WRC

WATER RESOURCES COMMISSIONER

Jim Nash

OAKLAND COUNTY SOIL EROSION AND SEDIMENTATION CONTROL MANUAL

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WATER RESOURCES COMMISSIONER
Jim Nash

March 27, 2025

To: The People of Oakland County

I am pleased to present this new, revised Soil Erosion and Sedimentation Control Manual.

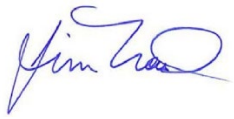
This manual has been updated to include new methods and materials that have been developed since its last revision. I am confident that the details and procedures presented in this manual will help you and us to effectively implement the requirements of Part 91, Soil Erosion and Sedimentation Control Act of the Natural Resources and Environmental Protection Act 451, of the Public Acts of 1994.

My office is always looking for new developments and techniques in soil erosion and sedimentation control. I would like to once again extend an invitation to you to submit your innovative ideas to our Soil Erosion Team. They can be reached at: 248-858-5389.

Your support over the past years has been greatly appreciated. My staff and I will continue to make every effort to provide reference information to assist you in developing a successful soil erosion and sedimentation control plan.

Thank you very much.

Sincerely,



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DISCLAIMER

The material presented in this manual has been prepared in accordance with generally recognized engineering principles and practices and is intended for general information only. This information should not be used without first securing competent advice with respect to its suitability for general or specific application.

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Section 1 – Oakland County Soil Erosion and Sedimentation Control

Part A: Authority

The following procedures are adopted under the authority granted by Part 91 of the Natural Resources and Environmental Protection Act, Act 451 of the Public Acts of 1994, as revised, being Sections 324.9101 to 324.9123 of the Michigan Compiled Laws Annotated ("Part 91"), (Soil Erosion and Sedimentation Control), as amended, Michigan Compiled Laws Annotated 46.11m and 46.10b, and R 323.1701, et seq., of the Michigan Administrative Code, ("State Regulations"). Part 91 of P.A. 451 may be viewed via the State of Michigan website here.

Municipalities shall not issue building permits until a soil erosion and sedimentation control permit is issued.

Part B: Intent

The following procedures are designed to provide guidelines and information to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and citizens of Oakland County as to how Part 91 will be administered by the Office of Oakland County Water Resources Commissioner (WRC), Oakland County's designated enforcing agency ("County Enforcing Agency").

The WRC was designated the County Enforcing Agency on July 19, 1973, by resolution of the Oakland County Board of Commissioners, to implement and administer the "Soil and Sedimentation Control Act" (a/k/a Part 91); this designation was re-affirmed by the Board of Commissioners on March 14, 2002, by Miscellaneous Resolution No. 02049.Part C: Objectives

The primary goal of Part 91 is to achieve effective and reasonable control of accelerated soil erosion. This is to be accomplished by using the best practical combination of procedures, techniques, and people to prevent sediment from leaving the site of earth disruption and reaching the "waters of the state." This is to be accomplished by the enforcement of Soil Erosion and Sedimentation Control (SESC) Programs by agencies on the county or local level.

The main factors that contribute to accelerated soil erosion during urbanization are as follows:

1. The destruction of natural vegetation, trees, etc.
2. The reshaping of the ground contour.
3. The removal of topsoil and the exposure of the subsoils for extended periods of time.
4. The placement of impermeable features that increase runoff and erosion, such as pavement and rooftops.

Part D: Applicability

The Oakland County Water Resources Commissioner's SESC Control Program ***shall apply to earth changes which disturbs one or more acres of land and/or which is within 500 feet of a lake, stream, wetland, or open drain*** and on land within Oakland County that (1) does not

fall within the legal boundaries of any city, village, or township granted the status of Municipal Enforcing Agency (MEA) by EGLE or (2) that is not part of an earth disruption project undertaken by a state, local, or county agency that has been granted by EGLE the status of Authorized Public Agency (APA) to enact and enforce their own SESC programs. Municipalities shall not issue building permits until a soil erosion permit has been issued.

A landowner or developer who contracts for, allows, or engages in an earth change in Oakland County, except for the exemptions described in Section 1 PART E: EXEMPTIONS, shall obtain a permit from the Oakland County WRC **prior** to commencement of an earth change.

A map of the communities under WRC jurisdiction can be found on WRC's website under **PERMITS/SOIL EROSION/WRC SOIL EROSION JURISDICTION MAP**.

Site Work Requiring a Permit

Site work requiring a permit is as follows:

1. Transportation facilities, including streets, highways, railroads, airports, common carrier pipelines, and mass transit facilities, except normal maintenance procedures such as earth or gravel road leveling and minor repairs or alterations to rights-of-way not affecting a lake, stream, open drain, pond, or wetland.
2. Subdivision or lot development as defined by Section 102(f) of the Land Division Act, Act No. 591 of the Public Acts of 1996, being Section 560.102(f) of the Michigan Compiled Laws, mobile home parks and multiple housing, and the preparation of a site for a single-family residence except for normal maintenance or landscaping activities or both on an existing single-family residence.
3. Industrial or commercial development, except normal maintenance or landscaping activities or both.
4. Service facilities, including but not limited to shopping centers and schools, except normal maintenance or landscaping activities or both.
5. Recreational facilities, including but not limited to parks, campgrounds, or trails, except normal maintenance or landscaping activities or both.
6. Utilities, including but not limited to underground pipelines or cables, except pole installation, service lines and other earth changes of a minor nature, normal maintenance, and emergency repairs.
7. Oil, gas, and mineral wells, except the installation of those wells under permit from the appropriate agency determined to be in compliance with the conditions of the sedimentation control act.
8. Water impoundments and waterway construction or improvements.

These Rules apply to the construction phase of a project. Please refer to **WRC'S STORMWATER ENGINEERING DESIGN STANDARDS** for post-construction requirements.

Part E: Exemptions

A Permit Exemption Affidavit will be issued if the project includes the following activities:

1. The project is less than one (1) acre of disturbance and/or is over 500 feet from any open drain, lake, stream, river, pond, or wetland or is within 500 feet and less than 225 square feet of disturbance.
2. A project engaged in logging. The exemption does not include access roads to and from the project site or any ancillary activities associated with the logging operations.
3. A project engaged in metallic or mineral mining. The exemption does not include access roads to and from the project site and mining does not include the removal of clay, gravel, sand, peat, or topsoil or any ancillary activities associated with the mining operations.
4. A project engaged in active farming, including plowing or tilling of the land for the purpose of crop production or harvesting of crops. The exemption does not include access roads to and from the project site.

As previously stated in Part D, an APA and MEA are exempt from obtaining a permit from the Oakland County WRC.

