Memorandum of Agreement
Between the New Jersey Pinelands Commission
and Pemberton Township
February 16, 2024

I. PURPOSE

This Memorandum of Agreement ("MOA") is entered into between the New Jersey Pinelands Commission ("Commission"), an independent political subdivision of the State of New Jersey, having its offices at 15 Springfield Road, P.O. Box 359, New Lisbon, New Jersey 08064; and the Township of Pemberton (the "Township"), a municipality, with its offices at 500 Pemberton-Browns Mills Road, Pemberton, New Jersey 08068.

Pemberton Township ("the Township") is proposing to improve a portion of an existing walking trail in the Pinelands Area located along the perimeter of Pemberton Lake. These improvements will render the trail accessible to individuals with mobility (ambulatory) disabilities. The Township is proposing to flatten and stabilize a 0.65 mile portion of the trail located adjacent to the banks of the lake. In order to achieve its goal, the Township will need to grade and fill portions of the trail. The Pinelands Preservation Alliance (PPA), a non-governmental environmental organization, is assisting the Township with the project.

Portions of the existing Pemberton Lake Trail are located within wetlands and wetlands buffers. The Pinelands Comprehensive Management Plan ("CMP") authorizes the development of trails within wetlands and wetland buffers provided certain standards are met. Specifically, (1) there is no feasible alternative route that does not involve development in a wetland/buffer, or, if none, that another feasible route which results in less significant adverse impacts on wetlands/buffers does not exist; (2) the need for the proposed linear improvement cannot be met by existing facilities or modification thereof; (3) the use represents a need which overrides the importance of protecting the wetland/buffer; (4) development of the facility will include all practical measures to mitigate the adverse impact on the wetland; and (5) the resources of the Pinelands will not be substantially impaired as a result of the facility and its development as determined exclusively based on the existence of special and unusual circumstances. (N.J.A.C. 7:50-6.13.)

As discussed below, the Township proposes to install gravel upon most of the existing dirt trail as part of its improvement project. There are other practical measures, such as the installation of boardwalks, that would have less impact on wetlands/buffers. The Township has advised that installation of boardwalks along the entire length of the trail proposed for improvement is cost prohibitive. Consequently, absent the Commission's approval of this MOA permitting a deviation from the wetland and wetland buffer standards of the Pinelands CMP, N.J.A.C. 7:50-6.6, -6.13 and –6.14, respectively, the project would not be allowed. This MOA will also establish an alternative application process in accordance with N.J.A.C. 5:50-4.52(c)1.

II. BACKGROUND

Pemberton Lake is part of the Pemberton Lake Wildlife Management Area ("WMA"). It is located in the Township of Pemberton, Burlington County and is made up of three parcels. Two of these parcels, Block 825, Lots 7.01 and 7.04, are owned by Pemberton Township. The State of New Jersey owns the third parcel, Block 825, Lot 7.05, and the New Jersey Department of Environmental Protection manages the WMA.

Pemberton Lake Trail is an existing walking trail located within the WMA. It is comprised of three sections: 1) an approximately 0.74 mile section that starts at a parking area located on Magnolia Road and then proceeds proximate to the lakeshore to the entrance of a parking area located off Coleman's Bridge Road; 2) an approximately 0.30 mile section that starts at the entrance of the Coleman's Bridge Road parking area then proceeds up Coleman's Bridge Road to its intersection with the Pemberton Bypass; and 3) an approximately 0.28 mile section that runs proximate to the bypass from the intersection with Coleman's Bridge Road to a point where the trail joins back to the first section. (Exhibit A).

Pemberton Lake is a scenic, manmade 45-acre impoundment off of Magnolia Road. The lake is bracketed by Magnolia Road, the Pemberton Bypass (Route 530), and Coleman's Bridge Road. There are wetlands to the north and south of the trail. These wetlands feed into the North Branch of the Rancocas Creek and are part of the Rancocas Creek Watershed.

Pemberton Lake Trail is a good candidate for a place for accessible nature recreation. The trail is close to many homes and, thus, easy to visit for Pemberton residents. The trail is short, provides lovely views of Pemberton Lake and has places for fishing or enjoying the scenery along its length and at either end.

III. THE PROJECT

The Pinelands National Reserve represents an important recreational resource and contains a wide assortment of public open spaces including, but not limited to, two national wildlife refuges, numerous State-owned parks, forests and wildlife management areas, and county and municipal parks. Hundreds of miles of trails suitable for hiking and bicycling exist throughout the Pinelands as well as countless unmarked sand roads that are also used for these purposes.

The Pinelands CMP protects those natural resources necessary for compatible recreational uses and promotes recreational opportunities in a manner that minimizes land use conflicts by permitting low-intensity, recreational uses in undeveloped areas and directing more intensive recreational uses to developed areas. In order to be certified by the Commission, municipal

master plans and land use ordinances must contain a program to protect and enhance recreational resources.

There is a growing interest among public and nonprofit land managers to provide better opportunities for people with disabilities to access recreational resources in the Pinelands and coastal areas of the State through low impact and affordable improvements to suitable, existing trails. The Pemberton Lake project will serve as a demonstration project on the costs, feasibility, impacts and effectiveness of this kind of accessible trail project in a Pinelands setting.

The PPA received a grant from the Inclusive Healthy Communities program of the New Jersey Department of Human Services that allocates $57,100 for accessibility improvements to trails in the Pinelands, including materials, equipment and professional fees associated with completing such projects. PPA is partnering with Pemberton Township to devote these funds to this project.

A. Need for Accessible Trails

People with disabilities that impair their ability to enjoy natural places make up a large portion of the population. According to the 2022 U.S. Census estimates, the total population of the seven counties located within the Pinelands National Reserve is about 2.4 million people. Approximately 14% of these individuals, just over 340,000, identify as having a disability. Ambulatory challenges account for 49% of these disabilities.

The percentage of people with disabilities is similar in Pemberton Township. Specifically, 14.3% of the Township's population self-identifies as having a disability. Of these individuals, 57.7% face mobility challenges.

The United States Department of Agriculture, Forest Service's Accessibility Guidebook for Outdoor Recreation and Trails, dated 2013, defines accessibility as a facility that complied with accessibility guidelines/standards when it was built or altered. With regard to trails, these standards require that the trail be firm and stable, at least 36 inches wide, with no more than a 5% grade (except for short segments), and without gaps or protruding obstacles. Based on these standards, it is likely that the vast majority of existing trails in Pemberton Township and the Pinelands National Reserve as a whole are not accessible, because they (1) are not flat due to gaps in the soil, slopes, protruding tree roots and puddles, (2) have sand that is too soft in places for regular wheelchairs or walkers, and (3) are not maintained, so the condition of these trails changes over time.

According to the Forest Service, the best way to integrate accessibility is to design programs and facilities to the greatest extent possible, without separate or segregated access for people with disabilities. The goal is independence, integration, and dignity for all visitors.

B. Health Benefits from Spending Time Outdoors

Although it is intuitive that human health is deeply intertwined with outdoor spaces and the environment, studies have proven the health benefits of spending time outside.[1] This growing body of research supports the beneficial effects that exposure to the natural world has on health, reducing stress and promoting healing.[2] These studies suggest that nature is not only nice to have, but it's a have-to-have for physical health and cognitive function.

C. Proposed Improvements

Pemberton Township is proposing to improve portions of the existing Pemberton Lake Trail. The existing trail starts at Pemberton's Magnolia Road parking area and proceeds proximate to the shoreline of Lake Pemberton to the trailhead at the New Jersey Department of Environmental Protection's Lake Pemberton WMA parking area on Coleman's Bridge Road. (Exhibit A.) The trail runs along the top of what was once a dyke or sand road created when the lake was part of a cranberry farm. There is an existing 905-square-foot boardwalk adjacent to the Magnolia Road parking area that extends to a pier on the west side of Pemberton Lake. The remainder of the trail is not accessible for individuals with mobility challenges, because it is uneven, has soft and wet spots, and has a steep incline. However, it is sufficiently wide, dry and flat along most of its course, to be readily improved to make it accessible.

Consistent with the United States Forest Service Guidelines[3], the Township proposes to make improvements to the existing dirt trail to make it firm, stable and flat from side to side (4 feet wide) with no more than a 5% grade along its entire length. Specifically, the Township proposes to fill and grade portions of the trail within its existing width, to create a compacted subgrade to a 95% proctor density, i.e., on-site soil density equal to 95% of the maximum achievable compact. Clean gravel will then be placed on the trail, at variable depths depending on existing elevation, to match the existing grade edges. (See Stone Path Detail, Sheet 7 of Exhibit A.)

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[1] *Prescribing Nature: A Physician's Perspective on Wellness and the Outdoors*, https://www.landscapeforms.com/blog/Pages/Prescribing-Nature-Article.aspx

[2] *Ecopsychology: How immersion in Nature Benefits Your* Health, Jim Robbins, Yale Environment 360 (2020), https://e360.yale.edu/features/ecopsychology-how-immersion-in-nature-benefits-your-health, See also. *Nature and mental health: An Ecosystem Service Perspective*, Bratman et al., Science Advances, July 24, 2019, https://www.science.org/doi/10.1126/sciadv.aax0903.

[3] US Forest Service Trail Accessibility Guidelines (FSTAG) dated 2013, https://www.fs.usda.gov/sites/default/files/FSTAG-2013-Update.pdf. See also https://www.fs.usda.gov/sites/default/files/FSORAG-2013-Update.1.pdf

For two portions of the trail, both 48 square feet, located in wetlands, the Township is proposing construction of two, separate boardwalks. These boardwalks would be constructed from pressure-treated lumber in sections 12 feet long by 4 feet wide. The deck of the boardwalk would consist of slats that are 2"x 8"x 4' within cleats that are 2"x 2"x 12'. The deck would sit on a backbone of 6"x 6"x 5' wood support structures. The boardwalk would also include two 4" x 4" x 12' side rails. The Township proposes to place the boardwalks directly on the ground. The use of posts or anchors is not proposed. (See Boardwalk Segment Detail, Sheet 7 of Exhibit A).

Pemberton Township is also proposing to install two accessible parking spaces at the Coleman's Bridge Road parking area. These new parking spaces will be paved. The remaining parking area will remain gravel. Currently, there are no accessible parking spaces in that parking area.

Pemberton Township intends to conduct the improvements using existing Township staff and resources, as well as PPA staff and volunteers. Additionally, once the improvements are completed, signage will be installed at each end of the trial advising that the trail is designed to be accessible to those using wheelchairs and that use of motorized vehicles, bicycles and horses is prohibited on the trail. The availability of the accessible trail will be promoted on various websites. Additionally, the Township intends to maintain the trail by conducting quarterly inspections and making repairs as necessary.

IV. MEASURES PROPOSED TO AFFORD AN EQUIVALENT OR BETTER LEVEL OF PROTECTION FOR THE RESOURCES OF THE PINELANDS

The proposed project is expected to result in the placement of gravel (i.e. fill) over 0.038 acres (1,656 square feet) of wetlands and 0.296 acres (12,894 square feet) of wetland buffers. To offset these impacts, Pemberton is proposing to revegetate two areas within the project site: one (4,980 square feet) adjacent to the Magnolia Road parking area and the other (9,250 square feet) adjacent to the Coleman Bridge Road parking area, with native Pinelands vegetation. Both of these areas are currently denuded and located within wetlands buffer areas. Pemberton also plans to install a 350-square-foot rain garden within the area to be revegetated adjacent to the Magnolia Road parking area.

Additionally, the Township proposes to install a gate at each end of the improved trail that is designed to permit pedestrians, wheelchairs, walkers and electric scooters to enter the trail, while making it difficult or impossible to enter with a motorcycle or ATV. The Township will also install wooden rail and post barriers at specific points along the Pemberton Bypass that are currently used unlawfully by motorcyclists to access the trail.

V. THE BASIS OF THE MOA

The Pinelands CMP at N.J.A.C. 7:50-4.52(c)2 authorizes the Commission to enter into intergovernmental memoranda of agreement with any agency of the Federal, State or local government to authorize such agency to carry out specified development activities that may not be fully consistent with the provisions of the CMP. In order to qualify for a MOA, the governmental entity must demonstrate, and the Commission must find, that any proposed development that may not be fully consistent with the provisions of the Pinelands CMP is accompanied by measures that will, at a minimum, afford a level of protection for the resources of the Pinelands equivalent to that provided by strict application of the standards of the Plan. As discussed above in Paragraph IV, Pemberton Township has proposed measures designed to offset the wetlands and wetland buffer impacts attributable to the project and these measures will afford, at a minimum, an equivalent level of protection for the resources of the Pinelands.

