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MEMO

TO: Jacqueline B. Justice, RMC.
Township of Dennis

Re: Addenda ,Stormwater Management Plan, Dennis Township, NJ.

Date: September, 2020

Enclosed is an Addendum to the Township Stormwater Management Plan which includes Phase One of the County Bikeway. Please file it adjacent to the existing Plan in your Tier A file.


Sincerely,
John C. Gibson, PE.
Township Engineer

Cc. Jessica Bishop, Chief Financial Officer

ADDENDA

STORMWATER MANAGEMENT PLAN

TOWNSHIP OF DENNIS

CAPE MAY COUNTY, NEW JERSEY

SEPTEMBER 2020



JOHN C. GIBSON, P.E.

TOWNSHIP ENGINEER

YEAR	POPULATION	POP. CHANGE	PCT. CHANGE
2010	6467	-- 25	-- 0.3 %
2019	6144	-- 323	-- 5.0 %

X.

COUNTY BIKEWAY, PHASE ONE

During 2020, Dennis Township constructed phase one of the County Bikeway, extending from the Middle / Dennis Township boundary line to Woodbine Boulevard in South Seaville, a distance of 2.47 miles (see map attached). The bikeway is generally ten feet wide and paved with porous pavement in accordance with the N.J. Department of Environmental Protection permit.

A Conservation Restrictive Easement for porous pavement has been filed in the office of the County Clerk (Book D3894, pages 222- 255 , 12/30/2019) in favor of the N.J. Department of Environmental Protection for the stormwater management strategies, required by the DEP. Stormwater maintenance strategies and measures play a significant role in the maintenance of environmental quality on a community, regional, and statewide level. Stormwater management strategies and measures cumulatively play a significant role in the maintenance of water quality and environmental health for the benefit of the public.

The Bikeway Maintenance Plan is attached (EXHIBIT D)

EXHIBIT D

BIKEWAY MAINTANANCE PLAN FOR CAPE MAY COUNTY BIKEWAY DENNIS TOWNSHIP, NEW JERSEY September 23, 2019

I. Purpose:

This report outlines the general maintenance plan for the portion of the Cape May County Bikeway located within Dennis Township, NJ. The New Jersey Department Of Environmental Protection (NJDEP) approved permit plans for this project consist of a seven (7) sheet set entitled "Cape May County Bikeway, Proposed Alignment Within Atlantic City Electric Right Of Way, Middle Township Line To South Seaville, Dennis Township, Cape May County, New Jersey", prepared by John C. Gibson, PE, Dennis Township Engineer dated March 07, 2017, revised through July 17, 2019 and stamped "Approved" by the NJDEP.

II. Project Description:

The bikeway is generally a two-way 10' wide porous pavement surface to accommodate two-way bicycle, pedestrian and handicap use in compliance with the Barrier Free Subcode of the Standard Uniform Construction Code (UCC), NJAC 5:23-7 and standards of the American Association of State Highway and Transportation Officials (AASHTO) and Americans with Disabilities Act (ADA).

The bikeway is designed to be used exclusively by pedestrians, bicycles, and other non-motorized methods of transport. The bikeway is not intended to be utilized by automobiles, golf carts, motorcycles, motorized trail bikes, all-terrain vehicles, or other motor vehicles.

The stormwater management system for this project was designed using low impact strategies, non-structural and structural stormwater management strategies.

The low impact strategies include minimizing site disturbance, preserving important site features, reducing impervious coverage, flattening slope, utilizing native vegetation, minimizing lawn, and maintaining natural drainage features and characteristics. The site disturbance has been minimized by clearing no more of the site than needed to construct the proposed improvements.

Non-structural stormwater management strategies incorporated herein include:

- Designing the site to generally preserve the existing slope, and natural vegetation to the maximum extent practical which provides water quality benefits to areas particularly susceptible to erosion and sediment loss.
- The impervious surface has been minimized through the use of porous pavement.
- Designing the site so that the natural drainage features and as much of the natural vegetation is preserved and undisturbed to the maximum extent practical.
- The proposed site clearing and disturbance has been minimized to the maximum extent practical.

