



LOWER NAZARETH TOWNSHIP

623 Municipal Drive | Nazareth, PA 18064

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## **POLLUTANT REDUCTION PLAN ADDENDUM**

For:

LOWER NAZARETH TOWNSHIP

Northampton County, Pennsylvania

**Revised September 2024**

Prepared By:



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## **POLLUTANT REDUCTION PLAN ADDENDUM**

### **NARRATIVE:**

Lower Nazareth Township, Northampton County requests to amend and update their NPDES MS4 Pollutant Reduction Plan, previously approved in October 2019. The Township wishes to modify the project selection BMPs that were previously approved to meet the 10% sediment, phosphorus, and nitrogen removal goals indicated in Appendix E of the permit. No changes to the sewersheds or total approved sediment loading are being proposed. The Township still intends to remove at least 136,288 lbs/yr based upon the current agreed upon sediment loading.

In the previously approved plan, the Township proposed to construct two (2) detention basins within Township-owned lands. The intent was to construct a “dry extended detention basin” within the storm water swale located in Hahn’s Meadow Park which is tributary to Outfall #004 and to construct a “runoff capture & reuse/detention basin in Newburg Park tributary to Outfall #011. The Township encountered regulatory issues with the basin at Hahns Meadow Park; if constructed as planned the basin would be classified as a dam. The creation of a dam was considered unfavorable, and the Township proposed to modify this BMP type from a basin to a “vegetated swale” and “Riparian Forested Buffer”.

The existing conveyance at Hahn’s Meadow Park is currently a swale, with some erosion at the outfall and finely cut grass in the channel (historically typical lawn maintenance practice for the property). The Township now proposes a swale enhancement that would consist of providing a “riparian forested buffer” on both sides of the swale in combination with a vegetated swale to provide a naturalized conveyance free of erosion. The Township will be able to achieve their goal of 10% sediment reduction from the current sediment volumes, with the construction of the proposed “vegetated swale” and “Riparian Forested Buffer” enhancements at Hahns Meadow Park. At this time the Township would also like to remove the construction of the proposed BMP basin located at Newburg Park, which was also included in the previously approved PRP, as the 10% goal will be met with the installation of the BMPs at Hahn’s Meadow Park.

The stretch of swale proposed to be modified is listed on PADEP eMAP as a tributary to Monocacy Creek. The Township owns the property where work is proposed.

### **EXISTING SEDIMENT LOADING / METHODOLOGY:**

A total sediment loading, in lbs. per year, was calculated for the PRP storm sewershed. A total of **136,288 lbs./yr.** is required to be reduced from within the Township’s planning area.

### **PROPOSED SEDIMENT REDUCTION BEST MANAGEMENT PRACTICES (BMP’S):**

To reduce the required sediment loading, a series of proposed BMPs are recommended to be implemented. The requirements of the proposed BMP’s and their anticipated operation and maintenance schedule is described as follows:

#### **1. Riparian Forest Buffer:**

General design considerations:

A Riparian Forest Buffer shall be established in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices Manual. A summary of design considerations are as follows:

- Establish buffer area along perennial, intermittent, and ephemeral streams.
- Plant native, diverse tree and shrub vegetation.
- Buffer width is dependent on project preferred function (water quality, habitat creation, etc.).
- The minimum recommended buffer width is 35' from the top-of-stream bank, with 100' preferred.
- Both short- and long-term maintenance plans shall be created.
- Mature forest is a vegetative goal.
- The designated buffer area shall include a well-marked boundary.

Specific design considerations:

This PRP Amendment proposes the construction of a Riparian Forest Buffer (50' wide buffer on each side of the swale) within existing Township-owned land. The swale is to be in the watershed area for Outfall #004. The proposed riparian forest buffer is to supplement and enhance the proposed vegetated swale described in BMP #2 below, for better water quality. This proposed enhancement will look to restore native vegetation to provide an opportunity for substantial sediment removal.

