
POST CONSTRUCTION CONTROL STORMWATER MANAGEMENT DESIGN STANDARDS

Requirements and General Compliance Guidelines and
NPDES Phase II Storm Water Discharge Requirements
For Storm Water Drainage System Design For
Development and Re-Development Projects within
Bridgeport Charter Township of Saginaw County
Watershed Permit MIG610181



**Bridgeport Charter
Township**

Prepared by:



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I. INTRODUCTION

A. The Objective of the Storm Water Management Plan

The purpose of developing this plan is to aid developers in the design of their storm water runoff collection and detention systems. This Storm Water Management Plan (SWMP) will formalize these policies to allow for a more uniform application of the guidelines. Additionally, this SWMP has been adopted as a means to comply with the National Pollutant Discharge Elimination System (NPDES) Phase II regulations as they relate to storm water discharge in Saginaw County's jurisdictional area within the urbanized area based on the most recent Census Data. These regulations are part of the Clean Water Act (CWA) as amended in 1987. Bridgeport Charter Township has a NPDES Storm Water Discharge Permit (MIG610181) and must comply with the goals and objectives of the Storm Water Pollution Prevention Initiative (SWPPI) developed to address storm water quantity and quality issues. Furthermore, the Township understands that it is part of the Saginaw Bay Watershed with valuable water resources that must be protected to the maximum extent practicable.

This Storm Water Management Plan establishes the framework through which detention measures and the design of storm water collection systems will be implemented and details the process that must be followed to gain approval for new developments and re-development projects. The SWMP will address storm water quality standards, best management practices (BMPs), post-construction storm water runoff from new development and re-development projects (*includes private, commercial and public projects and instances where Bridgeport Charter Township is the developer*), preventing or minimizing water quality impacts, and innovative design for Bridgeport Charter Township to assure that the storm water discharged into storm water drainage systems under jurisdiction of the county or state is as clean as possible. The plan requires storm water management design practices that will help to minimize the impacts of proposed development or re-development projects on the existing drainage system. In addition, these guidelines will help ensure adequate drainage systems are being constructed for future development in the Township. The following types of developments and earth changes require a Storm Water Management Plan:

1. Land development proposals subject to site plan review requirements in the Township Zoning Ordinance.
2. Projects 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 and discharge to Bridgeport Charter Township's Municipal Separate Storm Sewer System (MS4), or waters of the state within the township.
3. Subdivision plat proposals.
4. Site Condominium developments pursuant to the Condominium Act, P.A. 59 of 1978 as amended; MCLA 559.101 et.seq.
5. Any development on property divided by land division in connection with which one (1) or more public or private roads are created or extended, and/or in connection with which more than three (3) parcels of less than one (1) acre are created.
6. Any proposal to mine, excavate, or clear and grade or otherwise develop one (1) acre or more land for purposes other than routine single family residential landscaping and gardening, or any proposal within five-hundred (500) feet of an inland lake, river, or stream.

The Storm Water Management Plan explains the Township's proactive approach to managing the quantity and quality of storm water runoff and promotes the following:

- The practice to infiltrate storm water as part of the natural process when soil conditions permit.
- Regional detention as a means to store stormwater runoff and discharge it at a pre-determined rate. Regional detention provides for a more economical utilization of land and can provide more opportunities to provide a more aesthetically pleasing landscape.
- Innovative procedures in storm water management such as bio-filtration, bio-swales, rain gardens, and other practices that enhance storm water quality by cleansing pollutants from runoff.
- Encourages proper maintenance of storm water conveyance and storage systems to assure they are working properly.
- It is further noted that it is **not** the responsibility of the **township or Saginaw County** to maintain or operate these systems. However, if the township and/or County is forced into a situation to provide maintenance on a storm water conveyance or storage system, any and all costs incurred by the township and/or County will be passed on to the owner plus a 25% administration fee.

The Storm Water Management Plan includes:

1. A summary of the administrative procedures to be followed to comply with the plan, including meeting requirements, review procedures, inspection requirements, fee schedule, issuance of the permit, penalties and enforcement, and other county / state regulatory agency requirements.
2. A description of design calculations.
3. A description of design standards and guidelines.

B. The Need for Storm Water Management in Bridgeport Charter Township

Bridgeport Charter Township has been managing storm water runoff under the guidelines and review of the Saginaw County Public Works Commissioner's office, if applicable, to reduce the risk of overloading the storm drainage systems located within the Township. In the continuing effort to minimize impacts to the existing storm drainage system and to provide adequate drainage in the future, the Township has prepared this formalized Storm Water Management Plan. This SWMP will provide the guidelines and direction for development and redevelopment in Bridgeport Charter Township as it relates to storm water issues.

C. Administration of the Storm Water Discharge Permit and Management Plan

The Storm Water Management Plan will be implemented and operated by the Bridgeport Charter Township Zoning Administrator and/or designee. The Zoning Administrator and/or designee will be responsible for the review of new development and re-development plans and for the installation and maintenance of measures within the Township to accomplish the plan. The Planning Commission and/or designee will work in conjunction with Township Administration, the Saginaw County Public Works Commissioner, the Saginaw County Road Commission, planning, architectural and engineering consultants, landowners, and developers within the Township.

II. ADMINISTRATION

A. Definitions

For the purpose of this Storm Water Management Plan, 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 Storm Water 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. Typical design is not to exceed the predevelopment rate and volume for all storms up to the 2-yr 24-hr storm at the site. At a minimum, predevelopment 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)
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 storm water 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 storm water before discharge.
6. *Bio-swale*: 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 and rushes are commonly found in bio-swales because they help to trap the water and force it to absorb, rather than flowing through the bioswale 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 storm water 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.

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 storm water 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 storm water which is either in excess of the required detention storage or is due to a failure in the site's storm water 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. *Excess Storm Water Runoff*: The volume and rate of flow of storm water discharged from a drainage area, which is in excess of the allowable discharge.
20. *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.
21. *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 redevelopments will not be allowed to discharge storm water 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. **IF**'s have been established for the existing drains and storm sewer systems located within the Township and are all 0%.

22. *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.)
23. *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>
24. *NPDES*: National Pollutant Discharge Elimination System. In 1987 the Clean Water Act was amended and required to implement a program that would address pollutants being discharged to the nation's waters. This now includes storm water discharges into waters of the nation/state. Bridgeport Charter Township has an NPDES stormwater discharge permit as required by the State of Michigan in compliance with the CWA.
25. *Peak Flow*: The maximum rate of flow of storm water runoff at a given location.
26. *Percent Imperviousness (IMP)*: The actual proposed percentage of impervious surface for a proposed development or redevelopment. The **IMP** is used to calculate the design discharge (Q_d). The design discharge is used to determine storm sewer sizes and required detention volumes.
27. *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 storm water 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.
28. *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 storm water 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>
29. *Rear lot drainage*: A storm water 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 storm water in a rapid manner. It is a deliberately designed system that can provide additional detention capabilities during severe runoff conditions. It is a system that in condo or subdivisions is the responsibility of the owner to maintain. It is not the townships responsibility. The township may repair the system if necessary to prevent damage to neighboring properties, but all associated repair costs, plus a 25% administrative fee will be passed on to the owner.
30. *Restrictor*: A hydraulic control structure used to restrict the storm water 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.

31. *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 Storm Water Management Plan 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 Storm Water Management Plan Reviewer may require additional detention or storage based on historical or anecdotal problems on a site.
32. *Regional Detention Areas*: A regional detention area is one that is designed to provide the required detention volume and discharge requirements for multiple parcels that are developed to a predetermined or planned imperviousness. These detention areas must institute best management practices to provide improved water quality for storm water runoff to the maximum extent practicable. For example, it is recommended that forebays or BMPs with similar objectives be used to assure water quality.
33. *Retention Storage*: The permanent retaining or storage of storm water 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 storm water 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.
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 storm water issues and regulations, more information is available at www.saswa.org
35. *Saginaw County Land Development Advisory Committee*: When a development is to be proposed in the Township and will involve the Road Commission, Saginaw County Public Works Commissioner (a county drain) and the Township it is advisable to begin the development process with this committee. The advisory committee shall include a member of the Saginaw County Road Commission, Saginaw County Public Works Commission, and Bridgeport Charter Township. The goal of the committee is to arrive at a mutual understanding of the procedures, standards, and/or requirements as they may apply to the proposed development.
36. *Storm Water Management Plan (SWMP)*: Also known as post construction controls, this is a site specific storm water 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 storm water runoff from a site.
37. *Storm Water Management Plan Reviewer*: The engineering firm or professional person formally designated by Bridgeport Charter Township to act as their plan reviewer.
38. *Storm Water Runoff*: The water from a rainstorm or snowmelt, which flows over the surface of the ground or is collected in a drainage system.
39. *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)

40. *Time of Concentration (T_c):* The elapsed time for storm water runoff to flow from the most hydraulically distant point in a drainage area to the outlet or other predetermined point.
41. *Township Engineer:* The engineering firm formally designated by Bridgeport Charter Township to act as their Engineer in specified matters. Must have experience in Stormwater Reviews and with NPDES Stormwater Regulations as they pertain to Post Construction Controls (PCCs).
42. *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.
43. *Upland Area:* Land located in the upper portion of a watershed whose surface drainage flows toward the area being considered for development.
44. *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.
45. *Urbanized Area:* An area designated by the US Census Bureau, which has specific rules and regulations concerning storm water under the NPDES Phase II regulations. This regulated area may require adherence to specific water quality standards.
46. *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.
47. *Water Quality Volume (First Flush):* Is the volume of one (1) inch of rain over the area of land contributing storm runoff. The water quality volume of a rain event typically carries the most pollutants to our storm sewer system and ultimately to our rivers, lakes and streams. This volume is to be discharged over a 24-48 hour period of time to settle out pollutant loads. Or, other methods used to meet the water quality criteria of 80% removal of TSS or a discharge of 80 mg/L or less of TSS from the site.
48. *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, 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 and the Tittabawassee River.

B. Review Procedure

These Design Standards are applicable to all development projects that disturb at least one (1) 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 Bridgeport Charter Township and over which Bridgeport Charter Township has jurisdiction. These Design Standards are only for industrial, commercial, nonresidential development, or platted subdivisions or condominium complex development or re-development. These Design Standards 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 and less than one acre. Any questions regarding this should be referred to Bridgeport Charter Township for clarification. These Design Standards provide minimum requirements for developments covered under the Storm Water Management Design Standards, provided, however, that Bridgeport Charter Township reserves the right to deviate from the specific design requirements set forth in the Design Standards when, on a case-by-case basis, such deviation is appropriate or necessary in order to accommodate the goals and purposes underlying these Rules. These rules and their implementation are designed to promote low impact designs such as rain gardens, bioswales, infiltration techniques, or other site control of stormwater. Bridgeport Charter Township is committed to working with those developing projects or applying for permits to use alternate drainage methods which help meet local landscape ordinance requirements and improve the quality of water in our environment.

Bridgeport Charter Township's Zoning Administration, 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 Bridgeport Charter Township showing the acceptance or rejection of the proposed site drainage plans, calculations, best management practices for discharge of clean storm water and an operation and maintenance plan with signed agreement.

A site will be considered in compliance with the Bridgeport Charter Township Stormwater Management Plan when a review and approval of a site's Storm Water Management Plan and post-construction storm water runoff BMPs has been completed. The Township will not accept runoff into drainage systems located within the Township from newly developed or re-developed sites without compliance with this SWMP. **Developers or Builders should not install the storm water system unless they are working from a set of plans that have been stamped as "APPROVED"** with appropriate signature from the Township's Storm Water Plan Engineer and/or Reviewer or other appointed designee.

To comply with the Bridgeport Charter Township Stormwater Management Plan, complete the following process and deliver or mail all submittals to **Bridgeport Charter Township Hall, Supervisor, c/o Storm Water Discharge Permit, 6206 Dixie Highway, Bridgeport, MI 48722:**

A complete submittal package for a storm water review consists of the following:

- Associated fee for storm water review for the site.
- A completed Storm Water Discharge Permit Application
- A completed Drainage Checklist
- Two (2) sets of Site Plans
- Two (2) sets of calculations
- If applicable, a signed Storm Water Management Operation and Maintenance Plan and Agreement. This will include the maintenance and schedule for all structural storm water

controls being implemented on the site (i.e. detention basins, underground storage detention basin systems, catch basins, vegetated swale, etc.).

*Note: If documents are submitted via email, only **ONE** copy of each is necessary.*

1. Pre-Design Meeting

The Developer's Engineer shall be responsible for coordinating a pre-design meeting. This meeting, at a minimum, shall consist of the Developer's Engineer, the Township's reviewer or designee, and a representative of Saginaw County Public Works Commissioner and Saginaw County Road Commission, if necessary and applicable. The purpose of the meeting is to address the various storm water management proposals of the developer. Conceptual storm water 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 and apartment projects, and site developments larger than five (5) acres. It is recommended that other site development projects have this meeting or, at a minimum, correspond with the Township's designee by phone, e-mail, and/or facsimile regarding conceptual design alternatives prior to submitting for formal review.

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

- a. The drainage district in which the proposed development is located and the design impervious factor for the proposed development. *(This information can be obtained from the Storm Water Management Plan Reviewer or Saginaw County Public Works Commissioner's Engineer, if applicable.)*
- b. Small location map showing the section, or part of the section in which 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 contributing 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 redevelopment.
- g. Whether the proposed drainage system is going to be owned and maintained by a private or public entity.

If required, the Owner/Developer and his/ her technical consultant shall attend a Saginaw County Land Development Advisory Committee (LDAC) meeting. It is especially important if the project involves a county road and/or county drain as the Saginaw County Road Commission and Saginaw County Public Works Commissioner have design standards that must be met. The intent 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. The application for this meeting can be obtained at the following website:

<http://saginawcounty.com/PublicWorks/Permits-and-Forms.aspx>

If the Township's designee and the Developer's Engineer agree upon the conceptual layout of the storm drainage system, the Owner/Developer shall begin completing plans and calculations for formal review by the Township.

2. Formal Review

- a. In addition to the site plan review requirements, the owner / developer must put together the following for the review of the Storm Water Management Plan for the site:
 1. Completed Storm Water Discharge Permit Application and Checklist
 2. Two (2) sets of plans related to the site's storm water drainage
 3. Two (2) sets of calculations
 4. Any other supporting information
 5. An **operation and maintenance plan with signed maintenance agreement** for the Storm Water Management Plan, if applicable.

Note: If documents are submitted via email, only ONE copy of each is necessary.

If applicable and pertaining to the design, another complete set of this information shall be submitted to the Saginaw County Public Works Commissioner, Saginaw County Courthouse at 111 South Michigan Avenue, Saginaw, MI 48602. The plans and calculations will comply with the requirements of this Storm Water Management Plan. The permit application, checklist, design calculations, and design standards to be used during the formal review process are established by this Storm Water Management Plan.

- b. Submit deposit/fee in accordance with the fee schedule adopted by the Bridgeport Charter Township Board.
- c. Formal review and approval will not begin until all items required for application have been received. The proposed drainage system will be approved or rejected with reason, and returned to the owner/developer.
- d. The Storm Water Management Plan Reviewer will review all plans, calculations, and other information for compliance with the Township's Storm Water Management Plan. 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 Township Engineer 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 in accordance with the Storm Water Management System Maintenance Plans Section, below. The Township's Engineer 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.

- g. If the proposed drainage system is rejected, two (2) sets of plans and two (2) sets of calculations will need to be re-submitted to the reviewing agency with the appropriate revisions. A completed checklist will also have to be re-submitted along with any revisions to the operation and maintenance plan with signed maintenance agreement, if applicable. *Note: If documents are submitted via email, only **ONE** copy of each is necessary.*

3. Formal Review for Subdivisions, Condominiums, and Platted Developments

- a. In addition to the site plan review requirements, the owner / developer must put together the following for the review of the Storm Water Management Plan for the site:
1. Two (2) sets of plans;
 2. Two (2) sets of calculations;
 3. A copy of the completed permit application & checklist;
 4. A storm water system maintenance plan and maintenance agreement, if applicable, for review by the Township Engineer;
 5. Any other supporting information for the site.