Structural stormwater management strategies include incorporating a porous pavement into the design. Porous pavement captures stormwater through voids in the pavement surface and filters water through an underlying aggregate reservoir. The reservoir allows the water to infiltrate into the soil subgrade and recharge ground water. The purpose of porous pavement is to control the quality and quantity of stormwater runoff while accommodating pedestrians and bicycles.

III. Environmental Constraints:

A portion of the project site is located within freshwater wetlands and associated transition area (buffer). The limits of these environmentally sensitive areas are illustrated on the NJDEP approved permit plans.

In accordance with Special Condition 7 for a Flood Hazard Permit (NJDEP Permit No. 0504-18-0005.1 FHA180001 and 0504-18-0005.1 FWW180001, the project site is subject to a NJDEP approved Grant of Conservation Restriction/Easement. Condition 3 of the Grant of Conservation Restriction/Easement prohibits the following activities within the Restricted Area, with the exception of those activities that are a component of the Maintenance Plan approved as part of the Permit (components of this proposed maintenance plan include the proposed improvements as shown on the NJDEP approved permit plans and include the proposed bikeway, vegetated side slopes and stabilizing any disturbed areas):

- Removal, excavation, movement of soil, or compaction of the soil and ability to infiltrate stormwater, unless specifically approved under the Maintenance Plan;
- Dumping or filling with any materials;
- Relocation or installation of structures and change in land use;
- Placement of pavement or other impervious surfaces;
- Destruction of plant life that is inconsistent with the Maintenance Plan;
- Destruction of plant life which would alter the existing pattern of vegetation unless it is demonstrated to the Grantee that such removal will result in habitat enhancement or to prevent a safety hazard, and the Grantor has received written approval of the DEP's Division of Land Use Regulation;
- The use of fertilizers, herbicides or pesticides that are not specifically approved under the Maintenance Plan;
- Alteration of natural drainage features unless it is demonstrated to the Grantee that such alteration is necessary for soil erosion and sediment control and alteration will result in water quality enhancement or to prevent a safety hazard, and the Grantor has received written approval from the Division of Land Use Regulation; and
- All other activities constituting a regulated activity for which a permit is required from the Department.

IV. Maintenance Plan:

Maintenance shall include a visual inspection of all components of the bikeway at least initially monthly, including removal of any silt, soil, litter and other debris. Maintenance shall also include regular seasonal work, including but not limited to; mowing, fertilizing, lime, weed and pest control, reseeding and timely repairs of vegetated areas along the porous pavement. Vegetative maintenance shall comply with section 3-1 of "The Soil Erosion and Sediment Control Standards in New Jersey", dated January 2014, revised July 2017.

The principal maintenance objective of maintaining porous pavement is to prevent sediment buildup and clogging with fine sediments, which reduces infiltration capacity and pollutant removal efficiency. In general, maintenance consists of monitoring the surface for sediment buildup, and removing that buildup as needed, to maintain the porous pavement's permeability.

Because the permeable surface is a filter, like any filter it must be cleaned periodically. Cleaning is performed by vacuuming to remove sediments that have accumulated. The frequency of the vacuuming is directly related to the amount of sediment that the surface receives over time. The porous pavement surface should be vacuumed at least twice a year with a vacuum sweeper.

Simple broom sweepers are not recommended for porous pavement maintenance. Vacuuming porous pavement a vacuum sweeper is recommended. Though much less effective than "pure" vacuum sweepers, regenerative air sweepers are sometimes used. These units contain a blower system with a high volume air blast, the air is forced out at an angle, creating a 'peeling' effect, which then causes the debris to be loosened from the asphalt and sucked into the unit.