Exemptions provided in this section shall not be construed as exemptions from installing and maintaining the soil erosion and sedimentation controls for the project as required by Part 91. All enforcement procedures as described in SECTION 4 – INSPECTION AND ENFORCEMENT can be and will be enforced if the activities exempted cause or result in a violation of Part 91 or produce a significant erosion hazard or sedimentation problem.

Part F: Issuance of Building Permits

Villages, cities, charter townships, and non-charter townships in Oakland County, for which the Oakland County WRC is the enforcing agent under Part 91, shall not issue a building permit to a person engaged in an earth change which requires a soil erosion permit under Part 91 until the applicant has first obtained the required Soil Erosion Control Permit from WRC.

Section 2 – Submittal and Review Procedures

Part A: General Application and Plan Requirements

Applicant

The landowner undertaking the earth change on a property must submit an application to the WRC for review of proposed SESC measures. An owner or developer may have an agent complete a permit application provided an original notarized letter authorizing the agent to represent the owner or developer is submitted with the application.

Proof of ownership must be provided at the time of application. A current tax bill, warranty deed, closing statement, and/or recorded land contract are acceptable forms of proof.

Application Timing

An SESC application must be submitted and a permit issued prior to the start of any work including construction of access roads, driveways, tree and shrub removal, or grading. Any unauthorized work will be considered a violation of these procedures regardless of any later actions taken toward compliance.

Soil test borings, vegetative cutting for land surveys, tree cutting without pulling the stumps, and percolation test efforts will not be considered a violation under these procedures.

A SESC application must be submitted and a permit issued prior to the start of any work including construction of access roads, driveways, tree and shrub removal or grading.

Plans

It is the intent of these requirements to provide enough information upon which to judge the adequacy of the design relative to the goals of Part 91, as described in Part C: Objectives (of Part 91). In general, the plan shall be designed to effectively reduce accelerated soil erosion and control any sediment susceptible to contaminating stormwater runoff. The plan shall also identify factors specific to the site and project which may contribute to soil erosion and sedimentation. Unusual site or project conditions may require additional information to be provided to verify the controls on the site meet the intent of the program. A person with working knowledge of SESC methods and techniques shall prepare the plans. Plans prepared by a licensed Architect or licensed Engineer are preferred. **All plans shall be final and marked "For Construction."**

On very small projects, the specific plan requirements described in the preceding sections may be modified and permits issued on less rigorous requirements. However, such plans must include sufficient information to assure that accelerated soil erosion will be controlled, and that no sediment will leave the construction site.

Sequential Applications (Project Phasing)

On large or complex projects where a plan encompassing all phases of the project cannot reasonably be prepared prior to initial ground-breaking, application for a permit on successive major incremental earth change activities may be submitted. Permits issued on this basis will be

clearly defined as to the nature and extent of work covered. Any earth changes beyond or subsequent to that described on the permit must be covered by a separate approved plan before the work is undertaken.

Electronic Submission of Application and Plans

All application submittals for commercial and residential/single lots must be made electronically to the WRC Permitting & Soil Erosion Application Portal.

1. You will first need to log into the WRC Permitting & Soil Erosion Application Portal site and register as a user to be able to submit an application for review and approval.
2. Applications must be submitted by the property owners or their designated representatives.
3. Once an application has been submitted, the applicant may invite others, giving them permission to interact with the application submittal process or simply to view the Permit Status.
4. Construction and site plans must be in PDF format with layers flattened, optimized, and compressed.
5. JPG format is acceptable for documents or letters.
6. Maximum file size for each file should not exceed 50MB.
7. Below is the URL for the **WRC PERMITTING & SOIL EROSION APPLICATION PORTAL**
    - Full URL: **HTTPS://OAKLANDCOUNTYMI-ENERGOVPUB.TYLERHOST.NET/APPS/SELFSERVICE#/HOME**

Cancellation of Application

Failure to provide any response to the requested revisions within 30 days may result in the cancellation of the application. To receive an SESC permit after an application is cancelled, a new application with all the required information and an additional plan review fee must be submitted.

EGLE Permits

If the project requires a permit from EGLE, the WRC will not commence review of the application and site plan until the EGLE permit is received and uploaded on the WRC Application Portal.

Failure to respond to requested revisions within 30 days may result in the cancellation of the application.

Part B: Commercial Application and Plan Requirements

Separation of Plans

Depending upon the magnitude of the project, the consolidation and combination of the plans required in the following sections will be allowed, provided clarity and completeness can be retained.

The exception is the soil erosion plan, which should always be separated. All layers not pertaining to the SESC plan requirements should be removed to aid in plan review.

Include a description, location and sequence of construction indicating how infiltration SMP areas will be protected during construction.

SESC Plan Requirements

1. A description and location of the limits of proposed earth changes.
2. The timing and sequence of proposed earth changes.
3. A description, the location, and details of proposed temporary SESC measures including any dewatering operations using **WRC SOIL EROSION DETAIL SHEET** specifications and titles (e.g., SP-1, SO-2). Only WRC numbering will be accepted.
4. A description, location, and details of proposed permanent SESC measures.
5. A program describing the maintenance of SESC facilities both during and after construction. The program shall identify the party responsible for operation and maintenance of any facilities, including SMPs, which are to remain after project completion.
    a. If post-construction SMPs are required for a site, the Operations and Maintenance agreement with the city/township is to be submitted with the soil erosion permit application.
6. Statement on the site plan indicating who is responsible for maintenance of the SESC measures and that “the soil erosion and sedimentation controls will be maintained weekly and after every storm event by (Insert Maintainer Name)”.
7. A description, location, and detail for the stone access drive to be installed.
8. Silt fence is to be placed around the detention or retention pond until the permanent vegetation in and around the pond is fully established.
9. Location of all permanent SMPs.
10. A description, location, and sequence of construction indicating how infiltration SMP areas will be protected during construction.
11. All plans shall be the final set of drawings stamped “FOR CONSTRUCTION”. Plans not stamped “FOR CONSTRUCTION” will not be reviewed.

All plans shall include the following information on a dedicated Soil Erosion plan sheet:

Location Map

1. Drawn to a scale not smaller than 1" = 200'.
2. Map extents shall include 600 feet outside of the site boundaries in all directions.
3. Indicate the following:
    a. The site
    b. Adjacent properties
    c. Public and private roads within map extents
    d. Streams, ditches, and county drains
    e. Intermittent watercourses
    f. Lakes
    g. Ponds
    h. Marsh, swamps, wetlands, and their boundaries (regulated and non-regulated)

Topographic Plan

1. Drawn to a scale not smaller than 1" = 50'.
2. Indicate existing ground elevations with a contour interval not greater than 2 feet.
3. Drawing extents shall include 100 feet outside of the site boundaries in all directions.
4. Indicate the following:
    a. Existing buildings and structures
    b. Natural features, such as trees and shrubs, etc.
    c. Existing drainage systems, both natural and man-made.
    d. Include a legal description of the site, including the site acreage.
    e. Provide information as to the type of soil on the site, as obtained from a soil boring or a soil analysis. Project-specific conditions shall determine the extent of soil analysis needed.
    f. Provide soil infiltration test results, including location of infiltration tests. Please refer to WRC's **STORMWATER ENGINEERING DESIGN STANDARDS** for infiltration testing requirements.