**2. Vegetated Swale:**

General design considerations:

Vegetated swales shall be constructed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices Manual. It should be noted that existing swale in this case will be hand planted with no ground disturbance. A summary of design considerations is as follows:

- Vegetated swales shall provide conveyance, of the 10-year storm event, within erosion.
- A minimum of six inches (6") of freeboard should be provided above the 10-year storm event to the top of berm.
- Longitudinal slope of 1%-3% are generally recommended. If existing topography necessitates steeper slopes, check dams or turf reinforcement matting (TRM) may need to be considered to reduce energy and reduce the potential for erosion.
- Swale side slopes should be a maximum of 3:1.
- The bottom width of the channel should be a minimum of two feet (2').
- The maximum bottom width to depth ratio for a trapezoidal swale should be 12:1.
- Swale vegetation should consist of a dense and diverse selection of low growing native plant material. Vegetation should be salt tolerant if winter road maintenance is contributing to swale flow.

Specific design considerations:

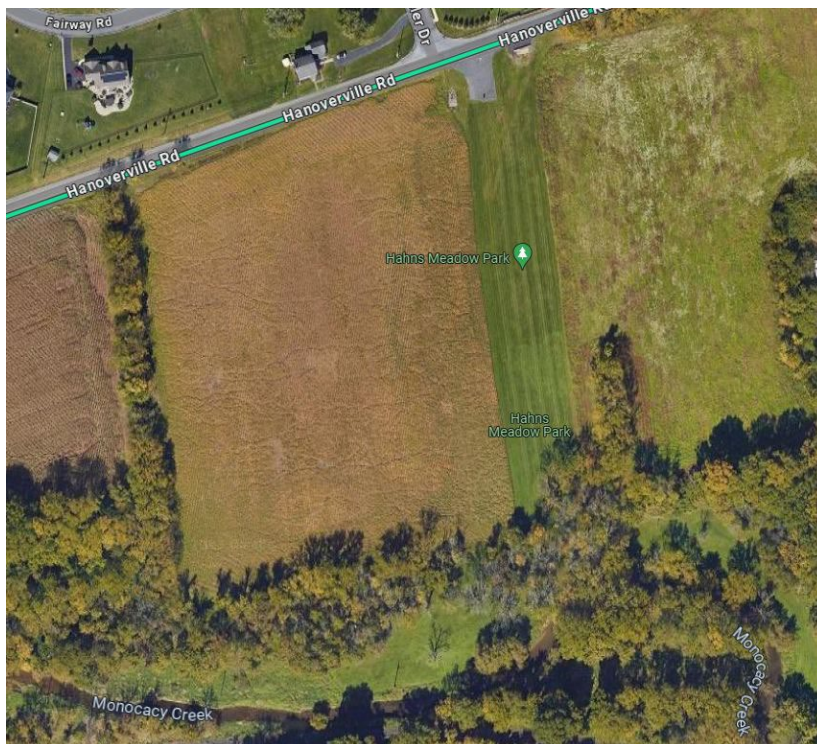
This PRP amendment proposes the planting of diverse native vegetation within the swale channel that is located on Township-owned land. The swale is in the watershed area for Outfall #004. The proposed vegetated swale is to be a non-invasive (no land disturbance) modification to the existing grass-lined open channel. The proposed enhancements will restore native meadow-type vegetation to provide an opportunity for substantial sediment removal. The existing swale will be hand planted with no heavy construction equipment utilized within the channel.

The vegetated swale project is as follows:

