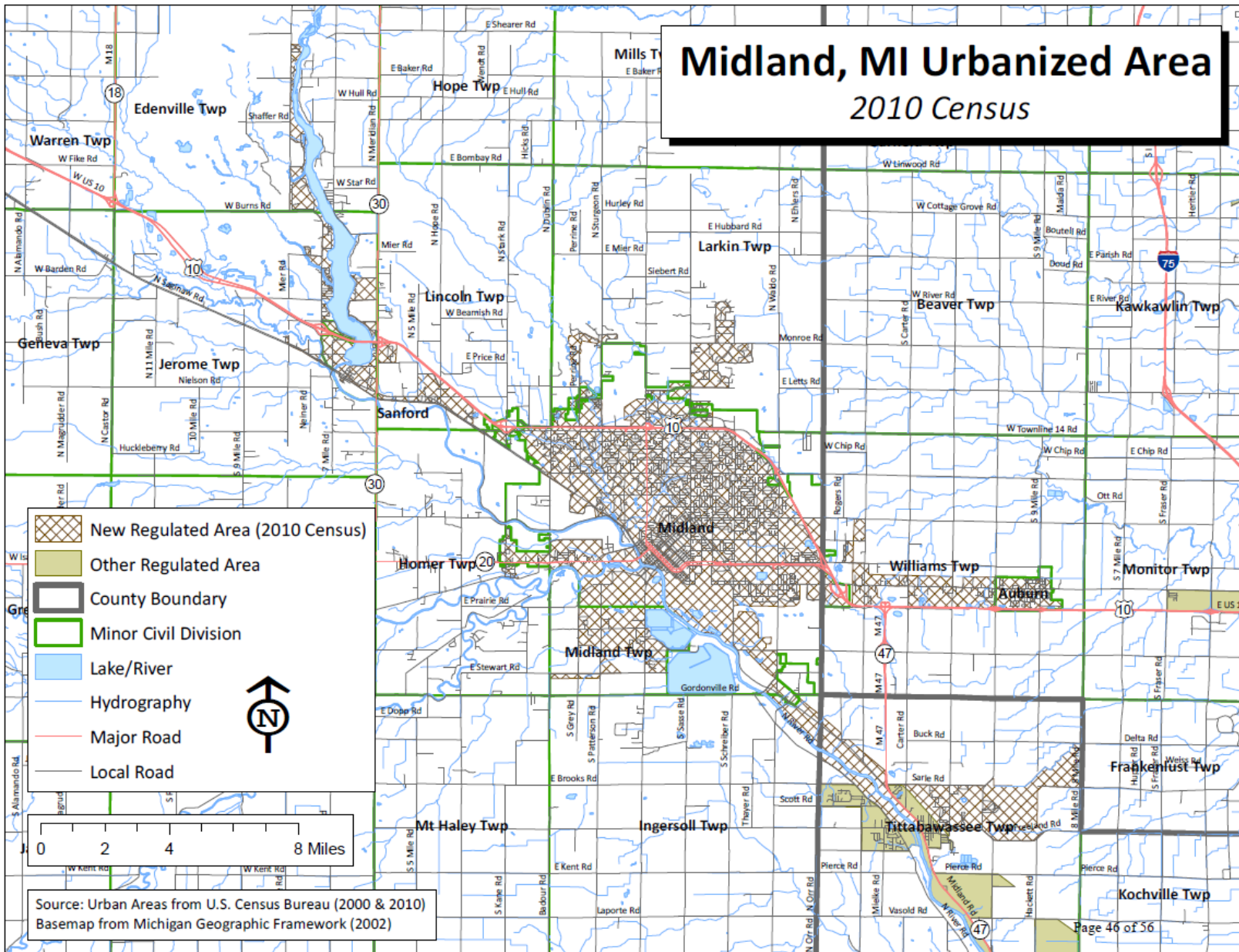
Name of Site Development:	
Planning Commission Approval Number:	
Location:	
Type of Development:*	
Size of Restrictor:	
Type of Restrictor:**	
Location of Restrictor:	
Required Detention (ft ³):	
Type of Detention:***	
Location of Detention:	
Do As-builts Conform To Present Site Conditions?	
Inspection Comments:	
Date of Inspection:	
Inspector's Name and Affiliation:	