The plans and calculations shall comply with the requirements of this Storm Water Management Plan. The permit application, checklist, design calculations, and design standards to be used during the formal review process are established by this Storm Water Management Plan.

One set of plans and one set of calculations are retained by the Township for their files.

- b. The developer / owner will submit to the Saginaw County Public Works Commissioner in a separate submittal. A determination by the owner must be made if the system is to be a private development or a public development. If the roads and utilities are to be turned over to public agencies such as the Road Commission or the Public Works Commissioner, then a submittal must be sent to that agency for review and comment.
- c. Submit deposit/fee for Storm Water Management Plan review and inspection to the Township in accordance with the fee schedule outlined in this plan or on the permit.
- d. Formal review and approval will not begin until all items required for application have been received. The proposed drainage system will be approved or rejected with reason and returned to the owner/developer.
- e. A typical review will take approximately two (2) weeks to complete from the date the plan is submitted in complete form.
- f. If the proposed drainage system is rejected, two (2) sets of revised plans and two (2) sets of any revised calculations will need to be resubmitted to the reviewing agency, with one copy of each to the Township for their records. 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. *Note: If documents are submitted via email, only **ONE** copy of each is necessary.*
- g. Utility contracts will not be awarded until such time at the Storm Water Management Plan is approved.

C. Plan Approval and Issuance of Storm Water Permit

Once the Storm Water Management Plan has been approved, the following steps will be followed:

- Two (2) sets of plans will be stamped “Approved” by the Reviewer; one set of plans will be sent to the applicant and one set will be sent to the Township.
- The Operation and Maintenance Plan and Agreement will be stamped “Approved” by the Reviewer and provided to the Township and Developer and kept on file with the Storm Water Management Plan Reviewer.
- A recommendation for approval letter to Bridgeport Charter Township will be provided by the Review Engineer and a copy of the letter will be forwarded to the Developer and any additional recipient deemed necessary.
- A Storm Water Permit will be issued to the applicant by Bridgeport Charter Township, and copied to the Storm Water Management Plan Reviewer and the Saginaw County Public Works Commissioner. The permit will include inspection requirements, compliance requirements, date of issuance, date of expiration, etc.

Note: If documents are provided via email, only ONE copy of each will be emailed out to all responsible parties.

NOTE: For Subdivisions, Condominiums, and Platted developments Bridgeport Charter Township/Storm Water Management Plan Reviewer will issue the storm water permit by coordinating the review with the Saginaw County Public Works Commissioner Engineer. This permit will only be issued when both reviews (storm drain, detention, rear lot, etc.) are completed and approved.

The developer will be required to meet all performance standards and ensure long-term operation and maintenance of all structural and non-structural Best Management Practices (BMPs) during the duration of the development. A Soil Erosion and Sediment Control Permit from the Saginaw County Public Works Commissioner County Enforcement Agency (CEA), inspections, and documentation throughout the duration of the development will all be required. All stormwater runoff control structures, measures, systems and facilities shall be maintained by the property owner or homeowners association following development. (For example, property owners will be individually responsible for rear lot drainage structures or best management practices (BMPs) on their parcels. Associations will be responsible for common use facilities, measures, systems and structures.)

Maintenance agreements shall specify responsibilities for financing maintenance and emergency repairs, including, but not limited to, the maintenance and repair of the following: detention and/or retention basins (wet or dry), Best Management Practices implemented on the site to address water quality, flow restriction structures, rear lot drainage systems, storm sewer structures, pipes as required by type of system and ownership of such a system. *(For example, if the system is under control of the MDOT, they will maintain the system, if a private owner or association, then they have responsibility.)*

If necessary to protect public health, safety, welfare, or water resources, including lakes, rivers, streams, protected wetlands, county drains or other receiving bodies of water, the Township may initiate emergency action to abate imminent and substantial danger and risk. Any costs incurred will be the responsibility of the owner or association responsible for maintenance of the storm water system.

D. Changes to Plan after Approval

1. Any changes made to the approved plan after issuance of the storm water permit, and before construction begins, shall require two (2) sets of plans for submittal to the Township for review and approval. Another complete set of this information shall be submitted to the Saginaw County Public Works Commissioner if the system will be turned over to this office. *Note: If documents are provided via email, only ONE copy of each will be emailed out to all responsible parties.*

If the change is minor and occurs in the field during the construction phase, the contractor shall contact the Storm Water Management Plan Reviewer and advise him/her of the change in a written letter. Anything that increases impervious area, grading changes or affects the rate of discharge from the site may require additional intervention to be decided at the time of occurrence. The Storm Water Management Plan Reviewer may choose to approve modifications by field inspection and a follow up to the Township with a letter approving the modification. The project owner will be invoiced for the engineer's time.

2. Upon receipt of this information, it will be determined whether additional information, such as calculations, a revised checklist, updates to the operation and maintenance plan and signed agreement, if applicable, etc. will be required.
3. The fee for review of any changes to the plan after approval will be billed on an hourly basis. A building or occupancy permit will not be issued until all changes have been approved and the Township has received all review fees.

E. Inspection and Letter of Certification Requirements

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. Inspection requirements will be outlined in the storm water management permit. Descriptions of the inspection requirements are outlined below. The fees associated with this inspection are included in the original deposit.

1. Small Developments and 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 final inspection of the restrictor and the detention storage areas by the Township's Designee or Storm Water Management Plan Reviewer 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 Contractor must complete a letter of certification indicating that the storm drainage system has been constructed as shown on the approved Storm Water Management Plans. A building or occupancy permit will not be issued until the Township has received a letter of certification and the final inspection of the site has been completed by the Storm Water Management Plan Reviewer.

A letter of certification will have to be completed by the developer's Engineer indicating the storm water drainage system and structural storm water controls have been constructed as shown on the approved Storm Water Management Plans and all structural storm water 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 Township's Engineer, or other appointed designee, and the final approved inspection of the site has been completed by the Township's Engineer or designee.

2. Large Developments and Redevelopments

(5 acres and greater) - Periodic Site inspections of the storm sewer, outlet, restrictors, and detention storage areas may be required by the Storm Water Management Plan Reviewer / Township Engineer. Specific items needing inspection prior to the completion of the project will be identified in the Storm Water Management Permit (i.e. installation of restrictors, restricting pipes, etc.).

The Storm Water Management Plan Reviewer / Township Engineer or designee shall be informed twenty-four (24) hours in advance of the placement of items requiring inspection as outlined on the Storm Water Management Plan.

A final inspection of the restrictor and the detention storage areas by the Storm Water Management Plan Reviewer / Township Engineer or 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 and be billed back to the Developer on an hourly basis for inspections performed by the Storm Water Management Plan Reviewer/Township Engineer or designee.

A letter of certification will have to be completed by the developer's Engineer indicating the storm water drainage system and structural storm water controls have been constructed as shown on the approved Storm Water Management Plans and all structural storm water 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 Township's Engineer, or other appointed designee, and the final approved inspection of the site has been completed by the Township's Engineer or designee.

3. Platted Developments, Subdivisions, and Condominium/Apartment Projects

Daily inspection of storm sewer and drainage system construction will be required. The Owner/Developer's Engineer or the Storm Water Management Plan Reviewer shall perform this inspection. Daily inspection reports shall be completed for all days on which construction of the storm drainage system occurs. These daily inspection reports do not have to be submitted to the Township. However, they should be on file with the Engineer and made available upon request.

INSPECTIONS:

A final inspection by the Saginaw County Public Works Commissioner's Engineer will be required for the restrictor / outlet device or metering line, storm sewers and the detention storage areas if the ultimate discharge is into an established Saginaw County drain. The Saginaw County Public Works Commissioner's Engineer may also require videotaping of the system or portions of the system before accepting the drainage system as a public utility. The cost of the videotaping is the responsibility of the owner or contractor. If not discharging into a county drain and not necessary for review by the Saginaw County Public Works Commissioner, the Township's Reviewer, or designee, will review for compliance of the restrictor / outlet device or metering line, storm sewers and the detention/retention/underground storage areas. Subsequent inspections may be required if deficiencies exist. Any additional fees incurred during this inspection process are the responsibility of the owner or contractor.

A final inspection of the rear lot drainage system by the Storm Water Management Plan Reviewer will be required. This one-time inspection will be performed at the completion of the project, or when directed by the Township. Subsequent inspections may be required if deficiencies exist. If additional inspection fees are incurred as a result of construction deficiencies these will be passed on to the owner or contractor.

The Developer's Engineer and Contractor will have to complete a letter of certification indicating the storm drainage system has been constructed as shown on the approved Storm Water Management Plans. A building or occupancy permit will not be issued until the Township has received a letter of certification and the Saginaw County Public Works Commissioner's Engineer, if applicable, and the Storm Water Management Plan Reviewer have completed the final inspections of the site.

F. Fee Schedule

The fee schedule for reviewing storm drainage submittals and performing inspection of drainage system construction can be obtained by contacting the Bridgeport Charter Township Planning Commission Board.

G. Exemptions

Re-development projects will be exempt from the requirements of the Storm Water Management Plan provided:

- There was an existing approved Storm Water Management Plan for the site.
- The area of additional roof, paved, and gravel surfaces is less than 5% of the existing improved areas of the site.
- The additional roof, paved, and gravel surface does not exceed 20,000 sq. ft.
- There is no cumulative increase equal to, or greater than the 5% area of improvement. (For example; If the site has added 2% one year, 3% another year, and another 2% increase in imperviousness. This is a cumulative 7% increase for the site.)
- There is no significant impact or change in detention amounts that may have adverse effects on neighboring properties.

Example: Existing 1-acre site with 0.75 acres of improved property plans to add 3,000 square feet of paved surface to the existing development. $.05 * (.75 * 43560) = 1633.5$ sq. ft. $3,000 > 1633.5$ therefore project will need to follow Storm Water Management Plan.

To obtain this exemption, the contractor, developer, or developer's Engineer must fill out the REQUEST FOR EXEMPTION form in Appendix A. Also, supply a site plan with existing conditions (buildings, parking lots, other impervious / pervious surfaces, etc.), current Storm Water Management Plan for the site, and proposed changes (buildings, parking lot, changes in impervious / pervious surfaces, etc.) with supporting calculations necessary for review purposes. (These calculations are shown above.) If the calculation is not present, the Storm Water Management Plan Reviewer will not review the plan.

NOTE: If no Storm Water Management Plan (SWMP) exists, the site must come into compliance to the maximum extent practicable. In other words meet the requirements of the existing up-to-date SWMP

An exemption may still be granted to re-development projects not meeting the above requirements if approved by the Storm Water Management Plan Reviewer.

The Storm Water Management Plan Reviewer can exercise the right to have a site comply with the Bridgeport Charter Township SWMP guidelines even if the change in impervious area is less than 5% if special circumstances exist, such as historical drainage problems affecting the area, or other concerns related to storm water runoff.

H. Appeal Process

If the developer is in disagreement with any of the reviews or inspections made by the Township and/or Storm Water Management Plan Reviewer, an appeal can be made to the Township Supervisor within thirty (30) days of the review and/or inspection.

Upon review of the items presented for appeal the Township Supervisor may:

- Refer to an independent third party for an opinion / recommendation
- Arbitrate with the Developer and Storm Water Management Plan Reviewer to reach an acceptable solution.
- Override the Storm Water Management Plan Reviewer.

I. Penalties and Enforcement

The Township will not award any contracts for the installation of the water or sanitary sewer utilities until such time as the Storm Water Management Plan has been approved by the Storm Water Management Plan Reviewer. Additionally, penalties may be utilized in the form of civil infractions and court action until compliance is achieved with the approved plan.

NOTE: Storm water systems cannot be altered once approved and constructed unless it has been reviewed by the Township. Removing restrictors or creating a situation that is harmful to neighboring parcels will be the owner's liability.

III. 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 storm water 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 Bridgeport Charter Township'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 allowable discharge (Q_a) from the site shall not exceed the runoff from the site during the 10-year storm event (Q_{d10}) under existing conditions. This discharge can be determined using the 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.
- I is the intensity of rainfall in inches per hour (in. / hr.).
- A is the 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 Bridgeport Charter Township, or appointed designee. This is available at the following websites: <http://www.bridgeportmi.org/> (or contact Bridgeport Charter Township’s Engineer or appointed designee for the excel spreadsheet) and <http://www.saswa.org>.

B. Storm Water Detention Requirements

The storm water detention storage required for a site is to be calculated using the Bridgeport Charter Township’s excel spreadsheet; this can be obtained at the following websites:

- <http://www.bridgeportmi.org/>
- <http://www.saswa.org>

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

1. On systems that utilize a storm water detention basin, a sediment forebay retention area can be utilized within the detention facility. This retention area is required in addition to the storm water detention requirements equal to 1.0 inch of runoff from the site area (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 0.5 inches of runoff above the detention requirement for the site.

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.

C. Discharge Restrictor Requirements

A restrictor regulates the discharge of storm water to the allowable discharge rate (Q_a) established for a site. Restrictors may be a circular in-line plate restrictor or a metering line. The circular in-line plate restrictor is based on the orifice formula.

$$a = \frac{Q_a}{0.62 * (64.4 * \Delta h)^{\frac{1}{2}}}$$

a = area of orifice (sq. ft.)

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

D. Water Quality (First Flush) Requirements

All site development projects are required to detain the water quality volume, which is defined as 1.0 inch of runoff over the area of the site contributing storm runoff (A) for new development or re-development. This volume will be calculated as:

$$V_{ff} = 3630 * A * C_w$$

C_w = Is the weighted runoff coefficient for the entire contributing area.

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:

$$Q_{ff} = \frac{\text{Volume}}{(24 \text{ hr}) * (3,600 \text{ sec} / 1 \text{ hr})} = \frac{V}{86,400 \text{ sec}}$$

It will also be acceptable for site development projects to calculate the runoff generated by the 90 percent annual non-exceedance storm. **If this method is chosen, please contact the Township Engineer, or other appointed designee for guidance.**

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to Bridgeport Charter Township Engineer, or appointed designee. This is available at the following websites:

<http://www.bridgeportmi.org/>

(or contact Bridgeport Charter Township’s Engineer or appointed designee for the excel spreadsheet) and

<http://www.saswa.org>.

E. Bank Full Flood Requirements

The purpose of bank full or channel protection criteria is to prevent habitat degradation and erosion in urban streams caused by an increased frequency of bank full and sub-bank full 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 redevelopment. Waterbodies excluded to this channel protection performance 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) and engineered county drains. Contact the Saginaw County Public Works Commissioner’s Engineer upon determination of bank full flood requirements when dealing with Saginaw County drains.

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to Bridgeport Charter Township Engineer, or appointed designee. This is available at the following websites:

<http://www.bridgeportmi.org/> (or contact Bridgeport Charter Township’s Engineer or appointed designee for the excel spreadsheet) and <http://www.saswa.org>.