In accordance with N.J.A.C. 7:50-4.52(c)i, the Commission may also enter into intergovernmental memoranda of agreement with any agency of the Federal, State or local government which authorizes such agency to carry out specified development activities without securing individual development approvals from the Commission, provided that the specified development activities are consistent with the provisions of N.J.A.C. 7:50-5 and 6. Execution of this MOA also warrants alternative application procedures because the Township is proposing measures that will afford an equivalent level of protection of the resources of the Pinelands as would be accomplished by application of the standards in Subchapters 5 and 6, which makes the MOA consistent with requirements of the Pinelands CMP.

VI. AGREEMENTS

A. The Township agrees:

1. The proposed improvements to the Pemberton Lake Trail will be constructed in accordance with the following:

   a. The Plan entitled "Pinelands Preservation Alliance, Pemberton Lake, Accessible Trail Improvement Plans, Block 825, Lots 7.01, 7.04 & 7.05, Township of Pemberton, Burlington County, New Jersey", prepared by Adams, Rehmann & Heggan, Associates, Inc., dated September 22, 2023, consisting of 7 sheets, and attached hereto as Exhibit A and incorporated herein by reference; and

   b. Stormwater Management Narrative for Pemberton Lake Accessible Walking Trail & Restoration Area, Pinelands Preservation Alliance, Block 825, Lots 7.01, 7.04, & 7.05, Township of Pemberton, Burlington County, New Jersey, " prepared by Adams, Rehmann & Heggan, Associates, Inc., dated June 26, 2023.

2. It will undertake the following to provide an equivalent level of protection for the resources of the Pinelands:

   a. Magnolia Road Parking Area– 4,980 sq. ft. Sand Area

      i. It will revegetate the existing 4,980 sq. ft. sand area located adjacent to the Magnolia Road parking area in accordance with the vegetation standards of the Pinelands CMP at N.J.A.C. 7:50-6.23 through -6.27.

      ii. It will construct a rain garden on a 350 sq. ft. portion of the 4,980 sq. ft. sand area located adjacent to the Magnolia Road parking area.

   b. Coleman's Bridge Road Parking Area – 9,250 sq. ft. Barren Area

      i. It will revegetate a 9,250 sq. ft. area located at the trail head adjacent to the Coleman's Bridge Road parking area in accordance with the vegetation standards of the Pinelands CMP at N.J.A.C. 7:50-6.23 through –6.27.

      ii. It will construct two accessible parking spaces at the Coleman's Bridge Road parking area.

   c. Other Offsetting Measures

      i. It will install a gate at the trailhead at each end of the improved trail that is designed to permit pedestrians, wheelchairs, walkers, electric scooters and other mobility assisting devices to enter the trail, while prohibiting entry by off-road vehicles.

      ii. It will install wooden barriers at other known areas used by off-road vehicles for trail access, to prevent future access by these vehicles.

3. At least thirty (30) days prior to commencing construction of the proposed improvements to the Lake Pemberton Trail, the Township shall provide the following information to the Executive Director:

   a. Revegetation plans for revegetation of the 4,980 sq. ft. area adjacent to Magnolia Road and revegetation of the 9,250 sq. ft. area at the trailhead of the Coleman's Bridge Road parking area. Such revegetation plans shall include:

i. A list of the native Pinelands trees, plants and/or grasses that will be used in the revegetation plan. At a minimum, the plans for both denuded areas shall include the use of the following Pinelands native grasses: switchgrass, little bluestem and broomsedge, where appropriate. The revegetation plan for the Coleman's Bridge Road area shall include the planting of a combination of pitch pine and shortleaf pine at an equivalent rate of 300-400 plants per acre. Temporary fencing shall also be installed to protect the revegetated areas during maturation of the planted vegetation.

ii. A plan or sketch showing the locations of the plantings and temporary fencing.

iii. A plan for replacement of vegetation that does not survive after planting, and percentage survival rate for replanted vegetation required to ensure viability of the replanted areas in perpetuity.

b. A plan for creation of the rain garden adjacent to the Magnolia Road parking area. This plan shall include the following:

i. A plan depicting the existing conditions;

ii. A proposed site plan;

iii. A planting plan that includes a planting schedule listing the names of the plants, the number and size of each plant that will be planted and the location where the plants will be planted. Only native Pinelands trees, plants and grasses shall be used to create this rain garden. The Commission's Green Infrastructure Implementation Project plans may be used as a model, see:

www.nj.gov/pinelands/infor/yard/20220711_PinelandsCommission_AsBuilt%20(2).pdf);

iv. A plan showing planting details;

v. A conceptual drawing of what the rain garden is expected to look like upon completion; and

vi. A plan for replacement of vegetation that does not survive after planting, and percentage survival rate for replanted vegetation required to ensure viability of the replanted area in perpetuity.

4. It will ensure that its staff, as well as any staff or volunteers provided by the Pinelands Preservation Alliance, any other entity or individuals who volunteer on their own, to assist with the construction of the proposed project, comply with the obligations of this MOA and all requirements of the Pinelands CMP, unless a deviation therefrom is expressly authorized by this Agreement.

5. Obtain any and all certificates, licenses, consents, approvals, or permits required from any other State and/or Federal entity, including but not limited to a Freshwater Wetlands General Permit 17 and a Right of Entry from the New Jersey Department of Environmental Protection, prior to commencing site preparation or construction of any portion of the proposed improvements to the Lake Pemberton Trail project, including the offsetting measures delineated in Paragraph VI.A.2 above. No part of this MOA is intended to release the Township and/or any of its consultants, including the Pinelands Preservation Alliance, staff, volunteers, assignees, or successors from the responsibility to obtain all required approvals.

6. Incorporate the terms of this MOA, as well as the obligation to comply with all requirements of the Pinelands CMP from which a deviation has not been expressly authorized by this Agreement into any agreements, contracts, or other legal documents pertaining in any way to the construction of the Lake Pemberton Trail Project.

7. Any material addition, deviation, or modification to the proposed Lake Pemberton Trail project as delineated in Exhibit A, shall require the Township to submit a formal public development application in accordance with N.J.A.C. 7:50-4.52(b) to the Commission and seek formal Commission approval of such addition, deviation, or modification. Any construction activities that may have commenced on the Lake Pemberton Trail project shall cease and no further development may proceed until the public development application review process has been completed and the Commission has issued a resolution approving the addition, deviation, or modification to the Lake Pemberton Trail project.

8. To the extent that new information becomes available or changes are made to the scope or design of the proposed Pemberton Lake Trail project that would result in more than a de minimis change to the impacts to wetlands, wetland buffers or threatened or endangered plants or animals species or habits for such animals, but would not be considered material and subject to Paragraph VI.A.7., the Township shall submit the new information or changes to the Executive Director who shall determine whether the proposed development remains consistent with the terms of this MOA, the requirements of N.J.A.C. 7:50-5 or 6 not addressed by this MOA, and Exhibit A and issue a written consistency determination.

9. If the Executive Director determines that as a result of the new information or any de minimis change to the scope or design of the proposed Pemberton Lake Trail project is inconsistent with the terms of this MOA or a standard of the Pinelands CMP from which a deviation has not been expressly authorized by this agreement or results in increased impacts to threatened or endangered animal species habitat or plant species, or wetlands or wetland buffers associated with the proposed Pemberton Lake Trail project, the Township shall modify the proposed development project(s) until the Executive Director determines that it is consistent with all requirements of this MOA and the Pinelands CMP. If the Township disagrees with the Executive Director's determination, it may file an application for public development pursuant to N.J.A.C. 7:50-4.52(b) and seek formal approval from the Pinelands Commission of the project. The proposed development project may not proceed until the public development application review process has been completed and the Commission has issued a resolution approving the development project.

10. The terms of this MOA shall immediately be suspended in the event that the Executive Director determines that an unresolved violation of the terms of this MOA, a requirement of the Pinelands CMP for which a deviation is not authorized by this Agreement, or a written authorization issued by the Executive Director has occurred on the site of the Pemberton Lake Trail Project (Portions of Block 825, Lots 7.01, 7.04 & 7.05, Township of Pemberton, Burlington County, New Jersey). The Township shall have thirty (30) days to seek reinstatement of this MOA by providing the Commission with a written agreement itemizing the steps the Township will take to remedy the violation and a timeline for completion of such steps. If the measures and timeline for completion proposed by the Township are acceptable to the Executive Director, following Commission concurrence, she shall issue a letter to the Township reinstating the terms of this MOA. Failure of the Township to

complete the measure required to cure the violation or make changes to its submission following staff review within the specified timeline may result in reinstatement of the suspension.

11. The Township shall attend a meeting of the Commission's CMP Policy & Implementation Committee to provide a summary of the project following completion of the total project, including 1) the grading and installation of gravel and boardwalks on the Pemberton Lake Trail; 2) revegetation of and installation of the rain garden on a portion of the area adjacent to the Magnolia Road parking area; 3) revegetation of the denuded area at the trail head at the Coleman's Bridge Road parking area; 4) installation of gates at the trailheads at each end of the improved trail; 5) installation of wooden barriers to prevent access to the trail by off-road vehicles; and (6) construction of the two accessible parking spaces at the Coleman's Bridge Road parking area.

12. Notify the Commission upon the completion of each component of the project, including improvements to the Pemberton Lake Trail, revegetation of each of the denuded areas, construction of the rain garden and installation of the gates and wooden barriers as required in Paragraphs VI.A.1 and 2 above.

B. The Pinelands Commission agrees:

1. The Commission shall not require the filing of formal public development applications in accordance with N.J.A.C. 7:50-4.52(b) for the proposed improvements to the Lake Pemberton Trail and implementation of the offsetting measures set forth in Paragraphs VI.A.1 and 2 above, unless:

a. Any of the proposed offsetting measures set forth in Paragraph VI.A.2 are inconsistent with the requirements of this MOA and/or any of the standards of Subchapter 5 and 6 of the Pinelands CMP for which a deviation has not been expressly provided by this MOA, and the Township has not modified the proposed development project to render it consistent with such requirements;

b. There is a material addition to, deviation from, or modification to any of the proposed development projects; or

c. As a result of new information or any change to the scope or design of the proposed development project(s) submitted to the Executive Director in accordance with Paragraph VI.A.8., the proposed

development project is inconsistent with the requirements of this MOA or a standard of the Pinelands CMP from which a deviation has not been authorized by this Agreement or will result in a material increase in the threatened or endangered animal species habitat or wetlands/wetland buffers impacts associated with the proposed project for which deviations have been authorized by this MOA, and the Township has not modified the proposed development project to render it consistent with such requirements.

2. Within thirty (30) days of receipt of the information submitted pursuant to Paragraphs VI.A.3 or VI.A.8, the Executive Director will provide written authorization in accordance with Paragraph VI.B.4 or the Commission staff will provide a written explanation of deficiencies in accordance with Paragraph VI.B.3.

3. If the Executive Director determines that any portion of a proposed project is inconsistent with this MOA and/or the provisions of the CMP from which a deviation has not been authorized by this Agreement, then the Commission staff shall provide a written explanation of the deficiencies and identify specific actions that must be taken by the Township to remedy such deficiencies.

4. If the Commission staff determines, after review of information submitted in accordance with Paragraphs VI.A.3 or VI.A.8 and/or in response to any deficiency letter issued by the Commission pursuant to Paragraph VI.B.3, that a proposed project is consistent with this MOA and the provisions of the CMP from which a deviation has not been authorized by this Agreement, it shall issue a written authorization to the Township setting forth this determination. This written authorization shall constitute a public development approval and no further action by the Commission shall be required.

5. In the event of a suspension of the terms of this MOA in accordance with Paragraph VI.A.10, the Executive Director shall, following the Commission's concurrence, issue a letter to the Township reinstating the terms of this MOA following the Township's submission of a written agreement in accordance with Paragraph VI.A.10 and the acceptance of same by the Executive Director and the Commission. The Executive Director retains the right to a violation unresolved until such time as the Township has implemented all measures set forth within its written agreement.

