

7.1 Sediment Settling Basin



Description

A sediment settling basin is a temporary impoundment that detains sediment-laden runoff from a construction site. A floating skimmer device gradually draws water from the pond surface, allowing some suspended sediment to settle out and be captured in a permanent pool below the outlet. A sediment settling basin may be an embankment pond, an excavated pond, or a combination of both.

Use Criteria

Install a sediment settling basin where stormwater runoff discharges from the site as a concentrated flow, such as the site's stormwater drains or drainage ditches.

Divert surface runoff from drainage areas that exceed the capacity of sediment barriers and inlet protection to a sediment settling basin.

A sediment settling basin is ineffective at capturing fine silt and clay particles and is not intended to be the sole method of control. Timely stabilization, coupled with upgradient erosion and sediment control practices, is essential to minimize the incoming sediment load.

Jurisdictional wetlands, lakes, and streams may not be used as a sediment settling basin.

When using an existing or planned permanent post-construction stormwater management practice as a temporary sediment settling basin during construction, temporary modifications will be necessary to meet the design criteria in this chapter, including blocking peak discharge control openings and attaching a temporary skimmer. Delay the installation of post-construction features (for example, forebays, micropools, and wetland benches) that could be damaged by construction sediment. Re-grading may be necessary to develop the final post-construction design.

Design Criteria

Dewatering Zone

The dewatering zone is a detention storage volume above the dewatering outlet and below the principal spillway, as shown schematically in Figure 7.1.1. The minimum volume of the dewatering zone is 1,800 cubic feet per acre of area draining to the sediment settling basin, including offsite and/or undisturbed areas. Diverting runoff from undisturbed areas away from the basin can reduce the sediment basin size and improve its performance.

The recommended average dewatering zone depth is two feet or less to produce a pond surface area optimal for settling suspended solids.

Sediment Storage Zone

The sediment storage zone is a permanent pool below the dewatering outlet, as shown schematically in Figure 7.1.1. It provides storage for captured sediment and limits its resuspension. The minimum volume of the sediment storage zone is 1,000 cubic feet per acre that is disturbed and drains to the sediment settling basin. Alternatively, use the Revised Universal Soil Loss Equation (RUSLE) to calculate the sediment storage zone volume (estimating a minimum of six months between cleanouts). The sediment storage zone depth should be between two and six feet.

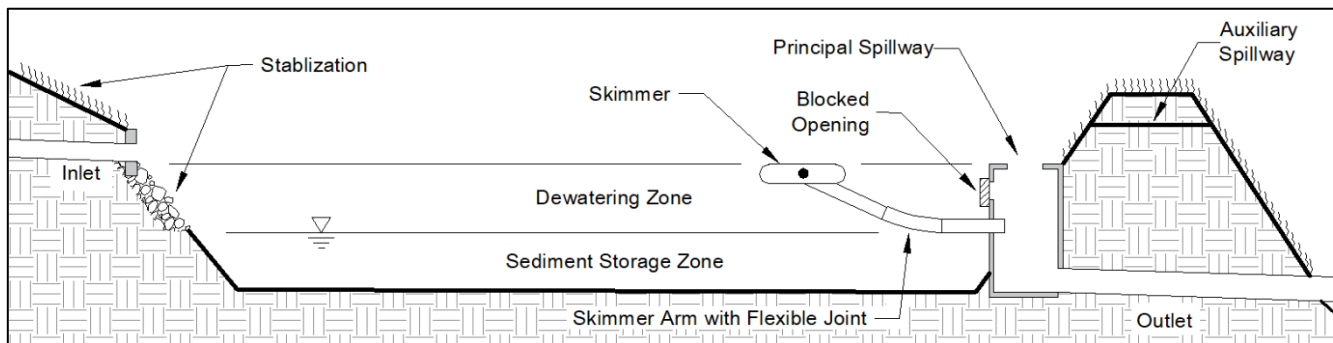


Figure 7.1.1 Typical Temporary Sediment Settling Basin in Profile (not to scale)

Skimmer

Drain the dewatering zone through a device —commonly referred to as a skimmer— that floats and adjusts to changing water levels, drawing water from just below the surface of the pool, where suspended sediment concentrations are lowest. Size the skimmer with an orifice that drains the required dewatering zone volume over a period longer than 48 hours but shorter than seven days.