If the porous pavement surface has become significantly clogged to the point where the routine vacuum sweeping does not restore permeability, it may be necessary to wash the porous pavement with clean, low pressure water, followed by immediate vacuuming. If the pressure of the washing nozzle is too great, contaminants may be driven further into the porous surface.

The vegetative side slopes adjacent to the porous pavement serves as pre-treatment of excess stormwater runoff and should be well maintained to prevent ruts, scouring or washouts. Adjacent areas that do drain to the porous pavement should be kept seeded and maintained to minimize sediment deposition which may increase the frequency of cleaning of the pervious surface. If any washout does occur, it should be cleaned off the porous pavement immediately to prevent further clogging of the pores. Furthermore, if any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once. Vegetative maintenance of the disturbed areas shall comply with section 3-1 of "The Soil Erosion and Sediment Control Standards in New Jersey", dated January 2014, revised July 2017 (copy attached for reference).

Planted areas should be inspected on a semi-annual basis. All trash and other litter that is observed during these inspections should also be removed.

A maintenance log should be completed that records the following:

- Date of service
- Name of individual/company performing service
- Type of maintenance performed

- Amount (lbs.) and type(s) of sediment/debris/other material removed as result of cleaning
- General observations and record of porous pavement condition
- Name/signature of individual completing the inspection

Visually inspect the porous pavement periodically during or immediately following a rain event. Ponding or puddles are signs that it is time to clean the porous pavement. In some areas, moss growth can be an issue. Moss can be controlled by sprinkling baking soda on the surface, followed by a dry vacuuming within a few weeks. Additionally, moss growth can be retarded/eliminated with lime water applications. Since this porous pavement is designed to infiltrate water, any surface treatment must be evaluated for environmental impacts to ground water.

Over time, deep cleaning/unclogging of porous pavement may become necessary, particularly if routine and periodic maintenance is not performed. If the porous pavement is not periodically cleaned, the void structure system will become clogged with debris over time, triggering the need for deep cleaning/unclogging. Neglected projects that had never been cleaned and are completely clogged should be restored by using specialized cleaning equipment.

Deep cleaning/unclogging is best accomplished by simultaneous pressure washing and vacuuming. For best results, follow the equipment manufacturer's recommendations. Use of chemicals to clean porous pavement should be done with extreme caution to prevent damage to the aquifer, the biological organisms within the pervious system, or the porous pavement itself.

V. Snow and Ice Management:

Porous pavement can be more effective at melting snow and ice than conventional pavements. When snow and ice melts, the water infiltrates into the aggregate base rather than staying on the pavement surface and refreezing. Therefore, light snow and ice accumulation generally do not require removal. The base and soil act as a heat sink which helps drain water before it freezes and slows the rate of surface freezing.

Porous pavement can be plowed like conventional pavements. The plow blade should be set about 1 in. higher than usual to avoid damaging the surface. A rubber strip should also be applied to the blade to protect the surface. Piles of plowed snow should not be placed upon any porous pavement surfaces to avoid concentrations of dirt and sediment when the snow eventually melts.

During the winter, it is very important that sand and other abrasives not be used for winter maintenance, because they will clog the pores; rather, use deicing materials, if required. Standard road salt is acceptable as a deicer on porous pavement.

VI. Maintenance of Signage and Paint Lines:

Repair or replacement of any damaged or missing traffic, safety or informational signage. Safety signage to be provided at all entrances to the bikeway and at all road crossings to warn cyclists and pedestrians of any oncoming traffic hazards. In addition, in those areas where the bikeway is reduced to 8' wide, standard "bikeway narrows" signs to be provided in advance of the reduction to warn oncoming cyclists and pedestrians. Signage also to be provided throughout the bikeway highlighting the environmental education, wildlife viewing, and passive recreation aspects of the project by identifying the various

plants and animals or explaining hydrology, ecology, or other significant environmental features in the vicinity.

Restore any damaged or faded paint lines and signs.