IV. DESIGN STANDARDS

A. Requirements

1. General Requirements

- a. Storm water detention requirements for any new construction development, re-development, or land use change occurring within Bridgeport Charter Township will be determined according to this Storm Water Management Plan.
- b. For business and commercial site developments it is recommended that a licensed landscape architect be utilized early in the design process. The landscape architect should be knowledgeable in addressing issues related to storm water quality and incorporate designs that would effectively utilize space. The guidelines of this Storm Water Management Plan regarding storage and discharge must still be met. The use of native or similar plants and innovated designs such as rain gardens, bio-detention areas or swales to address water quality should be used whenever possible.
- c. 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 calculation section of this plan.
- d. 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.
- e. Engineering calculations must be submitted with the storm water discharge permit application. The calculations shall follow the procedures outlined in this document and the additional supporting documents pertaining to calculation requirements.
- f. Roof drains should discharge onto landscaping or to rain gardens to promote infiltration for water quality reasons. It is preferable to have the water flow through vegetation such as a rain garden, bio-swale or bio-filtration before reaching a catch basin for discharge. Unrestricted runoff from roof drains directly to a public drain or private unrestricted drain will not be acceptable. There are no exemptions. However, if the site is very small and no landscaping is available and discharge over a sidewalk or paving could create a slip / fall hazard, the roof drain may be connected to a storm sewer system if there is an appropriate Best Management Practice in place in the detention area to deal with water quality issues and the detention discharge flow is properly restricted.
- g. The Developer, Storm Water Management Plan Reviewer 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, Saginaw County Road Commission drainage system, or the Michigan Department of Transportation drainage system.
- h. The Storm Water Management Plan Reviewer 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 Storm Water Management Plan Reviewer and/or the Saginaw County Public Works Commissioner 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.

- i. 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.
- j. Soil erosion and sedimentation control measures, including Best Management Practices (BMPs), must be implemented and properly maintained per Part 91 of Public Act 451 of 1994 (NREPA). SESC Part 91 permits are issued by the Saginaw County Public Works Commissioner (CEA).
- k. The owners of the property shall be advised to annually clean out the sumps of all catch basins or manholes and routinely check restricted outlets for obstructions (see example maintenance plans in Appendix D).
- l. The use of infiltration BMPs to not exacerbate existing conditions will not be implemented to meet the water quality treatment and channel protection standards for new development or redevelopment projects in areas of soil or groundwater contamination. Coordination with the MDEQ staff will be done when deemed necessary.
- m. 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.
- n. It is recommended that BMPs addressing water quality for stormwater be instituted on all storm sewer systems. Examples can be found in the following:
 - i. Upper Saginaw Watershed Management Plan or Lower Tittabawassee Watershed Management Plan available at www.saswa.org
 - ii. MDEQ's "Guidebook of Best Management Practices for Michigan Watersheds", available from regional DEQ office in Bay City.
 - iii. Office of Management and Budget, State of Michigan
 - iv. Michigan Department of Transportation

2. Storm Sewer Piping Requirements

- a. Proposed storm sewer shall be designed to convey the 10-year design storm runoff rate (Q_d). 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, or other suitable material approved by the Saginaw County Public Works Commissioner or the Saginaw County Road Commission, must be used for the following:
 - i. Storm sewers within county and state right-of-way
- c. Provide 2' minimum cover, with minimum 5' cover in M.D.O.T. R.O.W.
- d. Provide 18" vertical separation between all other utilities, including sanitary sewers and water mains. Provide 10' horizontal separation from other utilities. Any deviations from these vertical and horizontal separations must be discussed with and approved by the Storm Water Management Plan Reviewer.
- e. A minimum of 4" of sand bedding is required beneath the pipe and a minimum of 6" of sand backfill is required above the pipe.
- f. Manhole/catch basin shall be placed at a maximum distance of 300' 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 can be connected to rear lot drainage systems. However only foundation water can be discharged from these systems. Sumps cannot discharge domestic or industrial waste waters (e.g. washing machines, dirty water, cleaning water or any water containing any type of pollutant).

- h. Place a catch basin (minimum 3' diameter) between each pair of driveways, if curb and gutter, driveway culverts, and/or valley shaped ditches are not proposed.
- i. When appropriate the catch basins should have leads strategically placed.
- j. Minimum pipe grades must be such to produce minimum scouring velocity of 2.5 ft. / sec when pipe is flowing full without surcharging.
- k. Concrete pipe (C-76-III, IV) shall have fabric wrapped joints.
- l. For private storm sewer systems, plastic pipe may be used. This plastic pipe shall be either smooth walled HDPE or SDR 35 PVC Pipe. If pipe is perforated, a manufacturer's sock shall be used over the pipe.
- m. Minimum pipe diameter for catch basin leads is 10". The material should be PVC.
- n. Minimum pipe size for storm sewer main is 12" in systems that are publicly owned.
- o. When two or more pipes of different sizes come into a structure, the 8/10th flow lines shall match when possible.
- p. Catch basins should have a minimum sump depth of 24".
- q. Inlets may be allowed if approved by the Storm Water Management Plan Reviewer and adequate sediment trapping measures are provided.
- r. Catch basin inlets must be permanently marked with "Dump No Waste", "Drains to River" for outfall destination or cast in the metal of the inlet (e.g. EJIW 4000 series curb inlets).
- s. Condominiums / Subdivisions / Apartment Complexes should have signage at the site's best management practices informing residents that the storm water system drains to the Saginaw River or designated drain, and these implemented BMPs are improving the storm water quality for the watershed.

3. Detention and Retention Requirements

- a. Residential developments will need to provide a separate lot or parcel for detention or retention. In addition the following requirements will apply:
 - i. This area cannot be dedicated through an easement that covers more than one parcel.
 - ii. This individual lot or parcel must abut a public road with a twenty (20') minimum width and should be near the outlet.
 - iii. Maintenance easements should be shown on the plans.
 - iv. The outer limits shall be delineated on the Exhibit B drawings of a Condominium Development and Final Plat.
 - v. Setbacks will be such that the minimum distance to adjacent lots side property line is 10'.
 - vi. Condominium Developments - Detention or Retention areas shall be designated as general common areas.
 - vii. Platted Developments - Detention or Retention areas shall be designated as a storm water detention/retention area or recreation area when approved by the Storm Water Management Plan Reviewer. (See State Requirements)
- b. Requirements for all Detention / Retention Areas
 - i. Proposed storm water detention or retention facilities shall be designed to detain/retain the 10-year design storm runoff volume from the entire contributing area in excess of the allowable discharge from the site (See the Design Calculations Section 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/retention area.
- iii. The design maximum storage elevation in a detention area must not exceed a 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.
- iv. Parking Lots - the design maximum storage elevation in a detention area must not exceed a depth of nine (9) inches above any paved surfaced in non-residential developments. If parking lot storage is to be used then commercial silt sacks must be placed in the catch basins and maintained by the property/business owner. For example, Ultra Drain Guard by Ultra Tech or similar product. 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.
- v. In residential developments the maximum ponding elevation in the detention/retention pond shall not exceed the lowest rim elevation in the development. The only exception to this would be rear lot rim elevations.
- vi. The design maximum storage elevation in a detention or retention area must not be closer than one (1) foot below the lowest opening, window, or door of the proposed structure(s) or existing facilities.
- vii. An emergency overflow shall be provided at the detention/retention basin ensuring the maximum ponding elevation does not exceed the depths outlined in items iii and iv 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. This overflow should be to a public street. NOTE: Sites with no acceptable emergency overflow outlet available MUST hold the volume of two (2) 100-year design storm events. Please contact Bridgeport Charter Township and/or designee if site needs this requirement.
- viii. Designs of detention/retention facilities shall incorporate safety features, particularly at inlets, outlet structures, and at any attractive nuisances. These features may include, but not be limited to, fencing, handrails, lighting, steps, grills, signs. On steep slopes, (e.g., 3H: 1V or steeper), landscaping and other protective or warning devices to restrict access may be required by the Township. These items will be discussed and approved by the Township.
- ix. Side slopes and the bottom of detention/retention basins shall have topsoil to a minimum of 3 inches, and seeded.
- x. The side slopes and bottom of the basins shall be shaped with maximum slopes of 1 vertical to 3 horizontal to allow mowing of these surfaces. If side slopes are steeper than 3H: 1V, other design and landscaping features may be needed to provide for protection of the public (e.g. fences, hedgerows, etc.).
- xi. Detention/retention basins with bottom slopes less than 1% shall be underdrained. If a detention basin is designed to be a “dry” basin, the owner must make corrections if it is not draining properly.
- xii. Typical setbacks for detention areas must meet the required setback requirements for the zoning district where the development is located.
- xiii. Detention/retention 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).
- xiv. 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 ix shall not apply to “Wet” detention facilities.

- xv. If a detention/retention basin is proposed in a front yard area it must be designed to be aesthetically compatible with the development. (i.e. mild slopes, rain garden etc.).
- xvi. Incorporate BMPs that address water quality issues, such as forebays, grass swales, vegetated strips, rain gardens, bio-filtration, et cetera.
- xvii. 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.
- xviii. Maintenance Requirements for Detention/Retention Facilities.
- xix. Detention/retention basins and restrictors will be maintained as necessary. If a detention/retention basin is found not to be maintained, or a restrictor is removed or not maintained, the owner will have thirty (30) days to complete the necessary maintenance. If this maintenance is not completed, the Township will take the necessary legal action to have the work completed.
- xx. Condominium Projects - If the detention/retention facility areas are designated as general common element, the Master Deed will set up a mechanism by which the storm water facility will be maintained by the Condominium Association.
- xxi. Platted Developments - An association for the subdivision will need to be established. The Saginaw County Public Works Commissioner will require an easement be established that will enable their office to repair any problems associated with the system and assess the charges back to the subdivision association members. This will only occur if the association does not properly maintain the detention/retention area.
- xxii. Maintenance shall include, but not limited to, the following: mowing of the basin bottom and side slopes, removal of excess spoils from the basin, removal of debris and sediment from the outlet, repair of fencing, spraying for plants, brush, and cattails, and any other maintenance necessary to ensure the basin remains functional and is aesthetically pleasing to surrounding landowners.

4. Rear Lot Drainage Requirements

- a. NOTE: Rear lot drainage systems are not owned or maintained by the township or the county; they are the sole responsibility of the subdivision's home owners association or condo association. An easement is present to provide for maintenance work on rear lot drainage systems. The 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. The homeowners association should develop a preventive maintenance plan for the rear lot system to assure proper function of the system. If necessary, the homeowner may repair the rear lot system on their own if they so desire. However, the area worked on must be returned to the condition it was in prior to the repair.
- b. All lots within a condominium or platted development shall require rear lot drainage. Each lot shall be adjacent to a rear lot catch basin.
- c. 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 placed at 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 placed at 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 placed at a minimum slope of 0.32%.
- d. 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.
- e. Any rear lot basin must be directly connected to the development's storm sewer system. Storm sewer services cannot be connected to a branch of a rear drainage system.
- f. Connections at the rear yard basin and at the storm sewer shall be soil tight and or constructed using premanufactured seals, joints, etc. (i.e. Kor-n-Seal).
- g. The rear lot system's piping shall be SDR-35 PVC piping or a dual wall HDPE piping.
- h. Rear lot tile drains cannot connect to road underdrains.
- i. Sand backfill and bedding is not required for rear lot drainage systems provided dual wall pipe is used (i.e. N-12, H-1-Q, etc.) or SDR-35 PVC pipe.
- j. Rear lot drainage tiles shall have a minimum cover of 2 feet. A minimum of 4 inches of sand bedding is required beneath corrugated plastic pipe and a minimum of 6 inches of sand backfill is required above corrugated plastic pipe.
- k. Rear lot catch basins shall have a minimum diameter of 2 feet. Plastic pre-manufactured structures may be used for rear lot drainage systems. Concrete structures are required for storm sewer systems. The catch basins shall not be placed at spacing greater than 300 feet. Any bends, turns, or dead ends shall require a structure.
- l. If pipe is perforated, a manufacturer's "sock" shall be used over the pipe.
- m. A 10' wide easement shall be provided on every lot for all rear lot drainage systems. 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. This is to assure a minimum of 20' of easement for maintenance purposes. NOTE: if no rear lot system exists on the property this easement should still be provided in case of future drainage problems.
- n. 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 storm water 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 storm water runoff to pass through their existing system.
- o. 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:
- p. 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.
- q. If covenants are not made as outlined above, future phases will require separate rear lot drainage systems or agreements from the current landowners allowing for the use of their rear lot drainage system.
- r. The rear lot drainage system shall be designed to convey rear lot drainage from both the existing and proposed rear lot drainage areas.
- s. Easements shall be provided, allowing for maintenance by both abutting landowners in current and proposed phases of development.
- t. Rear lot drainage shall be shown on the preliminary plat (subdivisions) or site plan (condominiums).

- u. All rear lot drains will connect to an approved storm water drainage system.
- v. Rear lot layout examples can be found in the Appendix section.

B. General Compliance Guidelines

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

The minimum surface slopes for overland drainage are as follows:

- a. For bituminous paved surfaces, 1.0 %
- b. For concrete paved surfaces, 0.5 %
- c. For concrete curb and gutter, 0.32 %
- d. For drainage swales and valley shaped ditches, 0.50 %
- e. For rear lot drainage swales and valley shaped ditches, 0.50 %
- f. Landscape grading, 2.0 %

The maximum surface slopes for overland drainage are as follows:

- a. For bituminous, concrete paved surfaces, 5.0 %
- b. For concrete curb and gutter, 5.0 %
- c. For drainage swales and valley shaped ditches, 5.0 %
- d. For rear lot drainage swales and valley shaped ditches, 5.0 %
- 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

Bridgeport Charter Township may issue a storm water discharge permit that waives allowable discharge requirements and or detention/retention requirements. Variation from these requirements shall be made by filing an appeal with the Township Zoning Administrator. The disposition of the variance will be reviewed and acted upon by the Planning Commission whose actions shall be conditioned upon the following:

- a. A petition shall be submitted describing in detail the rationale for the proposed design changes including hydraulic and/or hydrologic computations.
- b. Special circumstances or conditions exist which will affect the property under consideration such that strict compliance with the provisions of the storm water discharge permit would deprive the applicant of the reasonable use of their land.
- c. A variance is necessary for the preservation and enjoyment of a substantial property right of the proprietor.
- d. 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.
- e. An affirmative recommendation must be received from the Storm Water Management Plan Reviewer supporting such variance

D. Easements

1. Wording relative to easement information will be as specifically required by the Saginaw County Public Works Commissioner's office. If a county drain is to be established under the Michigan Drain Code, related easement language will be depicted on final Mylar plats and condominium exhibit B drawings as follows:
"_____foot wide private easement to Saginaw County Public Works Commissioner and the _____ Homeowner's (or Condominium) Association for drainage."
2. The typical easement language will be included in the subdivision deed restrictions or condominium master deed.
3. The location and purpose of drainage easements should be clearly described in subdivision deed restrictions or condominium master deeds.
4. Language will be included within the subdivision deed restriction or condominium master deed that clearly notifies property owners of the presence of storm water management facilities and accompanying easements, as well as restrictions on use or modification of these areas.
5. If a utility is to be located within the right-of-way of any county drain or drainage easement, it will be located such that it will not increase the expense of maintaining the drainage facility.
6. Retention/detention basins or other storm water management facilities will have sufficient easements for maintenance purposes. Easements will be sized and located to accommodate access and operation of equipment, spoils deposition, and other activities identified in the development's storm water system maintenance plan.
7. Easement widths will be determined by the Saginaw County Public Works Commissioner and be situated in such a way as to allow maximum maintenance access, for example, offsetting them from the centerline. In general, easement widths will conform to the following:
 - a Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including, but not limited to the following: watercourses with floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.
 - b Open swales (cross lot drainage): A minimum of 30 feet total width.
 - c Enclosed storm drains: A minimum of 20 feet will be required (10 feet each side of centerline), 30 feet preferred (15 feet each side of centerline), situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases. These may include, but are not limited to, pipe depths exceeding 4 feet from the top of pipe, sandy soils, and steep slopes.
 - d Drain fields (septic areas) shall not be located within drainage easements.