Any constructed or manufactured device that meets the criteria in this section and is structurally sound, maintainable, and capable of reliably performing the intended function may be used. If specifying a proprietary skimmer device, use the manufacturer’s tools to determine the skimmer size/model and orifice opening that meets the two- to seven-day drawdown requirement.

Specifications for constructing a skimmer are available from the State of Delaware Department of Transportation (DelDOT). Modifications to the DelDOT drawings will be necessary to meet the design criteria specified herein, including a properly sized orifice plate (Use Ohio EPA’s *Sediment Basin Calculator* to size an appropriate control orifice).

The dewatering zone must only drain through the skimmer. Seal the skimmer arm to the outlet structure and block any openings and underdrains within the dewatering zone to prevent outflow from bypassing the skimmer.

Typically, the skimmer is in a constant floating position. Provide a gravel, block, or similar base if the skimmer may potentially get stuck in bottom mud.

All skimmers must include:

- a flexible joint and arm length that allows the skimmer head to adjust to the full range of potential water levels,
- structurally sound and watertight connections between the headworks, arm, flexible joint, and outlet structure,
- a screen, trash rack, or other mechanism that prevents clogging by trash, algae, or other floating debris, and
- a rope or equivalent method to bring the skimmer head to shore for maintenance.

Geometry

The shape of a sediment settling basin influences its trapping efficiency. Design the sediment basin with a flow length to average basin width ratio (L:W) of at least 2:1 and, where practical, up to 4:1. Flow length is the direct distance from an inlet to the basin outlet, measured at the elevation of the invert of the skimmer outlet. If necessary, use solid baffles to increase the flow length-to-width ratio.

Design side slopes of 2:1 or flatter to limit sloughing and rill erosion. Slopes of 3:1 or flatter are recommended above the water line for safety.

The post-construction geometry requirements should also be considered if the sediment settling basin is to be converted into a permanent stormwater practice.

Stabilization

The basin itself should not generate sediment. Stabilize the interior banks above the waterline and the outer embankment using the methods described in Chapters 5.3 and 5.5 within seven days of the basin reaching design grade.

Plan outlet protection (see Chapter 6.1) to prevent erosion at concentrated inflow points and the basin outlet.

Porous Baffles

Porous baffles across a sediment settling basin improve sediment deposition and retention by reducing flow velocity, dampening turbulence, and spreading flow across the entire basin width (North Carolina, 2013). If greater sediment capture efficacy is needed, install at least three rows of mesh baffles perpendicular to the flow to partition the dewatering volume into equally sized cells. Use two baffle rows in basins less than 40 feet in overall length.

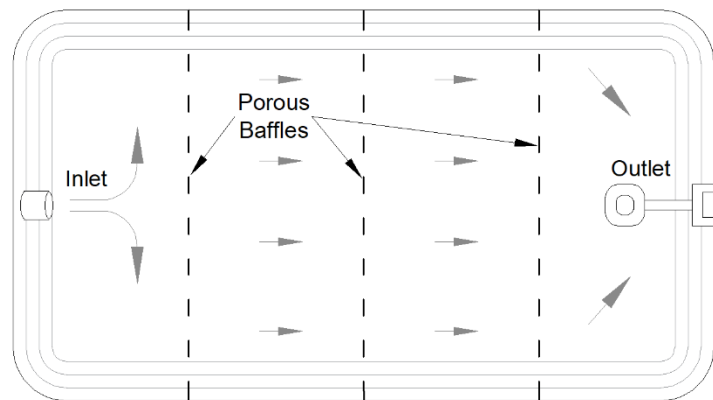


Figure 7.1.2 Illustration of Porous Baffles Partitioning a Sediment Settling Basin (not to scale)

Embankment and Spillway Design

In addition to the skimmer, a sediment settling basin must include a principal spillway to bypass runoff events that exceed the skimmer capacity and, where necessary, an auxiliary spillway to protect the embankment from overtopping. Designers are encouraged to review the Natural Resource Conservation Service - *Ohio's Conservation Practice Standard Code 378 - Pond and Engineering Field* and *Handbook Chapter 11 - Ponds and Reservoirs* for pond embankment and spillway design guidance.

Dam Safety Rules

Dams for temporary sediment settling basins are regulated under Ohio Revised Code (ORC) 1501: 2 - Dam Safety Administrative Rules. A dam is exempt from the state's authority (ORC Section 1521.062) if it is six feet or less in height, regardless of total storage; less than 10 feet in height with not more than 50 acre-feet of storage; or not more than 15 acre-feet of total storage, regardless of height. Check with the Ohio Department of Natural Resources for the most current requirements.