VII. EFFECTIVE DATE, DURATION AND SIGNATURES

1. In accordance with N.J.S.A. 13: 18A-5(h), this MOA shall take effect following the conclusion of the Governor's review period and approval of the Pinelands Commission meeting minutes authorizing execution of this MOA and then upon approval and signature by the authorized representatives of all parties.

2. This agreement shall remain in effect unless amended by written consent of both Parties or otherwise terminated or suspended by the Pinelands Commission or terminated by both parties upon sixty (60) days written notice or suspended by the Commission in accordance with Paragraph VI.A.10.

3. This MOA, along with any exhibits, appendices, addendums, or schedules, attached hereto and incorporated herein by reference and any subsequent written amendments executed by the parties, constitutes the entire agreement of the parties, and supersedes all previous understandings and agreements between the parties, whether oral or written. The Parties hereby acknowledge and represent that said parties have not relied on any representation, assertion, guarantee, warranty, collateral contract or other assurance, except those set forth in this MOA, made by or on behalf of any other party or any other person whatsoever, prior to the execution of this MOA.

4. This MOA may be executed in counterparts. All such counterparts shall constitute an original and all of which together shall constitute one and the same agreement, binding upon the parties. Faxed and electronic signatures shall constitute original signatures.

IN WITNESS WHEREOF, the parties have caused their duly authorized representatives to execute this MOA on and as of the day and year written below. This MOA shall be executed in at least three (3) original copies, one of which is to be delivered to Pemberton Township and two (2) of which are to be delivered to the Pinelands Commission.

Pemberton Township

By: Daniel Hornickel
Name: Daniel Hornickel
Title: Business Administrator
Date: 02/16/2024

Witnessed:

By: [signature]
Name: Anna Shaker
Title: HR
Date: 02/16/24

New Jersey Pinelands Commission

By: Susan R. Grogan

Susan R. Grogan
Executive Director

Date: 2/16/2024

Witnessed:

By:

Name: Jessica Nobile

Title: Executive Assistant

Date: 2/16/2024

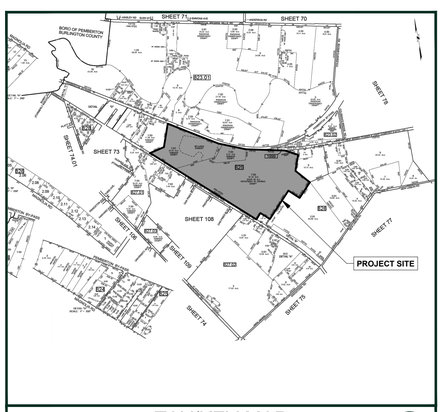
Exhibit A

Pemberton Lake Accessible Trail Improvement Plans
Block 825, Lots 7.01, 7.04 & 7.05
Pemberton Township, Burlington County, NJ
Dated September 22, 2023, revised November 1, 2023

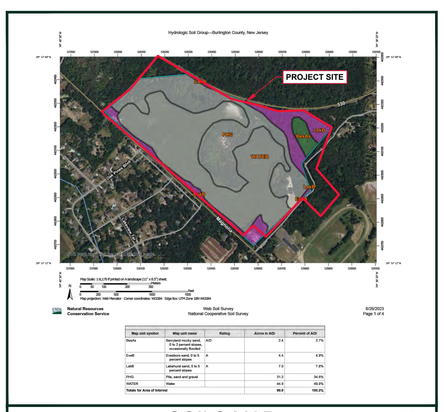
PINELANDS PRESERVATION ALLIANCE
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS

BLOCK 825, LOTS 7.01, 7.04 & 7.05

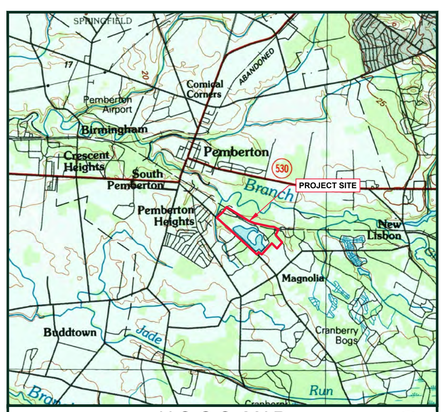
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY
SEPT. 22, 2023



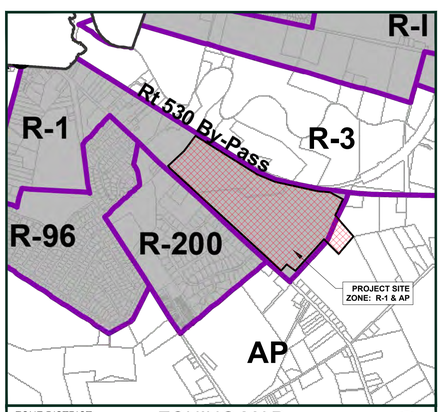
TAX/KEY MAP
SOURCE: PEMBERTON TOWNSHIP TAX MAP #72
SCALE= 1" = 1,000'



SOILS MAP
SOURCE: N.R.C.S. USDA Web Soil Survey
SCALE= 1" = 1,000'



U.S.G.S. MAP
SCALE= 1" = 1,000'



ZONE DISTRICT:
R-1 - RESIDENTIAL 1
AP - AGRICULTURAL PRODUCTION

ZONING MAP
SOURCE: MAP 4M-29: PEMBERTON TOWNSHIP ZONING
SCALE= 1" = 1,600'

AGENCIES/UTILITY COMPANIES:

NEW JERSEY ONE CALL
(UNDERGROUND LOCATING SERVICE)
PHONE:(800)272-1000

PSE&G
300 NEW ALBANY RD
MOORESTOWN, NJ 08057
PHONE: 800-436-7734

COMCAST
21 BEVERLY-RANCOCAS ROAD
WILLINGBORO, NJ 08046
PHONE: 609-871-6900

VERIZON-NJ
10 TANSBORO ROAD
BERLIN, NJ 08009
PHONE: 856-767-6979

PEMBERTON TOWNSHIP
(SEWER DEPARTMENT)
500 PEMBERTON - BROWNS MILL ROAD
PEMBERTON, NJ 08068

JCP&L
101 CRAWFORDS CORNER ROAD
HOLMDEL, NJ 07733
PHONE: 800-662-3115

Sheet List Table

Sheet Number	Sheet Title
1	COVER
2	EXISTING CONDITIONS PLAN
3	SITE PLAN
4	SITE PLAN (2)
5	SITE PLAN (3)
6	SOIL EROSION AND SEDIMENT CONTROL NOTES
7	SOIL EROSION AND SEDIMENT CONTROL DETAIL & CONSTRUCTION DETAILS

PREPARED FOR
PINELANDS PRESERVATION ALLIANCE
17 PEMBERTON ROAD
SOUTHHAMPTON, NJ 08088

PINELANDS PRESERVATION ALLIANCE

PREPARED BY

ARH ASSOCIATES
certificate of authorization
NJ no. 24GA27973300, DE no. 2167

ADAMS, REHMANN & HEGGAN ASSOCIATES, INC.
215 BELLEVUE AVENUE
PO BOX 579
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TEL (609) 561-0482
FAX (609) 567-8909

GENERAL NOTES:

1. OWNER: TOWNSHIP OF PEMBERTON
   500 PEMBERTON-BROWNS MILLS ROAD
   PEMBERTON, NJ 08068
2. APPLICANT: PINELANDS PRESERVATION ALLIANCE
   17 PEMBERTON ROAD
   SOUTHHAMPTON, NJ 08088
3. THE SUBJECT PROPERTY IS KNOWN AS BLOCK 825, LOTS 7.01, 7.04 & 7.05 IN THE TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY. THE SITE PROJECT IS KNOWN AS ACCESSIBLE WALKING TRAIL AND PEMBERTON WILDLIFE MANAGEMENT AREA AT PEMBERTON LAKE.
4. THE APPLICANT PROPOSES TO IMPROVE THE EXISTING PATH BY INSTALLING GRAVEL SURFACE ALONG THE MAJORITY OF THE TRAIL LENGTH TO IMPROVE ADA ACCESSIBILITY. A PORTION OF WETLAND AREAS A AND B WILL BE COMPLETED WITH A BOARDWALK, WHERE NOTED. THE EXISTING 4' TO 5' FOOT WIDE TRAIL IS A DIRT/COMPACTED PATH ALONG A PORTION OF PEMBERTON LAKE PERIMETER AND MEASURES A TOTAL OF ±0.65 MILES.
5. BOUNDARY INFORMATION IS BASED ON THE TOWNSHIP OF PEMBERTON TAX MAPS. TOPOGRAPHIC INFORMATION IS TAKEN FROM PUBLICLY AVAILABLE LIDAR.
6. THE EXISTING TRAIL AND WETLAND LOCATIONS WERE CONFIRMED DURING AN ON-SITE MEETING WITH THE NJ PINELANDS COMMISSION ON OCTOBER 16, 2023 AND HAVE BEEN FIELD SURVEYED BY ARH ASSOCIATES, INC. IN OCTOBER 2023.

MARK HERRMANN
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. PE 49668

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NJ no. 24GA27973300, DE no. 2167

revisions
2023-11-01 - REVISED PER PINELANDS COMMENTS

COVER
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date:	SEPT. 22, 2023
scale:	AS SHOWN
drawn by:	P.T.
checked:	R.H.
proj. no.:	5052894.01

DRAWING LOCATION	W:\FILEROOM\HQ\5052894\ENG\DWG\E-5052894-Cover.DWG
LAST DATE SAVED	11/2/2023
LAST SAVE BY	plucker

GENERAL NOTES:

1. TRAIL LOCATION, VARYING WIDTHS (4 - 5'), AND WETLANDS AREA A AND B SURVEYED BY ARH ASSOCIATES, INC. IN OCTOBER 2023. TOTAL LINEAR LENGTH OF EXISTING COMPACTED TRAIL IS APPROXIMATELY 3423 LF (±0.65 MILES).

2. THE NJ PINELANDS INTERACTIVE MAP WAS UTILIZED TO DISPLAY APPROXIMATE WETLAND AREAS SURROUNDING THE TRAIL. THE WETLAND AREAS OF THE TRAIL WERE FIELD VERIFIED BY ARH ASSOCIATES, INC. IN JUNE 2023 AND FIELD CONFIRMED BY NJ PINELANDS COMMISSION DURING AN ON-SITE FIELD MEETING CONDUCTED ON OCTOBER 16, 2023. WETLANDS AREA A AND B WERE SUBSEQUENTLY SURVEYED BY ARH ASSOCIATES, INC. IN OCTOBER 2023 AND CONFIRMATION OF EXISTING TRAIL LOCATION AND OTHER CONDITIONS WERE FIELD SURVEYED. REMAINING AREAS CONSIST OF WETLANDS BUFFER AREAS AND UPLANDS. ALL AREAS OF THE TRAIL EXIST AS "PREVIOUSLY DISTURBED" AND MAINTAINED TRAILS WITHIN THE NJ WILDLIFE MANAGEMENT AREA AND TOWNSHIP OF PEMBERTON.

TOTAL PROPOSED TRAIL IMPROVEMENTS		
GRAVEL AREA OUTSIDE WETLANDS AREAS A & B	GRAVEL AREA IN WETLANDS AREAS A & B	BOARDWALK PROPOSED IN WETLANDS *
12,887 S.F. (0.296 Ac.)	1,519 S.F. (0.035 AC.)	160 S.F. (0.003 AC.)

* BOARDWALK WILL BE EXTENDED FOR UP TO APPROXIMATELY 16 LF, AND PLACED WHERE NECESSARY RELATIVE TO REVIEW OF CONDITIONS ON THE TRAIL WHERE NEEDED. LOCATIONS SHOWN ON PLAN VIEW ARE APPROXIMATE AND WILL BE FIELD VERIFIED.

