Chapter 7 - Conversion of Temporary Controls to Permanent Stormwater Treatment

7.1 Background

This section provides guidance on converting temporary sediment controls into permanent stormwater control measures (SCMs). The recommendations are intended as a starting point and should be applied with sound engineering judgment. Final SCM designs must follow recognized best practices and be developed in accordance with applicable local and state stormwater ordinances and their design manuals.

Construction EPSC measures and permanent SCMs serve complementary but distinct purposes within development projects. Certain EPSC practices possess design characteristics that can be readily adapted for long-term stormwater management. For example, a sediment basin constructed for temporary sediment storage and sized to accommodate both construction and post construction requirements, can later be retrofitted with a permanent outlet structure to function as a stormwater wet or dry pond. This dual use allows for more efficient use of land and resources. Among the most suitable EPSC measures for conversion are sediment basins, swales, and other conveyances. Guidance on converting these practices is provided in the following sections.

7.2 General Considerations

Successful conversion of temporary sediment controls into permanent SCMs requires careful attention to planning, construction timing, and sediment removal. Each of these elements plays a critical role in ensuring that the permanent system functions as intended, avoids premature failure, and complies with design and regulatory requirements. As mentioned in Section 4.4.7, the sediment storage zone of a sediment basin can be over-excavated, such that accumulated sediment during the construction phase can bring the bottom elevation to its permanent grade. This method reduces sediment removal maintenance and is encouraged if the accumulated sediment is stabilized before the basin is converted to a permanent measure.

Planning

Pre-construction planning is essential for an effective conversion. Temporary EPSC measures should be aligned to convey runoff in the same direction as the intended permanent discharge point, ensuring a smooth transition post-construction. Design calculations must account for both construction-phase and long-term regulatory flow requirements, with EPSC measures sized or adaptable to meet those needs. Construction plans should clearly document conversion details, including access provisions for equipment and modifications to outlet structures. In many cases, outlet structures must be designed for flexibility, such as the ability to dewater or adjust orifice locations using knock-out ports, so they can be adapted during conversion without extensive reconstruction. Further, modifications to site conditions must also be documented. For example, temporary construction EPSC measures may have lesser designs if diversions have been installed upstream to limit the associated drainage area. If those diversions are also temporary and are to be removed upon site stabilization, the permanent SCM must account for the increase in drainage area.

Construction Timing

Conversion must only take place after site construction is complete, and disturbed areas have achieved final stabilization requirements. This precaution minimizes the risk of sediment laden runoff entering the permanent SCM, where it could clog treatment components or reduce storage capacity. If an earlier conversion is necessary, equivalent sediment controls may be used to stay in compliance with the CGP. To the extent possible, conversion is to be scheduled during dry weather forecasts, reducing the likelihood that runoff will enter the system before it is fully operational. Rapid execution of conversion activities is critical to protect water quality and maintain design functionality (which includes quickly establishing vegetative cover).

Sediment Removal

Prior to conversion, all accumulated sediment in the EPSC measure must be removed to achieve the intended design elevations of the permanent SCM. Dewatering strategies should be incorporated into the plan to allow safe and efficient removal of ponded water and sediment. Sediment deposits are often fine-grained and may not be suitable for plant establishment making disposal or stabilization necessary. Providing a clean, stable foundation ensures that vegetation, outlet structures, and other design elements of the permanent control can perform as intended over the long term.

7.3 Sediment Basin Conversion – Retention Basin

Adapted from Tschantz (2012), the following steps outline the conversion process of a temporary sediment basin into a permanent stormwater detention facility:

1. *Dewatering*: Once the construction site is fully stabilized, the sediment basin is to be dewatered to the top of the sediment layer in both the forebay and the main basin area. Dewatering is to begin after the pond has drained to or below the sediment storage elevation and must occur over the course of at least one day to avoid resuspension of captured sediment, embankment slumping, or slope failure. A

surface skimmer discharging into the riser can be used to lower the live storage pool to the sediment layer. Forebay areas, which trap mostly sands and coarse silts, if properly constructed above the elevation of the sediment storage zone, should dewater by gravity. However, dewatering the mucky bottom of the sediment storage area, containing a greater proportion of finer sediments, may be challenging. Dewatering the slurry in the bottom of the sediment storage zone may require digging out a small pit at the lower end of the basin near the riser and pumping into a silt bag, or pumping/siphoning into a small clarification chamber. Dewatering may require three or four days of dry weather and a few additional days for the drained sediment to sufficiently dry out for handling.