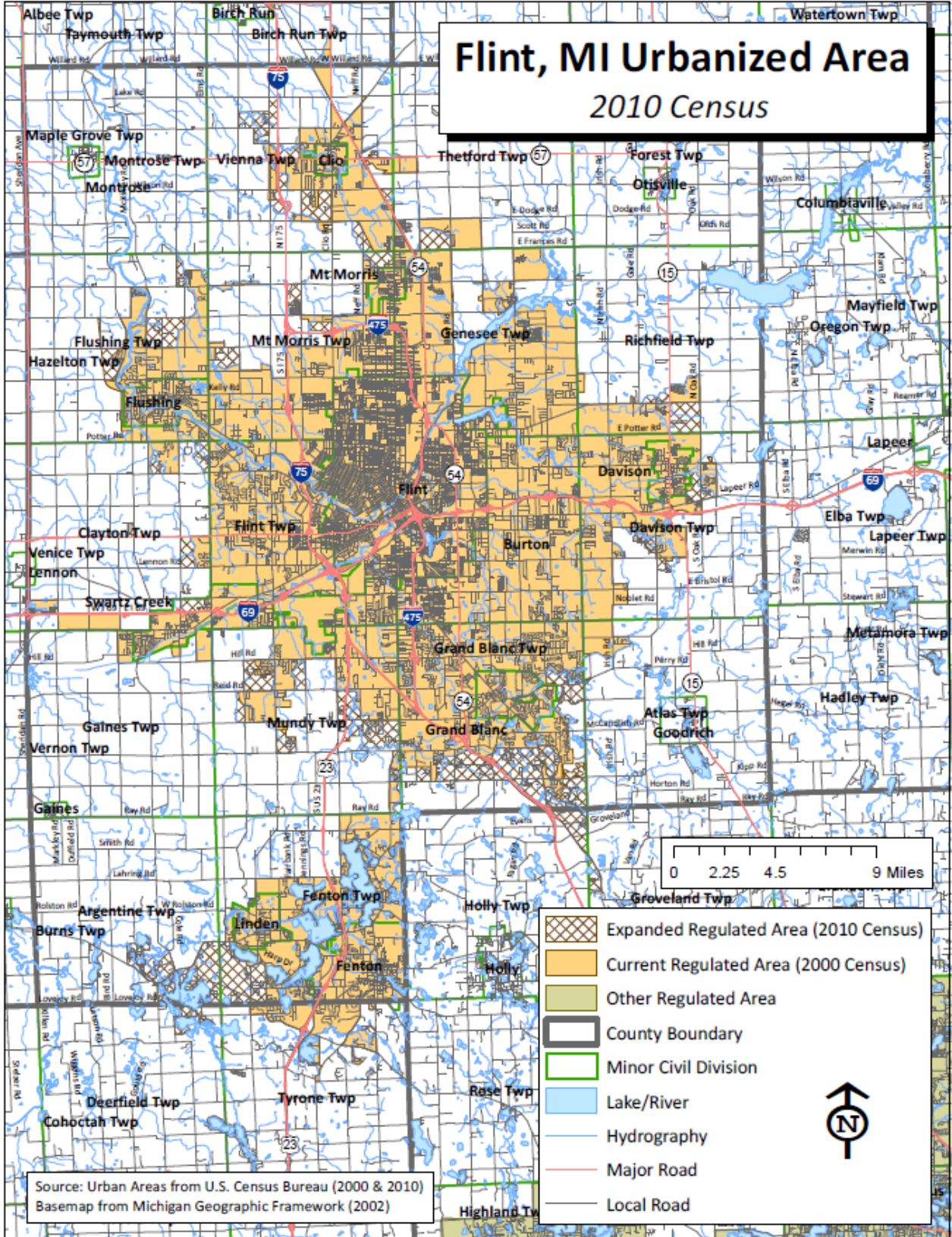
* - Residential, Commercial, Subdivision, Etc.

** - Orifice in Outlet Pipe, Metering Outlet Pipe, Square Orifice, Etc.

*** - Parking Lot Ponding, Detention Basin, Underground Detention, Etc.







APPENDIX B

1. MICHIGAN DEPARTMENT OF TRANSPORTATION PERMIT APPLICATION FOR USE OF RIGHT-OF-WAY
2. MICHIGAN DEPARTMENT OF TRANSPORTATION STORMWATER DISCHARGE PERMIT APPLICATION
3. MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY JOINT PERMIT APPLICATION

To assure that all agency forms are as up to date as possible Onekama Township has provided the following website addresses that various forms may be attained at for use by developers and design engineers.