Site Development Plan

1. Drawn to a scale not smaller than 1" = 50'.
2. Provide a complete depiction of proposed construction activity on the site including, but not limited to, buildings, roads, parking lots, walks, drives, retaining walls, retention basins, detention basins, sediment basins, grassed areas, storm drainage facilities, permanent

stormwater management practices (SMPs), and all other construction of any nature including utilities.

3. Dimension size and location of all features on the plan.
4. Outline the extent of earth disruption proposed for the site and state the quantity in acres.
5. Include existing buildings and natural features surrounding the site on all sides to a distance of 100 feet.
6. Legal description of the project site.

Final Grading and Drainage Plan

1. Drawn to a scale not smaller than 1" = 50'.
2. Indicate the final grade elevations at high and low points, breaks in grade, swales and ridge lines, buildings, and other structures in sufficient detail to determine the surface flow.
3. Provide the complete stormwater drainage system, including enclosures, open drainage courses and swales, retention, detention and sediment basins, infiltration SMPs, and the point-of-discharge of stormwater. The following should be included:
    a. Storm drain, retention basin, detention basin, sediment basin, and any other post-construction SMP design calculations
    b. The amount of acreage contributing to each specific inlet
    c. Storm drain and road profiles
    d. Identify the last ultimate drainage outlet from the site
    e. Indicate the existing ground elevations surrounding the site on all sides to a distance of 100 feet

Part C: Residential/Single Lot Application and Plan Requirements

Residential/Single Lot Applications shall include plans with the following information:

Location Map

1. Drawn on a separate sheet of 8½" x 11" paper (Can be drawn by hand).
2. Identify the following:
    a. The site
    b. Public and private roads in the area
    c. A north arrow

All layers not pertaining to the SESC plan requirements should be removed to aid in plan review.

Site Plan/Plot Plan

1. For site Classes 4 and 5, the site plan must be drawn by a licensed architect, surveyor, or a civil engineer. For Classes 1 through 3, the plan can be hand drawn but must be to scale.
2. Drawn to a scale not smaller than 1" = 50'.
3. Existing and proposed ground elevations with a contour interval not greater than 2 feet.
4. Contours shall extend a minimum of 25 feet outside of the site boundaries in all directions.
5. Identify the following:
    a. Existing buildings and structures
    b. Natural features, such as trees and shrubs, etc.
    c. Existing drainage systems, both natural and man-made.
    d. Include a legal description of the site, with a statement as to the amount of acreage within the site.
    e. Provide information as to the type of soil on the site, as typically obtained from a soil boring or a soil analysis.
6. Indicate the following erosion and sedimentation controls:
    a. A description, location, and details of proposed temporary erosion and sedimentation control measures.
    b. A description, location, and details of proposed permanent erosion and sedimentation control measures.
    c. A description, location, and detail for the stone access drive to be installed after basement is backfilled.
    d. A description and location of the limits of proposed earth changes.
    e. Location of all permanent Stormwater Management Practices (SMPs).
    f. Statement on the site plan indicating who is responsible for maintenance of the soil erosion controls and that "the soil erosion controls will be maintained weekly and after every storm event by (Insert Maintainer Name)".
    g. Include a subdivision map (if applicable).

Part D: Utility Plans

Utility Construction Applications shall include plans with the following information:

1. Erosion and sedimentation control plan features as described in the commercial application
    a. Drawn to a scale not smaller than 1" = 50'.
    b. Information as to how excavated material will be handled and stored to prevent erosion.
    c. Information on trench backfill stabilization and surface restoration.
    d. Information on the existing drainage system adjacent to and/or crossing the proposed utility, including maintenance provisions.
    e. Information on jack-and-bore or directional boring operations. Drawings of the location, a description, and details of soil erosion controls around this operation.
    f. Drawings with the location, description, and details of dewatering operations, including filtering of the groundwater before discharge.

Part E: Plan Review and Permit Issuance

SESC plans will be reviewed and approved by the Soil Erosion Unit of the Office of the Oakland County WRC. The review will not commence until a complete permit application is submitted and the review fee is paid. Please refer to **WRC PERMITTING & SOIL EROSION APPLICATION PORTAL** for the current fee schedule. Permits from EGLE, if applicable, must be obtained prior to WRC review of the plans. An exemption shall be issued if the project does not conform to the minimum permit requirements. See SECTION 1 PART E: EXEMPTIONS for exemption requirements.

Review Time

The Soil Erosion Unit will approve, exempt, or require a revision to the plans within 30 calendar days following the receipt of an acceptable set of plans and a completed application for an erosion control permit. Notification of approval will be provided indicating that the permit is ready to be issued and the amount of the inspection fee. No permit will be issued until the inspection fee is paid.

Failure to submit revised plans by the applicant within 30 days will result in cancellation of the application with no refund. If the application is cancelled, a new permit application and review fee must be submitted.

If a revision is needed, the applicant will be notified either by telephone and/or email. The applicant will have 30 days to resubmit revisions requested. The department will review revisions within 30 days of receipt. Reasons for the requested revisions will be stated and a second review of the plans will be completed within 30 days of the resubmittal. Failure to submit revised plans by the applicant within 30 days will result in cancellation of the application with no refund. If the application is cancelled, a new permit application and review fee must be submitted.

When the requirements of both Part 91 and these procedures are met, the SESC Permit will be issued to the applicant. The permit holder is responsible for providing copies of the permit to the Building Department of the municipality involved, EGLE, and other appropriate governmental units.

Plan Revisions after Permit Issuance

Any revisions to construction plans after SESC permit issuance due to a change in concept or remedy to a revealed deficiency must be submitted to WRC for review and approval. However, to the extent such changes void or otherwise require duplication of engineering time expended in review of the original plan, an additional review fee will apply. **The additional review fee will be due prior to review and revision of the permit.**

The revision date on the approved plans must match the revision date of the plans in the field.

The soil erosion permit along with a complete set of the approved SESC plans shall be available at the site of the earth change for inspection. The revision date on the approved plans must match the revision date of the plans in the field.