Source: TNWRRC

2. *Demucking*: Following dewatering, sediment that has accumulated in the forebay and main basin during the construction period must be removed and disposed of without allowing sediment to enter into the outlet structure, local storm sewer drainage system, or receiving waters. Once sufficiently dried, sediment may be excavated with a track hoe or loader to the planned retention pond grade and disposed of as fill in accordance with the approved SWPPP. In some cases, wet bottom material may require polymer thickening for more timely and orderly sediment removal. In such cases, distribute the soil-specific anionic polymer uniformly across the sediment surface. Use the bucket of the excavation equipment to mix it into the soil to a depth of up to three feet. Allow ten to 20 minutes for the polymer to interact with the sediment; increased mixing will shorten the reaction time. The polymer binds the sediment, causing it to consolidate and making removal more efficient. To prevent damage, heavy equipment should not be used around the riser, outlet barrel, and foundation.
3. *Sediment Disposal*: Depending on the characteristics of the accumulated sediment, it may be used as fill material. Otherwise, or if polymers were used during the operational lifespan of the sediment basin, a disposal plan ensuring proper disposal of the accumulated sediment must be outlined in the SWPPP and followed.
4. *Removing Sediment Basin Controls*: The forebay of a sediment basin may be kept in place if specified by permanent, post-development design. However, the primary dewatering device assembly for the main sediment basin should be removed, along with the resting pad if a surface skimmer was used. If the skimmer is appropriately sized for the post-construction design, it may be repurposed for use in an extended

retention basin or a similar facility. The riser foundation, trash rack (including any anti-vortex device), and outlet barrel connection must be carefully inspected for structural integrity and prepared to function as a service spillway and peak flow control. Extreme caution is required if the outlet riser structure is to be modified for permanent stormwater control, as improper handling can compromise the integrity of the riser and barrel assembly. In particular, heavy equipment use or coring within the riser structure can lead to cracking or other structural damage. For this reason, any heavy construction work associated with the riser should be completed during its initial installation. Similarly, installing a temporary riser structure for the sediment basin with the intention of later replacing it with a permanent riser after stabilization is to be avoided.

5. *Checking dimensions and inspections*: Surveying the basin verifies all dimensions and elevations to confirm that the permanent retention pond provides the intended storage volume, hydraulic capacity, and freeboard. Earthen embankments require evaluation for settlement, as loss of elevation can compromise the emergency spillway design discharge. The dam crest profile, slopes, and foundation demand close inspection for sagging, depressions, cracks, bulges, or slumping. Particular attention is warranted at the outlet pipe of the spillway, where internal erosion, seepage, or piping may result from loose joints, crushed pipe, displacement of the riser, poor compaction around the pipe barrel, or differential settlement. These conditions threaten long-term stability and must be addressed promptly to prevent failure. Permanent inlet headwalls and scour-prevention measures, including rock riprap and associated geotechnical linings, also require inspection for damage or displacement. Any evidence of instability, structural weakness, inadequate storage capacity, or hydraulic malfunction necessitates repair or reconstruction to restore full design performance.
6. *Installing permanent stormwater controls*: Permanent orifices, weirs, valves, and multi-stage outlet structures must be carefully installed to avoid damaging the spillway. Cover plates and knock-outs are to be removed in accordance with the approved design, and all openings should be verified for correct size and elevation.
7. *Final Stabilization*: The basin bottom, side slopes, embankment crest, and upstream and downstream faces must be permanently stabilized with vegetation or

other approved measures to prevent erosion and resuspension of sediments. Stabilization measures must be inspected following installation to ensure adequacy.

8. *Close-out*: The close-out process is only necessary within a MS4, though this process is encouraged for all SCMs. The permanent SCM must be inspected and verified to confirm compliance with approved design plans and specifications. The 90-day verification period begins upon completion of the permanent SCM not the sediment basin construction or the beginning of conversion. Permanent maintenance agreements must be established to ensure long-term inspection, sediment removal, and repair. Easements should guarantee access for maintenance by the responsible party. Verify the closeout process of the SCM with the local MS4.