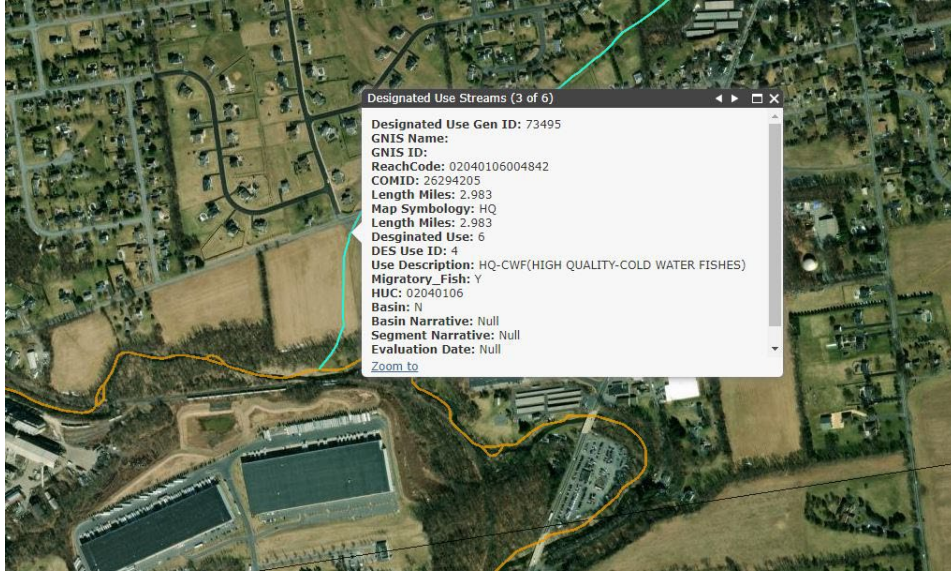
**Hahn’s Meadow Riparian Forest Buffer and Vegetated Swale** - is located just south of the intersection of Schindler Drive and Hanoverville Road. The existing swale, designated as a stream on the DEP eMap, is proposed to be enhanced via both stabilizing with hand-planted vegetation and installing a riparian forest buffer along both sides, totaling approximately 1,320 linear feet.

The property is owned and maintained by the Township. The combination of the vegetated swale and riparian forested buffer will reduce sediment at a calculated rate of 195,154 pounds of sediment a year to the Monocacy Creek. The Township is required to reduce the sediment loading by 136,288 lbs/yr due to previously approved parsing.

\*\*\*Existing condition photos located at the end of the narrative.



Existing Aerial view of Hahn's Meadow Park Swale



*PADEP eMAP listing and stream designation for proposed improvement.*

**FUNDING MECHANISMS:**

The BMP's will be funded by the Township general fund. Work is expected to be completed by the Township Public Works Department. Should the work exceed the capabilities of the Township staff, the work will be publicly bid.

**ESTIMATE OF PROBABLE COSTS:**

- Swale Vegetation and Riparian Forest Buffer Estimated assuming the following:
  - Buffer Area = 1.5 AC
  - Swale Area = 10,500 SF
  - Container Trees (4'-5' height), 50 trees/ac., \$400.00/tree
  - Native Species Grass & Wildflower Plugs @ \$1.50/SF
  - Native Shrubs (1'-3' height), 50 shrubs/ac., \$50.00/shrub

Trees:  $1.5(75)(400) = \$45,000.00$   
Planting Plugs:  $10,500(\$1.50) = \$15,750.00$   
Shrubs:  $1.5(75)(250) = \$28,125.00$

**Estimated Total = \$88,875.00**

**RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPS:**

Lower Nazareth Township will be responsible for the operation and maintenance of the proposed BMP's in accordance with the following schedule:

<b>Riparian Forest Buffer</b>		
<b>Inspection Activity</b>	<b>Frequency</b>	<b>Maintenance Action</b>
Tree Watering	(5) gallons immediately after planting, (5) gal. the day after	After day two, every 2 – 3 days if it's dry until the tree is established (especially Summer months)
Tree Mulching	After planting then annually during the first 4 years.	Apply a 2 – 4" layer of organic mulch, a minimum of 4" away from the trunk
Weed Control: Herbicides, Mowing & Weed Mats	<u>Herbicides</u> – apply as instructed during the first 2 – 3 years per the PA DOA <u>Mowing</u> – twice per growing season <u>Weed Mats</u> – install after planting and remove when tree canopies are established	Implement herbicides per PA DOA, mowing at a height of 8" – 12", or install weed mats. Dispose of cuttings in a local composting facility.
Deer Damage	Weekly during the first growing season. Quarterly for the first 4 years.	Use tree protection tubes, homemade deer repellent, and select plant species not favorable to deer.
Tree Protection	After planting. Should be monitored quarterly until trees reach 2" – 3" diameter.	Use a tree wrap from soil level to the lowest branch to protect from sunscald, mowing/weed trimming, and rodents.
Invasive Plant Species	Quarterly during the growing season, for the first 4 years.	Removal utilizing 3 methods: Mechanical, Mechanical w/herbicide, Herbicide
Monitoring the Buffer Area	Quarterly for the first 4 years (February, May, August, November).	Observation and status of the above activities

<b>Vegetated Swale</b>		
<b>Inspection Activity</b>	<b>Frequency</b>	<b>Maintenance Action</b>
Inspect for erosion, damage to vegetation, and sediment and debris accumulation	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize. Remove debris and sediment and dispose of in accordance with all federal, state and local laws.
Inspect vegetation on side slopes for erosion and formation of rill and gullies	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize as needed.