VII. Inspections:

The attached Porous Pavement Inspection and Maintenance Checklist shall be used to conduct inspections monthly (or as needed), identify needed maintenance, and record maintenance that is conducted.

Frequency may be adjusted if the first year maintenance records indicate that sediment and debris accumulation is insignificant. After the first year of operation, the plan should be reviewed and, if necessary, revised to reflect the actual results of that first period of service.

With minimal maintenance, porous pavement can function effectively for well over 20 years. However, in the event that maintenance of the porous pavement is neglected and it becomes clogged over time, the Owner shall vacuum the surface until the original permeability is restored. (If the original permeability of the surface cannot be restored, the pavement should be removed and replaced with a new porous mix.) One of the most effective ways of restoring porous pavement is applying a pressurized dose of a non-toxic detergent cleaning solution, allowing adequate soak time, and then vacuuming with a high performance unit. Once again, it is important to note that high pressure washing may drive contaminants further into the porous surface and even into the underlying aggregate. It is therefore recommended that, prior to vacuum sweeping, a low performance pressure washer is used to get the solution to break the surface tension and reach into the pores.

VIII. Summary:

- Prevent Clogging of Pavement Surface with Sediment (after initial monthly inspection):
 - Check for sediment and debris accumulation. Prevent soil from washing or blowing onto the pavement two to four times annually.
 - Maintain planted areas adjacent to pavement.
 - Immediately clean any soil deposited on pavement.
 - Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface.
 - Conduct preventative surface cleaning, using commercially available regenerative air or vacuum sweepers, to remove sediment and debris two times annually.
 - Inspect for any signs of pavement failure. Repair any surface deformations two to four times annually.
 - Check for standing water on the pavement surface within 30 minutes after a storm event two to four times annually.
 - Remove sediment and debris accumulation on pervious pavement two to four times annually.
 - Inspect pervious paving area using the attached inspection checklist to conduct inspections monthly (or as needed), identify needed maintenance, and record maintenance that is conducted.
- Snow/Ice Removal:
 - Porous pavement systems generally perform better and require less treatment than standard pavements.

- Do not apply abrasives such as sand or cinders on or adjacent to porous pavement
- Snow plowing is fine but should be done carefully (i.e. set the blade slightly higher than usual).
- Salt application is acceptable, although more environmentally-benign deicers are preferable.
- Repairs:
 - Surface should never be seal-coated.
 - Inspect for pavement rutting/raveling on an annual basis (some minor ruts may occur in the porous pavement from stationary wheel rotation).
 - Damaged areas should be patched with porous asphalt.