E. Storm Water Management System Maintenance Plans for Subdivisions and 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. An annual maintenance budget itemized by task. The financing mechanism shall also be described.
 - b. A copy of the final approved drainage plan for the development that delineates the facilities and all easements, maintenance access, and buffer areas.
2. A listing of appropriate tasks defined for each component of the system described, and a schedule for their implementation. The listing may include, but not limited to, the following:
- a. Maintenance of facilities such as pipes, channels, outflow control structures, infiltration devices, and other structures.
 - b. Long-term operation and maintenance of all structural and vegetative BMPs installed and implemented to meet the performance standards.
 - c. Debris removal from catch basins, channels, and basins.
 - d. Dredging operations for both channels and basins to remove sediment accumulation. Storm water system maintenance plans shall require that sediment be removed when sediment reaches a depth of equal to 50% of the depth of the forebay or 12 inches, whichever is less.
3. The party responsible for performing each of the various maintenance activities described which will be recorded with final approved plans and plats
4. A detailed description of the procedure for both preventive and corrective maintenance activities. Preventative maintenance shall include, but not be limited to, the following:
- a. Periodic inspections, adjustments, and replacements.
 - b. Record-keeping of operations and expenditures
5. Provision for the routine and non-routine inspection of all components within the system described:
- a. Bridgeport Charter Township 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.
 - b. Housekeeping inspections, such as checking for trash removal, should take place at least twice per year.
 - c. Emergency inspections on an as-needed basis, upon identification of problems; a professional engineer should conduct these inspections.
6. A description of ongoing landscape maintenance is recommended to be included in the plan. Landscaping shall consist of low maintenance and/or native plant species. The proprietor will monitor the viability of plantings for at least two years after establishment and plantings will be replaced as needed. Subsequent monitoring shall be conducted by the landowner or development association. The Saginaw County Public Works Commissioner nor the local government (e.g. city, village, and township) is not responsible for landscape maintenance.

7. 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.
8. Property deed restrictions or condominium master deed documents will specify the time frame for action to address needed maintenance of storm water management facilities. These restrictions or documents will also specify that, should the private entity fail to act within this time frame, the responsible governmental entity may perform the needed maintenance and assess the costs 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 storm water management facilities will be completed per the schedule submitted with the construction plans or within 30 days of receipt of written modification by the responsible 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 threat to public health, safety and welfare requires immediate action.
9. The proprietor may fulfill the obligation to ensure that a governmental entity will be responsible for drainage system maintenance by establishing a county drainage district, or any other similar mechanism approved by the Saginaw County Public Works Commissioner, to provide for the permanent maintenance of storm water management facilities and necessary funding. Or, a Resolution of Intent may be completed to provide a mechanism for funding maintenance on the drainage system.
10. If a County Drain is not established, the proprietor will submit evidence of a legally binding agreement with another governmental agency responsible for maintenance oversight.
11. A legally binding maintenance agreement 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.

F. Evaluation of Cost-Effective Structural and Non-Structural Best Management Practices (BMPs)

1. To meet Bridgeport Charter Township's NPDES Phase II regulatory requirements for storm water, the Township 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 performance standards. Please see an example of a maintenance agreement in the Appendix section.
 - 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.

G. BMPs to Minimize Post Construction Impacts on Water Quality

1. Bridgeport Charter Township requires that BMPs be utilized on all new or re-development sites improve storm water runoff quality in the post construction phase.
2. Bridgeport Charter Township requires BMPs to be designed on a site-specific basis to reduce post-development total suspended solids loadings by 80 percent or achieve a discharge concentration of total suspended solids not to exceed 80 milligram per liter.
3. The BMPs used on a site must be reviewed and approved by the Township Engineer 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.

V. STORM SYSTEM OPERATION AND MAINTENANCE PLANS

A. Operation and Maintenance Plans (O & M)

Operation and maintenance plans will be developed for new site developments and/or re-developments of **one (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 Bridgeport Charter Township 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 Township and/or County to enter the property to inspect structural and vegetative BMPs that 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 Storm Water Drainage Systems, Structural and Vegetative Best Management Practices (BMPs) document in the Appendix Section, then the Township and/or County 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 Bridgeport Charter Township and/or Saginaw County Public Works Commissioner that the O & M Plan has been carried out as described in the plan. All reports on this performance objective must be received by Bridgeport Charter Township and/or Saginaw County Public Works Commissioner on or before December 31st of each year. Failure to report will be construed as noncompliance 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 D for the Long Term Maintenance 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, and require the operation and maintenance of storm water drainage systems and/or structural and vegetative best management practices.

APPENDIX A

1. *Bridgeport Charter Township Discharge Permit Form and Checklist*
 2. *Sample Storm Water Discharge Permit*
 3. *Design Calculations*
 4. *SESC / NPDES Permit Procedure for Construction Sites E. Typical Daily Inspection Report Form*
- A. *Detention and Restriction Final Inspection Report Form*
 - B. *Site Report Visits Procedure & Deposit*
 - C. *Request for Exemption*

BRIDGEPORT CHARTER TOWNSHIP STORM WATER DISCHARGE PERMIT

PROJECT NAME:	
Property Tax Identification #:	
Site Plan Review Date:	
Date Issued:	
Expiration Date:	
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:	County:
Street Address:	Town – Range, Section:
Village/City, State Zip:	Name of Subdivision/Plat:
	Lot No:
TYPE OF DEVELOPMENT:	
AREA OF DEVELOPMENT (ACRES):	
AREA OF CONTRIBUTING DRAINAGE DISTRICT (ACRES):	
AREA OF EXISTING ROOF AND PAVED (ACRES):	
TOTAL ROOF AND PAVED AFTER DEVELOPMENT (ACRES):	
OUTLET DRAIN:	
DESIGN IMPERVIOUS FACTOR (IF NEEDED):	
MAXIMUM ALLOWABLE DISCHARGE FROM SITE (CFS):	
ACTUAL RESTRICTED DISCHARGE (CFS):	
REQUIRED ON-SITE STORAGE (CUBIC FEET):	
STORAGE PROVIDED (CUBIC FEET):	
RESTRICTOR’S SIZE AND LOCATION:	
<u>INSPECTION REQUIREMENTS:</u>	
<u>COMMENTS/COMPLIANCE REQUIREMENTS:</u>	
ATTACHMENTS: Approved Plans	
cc: Bridgeport Charter Township	PLEASE REFER TO BACK FOR ADDITIONAL INFORMATION REGARDING THIS PERMIT

DRAINAGE PLAN CHECKLIST

In order for the Owner, Developer, or Builder to be in compliance with these guidelines he/she shall for review by Bridgeport Charter Township's Engineer or designee, three (2) complete sets of the site drainage and grading plan, and two (2) 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.

DRAINAGE PLAN CHECKLIST


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 Bridgeport Charter Township's Engineer and/or 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 Bridgeport Charter Township's Storm Water Management Plan Design Standards, the Developer must submit applications for permits with all agencies that regulate storm water within the area of development. These may include Michigan Department of Transportation, Michigan Department of Environmental Quality, Saginaw County Public Works Commissioner (SESC and/or Outlet Discharge Review, Approval and Inspection), or the Saginaw County Road Commission.

BRIDGEPORT CHARTER TOWNSHIP STORM WATER DISCHARGE PERMIT

PROJECT NAME: Joe Development Complex	
Property Tax Identification #:	400-30-765-01
Site Plan Review Date:	234
Date Issued:	08/28/03
Expiration Date:	08/28/05
NAME OF DEVELOPER/OWNER: Developing, Inc.	ENGINEER/ARCHITECT: Engineering, Inc.
Contact Person: Joe Development	Contact Person: Jane Engineer
Street Address: 1234 Any Street	Street Address: 4321 Some Street
City, State, Zip: Any City, MI 22222	City, State, Zip: Any City, MI 22222
Telephone: (989) 555-5555	Telephone: (989) 555-6666
Email: joe@developing.com	Email: jane@engineering.com
PROJECT LOCATION:	County: County
Street Address: Address	Town – Range, Section: Town – Range, Section
Village/City, State Zip: City, State, Zip	Name of Subdivision/Plat: Name of Subdivision/Plat
	Lot No: No.
TYPE OF DEVELOPMENT:	Commercial
AREA OF DEVELOPMENT (ACRES):	3.0 acres
AREA OF CONTRIBUTING DRAINAGE DISTRICT (ACRES):	3.2 acres
AREA OF EXISTING ROOF AND PAVED (ACRES):	0 acre
TOTAL ROOF AND PAVED AFTER DEVELOPMENT (ACRES):	2.2 acres
OUTLET DRAIN:	County Drain
DESIGN IMPERVIOUS FACTOR (IF NEEDED):	0%
MAXIMUM ALLOWABLE DISCHARGE FROM SITE (CFS):	0.6 cfs
ACTUAL RESTRICTED DISCHARGE (CFS):	0.58 cfs
REQUIRED ON-SITE STORAGE (CUBIC FEET):	9,650 cubic feet
STORAGE PROVIDED (CUBIC FEET):	10,000 cubic feet
RESTRICTOR'S SIZE AND LOCATION:	4.75 inch orifice in outlet pipe
INSPECTION REQUIREMENTS: One final inspection upon construction completion.	
	
COMMENTS/COMPLIANCE REQUIREMENTS:	
ATTACHMENTS: Approved Plans	
cc: Bridgeport Charter Township	PLEASE REFER TO BACK FOR ADDITIONAL INFORMATION REGARDING THIS PERMIT

CHANGES TO PLANS AFTER APPROVAL:

- Any changes made to the approved plan after issuance of the storm water permit shall require three (3) sets of plans to be submitted to the Township for review and approval.
- Upon receipt of this information, it will be determined if additional information, such as calculations, revised checklist, updated maintenance plan and agreement, etc. will be required.
- The fee for review of any changes to the plan after approval will be billed on an hourly basis. An occupancy permit will not be issued until all changes have been approved and BRIDGEPORT CHARTER TOWNSHIP has received all review fees.

FEE SCHEDULE:

The fee schedule for reviewing storm drainage submittals not going through normal PLANNING REVIEW PROCESS and performing inspection of drainage system construction is outlined below:

Type of review	Fee	Collection of Fees
Small Developments and Re-development (0 to 5 Acres)	Hourly fee, minimum fee of \$500	\$500 deposit collected prior to initiation of the review. Any additional fees added to Building Permit Fee.
Large Developments and Re-developments (5+ Acres)	Hourly fee, minimum fee of \$600	\$600 deposit collected prior to initiation of the review. Any additional fees added to Building Permit Fee.
All Condominium, Apartment, and Platted Developments	Hourly fee, minimum fee of \$800	\$500 deposit collected prior to initiation of the review. Additional fees added to Building Permit Fee.
Determination if re-development from compliance.	\$125	Fees added to Building Permit Fee. project is exempt

These permit fees include: a) Pre-design meeting, if necessary b) Initial formal review

1. Review of requested changes made during first review.
2. First inspection of site upon completion.

An additional fee will be required for subsequent reviews beyond the first formal review and subsequent inspections beyond the first site inspection. The fee will be based on the actual hours needed to complete the subsequent reviews and inspection.

INSPECTION/LETTER OF CERTIFICATION REQUIREMENTS:

Refer to the Storm Water Management Plan and this permit for minimum inspection and Letter of Certification requirements.

PENALTIES/ENFORCEMENT:

Bridgeport Charter Township will not award any contracts for the installation of the water or sanitary sewer utilities until such time as the Storm Water Management Plan has been approved by the Bridgeport Storm Water Management Plan Reviewer.

APPEALS PROCESS:

If the developer is in disagreement with any of these reviews or inspections made by Bridgeport Charter Township and/or Bridgeport Storm Water Management Plan Reviewer, an appeal can be made with the Bridgeport Charter Township Supervisor within thirty (30) days of the review and/or inspection.

A general procedure for Soil Erosion and Sediment Control (SESC) and NPDES permits to discharge storm water 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.

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 MDEQ. 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 Enforcement Agency (MEA) first.

Create an account on the MDEQ’s MiWaters online database system and fill out the NPDES Notice of Coverage form for discharges from the construction site, submit the proper fee, and submit the form for the State’s review. Once the form is submitted and approved by the state, the site is covered.

Note: If the client is an APA (Authorized Public Agency for soil erosion and sediment control) they still must create a MiWaters account and fill out and submit the NPDES Notice of Coverage form to discharge storm water from a construction site; they do not need a SESC Permit as they have procedures approved by the MDEQ.

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

Once the project site is stabilized and has good vegetative cover, remember to fill out a project termination form on the MiWaters online database system; this can be found at the following:

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

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 MDEQ or enforcing agency will be fining them

DAILY 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 each day. Use reverse side if necessary.

By:

Date:

**BRIDGEPORT CHARTER TOWNSHIP
DETENTION AND RESTRICTION
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.

Bridgeport Charter Township Storm Water Management Plan Site Report Visits Procedure & Deposit

All site development projects are subject to a storm water management plan site visits after construction has been completed. There are two distinct types of Site Visits:

- F. Commercial / Business sites.
- G. Subdivision, Condominium, Manufactured home sites.

COMMERCIAL & BUSINESS SITES

For **Commercial / Business sites** the following inspection procedure will be in place to assure compliance with the approved Storm Water Management Plan for the site and to assure that all best management practices for water quality related to storm water are in place and functioning properly.

One visit will take place as soon as site construction is completed. The storm sewer system will be inspected for pipe sizes, structure layout, detention basin / area, and flow restrictor as it relates to the approved Storm Water Management Plan. A letter report will be generated to document the visit and sent to the owner and Bridgeport Charter Township.

Second visit will take place no sooner than 6-12 months after occupancy to assure that any best management practices are functioning and are being maintained properly. A letter report will be generated to document the visit and sent to the owner and Bridgeport Charter Township.

A cash deposit for these site visits will be required and established by Bridgeport Charter Township. Any costs incurred by Bridgeport Charter Township associated with inspections or administrative efforts for repair, replacement, or deficiency reconciliation will be deducted from this deposit. Any remaining deposit balance after successful completion of the site visit and report process will be refunded to the owner/developer who paid the deposit.

SUBDIVISIONS, CONDOMINIUMS & MANUFACTURED HOME SITES

For **Subdivision, Condominium, & Manufactured Home sites** the following procedure will be in place for inspections and deposit. The site must conform to the original reviewed plans that have been stamped “Approved” by the Bridgeport Charter Township Engineer and/or SCPWC Engineer, or designee. Any changes that are necessary based on field conditions during construction that change the approved plan must be documented in a letter and a copy provided to Bridgeport Charter Township and/or SCPWC and the Bridgeport Charter Township’s and/or SCPWC’s Engineer, or designee. This will assure that the site visits are as efficient as possible.

A review deposit will be in a suitable or acceptable deposit payable to Bridgeport Charter Township and/or SCPWC. The developer will be responsible for any additional fees above and beyond the deposited fee.

The deposit will be returned to the proprietor provided that all storm water facilities and best management practices are clean, unobstructed and in proper working order and that Bridgeport Charter Township and/or SCPWC has received all required documents, certificates, copies of covenants, maintenance plans, and as-built drawings. It is the proprietor’s responsibility to request final site visit.

The site will be inspected to assure compliance with the approved Storm Water Management Plan. Any costs incurred by Bridgeport Charter Township and/or SCPWC associated with subsequent visits or Bridgeport Charter

Township and/or SCPWC's administrative efforts for repair, replacement, or deficiency reconciliation will be deducted from this deposit. Any remaining balance after successful completion of the site visit process will be refunded to the owner/developer who paid the deposit.

To assure compliance, an inspector from Bridgeport Charter Township and/or SCPWC, or appointed designee, must be present during the entire construction phase of all subdivision, condominium and manufactured home sites when the storm water sewer system (including pipes, structures and layouts, detention basin/area, flow restrictor, all structural storm water controls, etc.) is being constructed on the site. All construction as it relates to the approved Storm Water Management Plan will require an inspector.

Additionally, to assure compliance there will be **two site visits**:

One visit will take place as soon as site construction is completed. The storm sewer system will be inspected for pipe sizes, structure layout, detention basin / area, and flow restrictor as it relates to the approved storm water management plan.

Second visit will take place after 50% of the lots or units have been sold or built upon to assure the storm sewer system and any best management practices are functioning and are being maintained properly.