7.4 Sediment Basin Conversion – Detention Basin

The conversion of a sediment basin to a detention basin follows a process similar to that of a retention basin, with the primary distinction being the placement of the permanent discharge orifice. In a detention basin, the orifice is to be at the bottom elevation of the basin to enable complete dewatering between storm events. Establishment of a stable, vegetated basin floor is a critical component of this conversion, as vegetation enhances both water quality treatment and long-term soil stability. The suitability of residual sediments for supporting vegetation requires evaluation; material that is excessively fine-grained, compacted, or lacking in organic matter and nutrients may inhibit plant establishment. Where sediment quality is inadequate, the basin bottom can be excavated to a depth of approximately six inches and reconstructed with suitable topsoil to restore the design elevation. Incorporating topsoil provides improved soil structure, organic content, and nutrient availability, thereby promoting vegetation growth and ensuring proper basin function.

7.5 Sediment Basin / Trap Conversion – Bioretention / Infiltration Basin

Bioretention and other infiltration-based practices rely heavily on the permeability of underlying soils for proper function. Sediments accumulated during construction are often dominated by fine particles that not only exhibit poor drainage characteristics but also have the potential to clog more permeable native soils. If the area does not have a HSG class rating of A or B, methods to enhance infiltration and counteract compaction are highly encouraged. Otherwise, conversion of EPSC measures to permanent infiltration based measures are not recommended. Where such a conversion is pursued, the following procedures provide a framework for preserving infiltration capacity and ensuring long-term functionality:

1. Restrict heavy equipment access to the area designated for infiltration following construction. Maintaining the natural infiltration capacity of in situ soils is critical, and

the designated footprint can be protected through the use of high visibility fencing or equivalent demarcation;

2. Stabilize the contributing watershed prior to initiating basin conversion. Preventing uncontrolled sediment-laden flows is essential to avoid clogging the infiltration media. Temporary diversion of runoff around the infiltration area during construction is recommended;
3. Close-out the sediment basin in accordance with the procedures previously described;
4. Construct the bottom of the sediment basin approximately one foot higher than the final design elevation of the bioretention or infiltration basin. This allows for an additional one-foot excavation to expose uncompacted in situ soils (OEPA, 2025);
5. Perform subsoil decompaction within all infiltration areas. Loosening with a backhoe ripper or equivalent equipment to a depth of at least 18 inches below subgrade reduces construction-related compaction and enhances infiltration. This soil ripping process has demonstrated measurable improvements in infiltration performance; and
6. Verify soil infiltration rates following decompaction and excavation to confirm design assumptions. Where measured infiltration rates are inadequate, the installation of an underdrain may be required, particularly for bioretention systems.

7.6 Swale Conversion – Grassy Swale

The conversion of temporary swales used as an EPSC measure to permanent grassy swales is generally a straightforward process when properly planned during design and construction. Aligning the swale in the same direction and slope as the final configuration minimizes the need for regrading and reduces land disturbance during transition. The final swale slope should not result in erosion which is dependent on the vegetation cover type (Tables 3.3.2.1-A,B). Design procedures should follow those in Sections 4.2.6.1 and 4.3.2. The following considerations support a successful conversion:

1. Remove all accumulated sediment from the swale to restore conveyance capacity and prepare the channel for permanent stabilization;
2. Re-establish or modify channel geometry and longitudinal slope as needed to achieve the design flow capacity;
3. Evaluate soil quality in the swale bottom prior to establishing permanent vegetation. Adequate organic matter and nutrient levels are necessary to support vegetation growth. Where soils are deficient, the bottom may be excavated four to six inches and backfilled with topsoil to the intended design grade.

Where conversion to a bioswale (a linear bioretention system) is desired, additional design considerations apply. Bioswales incorporate engineered media beneath the channel bed to promote infiltration as stormwater flows downslope. In such cases, the swale bottom is excavated an additional one to two feet and replaced with bioretention media. Subsoil decompaction, as previously described, is critical to restore infiltration capacity. The surface of the bioswale may be stabilized with sod or decorative stone to limit erosion and provide rapid establishment of the system.

References:

OEPA. (2025). *Rainwater and Land Development: Post-Construction Stormwater Management Structural Practices.*

Tschantz, B. A. (2012). *Converting temporary sediment basins to permanent stormwater detention ponds in Tennessee.* ASCE-TSPE-ACEC Joint annual meeting.