Section 3 – SESC Measures

The measures prescribed hereinafter must be incorporated into the SESC plans, as described in SECTION 2 PART B: COMMERCIAL APPLICATION AND PLAN REQUIREMENTS.

Part A: General Requirements

1. All earth change activities must be designed, constructed, and completed in such a manner to limit both the area and duration of earth disruption to the practical minimum.
2. Sediment caused by accelerated soil erosion must be removed, to the extent possible, from stormwater runoff water before it leaves the site of the earth change activity.
3. All dewatering operations must discharge into an appropriately sized dewatering filter bag.
4. All temporary and permanent facilities constructed for the conveyance of stormwater runoff from the earth change area must be designed to limit the flow to non-erosive velocity.
5. All temporary SESC BMPs must be maintained until permanent SESC measures are implemented.
6. Maintenance of the SESC BMPs is the responsibility of the permit holder and cannot be deferred to the following: including but not limited to, tenants, residents, or homeowners' associations.
7. Temporary SESC BMPs must be removed only after permanent SESC measures have been implemented.
8. Permanent SESC BMPs for all slopes, channels, ditches, or any disturbed land area must be completed within 15 calendar days after final grading, or the final earth change has been completed.
9. During the non-growing season, when it is not possible to permanently stabilize a disturbed area after an earth change has been completed, or where significant earth change activity ceases, temporary SESC measures must be implemented within a period not exceeding 5 calendar days from the establishment of the final grade.
10. Remove temporary erosion and sediment control measures once contributing surfaces are stabilized with 90% vegetative coverage, every square foot, 1 inch tall.

Part B: Protecting Stormwater Management Practices

Proper construction methods and considerations in managing erosion and sediment during construction are critical to the long-term performance of permanent water quality Stormwater Management Practices (SMPs). This section presents practices to ensure that the long-term effectiveness of water quality facilities is not compromised.

Note that design criteria and other requirements for the design of water quality SMPs are provided in the **WRC'S STORMWATER ENGINEERING DESIGN STANDARDS.** The focus of this section is on construction approaches to protect SMPs during construction, including the management of erosion and sedimentation on site.

1. Clearly identify the locations of all post-construction stormwater facilities on project plans including all phases of SESC plans.
2. The long-term intended use of an SMP facility must be clearly stated so that all parties are aware of areas designated as a post-construction stormwater facility.
3. Physically mark infiltration areas in the field prior to any land-disturbing activities to avoid soil disturbance and compaction during construction.
4. Install orange temporary construction fence around infiltration areas to prevent heavy equipment from accessing the area. In addition, vegetative buffer zones can be implemented in the location of SMPs to establish a no-disturbance zone (see SP-1).
5. Include SMP areas in SESC inspections throughout construction.
6. Manually scarify the in-situ soils at the base of the excavation while excavating an infiltration area to the proposed invert depth. In-situ soils are not to be compacted.
7. Stone included as part of the infiltration system must remain free of sediment. If excessive sediment is found in the stone layer, the contractor will be required to remove the contaminated aggregate and replace it with clean, washed stone.
8. Remove temporary SESC measures once contributing surfaces are stabilized with 90% vegetative coverage, every square foot, 1 inch tall.
9. Maintenance of the SESC BMPs is the responsibility of the permit holder and cannot be deferred to the following: including but not limited to, tenants, residents, or homeowners' associations.

Clearly identify the locations of all post-construction stormwater management practices on project plans including all phases of SESC plans.

Refer to the **WRC STORMWATER ENGINEERING DESIGN STANDARDS** for information regarding post-construction operations and maintenance of SMPs.

Communication between the designer, contractor, and inspectors is critical to effectively construct Stormwater Management Practices and prevent costly rework and long-term maintenance expense.

Sequencing and Stabilization

1. Installation of SMPs must only begin when soil within the limits of disturbance is fully stabilized with approved SESC measures to prevent sediment from entering the facility. Therefore, it is recommended to install SMPs as close to the end of construction as possible to reduce the risk of sediment and other pollutants from entering the facility.
2. Temporary SESC measures shall be maintained and kept in place throughout construction and not removed until the SMP and contributing drainage area have been stabilized.

Routing Runoff

1. Construction runoff should be directed away from the proposed permanent SMP to the greatest extent possible by utilizing SESC measures such as:
    a. Diversion ditches
    b. Diversion berms
    c. Silt fence
    d. Straw wattles
    e. Core logs
    f. Erosion eels
2. Inlet protection must be utilized for inlets that discharge to an infiltration SMP.
3. Keeping the SMP completely disconnected from the flow path by obstructing the inlet during construction is recommended.

Avoid Compaction

1. Compaction of the soil within a proposed infiltration facility must be avoided. SMPs utilizing infiltration are designed based on tested infiltration rates of in-situ soils and compaction can significantly decrease the calculated infiltration rates, rendering the practice ineffective.
2. Do not use heavy equipment within the infiltration area. Keep all equipment out of the excavated area to the maximum extent possible.
3. Excavation and other construction activities such as loading stone into the facility should be performed from the perimeter of the infiltration facility, outside of the facility footprint.
4. Areas proposed for infiltration practices cannot have temporary stone access drives located on top of them.
5. Establish heavy equipment exclusion zones to avoid the infiltration area being compacted. No soil shall be stockpiled, nor construction materials staged in the area of the SMP.

See Table 1 for guidance on which protection measures apply to respective SMPs found in **WRC'S STORMWATER ENGINEERING DESIGN STANDARDS**.

TABLE 1 PROTECTION MEASURES FOR COMMON STORMWATER MANAGEMENT PRACTICES

	APPLICABLE SMP PROTECTION MEASURE		
PRACTICE	**Sequencing & Stabilization**	**Routing Runoff**	**Avoiding Compaction**
Bioretention/Rain Garden	X	X	X
Infiltration Basin/Trench	X	X	X
Bioswale		X	X
Detention Basin	X		
Retention Basin	X		X
Porous Pavement/Pavers	X	X	X
Underground Detention	X	X	

Soil Management

For some projects, impacts to in-situ soil in the location of an SMP area are unavoidable. Projects with significant land balancing, for example, often require earthwork to occur in the location of a proposed infiltrative SMP.

In the event in-situ soil in the location of an SMP area becomes compacted, the following corrective actions should be taken:

1. Remove accumulated sediment and debris from the SMP area.
2. Roughen compacted surfaces by furrowing, scarifying, ripping, or disking the soil 6 to 12 inches deep prior to the addition of topsoil or other media. Grooves created by roughening should be perpendicular to the direction of flow and not parallel, as this can create channels and increases the potential for erosion. See the **SURFACE ROUGHENING AND SCARIFICATION** standard detail.
3. Replaced topsoil must be a minimum of 8 inches thick and have an organic matter content of 5 and 10 percent dry weight for turf areas and planting beds, respectively, based on results from a standard burn test. Replaced topsoil must also have a pH suitable for the proposed landscape plants.
4. Prior to seeding, topsoil must be worked to prepare a proper seedbed. This includes raking of the topsoil and removal of debris and stones.