Inspect for pools of standing water	Annually and after every major rainfall event (>2 inches in 24 hours)	Dewater and discharge to an approved location. Restore and re-stabilize to design grades.
Trim vegetation to ensure safety, proper swale construction, or to suppress weeds and invasive vegetation	Annually in early spring	Dispose of cutting in a local composting facility. Mow only when swale is dry to avoid rutting.
Inspect for litter	Annually	Remove litter and dispose accordingly.
Inspect vegetation for uniform establishment	Annually	Hand-plant alternative species as needed. Immediately stabilize disturbed areas
Inspect swale for bare areas	Annually	Re-seed and/or plant bare areas. Install appropriate erosion control measures when native soil is exposed or if erosion channels are forming
Inspect for areas of standing water that dewater in greater than 48 hours	Annually and after every major rainfall event (>2 inches in 24 hours)	Rototill and re-plant swale as needed. Restore to design grades.
Inspect swale vegetation	During extreme dry periods	Water, fertilize and/or apply pesticide only when absolutely necessary.
Inspect swale	Immediately after spring melt	Remove residuals (e.g. sand or cinders) and replace damaged vegetation without disturbing remaining vegetation.
Restore soil structure and moisture capacity of swale	Immediately after spring melt	Mulching and/or soil aeration/manipulation may be required to restore soil structure and moisture capacity and to reduce impacts of deicing agents.
Inspect swale inlet and outlet for signs of erosion or blockage	Annually and after every major rainfall event (>2 inches in 24 hours)	Remove debris and sediment and dispose of in accordance with all federal, state, and local laws.

**PROJECT IMPLEMENTATION SCHEDULE:**

<u>Objective</u>	<u>Date</u>
• Budget and Preliminary Design	2025
• Engineering Design and Bid	2025
• Begin Construction	2025
• Complete Proposed Work	2027

\*\*\*Schedule is subject to change based on constraints and conditions of the PRP program.

### **BMP CALCULATION:**

The PADEP approved the PRP in October 2019. The approved plan allowed the parsing of tributary area leading to the Hahn's Meadow Swale such that 136,288 lbs/yr of sediment reduction is required. The DEP Simplified Method was utilized to determine the reduction efficiency of the proposed vegetated swale and riparian forested buffer area as follows:

- The predominant soil for the swale is CIA and is classified as a hydrological group "C" soil. This soil group has a 50% efficiency for sediment reduction.
- The originally determined (approved) sediment load for the swale is 388,369 lbs/yr. The approved sediment reduction is 136,288 lbs/yr.

The calculated sediment reduction is:  $388,369 \text{ lbs/yr} \times 0.50 \text{ (Swale)} + 1,941 \text{ lbs/yr} \times 0.50 \text{ (Riparian Buffer)} = \mathbf{195,154 \text{ lbs/yr}}$

- The proposed reduction is substantially greater than the required reduction and the Township anticipates removing the Newburg Park project as a BMP for these purposes.