EXISTING 4' WIDE COMPACTED FILL TRAIL TO BE IMPROVED
EXISTING 4' WIDE BOARDWALK TO REMAIN
EXISTING FISHING PIER TO REMAIN
PEMBERTON LAKE
WETLANDS LINE PER PINELANDS INTERACTIVE MAP (TYP.)
APPROXIMATE EDGE OF LAKE
PEMBERTON BYPASS (C.R. 530)
MAGNOLIA ROAD (BURLINGTON C.R. 644)
LAKEVIEW TERRACE
OAK PINE BLVD.
PINOAK DRIVE
COLEMANS BRIDGE RD.
EXISTING SAND PARKING AREA
EXISTING GRAVEL PARKING AREA
EXISTING 5' WIDE DIRT PATH
EXISTING 4' WIDE DIRT PATH
PATH LOW POINT
PATH HIGH POINT
10" OAK TREE
12" PINE TREE
WETLAND AREA 'A'
WETLAND AREA 'B'
WA-1
WA-2
WB-1
WB-2
N 039° 57' 27"
W 074° 39' 49"
"EXISTING MOUNT FOR BORROW"
Block 825 Lot 7.01
Block 825 Lot 7.04
Block 825 Lot 7.05
Block 823.01 Lot 7.01
Block 826 Lot 2.01
LOT 7.03
LOT 10
BLOCK 827.01
LOT 7.02
BLOCK 1107
BLOCK 1108
BLOCK 1109
BLOCK 1110
BLOCK 827.02
LOT 1.02
BLOCK 826
PHG
EveB
EveC
LakB
BesAs
SCALE: 1" = 100'
SCALE IN FEET
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ARH ASSOCIATES
Professional Land Surveyors
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revisions
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EXISTING CONDITIONS PLAN
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date:	SEPT. 22, 2023
scale:	AS SHOWN
drawn by:	P.T.
checked:	M.H.
proj. no.:	50528941.01

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LAST DATE SAVED	11/2/2023
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PROPOSED TRAIL IMPROVEMENT	
GRAVEL AREA	BOARDWALK AREA (WITHIN WETLAND AREA)
4,076 S.F. (0.093 Ac.)	

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2023-11-01 - REVISED PER PINELANDS COMMENTS
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SITE PLAN
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date:	SEPT. 22, 2023
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LAST DATE SAVED	11/2/2023
LAST SAVE BY	plucker

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TOTAL PROPOSED TRAIL IMPROVEMENTS		
GRAVEL AREA OUTSIDE WETLANDS AREAS A & B	GRAVEL AREA IN WETLANDS AREAS A & B	BOARDWALK PROPOSED IN WETLANDS *
5,404 S.F. (0.125 AC.)	1,519 S.F. (0.035 AC.)	160 S.F. (0.003 Ac.)

* BOARDWALK WILL BE EXTENDED FOR UP TO APPROXIMATELY 16 LF, AND PLACED WHERE NECESSARY RELATIVE TO REVIEW OF CONDITIONS ON THE TRAIL WHERE NEEDED. LOCATIONS SHOWN ON PLAN VIEW ARE APPROXIMATE AND WILL BE FIELD VERIFIED.

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LAST SAVE BY	ptucker

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ARH ASSOCIATES
certificate of authorization
NJ no. 24GA27973300, DE no. 2167

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2023-11-01 - REVISED PER PINELANDS COMMENTS
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SITE PLAN (2)
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date:	SEPT. 22, 2023
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CIVIL ENGINEERS & LAND SURVEYORS
NJ no. 24GA27973300, DE no. 2167

2023-11-01 - REVISED PER PINELANDS COMMENTS

revisions

SITE PLAN (3)
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date:	SEPT. 22, 2023
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LAST DATE SAVED	11/2/2023
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SOIL EROSION VEGETATIVE STANDARD NOTES:

I. Standard for High Management of Acid-Producing Soils

A. This practice is applicable to any high acid-producing soil materials. Such materials have been found in the Coastal Plain areas of Burlington, Camden, Cumberland, Gloucester, Mercer, Middlesex, Monmouth, Ocean, Salem and Somerset Counties.

B. Early recognition and burial, removal or disposal of high acid-producing soils is essential for limiting the amount of acidic material produced. Review a surface geology map for the proposed site to investigate the presence of geologic formations which commonly contain high acid-producing deposits. Figure 1-1 shows areas where these deposits may be present.

C. Contact the local Soil Conservation District to determine the historical presence of high acid-producing soils in the vicinity of the proposed development site.

D. High acid-producing soils may be present in undisturbed soils at varying depths, including near the soil surface to excavation or deep disturbances. Its presence on a site may be significant or limited in the soil profile. High acid-producing soils are commonly black, dark brown, gray or greenish with silvery pyrite or marcasite nuggets or flakes. Alternatively, sandy soils or reddish, yellowish or light to medium brown soil materials are usually free of high acid-producing deposits.

E. Methods and Materials:

1. Limit the excavation area and exposure time when high acid-producing soils are encountered.
2. Topsoil stripped from the site shall be stored separately from temporarily stockpiled high acid producing soils.
3. Stockpiles of high acid-producing soil should be located on level land to minimize its movement, especially when this material has a high clay content.
4. Temporarily stockpiled high acid-producing soil material to be stored more than 48 hours should be covered with properly anchored, heavy grade sheets of polyethylene where possible. If not possible, stockpiles shall be covered with a minimum of 3 to 6 inches of wood chips to minimize erosion of the stockpile. Silt fence shall be installed at the toe of the slope to contain movement of the stockpiled material. Topsoil shall not be applied to the stockpiles to prevent topsoil contamination with high acid-producing soil.
5. High acid-producing soils with a pH of 4.0 or less or containing iron sulfide (including borrow from cuts or dredged sediment) shall be ultimately placed or buried with limestone applied at the rate of 10 tons per acre (or 450 pounds per 1,000 square feet of surface area) and covered with a minimum of 12 inches of settled soil with a pH of 5.0 or more except as follows:

a. Areas where trees or shrubs are to be planted shall be covered with a minimum of 24 inches of soil with a pH of 5.0 or more.

b. Disposal area shall not be located within 24 inches if any surface of a slope or bank, such as berms, stream banks, ditches, and others, to prevent potential lateral leaching damages.

6. Equipment used for movement of high acid-producing soils should be cleaned at the end of each day to prevent spreading of high acid-producing soil materials to other parts of the site, into streams or stormwater conveyances, and to protect machinery from accelerated rusting.
7. Non-vegetative erosion control practices (stone tracking pads, strategically placed limestone check dam, sediment barrier, wood chips) should be installed to limit the movement of high acid-producing soils from, around, or off the site.
8. Following burial or removal of high acid-producing soil, topsoiling and seeding of the site (see Temporary Vegetative Cover for Soil Stabilization, Permanent Vegetative Cover and Soil Stabilization, and Topsoiling), monitoring must continue for a minimum of 6 months to ensure there is adequate stabilization and that no high acid-producing soil problems emerge. If problems still exist, the affected area must be treated as indicated above to correct the problem.

II. STANDARD FOR DUNE STABILIZATION

A. This practice is applicable along ocean and bay shorelines where blowing sands and storm waters may cause erosion damage. Stay at least one hundred feet (horizontal distance) from mean high tide water line (MHT)

B. Methods and Materials:

1. Sand dunes form on barrier islands, shorelines exposed directly to the ocean, and inland sand deposits. The source of this wind born sand in the ocean or its bays. These parallel ridges of sand form perpendicular to prevailing winds and grow toward its source of sand. Periodic storm events and human activity continually alter their development and original configuration. Once developed, the sand dunes provide protection from moderate storms and tides. The existence and maintenance of vegetation on dunes provides a network of root and foliage which holds unconsolidated sand in place. American beachgrass is the dominant, naturally occurring, vegetation of the frontal dunes of New Jersey. When beachgrass is established with structural resources and other dune species, a formidable well anchored storm barrier is established. Refer to the Standards for Soil Erosion and Sediment Control in New Jersey (7th Edition, January 2014) for additional information regarding vegetation stabilization and sand fencing.

III. STANDARD FOR MAINTAINING VEGETATION

A. A preventative maintenance program anticipates requirements and accomplishes work when it can be done with least effort and expense to insure adequate cover.

B. Maintenance should occur on a regular basis, consistent with favorable plant growth, soil, and climatic conditions. This involves regular seasonal work for mowing, fertilizing, liming, watering, pruning, fire control, weed and pest control, reseeding, and timely repairs.

C. The degree of preventative maintenance needed depends upon the type of vegetation and its proposed function or use:

1. Mowing is a recurring practice and its intensity depends upon the function of the ground cover. Oh high to moderate (A to B) maintenance areas, such as lawns, certain recreation fields, and picnic areas, mowing will be frequent (2 to 7 day intervals) and typically at a height of 2.5 to 3 inches. Return clippings from mowing (mulching mower) to the turf to reduce the amount of fertilizer needed to maintain the turf by as much as 50%. Some turf mixtures can be managed as naturalized stands requiring only one (cool season mixtures) or two (warm season mixtures) mowings per year. Mowing of naturalized areas is typically done at heights no less than 4 inches and should not be done between April 1st and July 15th to avoid disturbing ground nesting birds. The large amount of clipping debris generated by mowing naturalized areas will need to be removed and/or dispersed so the vegetation is not smothered. Burning of naturalized areas is another procedure used to manage naturalized turfs. Low maintenance (D) areas may be left un-mowed to permit natural succession.
2. Incorporation of organic matter (for example, mature compost) into the soil will substantially reduce the need for fertilizer and irrigation inputs.
3. Fertilizer and lime should be applied as needed to maintain a dense stand of desirable species. Frequently mowed areas and those on sandy soils will require more frequent fertilization but at a lower nutrient rate per application.
4. Lime requirement should be determined by soil testing every 2 or 3 years. Fertilization may increase the need for liming. Contact the local county extension office for details on soil testing and fertilization and pest control recommendations online at http://njaes.rutgers.edu/county/.
5. Fertilization and additions of other soil amendments are not recommended for managing native vegetation such as in the Pinelands National Reserve. See the Standard for Permanent Vegetative Stabilization for specific requirements in the PNR.
6. Weed invasion may result from abusive mowing and from inadequate fertilizing and liming. Many newly established grasses will not survive if mowed at heights below 2.5 inches and an intervals greater than 7 days. Brush invasion is a common consequence of lack of mowing. The amount of weeds or brush that can be tolerated in any vegetated area depends upon the intended use of the land. Drainage ways are subject to rapid infestation by weed and woody plants. These should be controlled, since they often reduce drainage way efficiently. Control of weeds or brush is accomplished by using herbicides or mechanical methods.
7. Fire hazard is greater where dry vegetation has accumulated. The taller the vegetation, the greater the hazard.
8. Prune trees and shrubs to remove dead or damaged branches. Remove undesirable or invasive plants to maintain integrity of the landscape and enhance quality of permanent vegetative cover.