1. MICHIGAN DEPARTMENT OF TRANSPORTATION PERMIT APPLICATION FOR USE OF RIGHT-OF-WAY, is available through the MDOT Permit Gateway. More information and link to the MDOT Permit Gateway can be found at:

https://www.michigan.gov/mdot/0,4616,7-151-9623_26662_26679_27267_48606-182161--,00.html

2. MICHIGAN DEPARTMENT OF TRANSPORTATION STORMWATER DISCHARGE PERMIT APPLICATION, through the MDOT Permit Gateway. More information and link to the MDOT Permit Gateway can be found at:

https://www.michigan.gov/mdot/0,4616,7-151-9623_26662_26679_27267_48606-331000--,00.html

3. MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY JOINT PERMIT APPLICATION is available on the MiWaters website. More information and link to MiWaters can be found at:

http://www.michigan.gov/deq/0,1607,7-135-3307_29692_24403---,00.html

APPENDIX C

1. MAINTENANCE PLAN AND AGREEMENT

OPERATION & MAINTENANCE PLAN FOR STORMWATER DRAINAGE SYSTEMS, STRUCTURAL & VEGETATIVE BEST MANAGEMENT PRACTICES (BMPS)

< Please insert name of site >
<Location >

This Operation & Maintenance Plan is to be completed for development or re-development of all commercial, industrial, subdivision and condominium developments that disturb at least one or more acres, including projects less than an acre that are part of a larger common plan of development or sale and require the operation and maintenance of stormwater drainage systems and/or structural and vegetative best management practices and/or structural stormwater controls.

I. Responsibility for Maintenance:

A. During Construction: <name of site> (contractor) has the responsibility to perform the maintenance.

B. Following Construction: <name of site> is responsible to perform the maintenance.

1. Routine maintenance of the stormwater facilities must be completed on a scheduled basis by the owner or lessee. All catchbasins/manholes/rear yard basins, detention basins, flow restrictors, or other stormwater structures must be maintained and inspection on a scheduled basis.
2. Any structural and/or best management practices (BMPs) must be installed and implemented properly to meet the performance standards.
3. If the site is notified by the local DPW, zoning administrator, County Engineer or municipal engineer, either verbally or in writing, within ten (10) calendar days of this notification action is required, unless other acceptable arrangements are made with the County Engineer or responsible authority. Emergency maintenance (when there is endangerment to public health, safety or welfare) shall be performed immediately upon receipt of verbal or written notification. If the <name of site> fails to act within these timeframes, the responsible local township or municipality, or successors may perform the needed maintenance and assess the cost against the <name of site>, plus an administrative fee of 25%.

II. Funding:

The <name of site> is required to pay for all continued maintenance activities.

III. Maintenance Tasks and Schedule:

A. During Construction:

1. Properly plug and abandon existing storm sewer to prevent any sediment from entering the existing system.
2. Establish and maintain 'BMP's to prevent sediment from leaving the site.

B. Post-Construction:

1. Perform scheduled semi-annual inspections and inspections following major storm events to check for floatables and debris within the system. Remove floatables and debris as required.

2. Annually inspect for sediment within the catch basin sumps. Removal of sediment is required if within 12 inches of an inlet or outlet pipe in the structure.
3. Every two (2) years inspect the structural elements of the storm system (restrictor, catch basins, etc.) noting any failures. Correct as needed.
4. If catch basin inserts are in place, inspect every 6 months and replace screens, filters or cloth as necessary for the particular type of insert.
5. Mow detention basins on a regular basis; no cattails, Phragmites, or other plants can grow unrestricted in these basins.
6. Ensure long-term operation and maintenance of all structural and vegetative best management practices installed and implemented.

***Note:** Update and revise as necessary. Include all structural stormwater controls and the appropriate maintenance and schedule for each.*

IV. Records:

- A.** The <name of site> shall keep a written log of both preventive and corrective maintenance activities. At minimum, the log shall contain the date of the inspection, the reason for the inspection, the conditions encountered and the resulting activities and any photographs taken for documentation purposes. The log shall be available for review at the request of the SCPWC.
- B.** If a site is sold to another, this Operation and Maintenance agreement must be transferred to the new owner and the SCPWC must be informed of the change in ownership within fourteen (14) days of the sale.
- C.** Annually, a compliance statement must be sent to <insert tracking site>. The owner or operator of the site will at minimum provide the date of inspection(s) and any maintenance performed, if applicable. This can be accomplished via email to the email address listed below of the responsible party.
- D.** If the owner or operator of the site does not respond to the compliance statement with verification of site inspection and maintenance of stormwater structural controls and best management practices within fourteen (14) days from the day of receiving the email, the responsible local township or municipality, or representative for the responsible local township or municipality, will perform an inspection and an administrative fee will be charged to the owner or operator.