Safety

A sediment settling basin is a pool of open water and soft sediment that presents a potential safety hazard. Utilize signs, fencing, and/or other design measures as necessary and in accordance with state and local requirements.

Conversion to a Post-Construction Stormwater Management Practice

Consult Chapter two for guidance on converting a temporary sediment settling basin into each type of permanent post-construction stormwater management practice. After the drainage area is stabilized, dewater the temporary sediment-settling basin (see Chapter 4.3), remove and properly dispose of sediment that accumulated during construction, and reconfigure the basin and outlet structure to match the post-construction design. Construction sediment of acceptable quality may be integrated back into the site grading.

Stormwater Pollution Prevention Plan

The stormwater pollution prevention plan (SWP3) should include the following sediment settling basin information:

- drainage area, disturbed drainage area, and other relevant design data,
- the required and provided dewatering zone and sediment storage zone volumes (a stage-storage table is recommended)
- construction drawings depicting the practice's location and proposed ground contours,
- skimmer sizing and drawdown calculations,
- construction drawings detailing the outlet structure with the skimmer, and the conversion to a post-construction practice if applicable,
- skimmer specifications (manufacturer, size, and orifice opening),
- principle and auxiliary spillway drawings and specifications,
- embankment material and compaction specifications (where applicable),
- temporary stabilization specifications, and
- the method(s) of removing and disposing of the sediment removed from the basin, both for interim maintenance as well as final conversion to a post-construction practice after the drainage area is stabilized.

NOTE: Sizing methods vary by proprietary skimmer type. To ensure proper sizing of the contractor's selected skimmer, it is recommended that construction plans specify one or more approved proprietary skimmer models rather than using a general "or equal" designation. Require changes from the specified skimmer(s) be approved by the design engineer. This approach helps ensure compliance with performance requirements.

If a sediment settling basin will be converted to a permanent stormwater management practice, include drawings and design data for each practice in the SWP3. This may include:

- temporary modifications to a permanent outlet structure are necessary to securely attach the skimmer and develop proper sediment storage and dewatering zone volumes,
- modifications, including sediment removal, necessary to achieve post-construction design (for example, re-shaping of the basin, constructing forebays, micropools, or benches).

Inspection and Maintenance

A sediment settling basin must be easily accessible for sediment removal during construction and for decommissioning after construction.

See the practice specification that follows.

References

Delaware. 2020. Skimmer Dewatering Device. Standard Drawing E-8(2020). Department of Transportation.

Georgia. 2016. Manual for Erosion and Sediment Control in Georgia. Georgia Soil and Water Conservation Commission. Athens, GA.

Illinois. 2013. Illinois Urban Manual Practice Standard Code 957 – Temporary Sediment Basin. Accessed Dec. 11, 2025, at illinoisurbanmanual.org

North Carolina. 2013. Erosion and Sediment Control Planning and Design Manual. Department of Environmental Quality. Raleigh, NC.

NRCS Ohio. 2018. Conservation Practice Standard Pond. Code 378.

NRCS Ohio 2018. General Specification OH-23 Earthfill.

Practice Specification

Temporary Sediment Settling Basin

Scope

Furnish all materials, labor, and equipment necessary for constructing a temporary sediment settling basin in accordance with the construction drawings and these specifications. The temporary sediment settling basin shall be constructed and operational before upslope land disturbance begins.