Storm water and rear lot drainage can be problematical in many developments that take place within Saginaw County. To alleviate some of these problems the following will occur:

- Developer will meet with Bridgeport Charter Township and/or SCPWC and complete a Storm Water Management Site Review Agreement that:
 1. reflects the amount of the fees placed in an account for the inspections and site visits of the developments storm sewer system
 2. has a responsibility statement
 3. has a checklist of items to be covered
 1. The site must have a storm water system maintenance plan. This plan must have a plat/site layout (11" x 17"), a list of homeowner/association responsibilities for the storm sewer, rear lot drainage and detention area.
 2. Developer must provide proof to Bridgeport Charter Township and/or SCPWC that each homeowner or lot owner will get copies of the aforementioned information (e.g., make part of Master Deed or covenants on deeds).
 3. Developer must provide proof that they have communicated information to the homeowners association or condo association about their responsibility for storm water quality, quantity, and drainage issues that develop.

Maintenance:

- All stormwater runoff control structures, measures, systems and facilities shall be maintained by the property owner or homeowners association. (For example, property owners will be individually responsible for rear lot drainage structures or best management practices (BMPs) on their parcels. Associations will be responsible for common use facilities, measures, systems and structures.)
- The person or association responsible for maintenance of storm water systems shall be designated in

the Stormwater Maintenance Plan for a subdivision, condominium, commercial property, etc. must be communicated to Bridgeport Charter Township and/or SCPWC, or their designee. Options include the following:

- Name of property owner
 - Property owners association or other nonprofit organization provided that provisions for financing necessary maintenance are included in deed restrictions or other contractual agreements.
 - Saginaw County Drain Commissioner in accordance with provisions of the Michigan Drain Code (Public Act 40 of 1956, as amended).
- Maintenance agreements shall specify responsibilities for financing maintenance and emergency repairs, including but not limited to the maintenance and repair of:
 - Detention / Retention basins (wet or dry) and/or Underground Storage Systems
 - Best Management Practices implemented on the site to address water quality
 - Flow restriction structures • Rear lot drainage systems
 - Storm sewer structures, pipes as required by type of system and ownership of such a system. *(For example if the system is under control of the MDOT, they will maintain the system, if a private owner or association, then they have responsibility.)*
- If necessary to protect public health, safety, welfare, or water resources, including lakes, rivers, streams, protected wetlands, county drains or other receiving bodies of water, Bridgeport Charter Township and/or the SCPWC may initiate emergency action to abate imminent and substantial danger and risk. Any costs incurred will be the responsibility of the owner or association responsible for maintenance of the storm water system. At any time Bridgeport Charter Township and/or the SCPWC has the option to obtain a contractor to complete any and/or all work to the storm water system that the owner or association has not properly maintained. All work will be charged to the owner or association for costs incurred plus a 25% surcharge for administrative fees

**REQUEST FOR EXEMPTION
BRIDGEPORT CHARTER TOWNSHIP
STORM WATER MANAGEMENT PLAN**

Development Name: _____

Development Location: _____

Total Area of Site: _____ Acre(s)

Existing Impervious Area: _____ Acre(s)

Proposed Impervious Area: _____ Acre(s) % Change in Impervious Area _____ %

Has this site had a previous exemption? Yes _____ No _____

Is any existing impervious area being removed? Yes _____ _____ No

Is any existing storm sewer being removed? Yes _____ _____ No

Is any existing detention storage area being disturbed? Yes No

Developer:

Name: _____

Contact Person: _____

Telephone: _____

Fax: _____

Engineer:

Name: _____

Contact Person: _____

Telephone: _____

Fax: _____

Note: A site plan, including the existing site features, proposed site features, and a location map must be included with this request form.

APPENDIX B

- A. Michigan Department Of Transportation Individual Application and Permit for Use of Right-of-Way*
 - B. Michigan Department Of Transportation Individual Storm Water Discharge Permit Application*
 - C. Michigan Department of Environmental Quality Joint Permit Application*
 - D. Michigan Department of Environmental Quality*
- 1. Notice of Coverage Form if construction site is over 5 acres- MiWaters Online Database System*
 - 2. Notice of Termination for construction sites- MiWaters Online Database System*

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

- MICHIGAN DEPARTMENT OF TRANSPORTATION PERMIT APPLICATION FOR USE OF RIGHT-OF-WAY, is available at:

<http://mdotcf.state.mi.us/public/webforms/public/2490.pdf>

- MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY STORM WATER DISCHARGE PERMIT APPLICATION, is available on the MiWaters Online Database System for online completion at:

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

- MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY JOINT PERMIT APPLICATION, is available on the MiWaters Online Database System for online completion at:

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

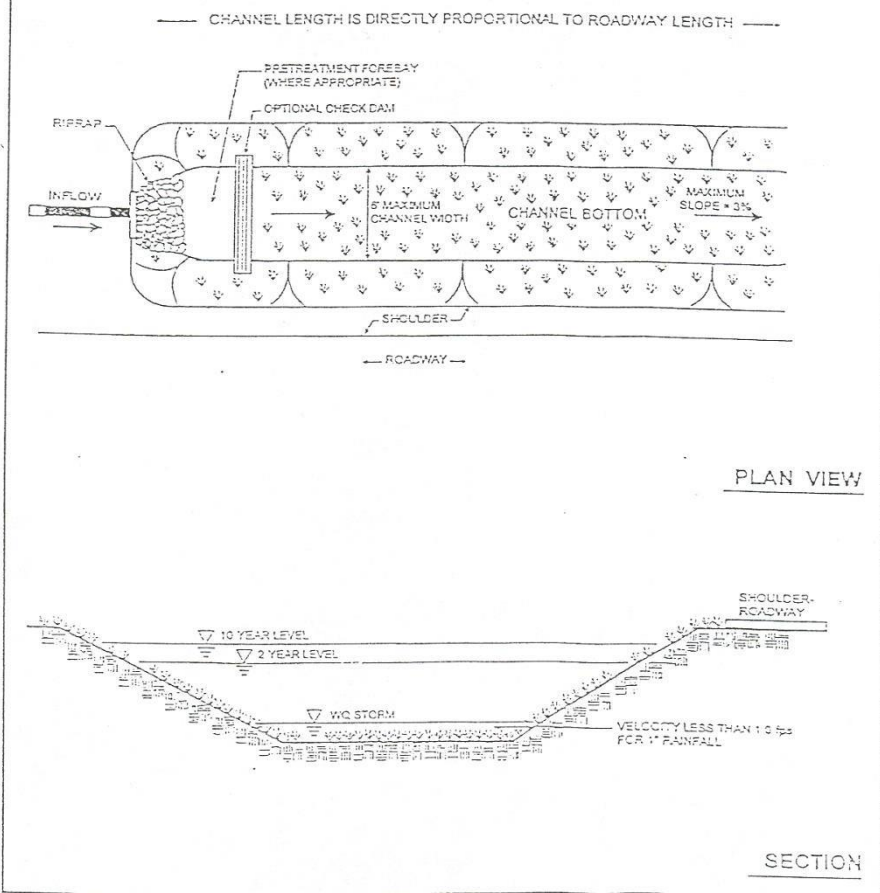
- MDEQ Notice of Coverage and Notice of Termination forms for Construction sites of 5 acres or more in size are available on the MiWaters Online Database System for online completion at:
<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