5. During site preparation for permanent vegetative stabilization, soils must be removed or treated as necessary to permanently support adequate vegetative ground cover. If the removal or treatment of the soil will not provide suitable conditions, non-vegetative means of permanent ground stabilization must be employed.

If design of an SMP was based on infiltration test results and the in-situ soils have become compacted or otherwise compromised during construction, re-testing of the soil may be required to determine if additional soil remediation is necessary or if construction of the practice can proceed as designed. Please refer to **WRC'S STORMWATER ENGINEERING DESIGN STANDARDS** for Infiltration Testing Requirements.

Section 4 – Inspection and Enforcement

Part A: Inspection

WRC will perform periodic inspections to verify compliance with the approved SESC plans and Part 91. The contractor is responsible for performing inspections and maintaining accurate records on site per State of Michigan requirements for SWPPP (Stormwater Pollution Prevention Plan).

Permanent Stormwater Management Practice (SMP) areas will be included in WRC's SESC inspections. Locations of planned SMP areas will be inspected once construction begins.

Schedule

On-site inspections before, during and after any earth change activity for which a permit has been issued will be performed as required by the schedule set by the site classification or as necessary due to the extent of erosion and sedimentation activity.

Sites where a Notice of Determination of Violation has been issued shall be inspected five (5) working days after said Notice was issued.

Misrepresentation of Site Conditions

If upon inspection the existing site conditions are found not to be as stated in the application and on the approved plan, the landowner will be issued a Notice of Determination of Violation. A person who knowingly violates or knowingly makes a false statement in an application for a permit or in a SESC plan may be subject to a $10,000 per day fine in accordance with Part 91. No earth disrupting work is to be undertaken or continued until revised plans have been submitted and a revised permit issued.

Field Changes

Field changes to SESC measures for a site must be submitted and approved by the Soil Erosion Supervisor prior to installation. The soil erosion inspector has the authority to approve minor changes to the soil erosion control to adapt to differing site conditions.

If an emergency condition exists on the site, the permit holder may be required to make major changes to the SESC measures by the field inspector. Major changes to the approved plan due to an emergency condition must be submitted to the Soil Erosion Supervisor for approval as soon as possible after the event.

Part B: Enforcement

Issuance of Notice of Determination of Violation

A Notice of Determination requires that the site meet SESC requirements within five working days of the date of the violation notice. If compliance is not achieved, the alleged violator(s) may be subject to the following:

1. A civil fine of not less than $2,500 or more than $25,000 per day for each violation.

2. The County Enforcing Agency installing the required SESC measures and a lien for the cost of this work filed against the property.
3. A civil action where fines, penalties, cost, damages, and injunctive or other relief will be sought.
4. If the landowner disagrees with any aspect of the Notice of Determination, the landowner shall be entitled to a formal appeal with the Oakland County WRC Soil Erosion Supervisor provided that a written or e-mail request for such an appeal is submitted within the five-day period to achieve compliance. The formal appeal shall be addressed as soon as practicable after receipt of request for same, but in no event shall it be held more than 10 days after the date of the Notice of Determination. This appeal shall not operate to stay the issuance of a civil infraction, or a civil action for fines, penalties, costs, damages, and injunctive or other relief.
5. All fines, penalties, administrative costs, and damages including, but not limited to, costs related to the County Enforcing Agency's enforcement and implementation of soil erosion and sedimentation controls, collected, or recovered, shall be paid to the County Enforcing Agency.

Consent Agreements

A consent agreement may be entered into at any time by and between the County Enforcing Agent and the landowner.

The consent agreement shall provide for and reflect the alleged violator's responsibility to correct violations of Part 91. In addition, the consent agreement may contain appropriate provisions necessary to resolve disputed claims and address identifiable and potential deficiencies in the alleged violator's compliance status, including, but not limited to:

1. A statement of facts
2. A description of the action necessary to achieve compliance
3. Compliance schedules
4. Required compliance or remedial actions
5. Fines
6. Penalties
7. Cost reimbursement
8. Financial assurance provisions
9. Stipulated penalties for non-compliance with the consent agreement

Violation of State Civil Infraction

A person who violates any provision of Part 91, the regulations promulgated hereunder, including, without limitation, a Notice of Determination of Violation, permit, consent, or other agreement, shall be guilty of a State civil infraction, subject to a fine not to exceed $2,500 for each infraction

in the first 5 days. A civil infraction shall not be issued until the time has elapsed for compliance after a Notice of Determination of Violation.

Except as otherwise provided by this section, the procedures for a municipal civil infraction shall be as set forth in Michigan Court Rules, Rule 4.101 et seq.

Knowing Violations and Penalties

Any person who knowingly violates Part 91 is subject to a civil fine of not less than $10,000 per day for each violation.

Part C: Fee Schedule

In compliance with the mandate from the Oakland County Board of Commissioners that administration of Part 91 be self-sustaining from permit fees and to allocate such fees as equitably as possible, a Soil Erosion Fee Schedule representing compliance with this mandate has been established. The fees will be revised on October 1st of each year. Please see **WRC PERMITTING & SOIL EROSION APPLICATION PORTAL** for the fee schedule.

1. At the time of application, payment of the review fee will be required before the plan review commences. At the time of issuance of the permit, payment of the inspection fee will be required.
2. Plans resubmitted for review due to a change in design concept or to remedy a deficiency will be charged a second review fee per the fee schedule.
3. Failure to submit revised plans by the applicant within 30 days will result in cancellation of the application with no refund. If the application is cancelled, a new permit application and review fee must be submitted.
4. Failure to obtain a SESC permit prior to commencement of earth disturbance will result in an After the Fact Permit issued and the cost of the permit and administrative costs put as a lien on the property.

Section 5 – Design Criteria

Part A: Sediment Basin Design

Definition

A sediment basin is a pond or depression built on a construction site to capture eroded or disturbed soil that is washed off during rainstorms, protecting neighboring properties, and protecting the water quality of nearby streams, rivers, lakes, or wetlands. Sediment basins allow suspended soil particles to settle out prior to leaving the site.