V. Site Access:

- A.** If there is a drainage issue/problem on a site that has to do with the storm drainage system, best management practices, or is discharging too much stormwater or water that does not appear to meet water quality standards, the owner must let the responsible local township or municipality, or designee, onto the property for the following:
 1. Inspect the structural or vegetative best management practice(s), drainage issue/problem, or discharge problem.
 2. Perform the necessary maintenance or corrective actions neglected by the BMP owner or operator. The responsible local township or municipality has the option to obtain a contractor to complete the work and charge the owner/developer for costs incurred plus a 25% surcharge for administrative fees.
- B.** Any and all necessary maintenance or correction actions that the responsible local township or municipality must perform will be charged to the owner or operator of <name of site>.

VI. Spills:

- *Identify key spill response personnel and train employees on who they are.*
- *Store and maintain appropriate spill cleanup materials in a clearly marked location near storage areas; and train employees to ensure familiarity with the site's spill control plan and/or proper spill cleanup procedures.*
- *Locate spill cleanup materials, such as absorbents, where they will be readily accessible (e.g. near storage and maintenance areas).*
- *If a spill occurs, notify the key spill response personnel immediately. If the material is unknown or hazardous, the local fire department may also need to be contacted.*
- *If the spill gets into the storm drainage system, contact the Saginaw County Public Works Commissioner, or appropriate agency depending on amount of material spilled.*
- *If safe to do so, attempt to contain the material and block the nearby storm drains so that the area impacted is minimized. If the material is unknown or hazardous wait for properly trained personnel to contain the materials.*
- *Spills or leaks from vehicles in parking lots such as oils, antifreeze, or fuels should be addressed immediately when noticed by staff working at the site. The spill MUST be cleaned up using adsorbent materials such as Oil Dry or even kitty litter and then swept up and properly disposed of. DO NOT hose down and wash into the storm drain system, these systems drain directly to rivers in our area and eventually the Great Lakes.*

VII. Operation and Maintenance Verification:

I have read this document and agree to implement the operation and maintenance procedures listed for this site to protect stormwater quality leaving this site and to ensure best management practices are installed and being implemented. I agree to update this document as necessary when there is a change to the site regarding any structural stormwater controls and provide an updated copy to the County within fourteen (14) calendar days.

Authorized Signature

Date

Email address of responsible party: _____

***NOTE:** Any change in email address must be provided to the SCPWC or local municipality within 5 business days from the change of responsible parties.*

APPENDIX D

1. RUNOFF COEFFICIENTS TABLE

TABLE 1. Runoff Coefficients

Description of area	Runoff coefficients
Impervious Areas	
Pavement, Roofs, Buildings	0.90
Water	1.00
Park/Playground/Cemetery Area	0.30
Lawn Area	0.17
Woodland Area	0.45
Pasture Area	0.40
Cultivated Area	0.60

Note: The coefficients in this tabulation are applicable for storms of 5-year to 10-year frequencies. Less frequent higher intensity storms will require the use of higher coefficients because infiltration and other losses have a proportionally smaller effect on runoff. The coefficients are based on the assumption that the design storm does not occur when the ground surface is frozen.

APPENDIX E

1. BEST MANAGEMENT PRACTICES

Best Management Practices

Best Management Practices recommended by the County can be obtained from the County Engineer or Designee by requesting the BMP manual appropriate to a commercial or industrial activity from the *BMP Guidance Series*.

The standard BMP Guidance series to utilize within Saginaw County can be found in the following sources:

- Guidebook of Best Management Practices for Michigan Watersheds, published by the Michigan Department of Environmental Quality – Water Division.
http://www.michigan.gov/documents/deq/deq-wb-nps-Intro_250601_7.pdf

- Soil Erosion and Sedimentation Control Guidebook, February 2003, from the Michigan Department of Management and Budget's – Infrastructure Services Design and Construction Division.

- Michigan Department of Transportation – Drainage Manual, Chapter 9 – Best Management Practices found at the following web site.
<http://www.michigan.gov/stormwatermgmt/0,1607,7-205--93193--,00.html>

- Any recommended or required BMPs that are established in Watershed Management Plans written for the Upper Saginaw, Lower Tittabawassee, Lower Cass Rivers, or Swan Creek.

- Storm Water Management For Construction Activities, published by the United States Environmental Protection Agency.
<http://nepis.epa.gov/Exe/ZyPDF.cgi/2000461J.PDF?Dockey=2000461J.PDF>

- NPDES Best Management Practices Guidance Document, published by the Environmental Protection Agency Office of Water Enforcement and Permits NPDES Technical Support Branch.
<http://nepis.epa.gov/Exe/ZyPDF.cgi/9100FCSA.PDF?Dockey=9100FCSA.PDF>