**HAHNS MEADOW SWALE – MAY 3, 2024 - EXISTING CONDITIONS**



Swale at South Side of Headwall



South Side of Headwall





Looking South at Swale Headwall



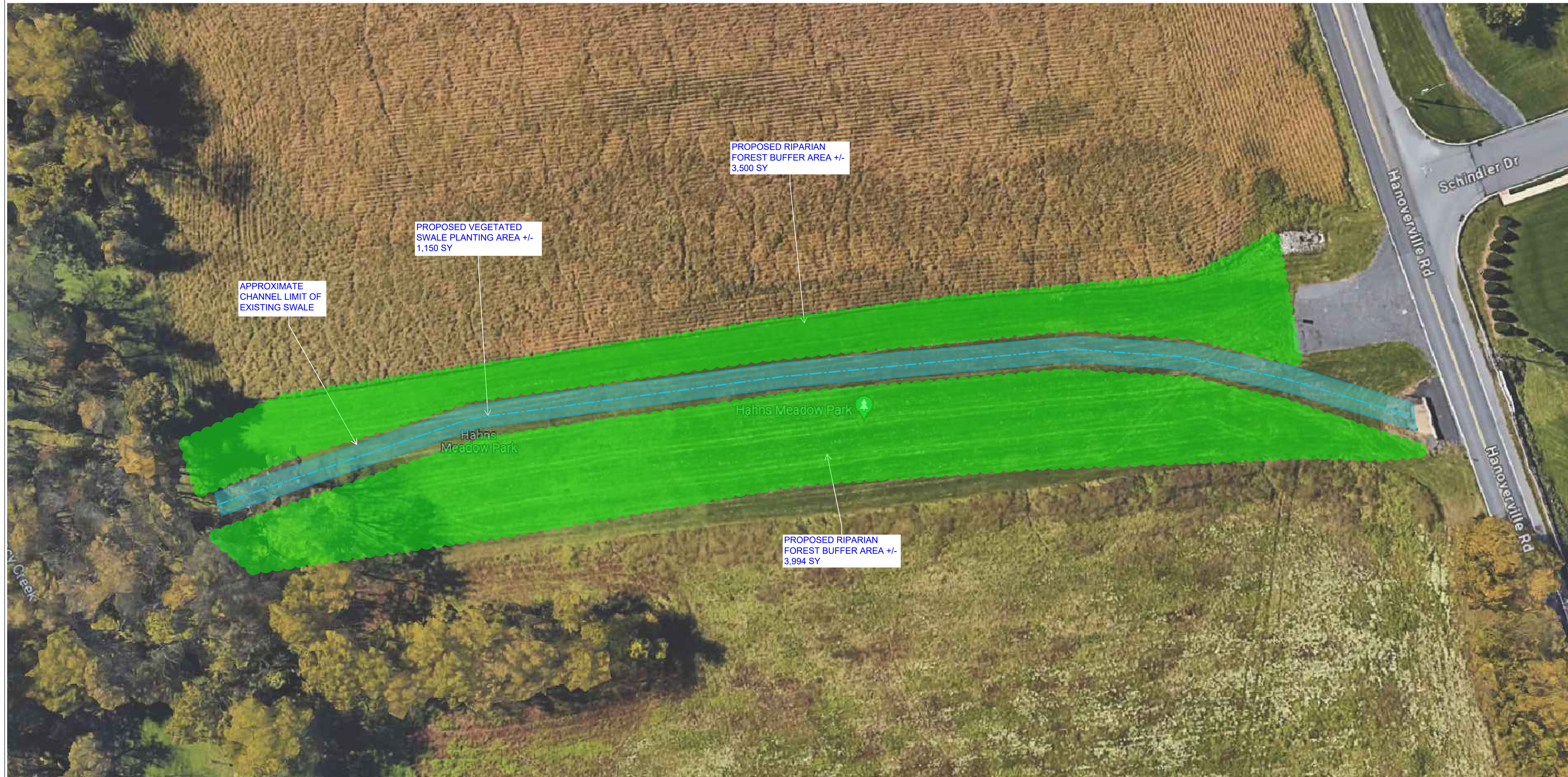
Looking North at Swale Headwall





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**PLAN VIEW - HAHN'S MEADOW SWALE**

SCALE: 1" = 30'

NO.	DATE	DESCRIPTION	INITIALS

MS4 VEGETATED SWALE  
 & RIPARIAN FOREST BUFFER

HAHN'S MEADOW PARK  
 4543 HANOVERVILLE ROAD  
 LOWER NAZARETH TOWNSHIP

LOWER NAZARETH TOWNSHIP  
 NORTHAMPTON COUNTY, PA

DATE: 08-26-2024  
 CADD FILE: 24-7048  
 JOB NO: 24-7048  
 DSG BY: CDB  
 DWN BY: CDB  
 CKD BY: CDB  
 SCALE: AS SHOWN  
 DRAWER NUMBER:  
 SHEET: 1 OF 1 SHEETS  
 DRAWING NUMBER