Materials

1. All materials shall be as specified in the plans.

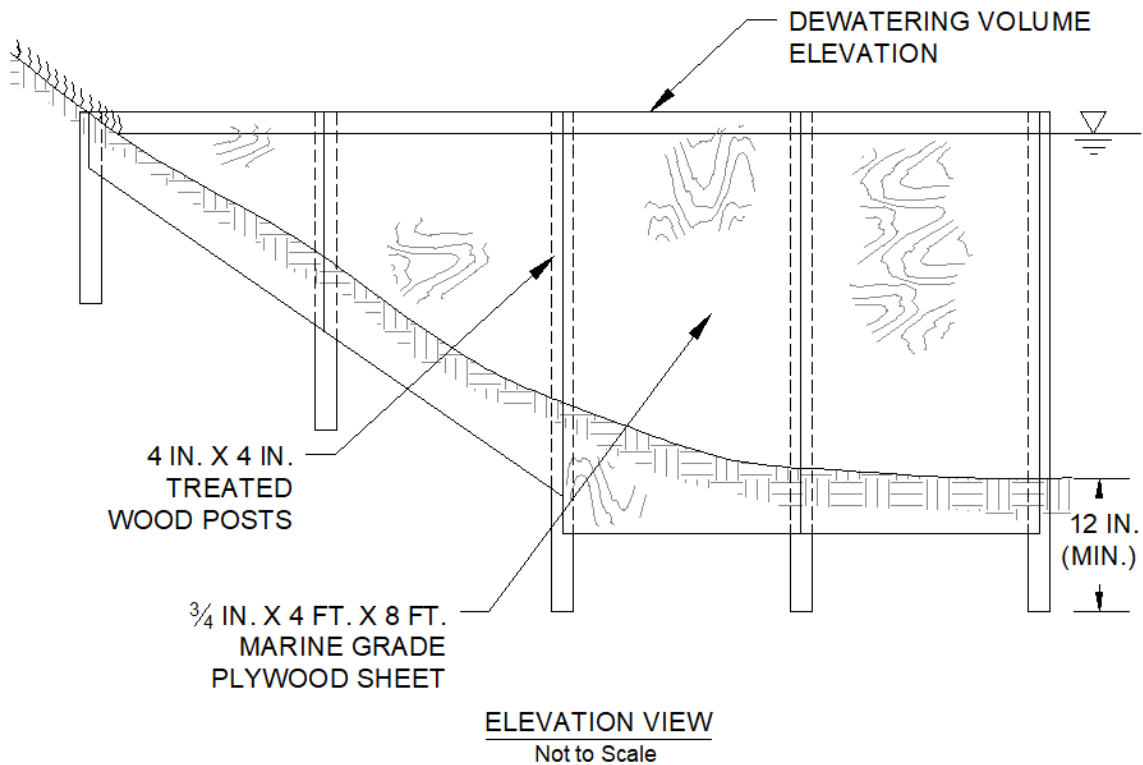
Installation

1. The sediment basin area shall be cleared, grubbed, and stripped of any vegetation and topsoil prior to its construction. Topsoil shall be stockpiled and replaced after decommissioning or used elsewhere.
2. Construct the sediment basin to the lines and grades shown on the plans.
3. The dewatering volume shall drain through the skimmer. All spillways and underdrains below the dewatering volume shall be grouted or otherwise sealed watertight during active use.
4. Stabilize the banks, embankment, and emergency spillway within 7 days of reaching design grade.

Maintenance and Removal

1. Inspect the sediment settling basin at least weekly and after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day. Promptly repair any erosion, bare areas, or other damage discovered during the inspection. Remove any burrowing rodents that may compromise the embankment.
2. Use the maintenance rope to pull the skimmer head to shore for inspection and maintenance. Clear trash, debris, and vegetation from the skimmer, orifice, and trash guard. Inspect flexible couplings, pipe clamps, and the skimmer arm for damage or wear and repair as necessary.
3. Remove sediment to restore the original dimensions whenever the sediment storage zone is fifty percent full, or if sediment interferes with proper inflow or outflow. Place removed sediment where it will not re-enter the basin or discharge from the site. It shall not be deposited in a regulated stream, wetland, or floodplain without proper approval from the Ohio EPA, the Army Corps of Engineers, and/or the local floodplain administrator.
4. Remove the temporary sediment basin after the drainage area is fully stabilized. Dewater the basin in a manner that does not discharge sediment-laden water into a stream or drainage way. Once dewatered, remove the temporary structures, grade the area to the final contours, and stabilize the area by seeding or sodding.