Design Methodology

1. The minimum capacity of sediment basins must be based on at least 1 inch of runoff from the entire drainage area. This can be estimated as 3,630 cubic feet per acre of contributing area.
2. The sediment basin should be designed to completely drain in approximately 48 hours. An acceptable dewatering time is between 48 and 72 hours.
3. The minimum required depth is 2 feet, and the basin should be no shallower than the average distance between the inlet and outlet divided by 200.
4. The inlet and outlet shall be designed to have the greatest possible distance apart to allow for maximum settling. Baffles may be used if necessary.
5. If the sediment basin is anticipated to be converted to a post-construction facility, the sediment basin may be designed with consideration for post-construction requirements provided in the Stormwater Engineering Design Standards. SEE SECTION 5 PART A CONVERSION FROM TEMPORARY TO PERMANENT FACILITIES for recommended approaches to converting a sediment basin to a post-construction facility, including volume and outlet structure considerations.

Required Volume	
Equation 1	$V = 3{,}630\ x\ A$
V =	Basin volume in cubic feet
A =	Contributing drainage area in acres

Surface Area of Basin	
Equation 2	$A_m = \frac{V}{H}$
A_m =	Median surface area of the sediment basin in square feet
V =	Basin volume in cubic feet
H =	Average depth of basin in feet

The typical configuration of a sediment basin outlet structure is shown in the **TEMPORARY DETENTION BASIN OUTLET STONE FILTER (SO-2)** standard detail.

1. The principal outlet is a vertical pipe (riser) with perforated 1" orifices drilled into the riser to facilitate settling during frequent rain events.
2. The top of the riser should be set at the peak water surface elevation in the basin from 1 inch of runoff.
3. The primary overflow should be based on a 10-year storm event and sized large enough to pass 80% of the calculated peak discharge from the drainage area.
4. An emergency overflow should be provided at least 2 feet above the 10-year design elevation to allow the bypassing of the basin in the event of a significant rain event.

Number of One Inch Orifices	
Equation 3	$N = \frac{V_r}{4{,}666 * \sqrt{h_w}}$
N =	Number of one inch diameter orifices
V_r =	Required basin volume in cubic feet
h_w =	Hydraulic head on orifice (average depth or max depth/2)

Design Considerations

1. Sediment basins shall be located as the last ultimate discharge outlet from the site.
2. Manufactured treatment devices (MTD) are designed for post-construction runoff conditions and are not an acceptable alternative for sediment basins or for controlling soil erosion during construction.
3. Si de slopes of the basin should be as shallow as possible for safety reasons. Depending on the proposed slope, a fence and an access gate may be required to be constructed around the basin.
4. A sediment basin filter (SO-2) shall remain in service until such time that all denuded construction areas contributing runoff to it are stabilized.
5. Erosion of the side slopes should be prevented by stabilizing with vegetation the bank from the top of the basin slope to the elevation of the outflow and inflow invert.
6. Approximately two to three feet of depth should be excavated below the invert of the inflow and outflow pipe on a basin, to provide a trap for the deposit of sediment.
7. Provision should be made to remove the accumulated sediment deposits from the bottom of the sediment basin, as needed, to keep the basin functioning efficiently.
8. Provision should be made to provide an emergency overflow in case (1) the outflow pipe becomes obstructed or (2) the capacity of the outflow pipe is exceeded.

9. The sediment basin should be constructed and in operation prior to any major earth disruption.
10. Until the storm drain system is in operation, provision should be made to route storm runoff into the basin using temporary ditches, swales, and/or diversions.
11. The sediment basin could be designed in conjunction with the storm drain system, such that the storm system could be bulkheaded at a manhole, with the storm flow being diverted into the sediment basin.
12. The sediment basin should be located at or near the downstream end of the storm drain system.
13. The impact of floodplains should be carefully considered when selecting a site for a sediment basin.

Maintenance

Maintenance of sediment basins during construction is especially critical as sediment basins are usually the last control measure through which sediment laden storm runoff must pass before leaving the construction site. Failure of the sediment basin to operate as designed could result in irreparable ecological damage to the offsite environment.

1. During maintenance inspections, the basin should be checked for piping, seepage, and other mechanical damage.
2. The outlet structure should be checked to ensure no obstructions are preventing proper drainage.
3. The outfall should also be checked for erosive velocities and clogging. Immediately address any problems discovered during the maintenance monitoring.
4. Basin depth should be checked to ensure the basin has the required capacity.
5. As sediment accumulates in the basin as intended, sediment should be removed when it has accumulated to no more than 50 percent of the design depth.
6. Remove and dispose of accumulated sediment during cleaning, or place sediment in an upland area, and stabilize it so that it does not re-enter the drainage course.

Conversion from Temporary to Permanent Facilities

Temporary Soil Erosion sediment basins may be converted to permanent post-construction SMPs, but the design may need to be altered to meet post-construction standards. It is the responsibility of the design engineer to ensure the temporary soil erosion sediment basin meets Soil Erosion standards during construction, and the permanent post-construction SMPs meet post-construction stormwater design standards. These design changes must be clearly defined and/or outlined on plan sheets and labeled “Temporary” or “Permanent.”

The following requirements must be followed when converting a temporary Soil Erosion sediment basin to a permanent post-construction SMP:

1. Clearly indicate the intended long-term use of temporary facilities on SESC plans submitted with the soil erosion permit application.
2. An implementation sequence plan for the conversion should be provided in SESC plans and the SWPPP and begin after the site is fully stabilized. Commencement of the conversion should only begin after final site stabilization is approved by WRC.
    a. Consult with the SESC inspector prior to the conversion to ensure the timing is appropriate.
    b. Pump down the basin through a filter sock or filter bag, sized to handle the flow of the dewatering. Check turbidity at the discharge point to avoid discharging sediment laden water.
    c. Remove accumulated sediment as needed to establish the final grade of the pond. In cases where a smaller sediment basin was implemented, and the basin volume needs to increase to meet post-construction requirements, excavate additional material to achieve the required post-construction basin volume.
    d. Dispose of sediment in an approved location.
    e. Grade the bottom of the pond and prepare for seeding.
    f. Seed/mulch basin.
    g. Modify, clean, or repair outlet structure as necessary based on approved stormwater report and design/plans. The outlet stone filter (SO-2) must stay in place until the entire site is fully stabilized.
    h. Prepare and submit as-builts to WRC.
    i. Submit Notice of Completion.
3. Significant modifications to outlet structures may need to be made as part of the conversion. These modifications should be detailed in the SWPPP, SESC plans, and project plans.

The conversion of a temporary soil erosion sediment basin to a permanent SMP should only begin after final site stabilization is approved by WRC.