IV. STANDARD FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION

SEEDING SCHEDULE		
SEED MIX #12	PLANTING RATE	RECOMMENDED OPTIMUM SEEDING DATE (ZONE 6B)
TURF TYPE TALL FESCUE	8LBS/1000SF	8/15 TO 10/15

A. Methods and Materials: (Areas other than Pinelands National Reserve)

1. Site Preparation:
   - a. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standard for Land Grading (see 7th Edition Manual).
   - b. Immediately prior to seeding and topsoil application, the subsoil shall be evaluated for compaction in accordance with the Standard for Land Grading (see 7th Edition Manual).
   - c. Topsoil shall be handled only when it is dry enough to work without damaging the soil structure. A uniform application to a depth of 5 inches (unsettled) is required on all sites. Topsoil shall be amended with organic matter, as needed, in accordance with the Standard for Topsoiling.
   - d. Install needed erosion control practices or facilities such as diversions, grade-stabilization structures, channel stabilization measures, sediment basins, and waterways.
2. Seedbed Preparation
   - a. Uniformly apply ground limestone and fertilizer to topsoil which has been spread and firmed, according to soil test recommendations such as offered by Rutgers Co-operative Extension Soil sample mailers are available from the local Rutgers Cooperative Extension offices (http://njaes.rutgers.edu/county/). Fertilizer shall be applied at the rate of 500 pounds per acre or 11 pounds per 1,000 square feet of 10-10-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise and incorporated into the surface 4 inches. If fertilizer is not incorporated, apply one-half the rate described above during seedbed preparation and repeat another one-half rate application of the same fertilizer within 3 to 5 weeks after seeding.
   - b. Work lime and fertilizer into the topsoil as nearly as practical to a depth of 4 inches with a disc, spring-tooth harrow, or other suitable equipment. The final harrowing or disking operation should be on the general contour. Continue tillage until a reasonable uniform seedbed is prepared.
   - c. High acid producing soil. Soils having a pH or less or containing iron sulfide shall be covered with a minimum of 12 inches of soil having a pH of 5 or more before initiating seedbed reparation. See Standard for Management of High Acid-Producing Soils for specific requirements.
3. Seeding
   - a. Select a mixture from Table 4-3 in the 7th Edition Manual or use a mixture recommended by Rutgers Cooperative Extension or Natural Resources Conservation Service which is approved by the Soil Conservation District. Seed germination shall have been tested within 12 months of the planting date. No seed shall be accepted with a germination test date more than 12 months old unless retested. See applicable USDA Plant Hardiness Zone Map for New Jersey for planting dates.
     - i. Seeding rates specified are required when a report of compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in rates may be used when permanent vegetation is established prior to a report of compliance inspection. These rates apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative coverage with the specified seed mixture for the seeded area and mowed once.
     - ii. Warm-season mixtures are grasses and legumes which maximize growth at high temperatures, generally 85°F and above. See Table 4-3 mixtures 1 to 7. Planting rates for warm-season shall be the amount of Pure Live Seed (PLS) as determined by germination testing results.
     - iii. Cool -season mixtures are grasses and legumes which maximize growth at temperatures below 85°F. Many grasses become active at 65°F. See Table 4-3, mixtures 8-20. Adjustment of planting rates to compensate for the amount of PLS is not required for cool season grasses.
   - b. Conventional Seeding is performed by applying seed uniformly by hand, cyclone (centrifugal) seeder, drop seeder, drill or cultipacker seeder. Except for drilled, hydroseeded or cultipacked seedings, seed shall be incorporated into the soil within 24 hours of seedbed preparation to a depth of ¼ to ½ inch, by raking or dragging. Depth of seed placement may be ¼ inch deeper on coarse-textured soil.
   - c. After seeding, firming the soil with a corrugated roller will assure seed-to-soil contact, restore capillarity, and improve seedling emergence. This is the preferred method. When performed on the contour, sheet erosion will be minimized and water conservation on site will be maximized.
   - d. Hydroseeding is a broadcast seeding method usually involving a truck, or trailer-mounted tank, with an agitation system and hydraulic pump for mixing seed, water and fertilizer and spraying the mix onto the prepared seedbed. Mulch shall not be included in the tank with seed. Short-fibered mulch may be applied with a hydroseeder following seeding. (also see Section 4-Mulching below). Hydroseeding is not a preferred seeding method because seed and fertilizer are applied to the surface and not incorporated into the soil. When poor seed to soil contact occurs, there is a reduced seed germination and growth.
4. Mulching

   Mulching is required in all seeding. Mulch will protect against erosion before grass is established and will promote faster and earlier establishment. The existence of vegetation sufficient to control soil erosion shall be deemed compliance with this mulching requirement.

   a. Straw or Hay: Unrotted small grain straw, hay free of seeds, to be applied at the rate of 1.5 to 2 tons per acre (70 to 90 pounds per 1,000 square feet), except that where a crimper is used instead of a liquid mulch-binder (tackifying or adhesive agent), the rate of application is 3 tons per acre. Mulch chopper-blowers must not grind the mulch. Hay mulch is not recommended for establishing fine turf or lawns due to the presence of weed seed.

   Application: Spread mulch uniformly by hand or mechanically so that at least 85% of the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 to 90 pounds within each section.

   Anchoring shall be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area, steepness of slopes, and costs.

   - i. Peg and Twine: Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
   - ii. Mulch Nettings: Staple paper, jute, cotton or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
   - iii. Crimper (mulch anchoring coulter tool): A tractor- drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tackifying or adhesive agent is required.
   - iv. Liquid Mulch Binders: May be used to anchor salt hay, hay or straw mulch.
     - (a) Applications should be heavier at edges where wind may catch the mulch, in valleys, and at crests of banks. The remainder of the area should be uniform in appearance.
     - (b) Use of the following:
       - (1) Organic and Vegetable Based Binds - Naturally occurring, powder-based, hydrophilic materials when mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in phytotoxic effect or impede growth of turf grass. Use at rates and weather conditions as recommended by the manufacturer to anchor mulch materials. Many new products are available, some of which may need further evaluation for use in this state.
       - (2) Synthetic Binders: High polymer synthetic emulsion, miscible with water when diluted and, following application of mulch, drying and curing, shall no longer be soluble or dispersible in water. Binder shall be applied at rates recommended by the manufacturer and remain tacky until germination of grass.

       Note: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.

   b. Wood-fiber or paper-fiber mulch shall be made from wood, plant fibers or paper containing no growth or germination inhibiting materials, used at the rate of 1,500 pounds per acre (or as recommended by the product manufacturer) and may be applied by a hydroseeder. Mulch shall not be mixed in the tank with seed. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.

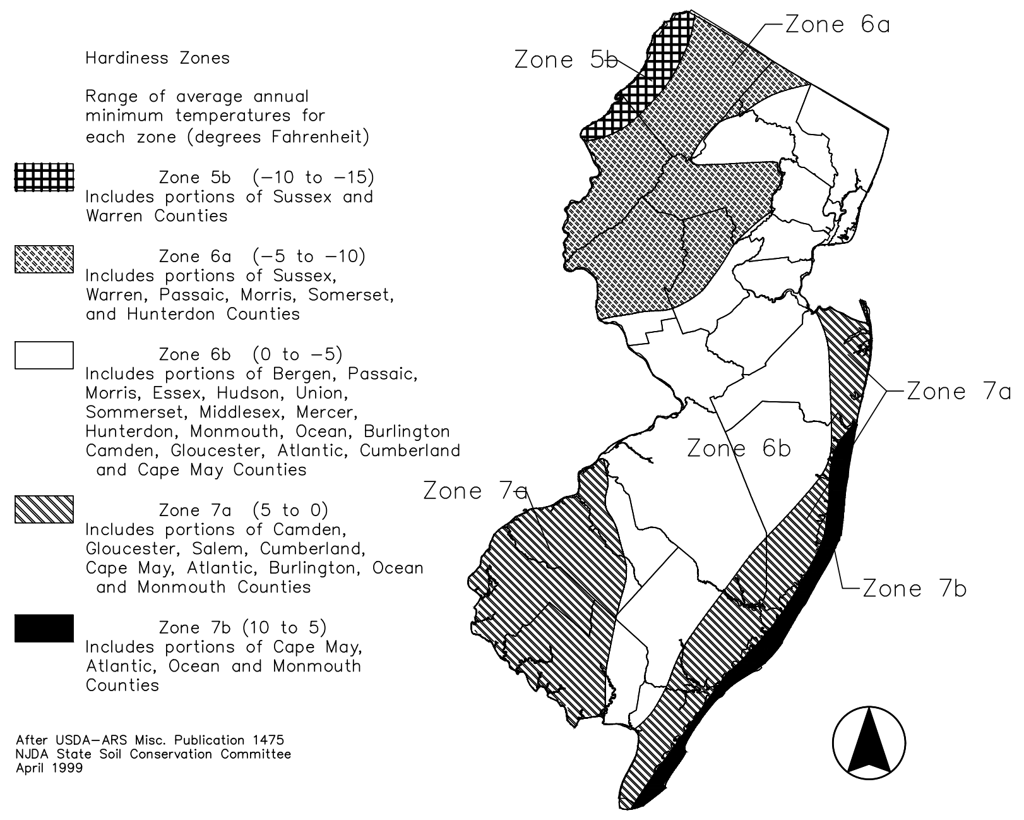
   c. Pelletized mulch - compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers, and coloring agents. The dry pellets, when applied to a seeded area and watered, form a mulch mat. Pelletized mulch shall be applied in accordance with the manufacturer's recommendations. Mulch may be applied by hand or mechanical spreader at the rate of 60-75 lbs/1,000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation areas, seeded areas where weedseed free mulch is desired, or on sites where straw mulch and tackifier agent are not practical or desirable. Applying the full 0.2 to 0.4 inches of water after spreading pelletized mulch on the seed bed is extremely important for sufficient activation and expansion of the mulch to provide soil coverage.
5. Irrigation (where feasible)

   If soil moisture is deficient, supply new seeding with adequate water (a minimum of ¼ inch applied up to twice a day until vegetation is well established). This is especially true when seedings are made in abnormally dry or hot weather or on droughty sites.
6. Topdressing

   Since soil organic matter content and slow release nitrogen fertilizer (water insoluble) are prescribed in Section 2A - Seedbed Preparation in this Standard, no follow-up of topdressing is mandatory. An exception may be made where gross nitrogen deficiency exists in the soil to the extent that turf failure may develop. In that instance, topdress with 10-10-10 or equivalent at 300 pounds per acre or 7 pounds per 1,000 square feet every 3 to 5 weeks until the gross nitrogen deficiency in the turf is ameliorated.
7. Establishing Permanent Vegetative Stabilization

   The quality of permanent vegetation rests with the contractor. The timing of seeding, preparing the seedbed, applying nutrients, mulch and other management are essential. The seed application rates in Table 4-3 are required when a Report of Compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in application rates may be used when permanent vegetation is established prior to requesting a Report of Compliance from the district. These rate apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative cover (of the seeded species) and mowed once. Note this designation of mowed once does not guarantee the permanency of the turf should other maintenance factors be neglected or otherwise mismanaged.

Figure 4-1
USDA Plant Hardiness Zones
Average Annual Minimum Temperature
New Jersey



After USDA-ARS Misc. Publication 1475
NJDA State Soil Conservation Committee
April 1999

SEEDING SCHEDULE		
SEED MIX #12	PLANTING RATE	RECOMMENDED OPTIMUM SEEDING DATE (ZONE 6B)
TURF TYPE TALL FESCUE	8LBS/1000SF	8/15 TO 10/15

B. Methods and Materials - Pinelands National Reserve

Due to the low fertility of native soils and other related factors, indigenous Pinelands vegetation can be relatively slow to re-colonize disturbed areas. Natural re-colonization by native plants is preferable however, where the intended land use permits or required native plant re-growth.

The following approaches shall be used for post-development soil stabilization in the Pinelands National Reserve (PNR) in areas where it is a desire for native plant materials to be used. These practices are limited to areas where slope is less than 2% which do not experience concentrated surface runoff.

Note: areas requiring traditional turf-type vegetation either by seeding or sodding shall be subject to the Standards for Topsoiling or Sodding and the prior portion of this Standard which detail methods for permanent vegetation stabilization. Table 4-4 in the 7th Edition Manual contains the required cool season turf mixture suitable for use in the PNR.

PNR A-Horizon soil shall be segregated and stockpiled separately to maintain seed and root stock remnants for re-vegetation efforts outlined below.

1. Site/Seedbed Preparation:
   - a. The reuse of stockpiled Pinelands A-Horizon soils to the depth found prior to construction (1.0" minimum) is required for all permanent stabilization efforts involving native plant materials.
   - b. pH, organic matter, texture and cation exchange capacity (CEC) (as estimated by sum of cations, CECsum) of any non-native PNR soil shall be equal or less than that of the native soil on the project site .
     - See Soil survey http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx for typical soil measurement for pH, texture, organic matter and CEC -
   - c. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and mulch anchoring. All grading shall be done in accordance with Standards for Land Grading (see 7th Edition Manual), including methods to alleviate soil compaction (the addition of compost for organic matter shall not exceed the in-situ composition).
   - d. Sand fencing - Sand fencing (standard snow fence) may be used to address potential wind erosion on large sites (see Sand fencing, Dune Stabilization Standard). Sand fencing shall be used in combination with other permanent stabilization methods to prevent erosion.
2. Re-seeding with Pinelands Approved Seed Mixtures:
   - a. Appropriate seed mixtures shall be selected from Table 4-4 in 7th Edition Manual. Seed shall be broadcast or drill seeded directly into the A-horizon soils. Mulch consistent with the Standard.
3. Re-establishment of Native Vegetation without seeding:
   - a. In cases where it is desirable or required for native vegetation to be re-established by unassisted re-colonization, A-Horizon soils (without adding seeding) shall be protected from erosion by any of the following measures until native plant materials (seed and root stock preserved in A-Horizon soils and other native volunteer vegetation) re-colonize in the area:
   - i. Unrotted small-grain straw, at 2.0 to 2.5 tons per acre, is spread uniformly at 90 to 115 pounds per 1,000 square feet and anchored with a mulch anchoring tool, liquid mulch binders, or netting tie down. Other suitable materials may be used if approved by the Soil Conservation District. The approved rates above have been met when the mulch covers the ground completely upon visual inspection.
   - ii. Light layer (2 inches thick maximum) of wood chips (locally sourced from within the Pinelands National reserve if available).
   - iii. Unseeded, Type A (or greater) biodegradable erosion control blanket.
   - iv. Combination of the above.
   - v. Re-apply mulch materials as needed (to limit erosion) until an adequate cover of native plants is established. **This may be require several growing seasons to adequately establish native vegetation.
   - vi. A bond (estimate to be prepared by a NJ Licensed Engineer) may be required by the local Soil Conservation District to ensure the suitable establishment of native vegetation is accomplished. A Final Certificate of Compliance shall not be issued to the overall project site until adequate, permanent vegetative cover is established.
   - vii. If natural re-colonization fails after 2 growing seasons, vegetative establishment will require the area to be mechanically seeded with a suitable mixture from Table 4-4 or otherwise replanted with live vegetation.of mowed once does not guarantee the permanency of the turf should other maintenance factors be neglected or otherwise mismanaged.