Practice Specification Temporary Solid Baffle



Materials

1. Baffle wall shall be $\frac{3}{4}$ in. marine grade plywood.
2. Posts shall be 4 in. by 4 in. treated wood posts.

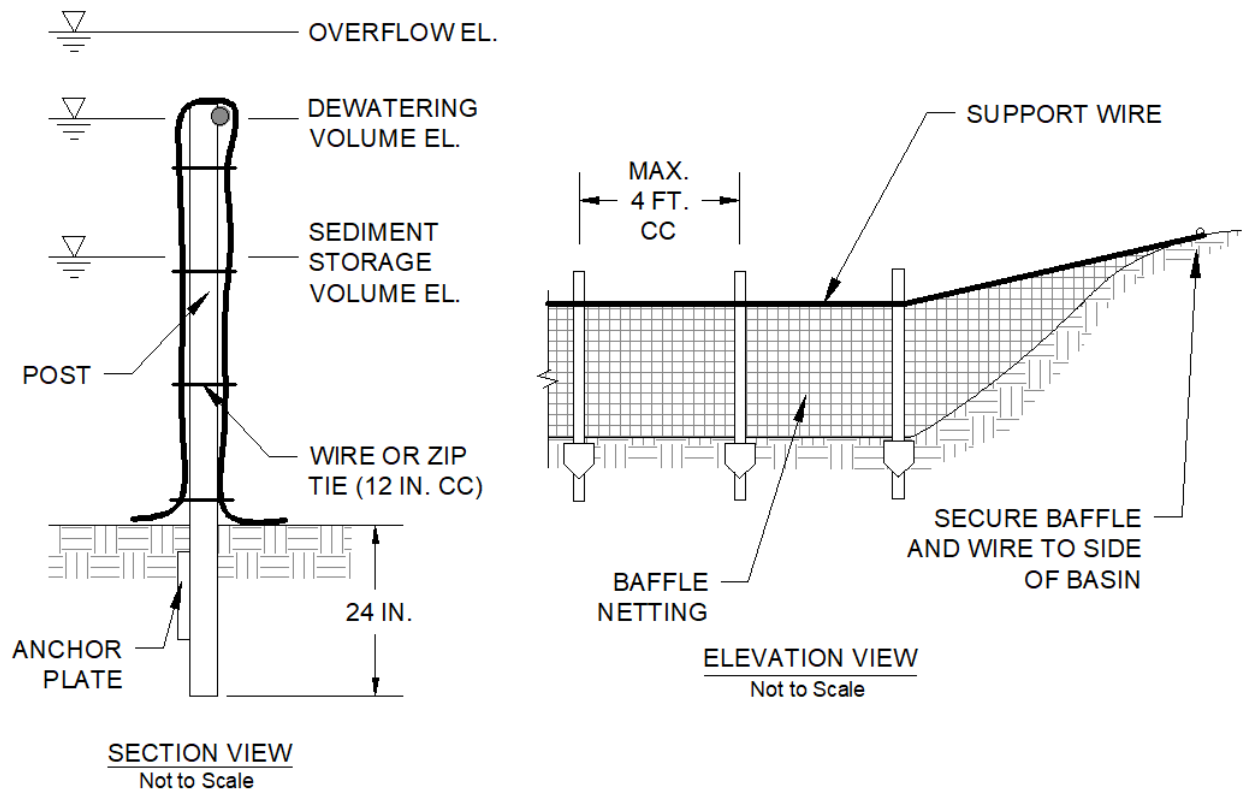
Installation

1. Construct the baffle in the positions and lengths shown in the plans.

Maintenance and Removal

1. Inspect the baffles at least weekly and after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day. Promptly repair any collapsed baffles or other damage discovered during the inspection.
2. Take care to avoid damaging the baffle during cleanout of the sediment settling basin. Replace or repair the baffle if it is damaged during cleanout operations.
3. Remove and properly dispose of all materials at the end of use.

Practice Specification Temporary Porous Baffle



Materials

1. Baffle netting shall be coconut fiber (coir) twine woven into a high-strength matrix (700 g/M² grade) or equivalent with a minimum open area of 50% and a tensile strength of 500 lb/ft.
2. Support wire shall be 9 ga. high-tension wire or equivalent.
3. Posts shall be steel fence posts or equivalent, equipped with an anchor plate, and of sufficient height to support the baffle to the planned height.

Installation

1. Extend baffles across the sediment basin as shown in the plans.
2. Secure the support wire to each steel post and each basin bank in a manner that prevents sagging.
3. Drape the netting over the wire. Secure it to the support wire and each fence post with wire or zip ties.

Maintenance and Removal

1. Inspect the baffles at least weekly and after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day. Promptly repair any collapsed baffles or damage discovered during the inspection. Replace the netting if it becomes excessively torn, decomposes, or becomes ineffective.
2. Take care to avoid damaging the baffles during the cleanout of the sediment basin. Replace baffles if they are damaged during cleanout operations.
3. Remove and properly dispose of all materials at the end of use.