References

Sources for Design Criteria

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https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_034363.pdf

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https://www.michigan.gov/-/media/Project/Websites/MDOT/Programs/Highway-Programs/Environmental-Efforts/Stormwater-Management/SESC-Manual.pdf

5. Construction specifications for bioretention, Minnesota Stormwater Manual, Minnesota Pollution control Agency

https://stormwater.pca.state.mn.us/index.php?title=Construction_specifications_for_bioretention

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https://www.portland.gov/bds/documents/erosion-and-sediment-control-manual/download

7. Erosion and Sediment Control Guide for Urban Construction, Toronto and Region Conservation Authority

https://sustainabletechnologies.ca/app/uploads/2020/01/ESC-Guide-for-Urban-Construction_FINAL.pdf

8. Converting Temporary Sediment Basins to Permanent Stormwater Detention Ponds in Tennessee, Dr. Bruce A. Tschantz, PE; Tennessee Water Resources Research Center, Knoxville, Tennessee

Appendices

Appendix A: Terms and Definitions

10-year Storm: A rainfall depth that has a 10% chance of being exceeded in a given year.

90th Percentile Storm: A rainfall depth in which 90 percent of the rainfall events that produce runoff will be less than or equal to this depth.

Authorized Public Agencies (APAs): State, county, or municipal agencies, such as the Michigan Department of Transportation, county road commissions, and city street departments, that have been designated by EGLE to undertake earth change activities without having to obtain soil erosion and sedimentation control permits from the county or municipal enforcing agencies. Designation is dependent upon having acceptable procedures for controlling erosion and off-site sedimentation.

Best Management Practice (BMP): A term applied to structural, vegetative, or managerial practices used to protect or improve surface waters, ground waters, or adjacent property. Distinguished from SMPs in that BMPs are temporary practices implemented during construction.

Closed Conduit: An enclosed conveyance system designed to carry stormwater runoff such that the surface of the water is not exposed to the atmosphere, including without limitation, storm sewers, culverts, enclosed County drains, and pipes.

Construction Activity: A human-made activity, including without limitation, clearing, grading, excavating, construction and paving, that results in an earth change or disturbance in the existing cover or topography of land, including any modification or alteration of a site or the "footprint" of a building that results in an earth change or disturbance in the existing cover or topography of land.

Conveyance: Any structure or other means of safely conveying stormwater or stormwater runoff within a stormwater management system, including without limitation, a watercourse, closed conduit, culvert, or bridge.

County Drain: Drains established pursuant to the Michigan Drain Code of 1956, MCL 280.1 et seq., as amended, that are under the jurisdiction of the WRC.

County Enforcing Agency (CEA): Counties are mandated by statute to administer and enforce Part 91. The board of commissioners for each county must appoint an agency within the county, referred to as the County Enforcing Agency (CEA), to review soil erosion and sedimentation control plans, issue permits, and take enforcement actions when necessary to ensure compliance with Part 91.

Culvert: A structure, including supports, built to carry a feature over a surface water or watercourse, with a clear span of less than 20 feet measured along the center of the feature being carried.

Design Storm: The rainfall event used as the basis of design for stormwater drainage facilities.

Design Water Level: The water surface elevation in a detention system at which the storage volume in the system (above the permanent pool water level, if any) equals the required flood control storage volume.

Detention System: A component of a stormwater management system, either aboveground or belowground, that detains stormwater and stormwater runoff. Detention systems can be classified as follows:

1. **Dry Detention Basin:** A basin that remains dry except for short periods following rain storms or snow melt events.
2. **Extended Dry Detention Basin:** A dry detention basin that has been designed to increase the length of time that stormwater will be detained beyond the normal dewatering time of 24-48 hours.
3. **Wet Detention Basin:** A basin that contains a permanent pool of water that will effectively remove nutrients in addition to other pollutants.
4. **Extended Wet Detention Basin:** A wet detention basin that has been designed to increase the length of time that stormwater will be detained beyond the normal dewatering time of 24-48 hours.
5. **Regional Detention Basin:** A wet or dry detention basin that receives water from multiple sites as an alternative to storage on-site.
6. **Underground Detention System:** One or more underground pipes and/or other structures that are utilized as a detention system.
7. **Constructed Wetland:** An open detention basin that uses a variety of water depths and wetland plants to provide pollutant removal and provide temporary storage of stormwater runoff to prevent downstream flooding and the attenuation of runoff peaks.

Discharge: The flow rate of water passing through the outlet at a given time, usually expressed as cubic feet per second (CFS).

Disturbed Area: An area where human activity has removed or altered the natural vegetative soil cover and the soil is susceptible to erosion.

Drainage Area: The entire upstream land area from which stormwater runoff drains to a particular location, including any off-site drainage area.

Detention time: The time required for the gradual reduction in water level in a BMP due to the combined effect of infiltration, evaporation and discharge from the peak or storage to full dewatering to the lowest outlet elevation. (i.e. in a bioretention area this would include dewatering of the soil media)

Emergency Spillway: A channel constructed in the embankment of an open detention or retention basin that is used to control flows in excess of the overflow structure capacity to prevent erosion of the berm.

EGLE: Michigan Department of Environment, Great Lakes, and Energy

FEMA: Federal Emergency Management Agency

Floodplain: For a given flood event, that area of land adjoining a continuous watercourse that has been covered temporarily by water. This design standard, the term floodplain includes all physical floodplains weather or not they have been officially mapped by FEMA.

Flow Path: The distance that a parcel of water travels through a stormwater detention pond or wetland. It is defined as the distance between the inlet and outlet, divided by the average width.

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

Ground Water Table: The uppermost extent of naturally existing water beneath the earth's surface between saturated soil particles and rock that supplies wells and springs. At least two feet of separation is required between the normal ground water elevation and the bottom of the bioretention filter media.

Impervious Surface: A surface that prevents the infiltration of water into the ground such as all roofs, streets, sidewalks, driveways, parking lots, highly compacted soils, and gravel.

Infiltration Rate: The rate of infiltration (inches/hour) of in-situ soils at the base (subgrade) of a designed BMP, as determined by on-site soil evaluation certified by a Professional Engineer. Also referred to as Saturated Soil Conductivity (K_{sat}) or In-Situ Infiltration Rate.

Inlets: A stormwater collection structure designed to collect and convey surface water into the stormwater management system via a grated cover.

1. **Standard Inlet:** A stormwater collection structure designed to collect and convey surface water from a paved area into the stormwater management system. An Inlet is normally 2 feet in diameter, is designed so that stormwater is collected via a grated cover and falls directly into the storm drain.

2. **Catch Basin:** A stormwater collection structure designed to collect and convey surface water from a paved area into the stormwater management system. A catch basin is normally 4 feet in diameter, is designed so that stormwater is collected via a grate cover and sediment falls to the bottom of the catch basin sump not directly into the storm drain.

3. **Rear Yard Catch Basin:** A stormwater collection structure designed to collect and convey surface water from an unpaved area into the stormwater management system. A rear yard catch basin is normally 4 feet in diameter, is designed so that stormwater is collected via a grate cover and sediment falls to the bottom of the catch basin sump not directly into the storm drain.