V. STANDARD FOR STABILIZATION WITH MULCH ONLY

A. Where Applicable:

This practice is applicable to areas subject to erosion, where the season and other conditions many not be suitable for growing an erosion-resistant cover where stabilization is needed for a short period until more suitable protection can be applied.

B. Methods and Materials:

1. Site Preparation:
   - a. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standard for Land Grading (see 7th Edition Manual).
   - b. Install needed erosion control practices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways. See Standards 11 through 42, in the 7th Edition Manual.
2. Protection Materials:
   - a. Unrotted small-grain straw, at 2.0 to 2.5 tons per acre, is spread uniformly at 90 to 115 pounds per 1,000 square feet and anchored with a mulch anchoring tool, liquid mulch binders, or netting tie down. Other suitable materials may be used if approved by the Soil Conservation District. The approved rates above have been met when the mulch covers the ground completely upon visual inspection, i.e. the soil cannot be seen below the mulch.
   - b. Synthetic or organic soil stabilizers may be used under suitable conditions and in quantities as recommended by the manufacturer.
   - c. Wood-fiber or paper-fiber mulch at the rate of 1,500 pounds per acre (or according to the manufacturer's requirements) may be applied by a hydroseeder.
   - d. Mulch netting, such as paper jute, excelsior, cotton or plastic, may be used.
   - e. Woodchips applied uniformly to a minimum depth of 2 inches may be used. Woodchips will not be used on areas where flowing water could wash them into an inlet and plug it.
   - f. Gravel, crushed stone, or slag at the rate of 9 cubic yards per 1,000 sq. ft. applied uniformly to a minimum depth of 3 inches may be used. Size 2 or 3 (ASTM C-330 is recommended.
3. Mulch Anchoring:

   Should be accomplished immediately after placement of hay or straw mulch to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area and steepness of slopes.
   - a. Peg and Twine - Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
   - b. Mulch Nettings - Staple paper, cotton, or plastic nettings over mulch. Use degradable netting in areas to be mowed. Netting is usually available in rolls 4 feet wide and up to 300 feet long.
   - c. Crimper Mulch Anchoring Coulter Tool - A tractor-drawn implement especially designed to punch and anchor mulch into the soil surface. This practice affords maximum erosion control, but its use is limited to those slopes upon which the tractor can operate safely. Soil penetration should be about 3 to 4 inches. On sloping land, the operation should be on the contour.
   - d. Liquid Mulch Binders:
   - i. Applications should be heavier at edges where wind catches the mulch in valleys, and at crests of banks. Remainder of area should be uniform in appearance.
   - ii. Use of the following:
     - (a) Organic and Vegetable Based Binders - Naturally occurring, powder based, hydrophilic materials that mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membrane networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in a phyto-toxic effect or impede growth of turfgrass. Vegetable based gels shall be applied at rate and weather conditions recommended by the manufacturer.
     - (b) Synthetic Binders - High polymer synthetic emulsion, miscible with water when diluted and following application to mulch, drying and curing shall no longer be soluble or dispersible in water. It shall be applied at rates and weather conditions recommended by the manufacturer and remain tacky until germination of grass.

VI. STANDARD FOR PERMANENT STABILIZATION WITH SOD

A. Where Applicable:

On exposed soils that have a potential for causing off-site environmental damage where an immediate, permanent vegetative cover is desired. Water (rain or irrigation) is required for success; access to irrigation is essential during drought.

B. Methods and Materials:

High Quality cultivated sod is preferred over native or pasture sod.

Sod should be free of broadleaf weeds and undesirable coarse and fine weed grasses.

Sod should be of uniform thickness, typically ⅝ inch, plus or minus ¼ inch, at time of cutting (excludes top growth).

Sod should be vigorous and dense and be able to retain its own shape and weight when suspended vertically with a firm grasp from the upper 10 percent of the strip. Broken pads and rolls or torn and uneven ends will not be acceptable.

For droughty sites, a sod of turf-type tall fescue or turf-type tall fescue mixed with Kentucky bluegrass is preferred over a 100% Kentucky bluegrass sod. Although not widely available, a sod of fine fescue is also acceptable for droughty sites.

Only moist, fresh, unheated sod should be used. Sod should be harvested, delivered, and installed within a period of 24 hours or less during summer months.

1. Site Preparation:
   - a. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standard for Land Grading (see 7th Edition Manual).
   - b. Topsoil should be handled only when it is dry enough to work without damaging the soil structure. A uniform application to a depth of 6 inches (unsettled) is required on all sites. See the Standard for Topsoiling for topsoil and amendment requirements.
   - c. Install needed erosion control practices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways.
2. Soil Preparation:
   - a. uniformly apply ground limestone, and fertilizer according to soil test recommendations such as offered by Rutgers Co-operative Extension. Soil sample mailers are available from the local Rutgers Cooperative Extension offices (http://njaes.rutgers.edu/county/). Fertilizer shall be applied at the rate of 500pounds per acre or 11 pounds per 1,000 square feet using 10-10-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise and incorporated in to the surface 4 inches. If fertilizer is not incorporated, apply ½ the rate described above during seedbed preparation and repeat another ½ rate application of the same fertilizer within 3 to 5 weeks after seeding. Apply limestone at the rate of 2 tons/acre unless soil testing indicates otherwise. Calcium carbonate is the equivalent and standard for measuring the ability of liming materials to neutralize soil acidity and supply calcium and magnesium to grasses and legumes. Table 6-1 is a general guideline for limestone application rates.

TABLE 6-1

LIMESTONE[1] APPLICATION RATE BY SOIL TEXTURE		
SOIL TEXTURE	TONS/ACRE	LBS./1000 SQ. FT.
CLAY, CLAY LOAM, AND HIGH ORGANIC SOIL	3	135
SANDY LOAM, LOAM, SILT LOAM	2	90
LOAMY SAND, SAND	1	45

   - b. Work lime, and fertilizer into the topsoil as nearly as practical to a depth of 4 inches with a disc, springtooth harrow, or other suitable equipment. The final harrowing or disking operation should be on the general contour. Continue tillage until a reasonably uniform, fine seedbed is prepared.
   - c. Remove from the surface all objects that would prevent good sod to topsoil contact and remove all other debris, such as wire, cable, tree roots, pieces of concrete, clods, lumps, or other unsuitable material.
   - d. Inspect site just before sodding. If traffic has left the soil compacted, the area must be re-tilled and firmed in accordance with the above.
3. Sod Placement:
   - a. Sod strips should be laid on the contour, never up and down the slope, starting at the bottom of the slope and working up. On steep slopes, the use of ladders will facilitate the work and prevent damage to the sod. During periods of high temperature, lightly irrigate the soil immediately prior to paying the sod.
   - b. Place sod strips with snug, even joints (seams) that are staggered. Open spaced invite erosion.
   - c. Lightly roll or tamp sod immediately following placement to insure solid contact of root mat and soil surface. Do not overlap sod. All joints should be butted tightly to prevent voids which would cause drying of the roots and invasion of weeds.
   - d. On slopes greater than 3 to 1, secure sod to surface soil with wood pegs, wire staples biodegradable plastic spikes, or split shingles (8 to 10 inches long by ¾inch wide).
   - e. Surface water cannot always be diverted from flowing over the face of the slope, but a capping strip of heavy jute or plastic netting, properly secured, along the crown of the slope and edges will provide extra protection against lifting and undercutting of sod. The same technique can be used to anchor sod in water-carrying channels and other critical areas. Wire staples must be used to anchor netting in channel work.
   - f. Immediately following installation, sod should be watered until water penetrates the soil layer beneath sod to a depth of 1 inch. Maintain optimum water for at least two weeks.
4. Topdressing:
   - a. Since soil organic matter and slow release nitrogen fertilizer (water insoluble) are prescribed in Sections 1 and 2 in this Standard, a follow-up topdressing is not mandatory, except where group nitrogen deficiency exists in the soil to the extent that turf failure may develop, topdressing shall then be applied. Topdress with 10-0-10 or equivalent at 400 pounds per acre or 7 pounds per 1,000 square feet every 3 to 5 weeks until the gross nitrogen deficiency in the turf is ameliorated.

VII. TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION

A. Where Applicable:

On exposed soils that have a potential for causing off-site environmental damage.

B. Methods and Materials:

1. Site Preparation:
   - a. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standard for Land Grading (see 7th Edition Manual), PG. 19-1.
   - b. Install needed erosion control practices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways. See Standards 11 through 42 (see 7th Edition Manual).
   - c. Immediately prior to seeding, the surface should be scarified 6" to 12" where there has been soil compaction. This practice is permissible only when there is no danger to underground utilities (cables, irrigation systems, etc.).
2. Seedbed Preparation:
   - a. Apply ground limestone and fertilizer according to soil test recommendations such as offered by Rutgers Co-operative Extension. Soil sample mailers are available from the local Rutgers Cooperative Extension offices. Fertilizer shall be applied at the rate of 500 pounds per acre of 11 pounds per 1,000 square feet of 10-20-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise. Apply limestone at the rate of 2 tons/acre unless soil testing indicates otherwise. Calcium carbonate is the equivalent and standard for measuring the ability of liming materials to neutralize soil acidity and supply calcium and magnesium to grasses and legumes.
   - b. Work lime and fertilizer into the soil as nearly as practical to a depth of 4 inches with a disc, springtooth harrow, or other suitable equipment. The final harrowing or disking operation should be on the general contour. Continue tillage until a reasonable uniform seedbed is prepared.
   - c. Inspect seedbed just before seeding. If traffic has left the soil compacted, the area must be retilled in accordance with the above.
   - d. Soils high in sulfides or having a pH of 4 or less refer to Standard for Management of High Acid Producing Soils, pg. 1-1.
3. Seeding - Temporary Mixture:
   - a. Select seed from recommendations in Table 7-2.

TABLE 7-2

TEMPORARY VEGETATIVE STABILIZATION GRASSES, SEEDING RATES, DATES & DEPTHS

SEED SELECTIONS	SEEDING RATE [1] (pounds)		OPTIMUM SEEDING DATE[2] Based on Plant Hardiness Zone[3]			OPTIMUM SEED DEPTH[4] (inches)
	Per Acre	Per 1000 Sq. Ft.	ZONE 5b, 6s	ZONE 6b	ZONE 7a, b	
COOL SEASON GRASSES						
1.Spring Oats	86	2.0	3/15-6/1 8/1-9/15	3/1-5/15 8/15-10/1	2/15-5/1 8/15-10/15	1.0
2.Winter Barley	96	2.2	8/1-9/15	8/15-10/1	8/15-10/15	1.0
3.Annual Ryegrass	100	1.0	3/15-6/1 8/1-9/15	3/15-6/1 8/1-9/15	2/15-5/1 8/15-10/15	0.5
4.Winter Cereal Rye	112	2.8	8/1-11/1	8/1-11/15	8/1-12/15	1.0
WARM SEASON GRASSES						
5.Pearl Millet	20	0.5	6/1-8/1	5/15-8/15	5/1-9/1	1.0
6.Millet(German or Hungarian)	30	0.7	6/1-8/1	5/15-8/15	5/1-9/1	1.0

1. Seeding rate for warm season grass, selections 5-7 shall be adjusted to reflect the amount of Pure Line Seed (PLS) as determined by a germination test result. No adjustment is required for cool season grasses.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Plant Hardiness Zone (see figure 7-1, pg. 7-4) See 7th Edition Manual
4. Twice the depth for sandy soils.