APPENDIX C

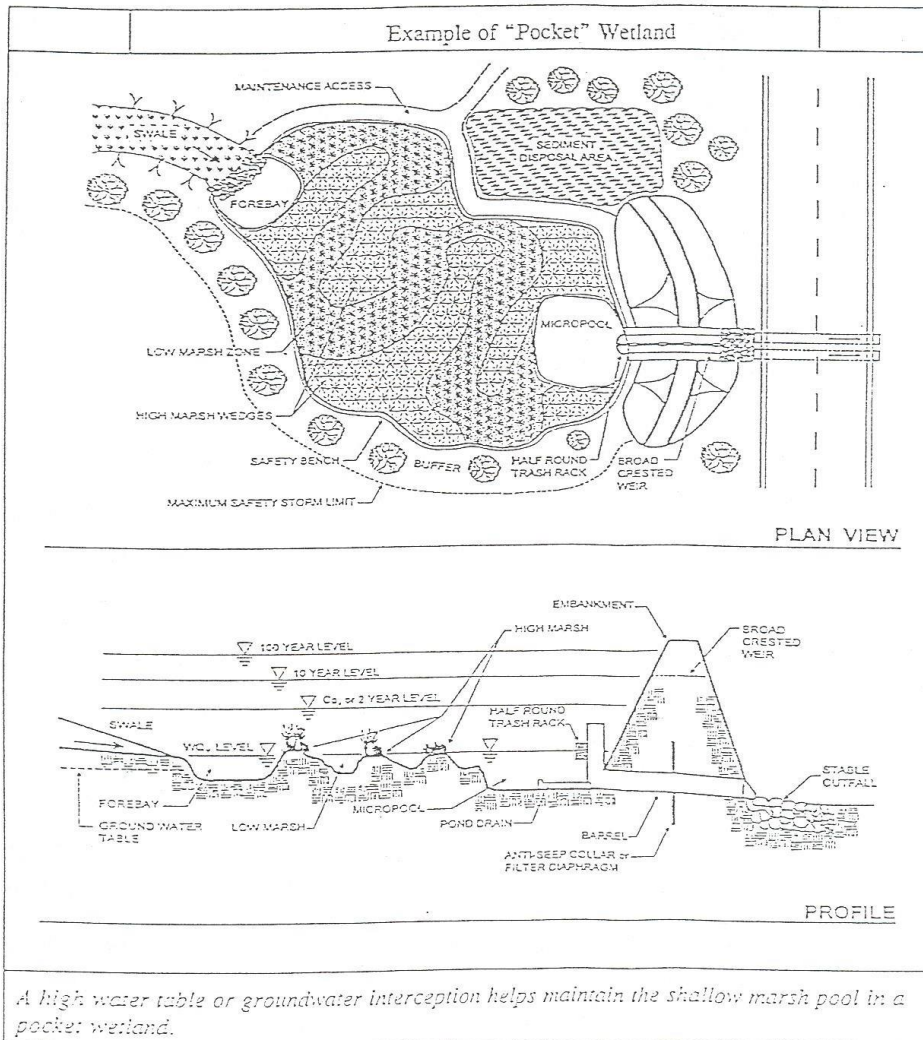
A. Design Examples

B. Rear Lot Design Examples

Example of Grass Channel

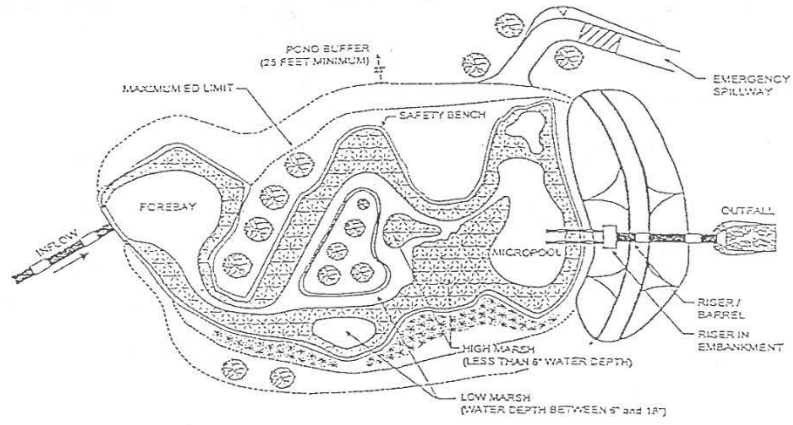


Source: State of Maryland, 1998

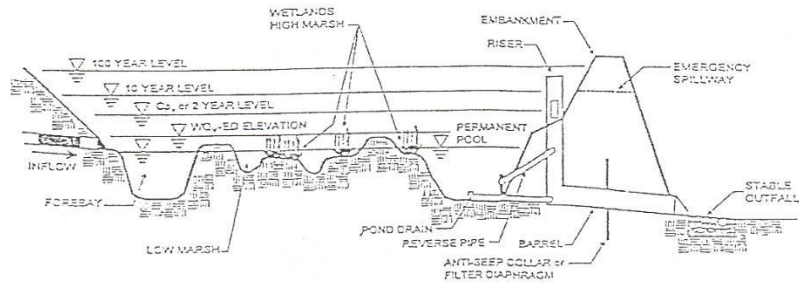


Source: State of Maryland, 1998

Example of Extended Detention Shallow Wetland



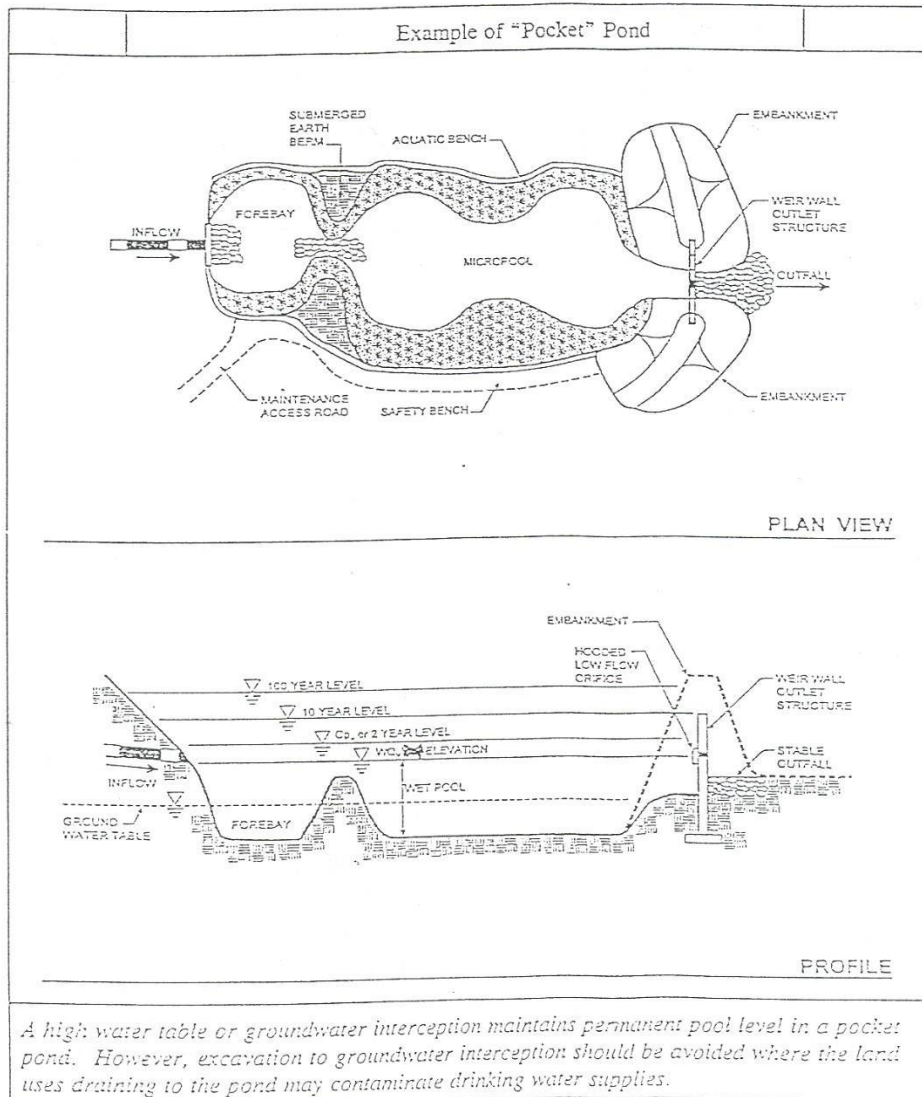
PLAN VIEW



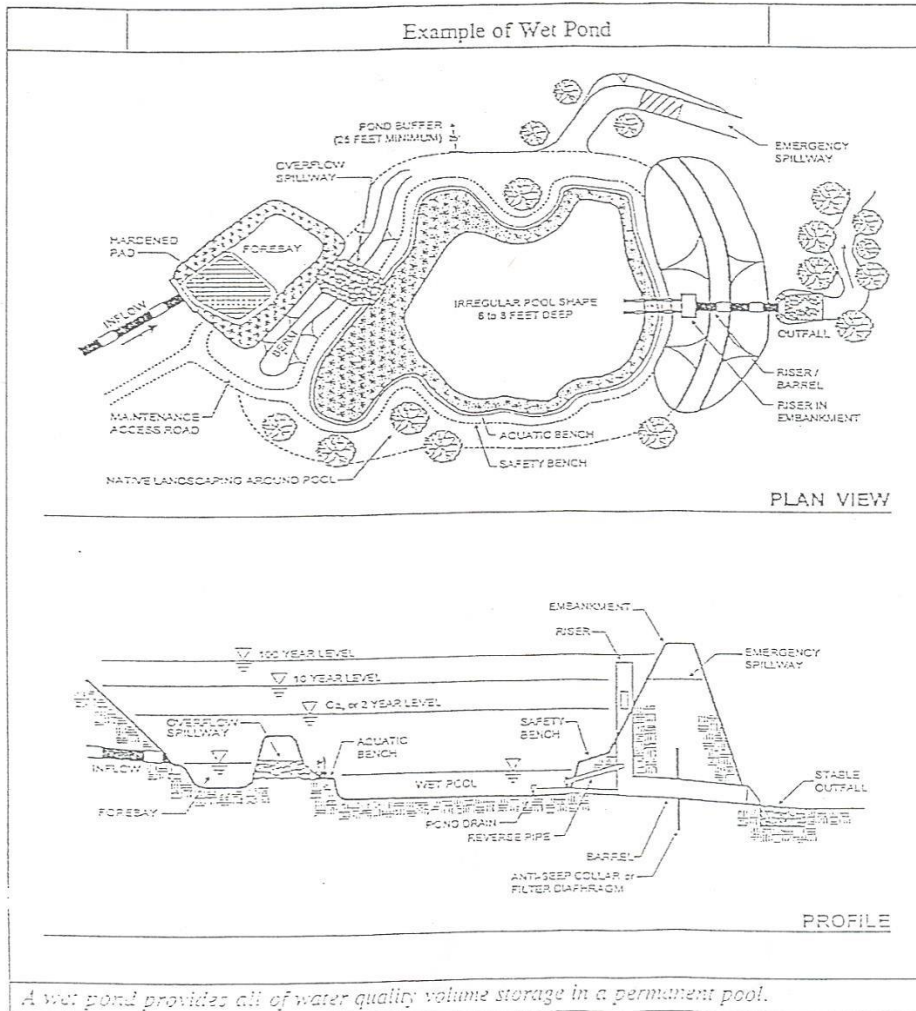
PROFILE

ED shallow wetlands provide water quality storage by a combination of shallow marsh pool and extended detention storage.

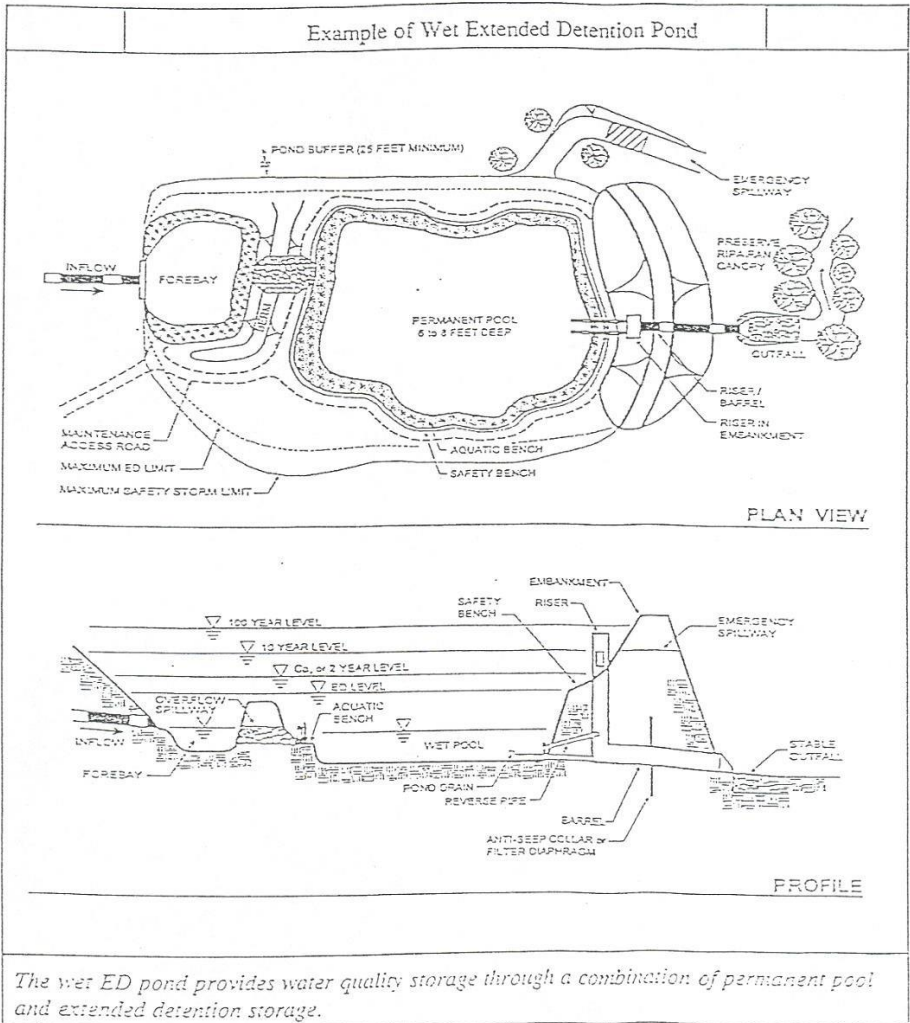
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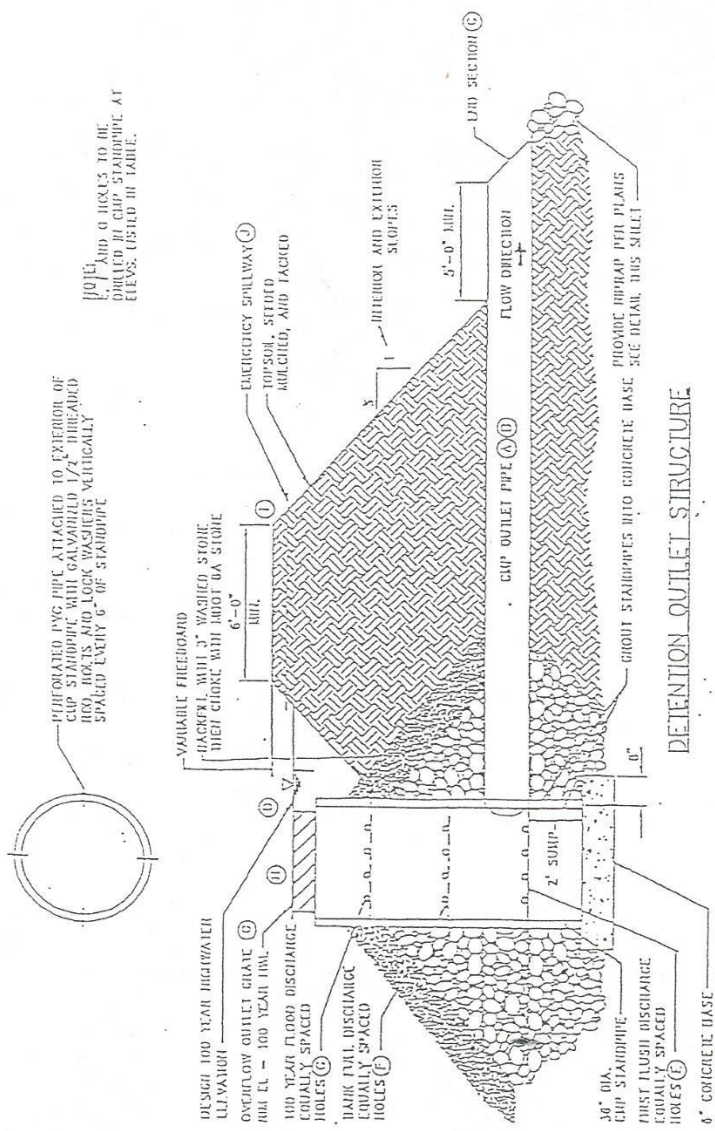


Source: State of Maryland, 1998



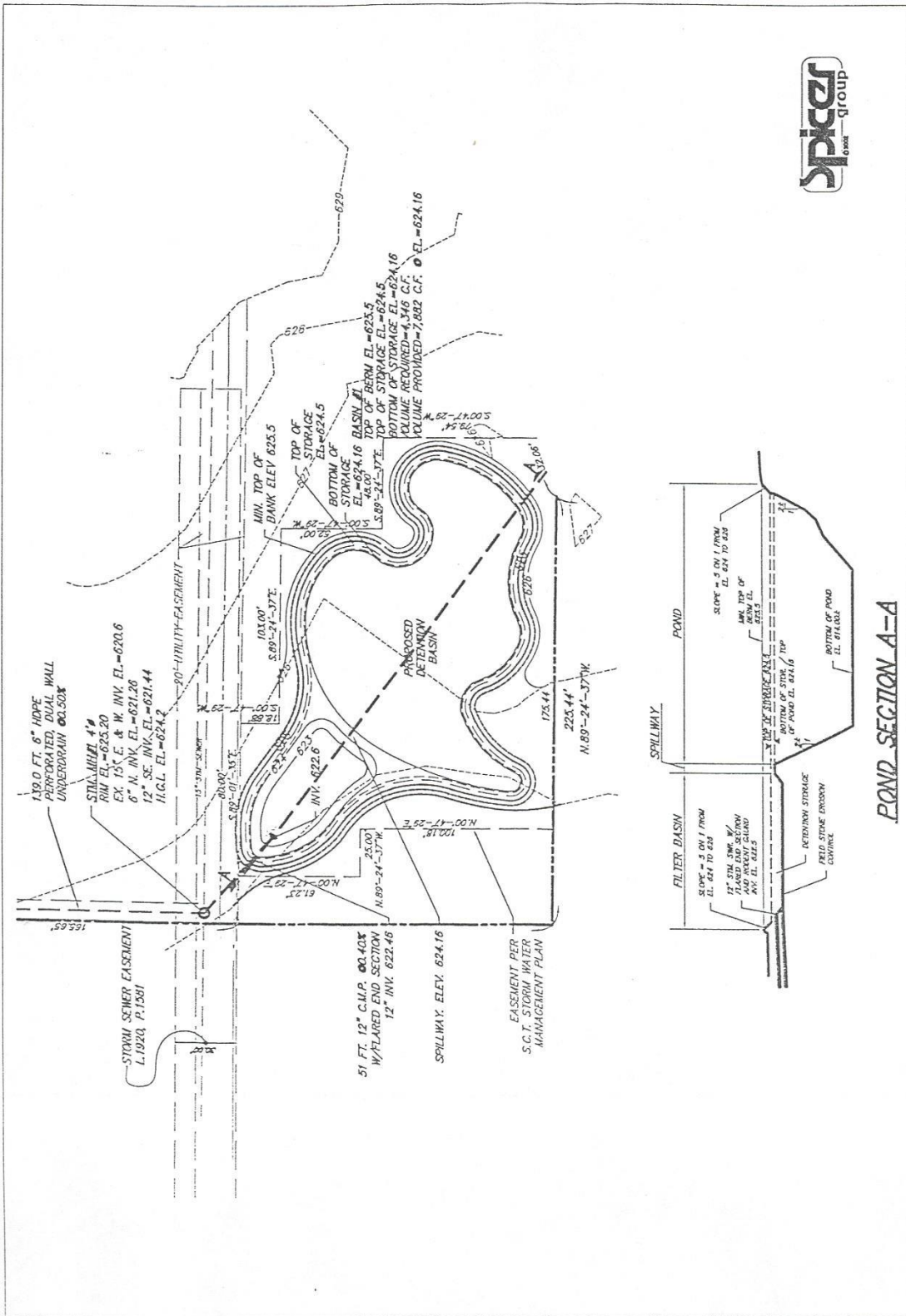
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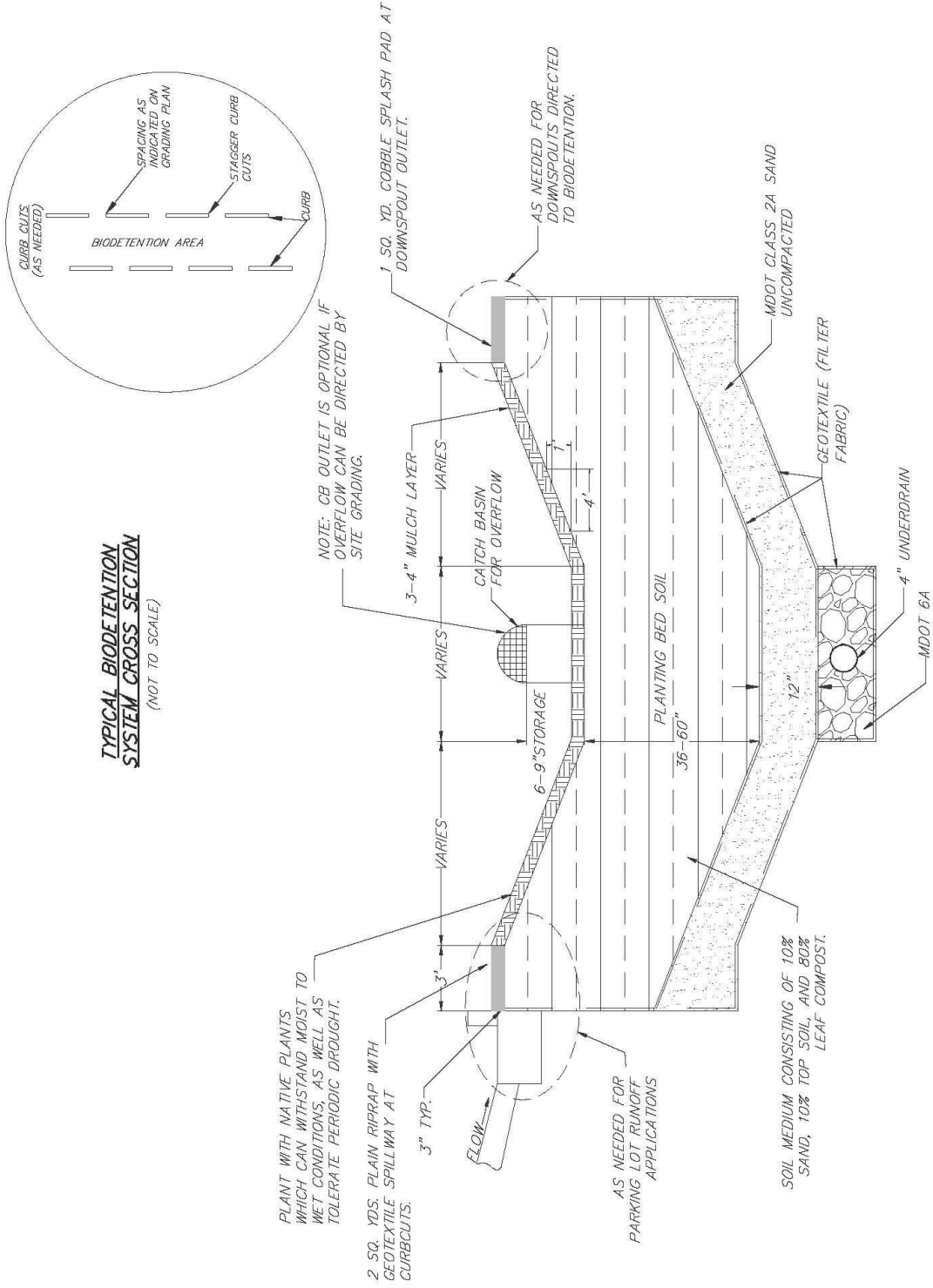