Porous Pavement Inspection and Maintenance Checklist

Location On Bikeway: _____ Station: _____

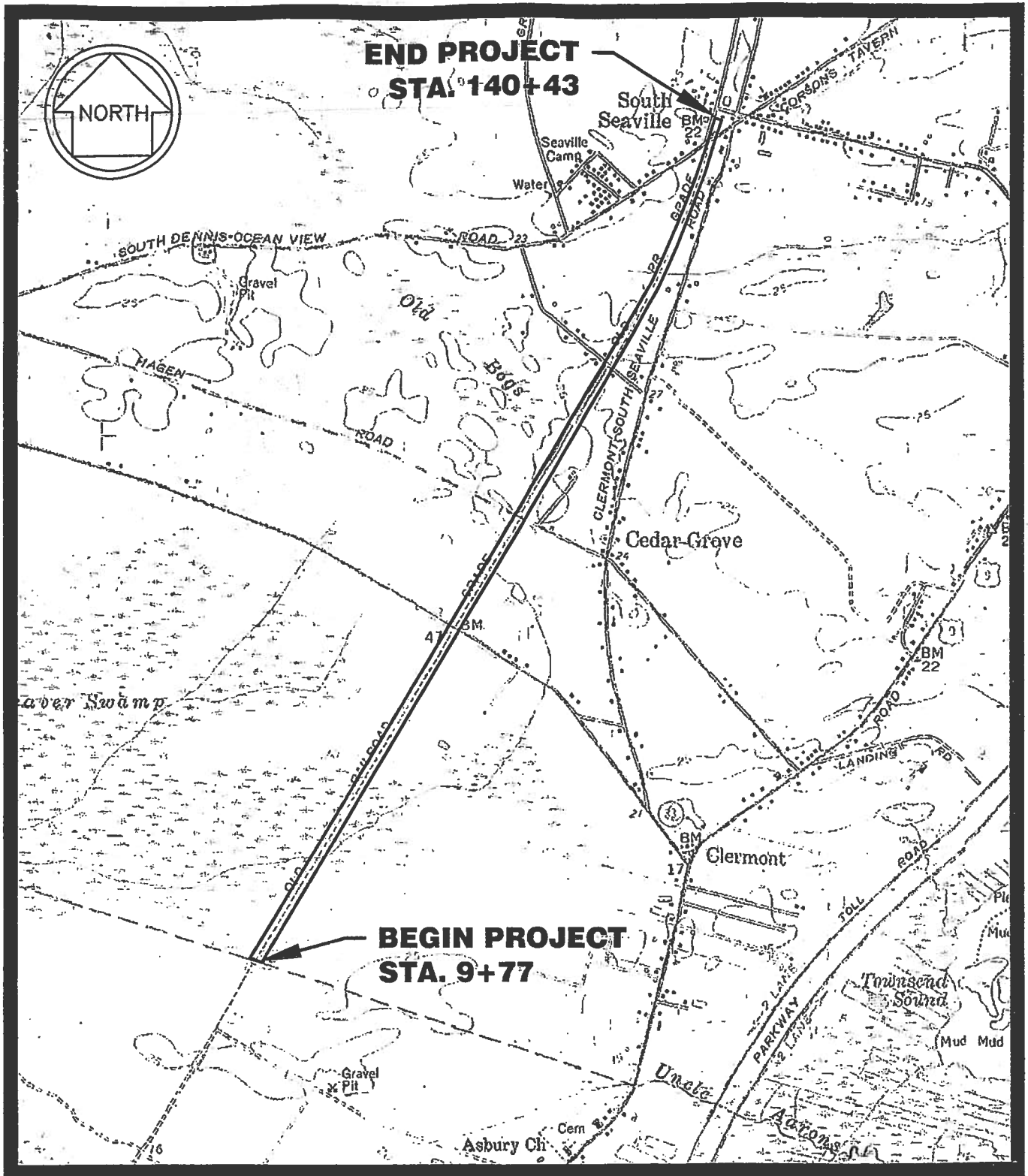
Treatment Measure No.: _____ Date of Inspection: _____

Type of Inspection: Monthly Semi-Annually
 After heavy storm Annually Other: _____

Name & Signature Of inspector: _____

Comments: _____

Defect	Conditions When Maintenance Is Needed	Maintenance Needed? (Y/N)	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	Results Expected When Maintenance Is Performed
1. Standing Water	Water stands in the porous pavement and does not drain within 30 minutes after storm event			There should be no areas of standing water once storm event has ceased. Restorative surface cleaning with a vacuum sweeper and/or reconstruction of part of the porous surface may be required.
2. Trash, or Sediment and Debris Accumulation	Trash, sediment or debris accumulated on porous pavement			Trash and debris removed from porous pavement and disposed of properly. Adjacent areas do not contribute to sediment and debris.
3. Damage	Surface deformation or damaged surface			Surface restored; no deformation or damaged surfaces.
4. Vegetation	Weeds growing on porous pavement			No weeds on porous pavement.
5. Underdrain Outlets	Water accumulates due to trash/sediment accumulation in outlets.			No standing water observed. Clean underdrain outlets and cleanouts.
6. Miscellaneous	Any condition not covered above that needs attention in order for the porous pavement and traffic control to function as designed.			Meets the design specifications.



LOCATION MAP:

SCALE: 1"=2000'