   - b. Conventional Seeding. Apply seed uniformly by hand, cyclone (centrifugal) seeder, drop seeder, drill or cultipacker seeder. Except for drilled, hydroseeded or cultipacked seedings, seed shall be incorporated into the soil to a depth of ¼ to ½ inch by raking or dragging. Depth of seed placement may be ¼ inch deeper on coarse textured soil.
   - c. Hydroseeding is a broadcast seeding method usually involving a truck or trailer mounted tank, with an agitation system and hydraulic pump for mixing seed, water and fertilizer and spraying the mix onto the prepared seedbed. Mulch shall not be included in the tank with seed. Short fibered mulch may be applied with a hydroseeder following seeding (also see Section IV Mulching). Hydroseeding is not a preferred seeding method because seed and fertilizer are applied to the surface and not incorporated into the soil. Poor seed to soil contact occurs reducing seed germination and growth. Hydroseeding may be used for areas too steep for conventional equipment to traverse or too obstructed with rocks, stumps, etc.
   - d. After seeding, firming the soil with a corrugated roller will assure good seed-to-soil contact, restore capillarity, and improve seeding emergence. This is the preferred method. When performed on the contour, sheet erosion will be minimized and water conservation on site will be maximized.
4. Mulching

   Mulching is required on all seeding. Mulch will insure against erosion before grass is established and will promote faster and earlier establishment. The existence of vegetation sufficient to control soil erosion shall be deemed acceptable with this mulching requirement.
   - a. Straw or Hay: Unrotted small grain straw, hay free of seeds, to be applied at the rate of 1.5 to 2 tons per acre (70 to 90 pounds per 1,000 square feet), except that where a crimper is used instead of a liquid mulch-binder (tackifying or adhesive agent), the rate of application is 3 tons per acre. Mulch chopper-blowers must not grind the mulch. Hay mulch is not recommended for establishing fine turf or lawns due to the presence of weed seed.

     Application: Spread mulch uniformly by hand or mechanically so that at least 95% of the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 to 90 pounds within each section.

     Anchoring shall be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area, steepness of slopes, and costs.
   - i. Peg and Twine: Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
   - ii. Mulch Nettings: Staple paper, jute, cotton or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
   - iii. Crimper (mulch anchoring coulter tool): A tractor- drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tackifying or adhesive agent is required.
   - iv. Liquid Mulch Binders: May be used to anchor salt hay, hay or straw mulch.
     - (a) Applications should be heavier at edges where wind may catch the mulch, in valleys, and at crests of banks. The remainder of the area should be uniform in appearance.
     - (b) Use of the following:
       - (1) Organic and Vegetable Based Binds - Naturally occurring, powder-based, hydrophilic materials when mixed with water formulated a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in phytotoxic effect or impede growth of turf grass. Use at rates and weather conditions as recommended by the manufacturer to anchor mulch materials. Many new products are available, some of which may need further evaluation for use in this state.
       - (2) Synthetic Binders: High polymer synthetic emulsion, miscible with water when diluted and, following application of mulch, drying and curing, shall no longer be soluble or dispersible in water. Binder shall be applied at rates recommended by the manufacturer and remain tacky until germination of grass.

       Note: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.
   - b. Wood-fiber or paper-fiber mulch shall be made from wood, plant fibers or paper containing no growth or germination inhibiting materials, used at the rate of 1,500 pounds per acre (or as recommended by the product manufacturer) and may be applied by a hydroseeder. Mulch shall not be mixed in the tank with seed. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.
   - c. Pelletized mulch - compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers, and coloring agents. The dry pellets, when applied to a seeded area and watered, form a mulch mat. Pelletized mulch shall be applied in accordance with the manufacturer's recommendations. Mulch may be applied by hand or mechanical spreader at the rate of 60-75 lbs/1,000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation areas, seeded areas where weedseed free mulch is desired, or on sites where straw mulch and tackifier agent are not practical or desirable. Applying the full 0.2 to 0.4 inches of water after spreading pelletized mulch on the seed bed is extremely important for sufficient activation and expansion of the mulch to provide soil coverage.

VIII. STANDARD FOR TOPSOILING

Definition

Topsoiling entails the distribution of suitable quality soil on areas to be vegetated.

Purpose

To improve the soil medium for plan establishment and maintenance

Water Quality Enhancement

Growth and establishment of a vigorous vegetative cover is facilitated by topsoil, preventing soil loss by wind and rain offsite and into streams and other stormwater conveyances.

Where Applicable

Topsoil shall be used where soils are to be disturbed and will be re-vegetated.

Methods and Materials

1. Materials
   - a. Topsoil should be friable, loamy, free of debris, objectionable weeds and stones, and contain no toxic substance or adverse chemical or physical condition that may be harmful to plant growth. Soluble salts should not be excessive (conductivity less than 0.5 millimhos per centimeter. More than 0.5 millimhos may desiccate seedlings and adversely impact growth). Imported topsoil shall have a minimum organic matter content of 2.75 percent. Organic matter content may be raised by additives.
   - b. Topsoil substitute is a soil material which may have been amended with sand, silt, clay, organic matter, fertilizer or lime and has the appearance of topsoil. Topsoil substitutes may be utilized on sites with insufficient topsoil for establishing permanent vegetation. All topsoil substitute materials shall meet the requirements of topsoil noted above. Soil tests shall be performed to determine the component of sand, silt, clay, organic matter, soluble salts and pH level.
2. Stripping and Stockpiling
   - a. Field exploration should be made to determine whether quantity and or quality of surface soil justifies stripping.
   - b. Stripping shall be confined to the immediate construction area.
   - c. Where feasible, lime may be applied before stripping at a rate determined by soil tests to bring the soil pH to approximately 6.5.
   - d. A 4-6 inch stripping depth is common, but may vary depending on the particular soil.
   - e. Stockpiles of topsoil should be situated so as to not obstruct natural drainage or cause off-site environmental damage.
   - f. Stockpiles should be vegetated in accordance with standards previously described herein; see standards for Permanent or Temporary Vegetative Cover for Soil Stabilization. Weeds should not be allowed to grow on stockpiles.
3. Site Preparation
   - a. Grade at the onset of the optimal seeding period so as to minimize the duration and area of exposure of disturbed soil to erosion. Immediately proceed to establish vegetative cover in accordance with the specified seed mixture. Time is of the essence.
   - b. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring, and maintenance. See the Standard for Land Grading.
   - c. As guidance for ideal conditions, subsoil should be tested for lime requirement. Limestone, if needed, should be applied to bring soil to a pH of approximately 6.5 and incorporated into the soil as nearly as practical to a depth of 4 inches.
   - d. Prior to topsoiling, the subsoil shall be in compliance with the Standard for Land Grading.
   - e. Employ needed erosion control practices such as diversions, grade stabilization structures, channel stabilization measures, sedimentation basins, and waterways. See Standards 11 through 42.
4. Applying Topsoil
   - a. Topsoil should be handled only when it is dry enough to work without damaging soil structure; i.e., less than field capacity (see glossary).
   - b. A uniform application to a depth of 5.0 inches, minimum of 4 inches, firmed in place is required. Alternative depths may be considered where special regulatory and/or industry design standards are appropriate such as golf courses, sports fields, landfill capping, etc. Soils with a pH of 4.0 or less or containing iron sulfide shall be covered with a minimum depth of 12 inches of soil having a pH of 5.0 or more, in accordance with the Standard for Management of High Acid Producing Soil.
   - c. Pursuant to the requirements in Section 7 of the Standard for Permanent Vegetative Stabilization, the contractor is responsible to ensure that permanent vegetative cover becomes established on at least 80% of the soils to be stabilized with vegetation. Failure to achieve the minimum coverage may require additional work to be performed by the contractor to include some or all of the following: supplemental seeding, re-application of lime and fertilizers, and/or the addition of organic matter (i.e. compost) as a top dressing. Such additional measures shall be based on soil tests such as those offered by Rutgers Cooperative Extension Service or other approved laboratory facilities qualified to test soil samples for agronomic properties.

IX. STANDARD FOR LAND GRADING

Definition

Reshaping the ground surface by grading to planned elevations which are determined by topographic survey and layout.

Purpose

The practice is for one or more of the following: Provide more suitable sites for land development; improve surface drainage and control erosion.

Conditions Where Practice Applies

This practice is applicable where grading to planned elevations is practical and it is determined that grading is needed. Grading that involves the disturbances of vegetation over large areas shall be avoided. It may be necessary to provide for temporary stabilization of large areas.

Water Quality Enhancement

Proper grading of disturbed sites will protect against soil loss from erosion, enhance establishment of permanent vegetative cover and help to properly manage stormwater runoff all of which will reduce off site discharge of pollutants.

Planning Criteria

The grading plan and installation shall be based upon adequate topographic surveys and investigations. The plan is to show the location, slope, cut, fill and finish elevation of the surface to be graded. The plan should also include auxiliary practices for safe disposal of runoff water, slope stabilization, erosion control and drainage. Facilities such as waterways, ditches, diversions, grade stabilization structures, retaining walls and subsurface drains should be included where necessary.

Erosion control measures shall be designed and installed in accordance with the applicable standard contained herein.

The development and establishment of the plan shall include the following:

1. The cut face of earth excavations and fills shall be no steeper than the safe angle of repose for the materials encountered and flat enough for proper maintenance.
2. The permanently exposed faces of earth cuts and fills shall be vegetated or otherwise protected from erosion.
3. Provisions shall be made to safely conduct surface water to storm drains or suitable water courses and to prevent surface runoff from damaging cut faces and fill slopes.
4. Subsurface drainage is to be provided in areas having a high water table, to intercept seepage that would adversely affect slope stability, building foundations or create undesirable wetness. See Standard for Subsurface Drainage.
5. Adjoining property shall be protected from excavation and filling operations.
6. Fill shall not be placed adjacent to the back of a stream or channel, unless provisions are made to protect the hydraulic, biological, aesthetic and other environmental functions of the stream.

Soil Management and Preparation

Subgrade soils prior to the application of topsoil shall be free of excessive compaction to a depth of 6.0 inches to enhance the establishment of permanent vegetative cover.

This section of this Standard addresses the potential for excessive soil compaction in light of the intended land use, testing for excessive soil compaction where permanent vegetation is to be established and mitigation of excessive soil compaction when appropriate.

Due to use or setting, certain disturbed areas will not require compaction remediation including, but not limited to the following:

1. Within 20 feet of building foundations with basements, 12 feet from slab or crawl space construction.
2. Where soils or gravel surfaces will be required to support post-construction vehicular traffic loads such as roads, parking lots and driveways (including gravel surfaces), bicycle paths or pedestrian walkways (sidewalks, etc.)
3. Airports, railways or other transportation facilities
4. Areas requiring industry or government specified soil designs, including golf courses, landfills, wetland restoration, septic disposal fields, wet/lined ponds, etc.
5. Areas governed or regulated by other local, state or federal regulations which dictate soil conditions.
6. Brownfields (capped uses), urban development areas, in-fill areas, recycling yards, junk yards, quarries and
7. Slopes determined to be inappropriate for safe operation of equipment.
8. Portions of a site where no heavy equipment travel or other disturbance has taken place.
9. Areas receiving temporary vegetative stabilization in accordance with the Standard.
10. Where the area available for remediation practices is 500 square feet or less in size.
11. Locations containing shallow (close to the surface) bedrock conditions.

Areas of the site which are subject to compaction testing and/or mitigation shall be graphically demoted on the certified soil erosion control plan.