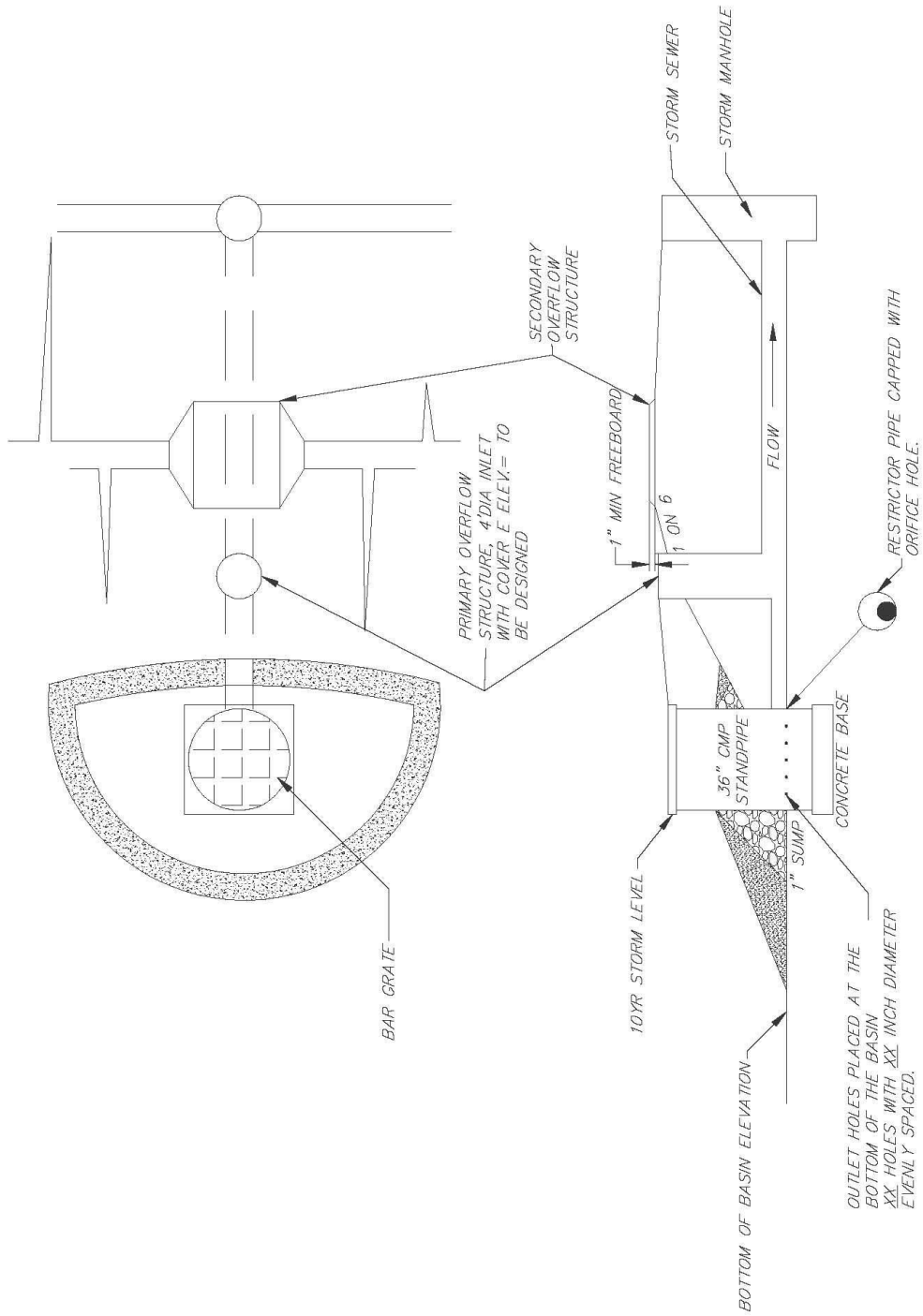
DETENTION OUTLET STRUCTURE

DETENTION OUTLET SCHEDULE													
OUTLET PIPE LENGTH	(A)	100-YEAR HWL	(D)	FIRST FLUSH DISCHARGE HW/ORIFICE SIZE	(F)	100 YEAR FLOOD DISCHARGE HW/ORIFICE SIZE	(G)	TOP OF STAND PIPE ELEVATION	(H)	FLOOD CHEST ELEVATION	(I)	EMERGENCY SPILLWAY ELEVATION	(J)

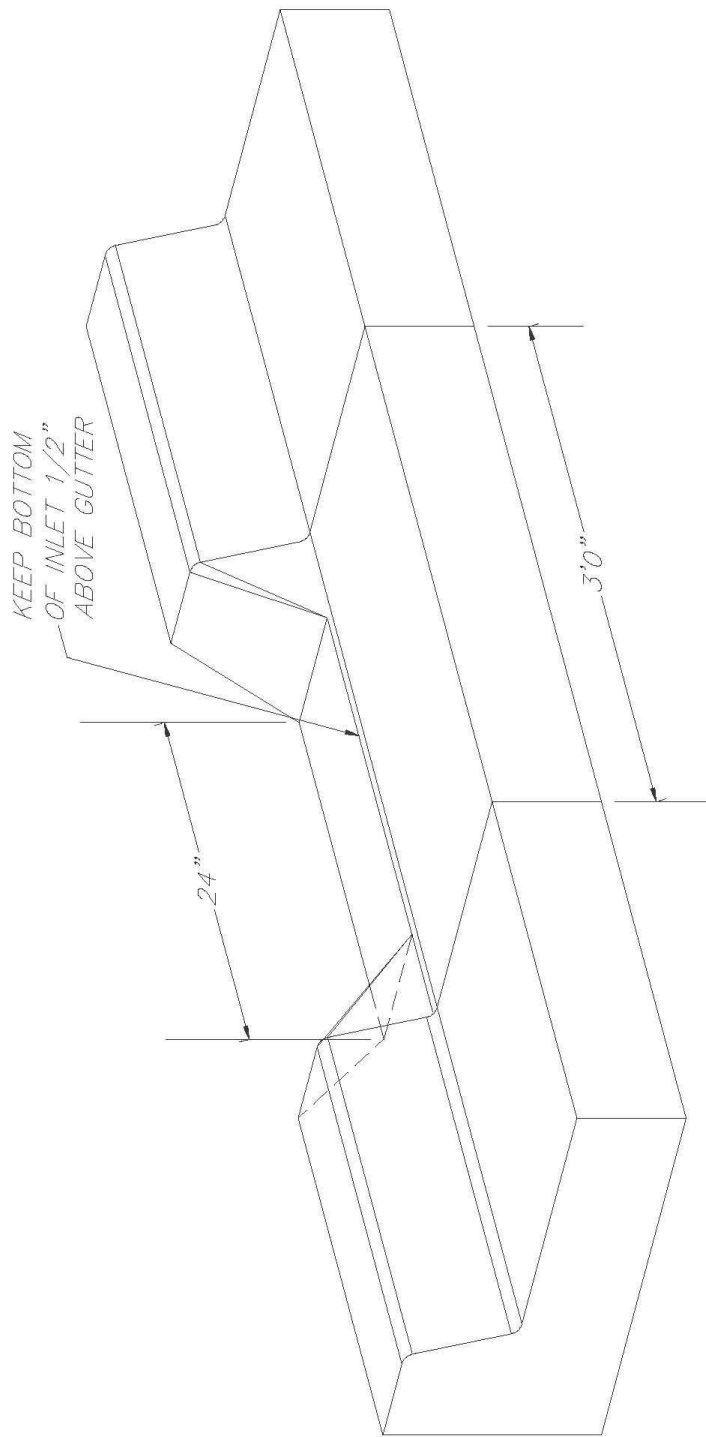


TYPICAL BIODETENTION SYSTEM CROSS SECTION
(NOT TO SCALE)