4. **Yard Inlet:** A stormwater collection structure designed to collect and convey surface water from an unpaved area into the stormwater management system. A yard inlet consists of a 2 ft. diameter manhole, is designed so that stormwater is collected via a grated cover and falls directly into the storm drain then into a water quality BMP.

Manhole: A stormwater structure designed to allow access into a closed conduit or other underground component of a stormwater management system. A manhole has a minimum diameter of 4 feet, is designed with a concrete flow channel at the bottom of the manhole and is fitted with a solid cover.

Manufactured Treatment Device (MTD): A prefabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff. The TSS removal rate for manufactured treatment devices must meet the NJDEP certification of the pollutant removal rates.

MDEQ: EGLE was formerly called the Michigan Department of Environmental Quality.

MDOT: Michigan Department of Transportation.

Municipal Enforcing Agencies (MEAs): Cities, villages, charter townships, and some general law townships that have elected to enforce Part 91 through adoption of a soil erosion and sedimentation control ordinance. After approval of the ordinance by the Department of Environment, Great Lakes, and Energy (EGLE), the MEAs assume responsibility for administering and enforcing Part 91 within their jurisdictions, independent of the CEAs.

Natural Resources Conservation Service (NRCS): A federal agency of the United States Department of Agriculture (USDA) that works with farmers, ranchers, forest landowners, local and state governments, and other federal agencies to maintain healthy and productive working landscapes, and to protect our natural resources through conservation.

NJDEP: New Jersey Department of Environmental Protection.

Outlet Control Structure: A horizontal pipe or series of pipes or vertical riser pipe designed to gradually release stormwater from a pond over a 24 to 48-hour interval.

Overflow Structure: A structure designed to allow unrestricted discharge from a component of a stormwater management system when the water level exceeds the design water level.

Peak Discharge or Flow Rate: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Permanent Pool: A pool in a wet detention system that provides additional removal of pollutants through settling and biological uptake.

Pervious or Porous Pavement: Traditionally impervious surfaces designed to allow stormwater to be stored in a layer of open graded stone and then infiltrate into the ground. (Pervious Concrete, Pervious Asphalt, Pervious Pavers)

Professional Engineer (PE): Only an engineer currently licensed in the State of Michigan may prepare, sign and seal, and submit engineering plans and drawings for approval.

Regulated Wetland: Any wetland protected by federal, state, and or local government regulation.

Retention Basin: The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass. Retention is discouraged under all circumstances unless there is no practical way to provide an outlet. Pre-treatment in the form of infiltration BMPs, sediment forebays, and mechanical separators is required for sediment removal.

Riser: A vertical pipe extending from the bottom of a basin that is used to control the discharge rate from the basin for a specified design storm. When this is used for soil erosion control during construction it is considered temporary.

Runoff: The excess portion of precipitation that does not infiltrate into the ground, but "runs off" into streams, water bodies, and/or storm sewers.

Saturated Soil Conductivity (K_{sat}): The rate of infiltration (inches/hour) of in-situ soils at the base (subgrade) of a designed BMP, as determined by on-site soil evaluation certified by a Professional Engineer. Also referred to as Infiltration Rate or In-Situ Infiltration Rate.

Sediment: Soil material that is transported from its site of origin by water. May be in the form of bed load, suspended or dissolved.

Soil Erosion: The increased loss of the land surface that occurs as a result of the wearing away of land by the action of wind, water, gravity, or a combination of wind, water, gravity or human activities.

Soil Erosion and Sedimentation Control (SESC): refers to the practices, measures, and regulations designed to prevent or minimize soil erosion and the resulting sedimentation of water bodies during construction, agricultural activities, or land disturbances. These controls aim to protect water quality, prevent habitat degradation, and ensure compliance with environmental laws.

Spillway: A depression in the embankment of a pond or basin, used to pass peak discharges in excess of the design storm.

Stabilization: The establishment of vegetation or the proper placement, grading, or covering of soil to ensure its resistance to soil erosion, sliding, or other earth movement.

Stormwater: Water resulting from precipitation, including without limitation rain, snow, snowmelt. Also referred to as "runoff".

Stormwater Management Practices (SMP): Permanent, post-construction structural and non-structural practices and techniques that mitigate the adverse impacts caused by land development on water quality and/or water quantity. SMPs include bioretention, rain gardens, bioswales, underground detention, and permanent detention/retention basins. Distinguished from BMPs in that SMPs are permanent features installed post-construction.

Stormwater Management Plan: Ordinances, orders, rules, regulations, and other mechanisms that provide for the management of stormwater to prevent flooding and to ensure the restoration and/or protection of surface waters.

Stormwater Management System: Any structure, feature, or appurtenance subject to the Ordinance, or a rule promulgated pursuant to the Ordinance, that is designed to collect, detain, retain, treat, or convey stormwater runoff, including without limitation buffer strips, swales, gutters, catch basins, closed conduits, detention systems, pretreatment systems, wetlands, pavement, unpaved surfaces, structures, watercourses, or surface waters.

Stormwater Pollution Prevention Plan (SWPPP): A comprehensive document required by the Clean Water Act for sites undergoing construction or other activities that could potentially pollute stormwater runoff. The SWPPP outlines the strategies and measures that will be implemented to prevent pollutants, such as sediment, chemicals, and debris, from being carried by stormwater into nearby water bodies.

Stream: By MDEQ definition: “a river, creek, or surface waterway that may or may not be defined by Act 40, P.A. of 1956; has definite banks, a bed, and visible evidence of continued flow or continued occurrence of water, including the connecting water of the Great Lakes.” Even if water flow is intermittent, it is classified as a stream.

Surface Water: A body of water, including without limitation seasonal and intermittent waters, in which the surface of the water is exposed to the atmosphere, including without limitation lakes, open detention basins, forebays, watercourses, bioretention areas, retention basins, wetlands, and impoundments.

Total Suspended Solids (TSS): Particles or other solid material suspended in stormwater or stormwater runoff. “Total suspended solids” is commonly expressed in concentration (mg/l).

Watercourse: A natural or artificial channel for flowing water.

Waters of the State (Michigan): Any groundwater, lakes, including the Great Lakes bordering the state, rivers, streams, and all other water courses and bodies of water within the jurisdiction of the state including wetlands.

Wetland: Michigan's wetland statute, Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, defines a wetland as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh." The definition applies to public and private lands regardless of zoning or ownership. Many wetland areas have only a high ground water table and standing water may not be visible. Types of wetlands include deciduous swamps, wet meadows, emergent marshes, conifer swamps, wet prairies, shrub-scrub swamps, fens, and bogs.