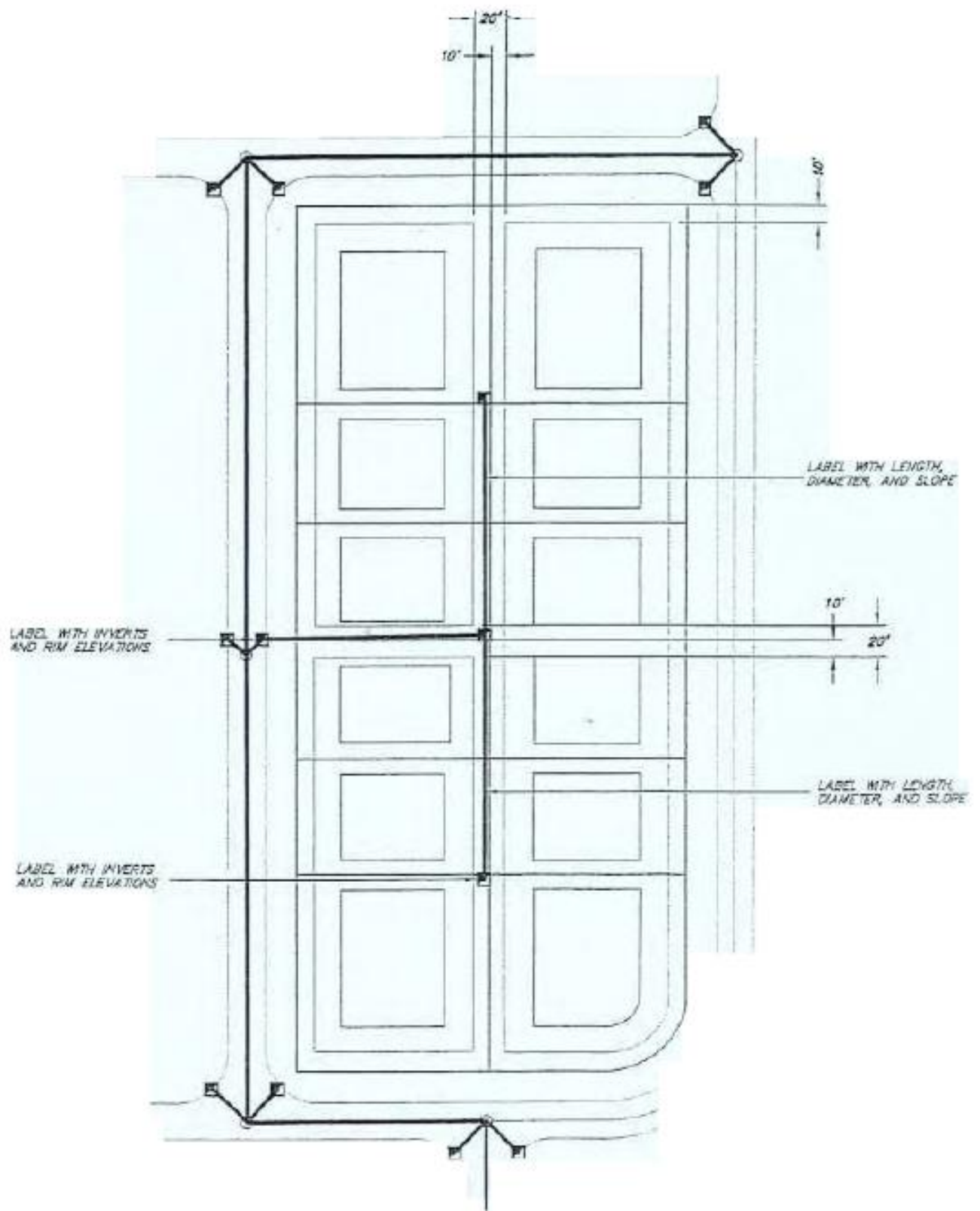


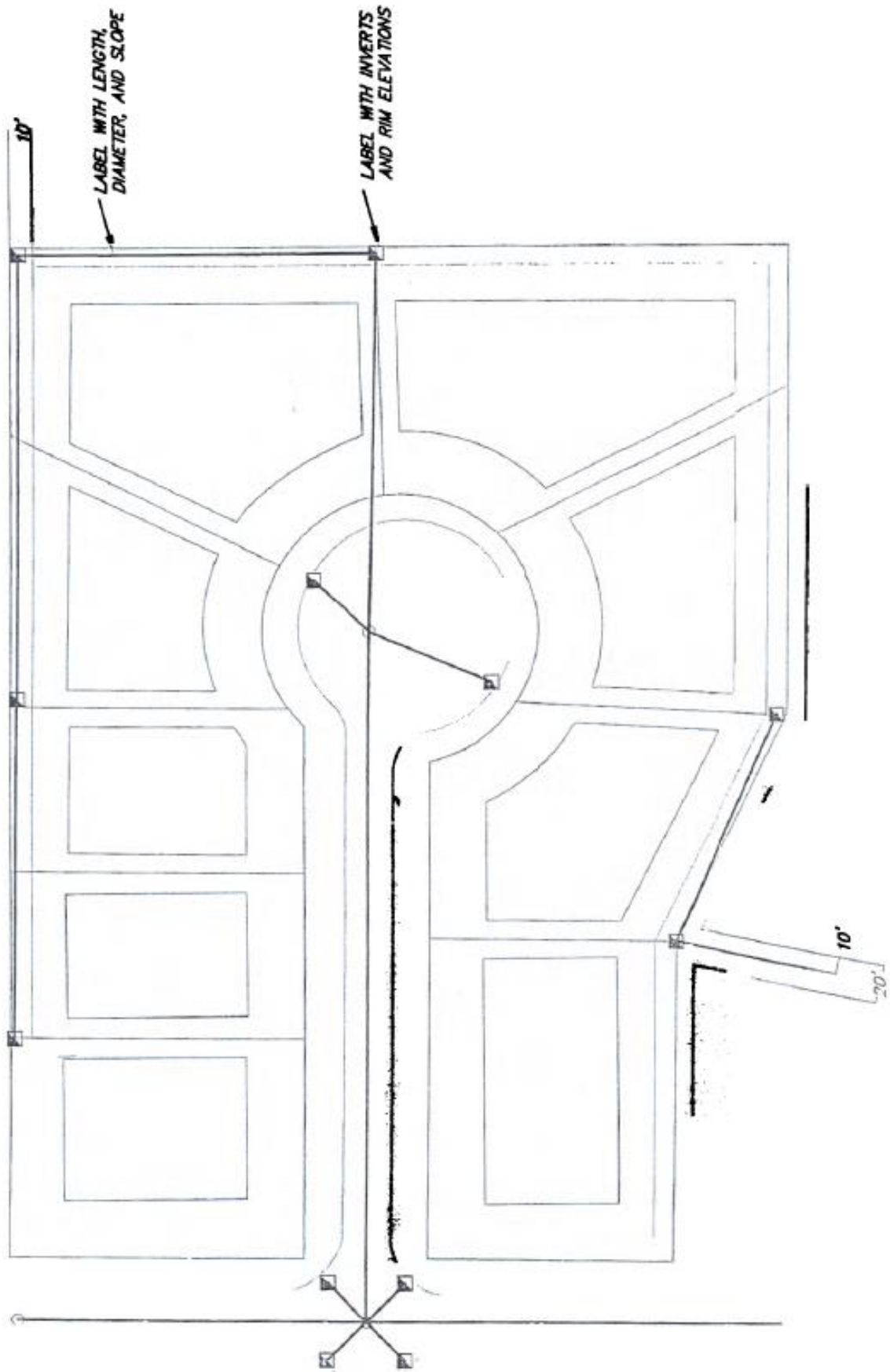


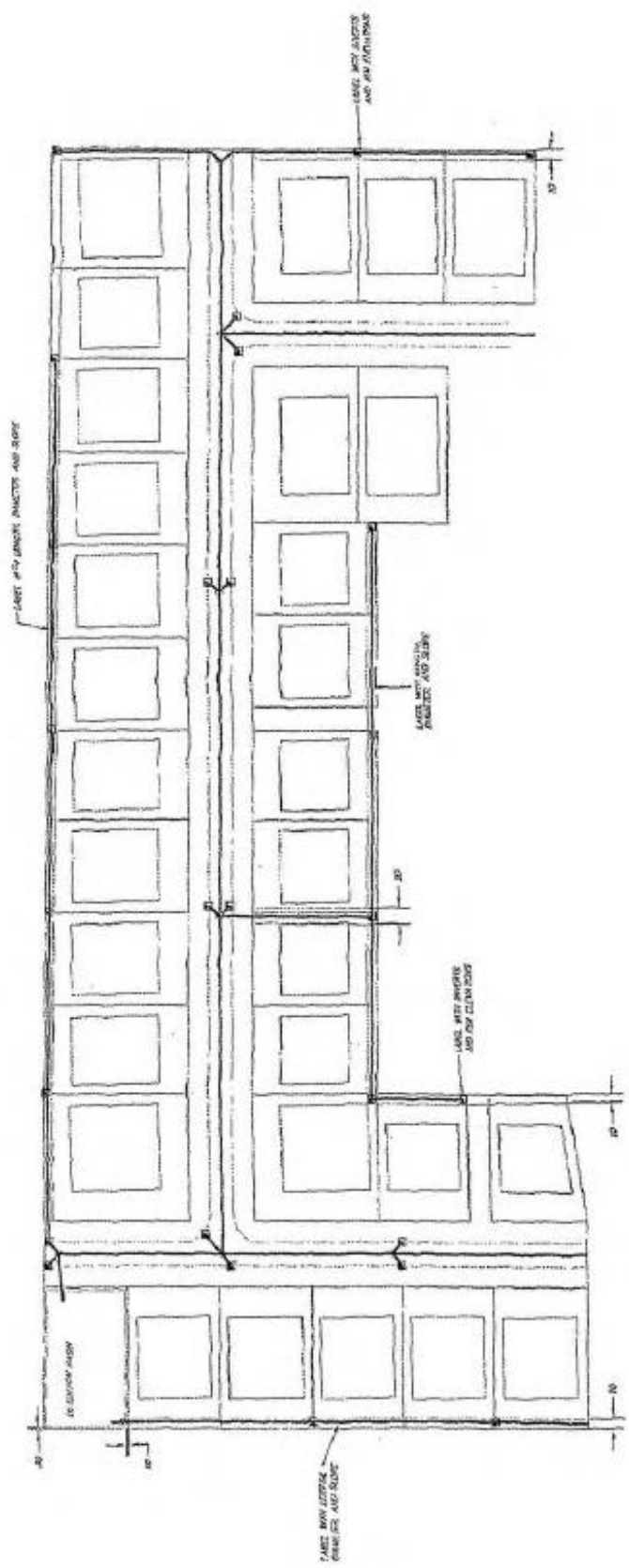
DETENTION BASIN OUTLET FILTER
 (NOT TO SCALE)



CURB INLET DETAIL







APPENDIX D

A. *Maintenance Plan and Agreement*

OPERATION & MAINTENANCE PLAN FOR STORM WATER 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 condo 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 storm water drainage systems and/or structural and vegetative best management practices and/or structural storm water controls.

a **Responsibility for Maintenance:**

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

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

1. Routine maintenance of the storm water 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 Township's Engineer, designee, County 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 Township's Engineer or designee, County Engineer, responsible authority, or successors may perform the needed maintenance and assess the cost against the <name of site>, plus an administrative fee of 25%.

b **Funding:**

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

c **Maintenance Tasks and Schedule:**

A. During Construction:

- a** Properly plug and abandon existing storm sewer to prevent any sediment from entering the existing system.
- b** 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 storm water controls and the appropriate maintenance and schedule for each.

1 **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 Bridgeport Charter Township.
- b If a site is sold to another, this Operation and Maintenance agreement must be transferred to the new owner and Bridgeport Charter Township 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 storm water structural controls and best management practices within fourteen (14) days from the day of receiving the email, Bridgeport Charter Township, or representative for Bridgeport Charter Township, will perform an inspection and an administrative fee will be charged to the owner or operator.

2 **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 storm water or water that does not appear to meet water quality standards, the owner must let Bridgeport Charter Township, the County, or designee onto the property for the following:
 - i Inspect the structural or vegetative best management practice(s), drainage issue/problem, or discharge problem.
 - ii Perform the necessary maintenance or corrective actions neglected by the BMP owner or operator. Bridgeport Charter Township 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 Bridgeport Charter Township must perform will be charged to the owner or operator of <name of site>. **VI.**

Spills:

- A.** Identify key spill response personnel and train employees on who they are.
- B.** 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.

- C. Locate spill cleanup materials, such as absorbents, where they will be readily accessible (e.g. near storage and maintenance areas).
- D. 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.
- E. 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.
- F. 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.
- G. 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 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.
- H. Solid materials should be swept up and disposed of properly. **DO NOT** hose down and wash into storm drain system, these systems drain directly to rivers in our area and eventually to 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 storm water 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 storm water controls and provide an updated copy to Bridgeport Charter Township within fourteen (14) calendar days.

Authorized Signature

Date

Email address of responsible party: _____

***NOTE:** Any change in email address must be provided to the Township Engineer or Designee within 5 business days from the change of responsible parties.*

APPENDIX E

A. Runoff Coefficients Table

TABLE 1. Runoff Coefficients- C

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 F

A. Best Management Practices – Regulations and Requirements

Best Management Practices

Regulations and Requirements

Requirement to Prevent, Control, and Reduce Storm Water Pollutants:

- (a) Authorization to Adopt and Impose Best Management Practices. The Township will adopt requirements identifying Best Management Practices for any activity, operation, or facility, which may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the State as a separate *BMP Guidance Series*. Where Best Management Practices requirements are promulgated by the County or any federal, State of Michigan, or regional agency for any activity, operation, or facility which would otherwise cause the discharge of pollutants to the storm drain system or water of the State, every person undertaking such activity or operation, or owning or operating such facility shall comply with such requirements.
- (b) Responsibility to Implement Best Management Practices. Notwithstanding the presence or absence of requirements promulgated pursuant to subsections (a), any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the State shall implement Best Management Practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the county or municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

Best Management Practices required by the Township can be obtained from the Township Engineer 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 the Township 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/stormwatermgt/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. This will be maintained by SASWA.

If a BMP is to be utilized and its specifications are not found in the above resources, the proposed BMP with appropriate references can be submitted to the SASWA for review. If the BMP review board deems it acceptable and it meets the goals and objectives of similar BMPs, and is approved by the Township it may be utilized.

LIST OF BEST MANAGEMENT PRACTICES:

BMP NAME:

ARMORING
 BOARDWALKS
 BREAKWALLS
 BRIDGES (BRIDGE CROSSINGS)
 BUFFER AREA
 BULKHEADS
 CART PATHS
 CATCH BASIN INLET PROTECTION
 CHUTES
 COMPOSTING
 CONCRETE PAVERS
 CONSTRUCTION SEQUENCE
 CONTOUR GRADING
 CRITICAL AREA SEEDING
 CULVERTS (CULVERT CROSSING)
 DEBRIS BASIN
 DECKING
 DE-ICING CHEMICAL USE
 DEWATERING BASIN
 DETENTION BASIN WET DET. BASIN;

 DOWNDRAINS
 DRAINAGE TILE
 DRIVEWAY
 DROP BOXES
 DROP CONTROL

 DROP INLET SPILLWAYS
 DROP PIPES
 DUAL PURPOSE BASIN
 EARTH EMBANKMENT STRUCTURES
 EGRESS ROAD
 EMBANKMENT POND
 ENERGY DISSIPATORS
 EROSION CONTROL BLANKETS
 EXCAVATED PONDS
 EXCELSIOR BLANKETS
 EXFILTRATION BASIN
 FENCES
 FILL PATHS
 FILTER FENCES
 FINDAMS

BMP CLASSIFICATION OR ALTERNATE NAME:

STREAM BANK STABILIZATION;RIPRAP
 WETLAND CROSSINGS
 SLOPE/SHORELINE STABILIZATION
 WATERCOURSE CROSSINGS
 BUFFER/FILTER STRIP
 SLOPE/SHORELINE STABILIZATION
 WETLAND CROSSINGS
 FILTER
 GRADE STABILIZATION STRUCTURE
 ORGANIC DEBRIS DISPOSAL
 MODULAR PAVEMENT
 STAGING & SCHEDULING
 GRADING PRACTICES
 CRITICAL AREA STABILIZATION
 WATERCOURSE CROSSINGS
 SEDIMENT BASIN
 WETLAND CROSSINGS
 WINTER ROAD MANAGEMENT
 SEDIMENT BASIN
 EXTENDED DET. BASIN;
 PARKING LOT STORAGE; ROOFTOP STORAGE
 GRADE STABILIZATION STRUCTURES
 SUBSURFACE DRAIN
 ACCESS ROAD
 GRADE STABILIZATION STRUCTURES
 STRUCTURES GRADE STABILIZATION
 STRUCTURES
 GRADE STABILIZATION STRUCTURES
 GRADE STABILIZATION STRUCTURES
 EXTENDED DETENTION BASIN
 GRADE STABILIZATION STRUCTURES
 ACCESS ROAD
 POND CONSTRUCTION AND MGT.
 STABILIZED OUTLETS; RIPRAP
 MULCHING
 POND CONSTRUCTION AND MGT.
 MULCHING
 INFILTRATION BASIN
 CONSTRUCTION BARRIERS
 WETLAND CROSSINGS
 FILTERS
 ROOFTOP STORAGE

FLUMES
FOOTPATH
GABIONS
GEOTEXTILE FABRIC FILTERS;
GRASSED CHANNEL
GROINS
GRUBBING
HAUL ROAD
HIGH RISK EROSION AREAS
HYDROSEEDING
INGRESS ROAD
INFILTRATION POND
IN-CHANNEL ENERGY DISSIPATOR
INTEGRATED PEST MANAGEMENT PESTICIDE MGT.; LAWN MAINTENANCE
INTEGRATED TURF MANAGEMENT PESTICIDE MGT.; LAWN MAINTENANCE
INTERCEPTORS
INTERCEPTOR DRAIN
LANDSCAPE PLANTING
LANDSCAPING
LAND SMOOTHING
LATERAL DRAIN
LATTICE CONCRETE BLOCKS
LIMING
LOG JAM STRUCTURES
MONOSLAB CONCRETE BLOCKS
MODULAR BRICK
NATURAL AREA
NUTRIENT MANAGEMENT
NITROGEN/PHOSPHORUS MGT.
OIL/GRIT TRAPS
OUTLETS
OUTLET PROTECTION
PALMITER METHOD
PERFORATED PAVERS
PERVIOUS PAVEMENT
PERMEABLE PAVEMENT
PHASING
PLATFORMS
PRE-CAST CONCRETE
PUMPING
RELIEF DRAIN
RETAINING WALLS
REVTMENTS

ROADWAYS (HAUL ROAD)
ROADWAYS (SECONDARY ROAD)
ROADWAY (INGRESS/EGRESS)
ROOFTOP DETENTION BARRIERS
ROUGH GRADING
RURAL LAWN CARE
SALT PILES
SEAWALLS
SEEPAGE BASIN
SEQUENCING
SERVICE AREA EQUIPMENT

GRADE STABILIZATION STRUCTURES
WETLAND CROSSINGS
SLOPE/SHORELINE STABILIZATION
MULCHING
GRASSED WATERWAY
SLOPE/SHORELINE STABILIZATION
LAND CLEARING
ACCESS ROAD
CRITICAL AREA STABILIZATION
SEEDING
ACCESS ROAD
INFILTRATION BASIN
CHECK DAM
INTEGRATED PEST MANAGEMENT PESTICIDE MGT.; LAWN MAINTENANCE
INTEGRATED TURF MANAGEMENT PESTICIDE MGT.; LAWN MAINTENANCE
DIVERSIONS
SUBSURFACE DRAIN
TREES, SHRUBS & GROUND COVERS
TREES, SHRUBS & GROUND COVERS
GRADING PRACTICES
SUBSURFACE DRAIN
MODULAR PAVEMENT
SOIL MANAGEMENT
STREAM BANK STABILIZATION
MODULAR PAVEMENT
MODULAR PAVEMENT
MODULAR PAVEMENT
BUFFER/FILTER STRIP
FERTILIZER MANAGEMENT
FERTILIZER MANAGEMENT
OIL/GRIT SEPARATORS
STABILIZED OUTLET
STABILIZED OUTLET
STREAM BANK STABILIZATION
MODULAR PAVEMENT
POROUS ASPHALT PAVEMENT
POROUS ASPHALT PAVEMENT
STAGING & SCHEDULING
WETLAND CROSSINGS
MODULAR PAVEMENT
DEWATERING
SUBSURFACE DRAIN
SLOPE/SHORELINE STABILIZATION
SLOPE/SHORELINE STABILIZATION;
STREAMBANK STABILIZATION; RIPRAP
ACCESS ROAD
ACCESS ROAD
ACCESS ROAD
ROOFTOP STORAGE
GRADING PRACTICES
LAWN MAINTENANCE
WINTER ROAD MANAGEMENT
SLOPE/SHORELINE STABILIZATION
INFILTRATION BASIN
STAGING & SCHEDULING
MAINTENANCE/STORAGE AREA

SETTLING BASIN
SHOP AREA
SILT FENCES
SILT FLOATATION CURTAINS
SINGLE STAGE DETENTION BASIN
SOD WATERWAY
SOIL ADDITIVES/AMENDMENTS
SOIL CONDITIONING
SOIL PILES
SOIL TEST
SPECIAL GRADING PRACTICES
SPILLWAYS
SPRIGGING

STABILIZED CONSTR. ENTRANCE
STOCK PILES
STORAGE PILES
STORM DRAIN INLET PROTECTION
STRAIGHT-PIPES
STREAM CROSSINGS
STREAM BANK PROTECTION
SUMP
SWALE
TACKING
TEMPORARY CROSSING
TILE
TOEWALLS
TREE PRESERVATION
TREE REMOVAL
TURBIDITY CURTAIN
TURF ESTABLISHMENT
TWO-STAGE DETENTION BASIN
UNDERGROUND DRAIN
URBAN LAWN CARE
USED OIL DISPOSAL
UTILITY CROSSINGS

VEGETATIVE SWALES
VEGETATIVE ESTABLISHMENT
WATER QUALITY INLETS
WET POND
WOOD CHIP PATHS
YARD WASTE MANAGEMENT

SEDIMENT BASIN
EQUIPMENT MAINTENANCE/STORAGE AREA
FILTERS
FILTERS
EXTENDED DETENTION BASIN
GRASSED WATERWAY
SOIL MANAGEMENT
SOIL MANAGEMENT
SPOIL PILES
SOIL MANAGEMENT
GRADING PRACTICES
GRADE STABILIZATION STRUCTURES
TREES, SHRUBS & GROUND COVERS;
DUNE/SAND STABILIZATION
ACCESS ROAD
SPOIL PILES
SPOIL PILES
FILTERS
GRADE STABILIZATION STRUCTURES
WATERCOURSE CROSSINGS
STREAM BANK STABILIZATION; RIPRAP
SEDIMENT BASIN
GRASSED WATERWAY
MULCHING
WATERCOURSE CROSSINGS
SUBSURFACE DRAIN
GRADE STABILIZATION STRUCTURES
TREE PROTECTION
LAND CLEARING
FILTERS
SEEDING; SODDING
EXTENDED DETENTION BASIN
SUBSURFACE DRAIN
LAWN MAINTENANCE
HOUSEHOLD HAZARDOUS WASTE DISPOSAL
WATERCOURSE CROSSINGS; WETLAND
CROSSINGS
GRASSED WATERWAYS
SEEDING; SODDING
OIL/GRIT SEPARATORS
WET DETENTION BASIN
WETLAND CROSSING
ORGANIC DEBRIS DISPOSAL