Soil compaction remediation or testing to prove remediation is not necessary will be required in areas where permanent vegetation is to be established that are not otherwise exempted above. Testing method shall be selected, and soil compaction testing shall be performed by, the contractor or other project owner's representative (e.g. engineer). A minimum of two (2) tests shall be performed for projects with an overall limit of disturbance of up to one (1) acre and at a rate of two (2) tests per acre of the overall limit of disturbance for larger areas which shall be evenly distributed over the area of disturbance subject to testing. Tests shall be performed in areas representative of the construction activity prevailing in the area. In the event this testing indicates compaction in excess of the maximum thresholds indicated for the testing method, the contractor/owner shall have the option to perform compaction mitigation over the entire disturbed area (excluding exempt areas) or to perform additional testing to establish the limits of excessive compaction whereupon only the excessively compacted areas would require compaction mitigation.

Soil compaction testing is not required if/when subsoil compaction remediation (Scarification/tillage (6" minimum depth) or similar) is proposed as part of the sequence of construction.

Soil Test Method Options

1. Probing Wire Test Method

   This test shall be conducted with a firm wire (15-1/2 gauge steel wire - e.g. survey marker flag, straight wire stock, etc.), 18 to 21 inches in length, with 6" inches from one end visibly marked on the wire. Conduct wire flag test by holding the wire flag near the flag end and push it vertically into the soil at several different locations in the field to the lesser of a 6 inch depth or the depth at which it bends due to resistance in the soil. Record the depth at which it bends due to resistance in the soil. The wire should penetrate without bending or deforming at least 6" into the ground by hand, without the use of tools. If penetration fails and an obstruction is suspected (rocks, root, debris, etc.) the test can be repeated in the same general area. If the test is successful the soil is not excessively compacted. If the wire is difficult to insert (wire bends or deforms prior to reaching 6 inches in depth) the soil may be excessively compacted and compaction mitigation or further testing via method 3 or 4 below is required, the choice of which is at the contractor/owner's discretion.
2. Handheld Soil Penetrometer Test Method

   This test shall be conducted based on the Standard Operation Procedure (SOP) #RCE2010-001, prepared by the Rutgers Cooperative Extension, Implemented June 1, 2010, last revised February 28, 2011. A result of less than or equal 300 psi shall be considered passing. If the result is greater than 300 psi, the soil may be excessively compacted and compaction mitigation or further testing via method 3 or 4 below is required, the choice of which is at the contractor/owner's discretion.
3. Tube Bulk Density Test Method

   This test shall be certified by a New Jersey Licensed Professional Engineer utilizing only undisturbed samples (reconstitution of the sample not permitted) collected utilizing the procedure for Soil Bulk Density Tests as described in the USDA NRCS Soil Quality Test Kit Guide, Section 1-4, July 2001. When the texture of the soil to be tested is a sand or loamy sand and lack of soil cohesion or the presence of large amounts of coarse fragments, roots or worm channels prevent the taking of undisturbed samples, this test shall not be used.

   Where the results of replicate tests differ by more than ten percent (10%), the samples shall be examined for the following defects:

   i. Cracks, worn channels, large root channels or poor soil tube contact within the samples;
   ii. Large pieces of gravel, roots or other foreign objects;
   iii. Smearing or compaction of the upper or lower surface of the samples

   If any of the defects described in 3 (i-iii) above are found, the defective core(s) shall be discarded and the test repeated using a new replicate sample for each defective replicate sample. The bulk density (defined as the weight of dry soil per volume) results shall be compared with the Maximum Dry Bulk Densities in Table 19-1. A result of less than or equal to the applicable maximum bulk density shall be considered passing. If the result is greater than the maximum bulk density the soil shall be considered excessively compacted and compaction mitigation is required.
4. Nuclear Density Test Method

   This test shall be certified by a New Jersey Licensed Professional Engineer and conducted by a nuclear gauge certified inspector pursuant to ASTM D6938. The bulk density measurement results shall be compared with the Maximum Dry Bulk Densities in Table 19-1. A result of less than or equal to the applicable maximum bulk density shall be considered passing. If the result is greater than the maximum bulk density the soil shall be considered excessively compacted and compaction mitigation is required.

   Table 19-1* - Maximum Dry Bulk Densities (grams/cubic centimeter) by soil type

SOIL TYPE / TEXTURE	BULK DENSITY (g/cc)
COARSE, MEDIUM AND FINE SANDS AND LOAMY SANDS	1.80
VERY FINE SAND AND LOAMY VERY FINE SAND	1.77
SANDY LOAM	1.75
LOAM, SANDY CLAY LOAM	1.70
CLAY LOAM	1.65
SANDY CLAY	1.60
SILT, SILT LOAM	1.55
SILTY CLAY LOAM	1.50
SILTY CLAY	1.45
CLAY	1.40

*Source: USDA Natural Resource Conservation Service, Soil Quality Information Sheet, Soil Quality Resource Concerns: Compaction, April 1996

5. Additional testing methods which conform to ASTM standards and specifications, and which reduce a dry weight, soil bunk density measurement may be allowed subject to District approval.

Procedures for Soil Compaction Mitigation

If subgrade soils are determined to be excessively compacted by testing, as identified above, procedures shall be used to mitigate excessive soil compaction prior to placement of topsoil and establishment of permanent vegetative cover. Restoration of compacted soils shall be through deep scarification/tillage (6" minimum depth) where there is no danger to underground utilities (cables, irrigation systems, etc.) or in the alternative, another method as specified by a New Jersey Licensed Professional Engineer.

Installation Requirements

Timber, logs, brush, rubbish, rocks, stumps and vegetative matter which will interfere with the grading operation or affect the planned stability or fill areas shall be removed and disposed of according to the plan.

Topsoil is to be stripped and stockpiled in amounts necessary to complete finish grading of all exposed areas requiring topsoil. See Standard for Topsoiling.

Fill material is to be free of brush, rubbish, timber, logs, vegetative matter and stumps in amounts that will be detrimental to constructing stable fills.

All structural fills shall be compacted as determined by structural engineering requirements for their intended purpose and as required to reduce slipping, erosion or excessive saturation.

All disturbed areas shall be left with a neat and finished appearance and shall be protected from erosion. See Standards for Permanent Vegetative Cover for Soil Stabilization.

Trees to be retained shall be protected if necessary in accordance with the Standard for Tree Protection During Construction.

X. STANDARD FOR TREE PROTECTION DURING CONSTRUCTION

A. Where Applicable:

On new development sites with existing trees.

B. Methods and Materials:

1. Reconnaissance should be performed before land clearing begins to identify dead and weak trees to be removed and healthy trees to remain, to create aesthetically pleasing development site with vegetation rather than the presence of dead or dying trees. Inventory the site and clearly mark the trees and stands of trees to be saved. Consider relocating streets, housed, or other structures if necessary and feasible. Once clearing begins and damage to the trees occurs, valuable specimens may be lost.
   - a. Characteristics of trees to be protected and saved. The following lists characteristics that should be evaluated before deciding to remove or protect a tree:
   - i. Tree Vigor

     Tree health is the overall condition of the tree. A tree of low vigor is more susceptible to damage by environmental changes than healthy trees and is more susceptible to insect and disease attacks. Indications of poor vigor include the dying of the tips of branches and entire limbs, small annual twig growth, stunted leaf size, sparse foliage, and poor foliage color. Avoid saving hollow or rotten trees, trees cracked, split, leaning or crooked, oozing sap, or with broken tops. Use woodchips generated from removal of trees of poor health and spread them around the root zones to help protect the trees that remain.
   - ii. Tree Age

     Large, picturesque trees may be more aesthetically valuable than smaller, young trees, but also require more extensive protection measures. If leaving an older tree, be sure it is sound and healthy.
   - iii. Species (the right trees for the right locations)

     Many species of trees found in New Jersey woodlands are not suitable for shade tree used around buildings. Avoid protecting trees that are short-lived, brittle, have soft wood, messy leaves, fruit or are frequently attacked by insects and disease. Tree root systems which do not adapt well to cuts and fills may not be suitable alternative. The following are severely affected by compacted construction fills: Aspen, Beech, Paper birch, Eastern red cedar, Black cherry, Dogwood, Katsura tree, Linden, Paperbark maple, Sugar maple, Black oak, Pin oak, Red oak, White oak, Pines, and Tuliptree. See Table 9-1 in the 7th Edition Manual for a more complete list of construction impacts to individual tree species.
   - iv. Resistant to insects and Diseases

     Avoid leaving trees in highly visible areas or specimens that are frequent targets of insects and diseases. American Elm, for example, could be lost due to Dutch Elm Disease. Wild Cherry, another example, is a favorite host of the tent caterpillar, which causes defoliation of the trees in early summer. The following are susceptible to insects (I) and disease (D): White Ash (D), Birch (I), Butternut (D), Crabapples (D), some Elms (D), Hawthorn (D), Hemlock (I), Linden (I), Sugar Maple (D), Mountain Ash (D), Sassafras (I), Scholartree (D), Redbud (D)
   - v. Tree Aesthetics

     Choose trees that are aesthetically pleasing, exhibiting good shape and form. Avoid leaning, crooked, and misshapen trees. Occasionally, an odd-shaped tree or one of unusual form may add interest to the landscape if strategically located. Be sure the tree is structurally sound and vigorous.
   - vi. Spring and Autumn Coloration

     Species differ in fall color. Some are bright red, others orange and yellow. Other species exhibit no autumn color, such as walnut, locust, and sycamore.
   - vii. Wildlife Benefits

     Favor trees that are preferred by wildlife for food, cover, and nesting. A mixture of evergreens and hardwoods is beneficial. Evergreen trees are important for cover during the winter months. The hardwoods are more valuable for food.
   - viii. Air Pollution Susceptibility

     Tree species vary greatly to susceptibility to air pollution. Symptoms vary from browning on the edges of the leaves and needles, to stunting of growth, to death of the tree. The following show tolerance to urban stress and are less likely to present problems with sidewalks: Baldcypress, Corktree, Amur maple, Kentucky coffee tree, Crabapple, Dawn redwood, Ginko (male), Goldenraintree, Hackberry, Hawthorn, Honeylocust, European hornbeam, Horsechestnut, Lindens, Oaks (excluding pin), Pear, Scholartree, Sourgum (tupelo), Sweet gum, Yews, Zelkova.
   - ix. Species Longevity

     Favor trees whose life span is long, such as oak, beech, and tulip poplar. Short-lived trees; (Black locust, Gray birch, Aspen) should be avoided for use as shade, lawn, or specimen trees. Although some short-lived trees have an attractive form of pleasing coloration in the spring or fall, such trees may not live for a long time and thus may not be worth preserving.
   - b. Criteria for protecting remaining trees
   - i. General mechanical damage - see Figure 9.3 in the 7th Edition Manual for correct root zone calculation and placement of tree protection.
   - ii. Box trees within 25 feet of a building site to prevent mechanical injury. Fencing or other barrier should be installed beyond the Critical Root Radius (See Figure 9.3). Tree root systems commonly extend well beyond the drip line.
   - iii. Boards will not be nailed to trees during building operations.
   - iv. Feeder roots should not be cut in an area inside the Protected Root Zone (PRZ).
   - v. Damaged trunks or exposed roots should have damaged bark removed immediately and no paint shall be applied. Exposed roots should be covered with topsoil immediately after excavation is complete. Roots shall be pruned to give a clean, sharp surface amenable to healing. Roots exposed during hot weather should be irrigated to prevent permanent tree injury. Care for serious injury should be prescribed by a professional forester or licensed tree expert.
   - vi. Tree limb removal, where necessary, will be done as natural target pruning to remove the desired branch as close as possible to the branch collar. There should be NO flush cuts. Flush cuts destroy a major defense system of the tree. See Figure 9-1. No tree paint shall be applied. All cuts shall be made at the outside edge of the branch collar (fig. 9-1 and 9-2). Cuts made too far beyond the branch collar may lead to excess sprouting, cracks and rot. Removal of a "V" crotch should be considered for free standing specimen trees 9see Figure 9-2_ to avoid future splitting damage.

Note: For more specific data on certain tree characteristics by species, see Table 9.1, Tree Characteristics or consult with a Licensed Professional Tree Expert, Soil Conservation District or Rutgers Cooperative Extension.

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IF THIS PLAN OR DOCUMENT DOES NOT CONTAIN A RAISED SEAL IMPRESSION, BEARING THE NAME AND REGISTRATION NUMBER OF THE ABOVE SIGNED PROFESSIONAL, IT MAY NOT BE AN AUTHORIZED COPY OF THE ORIGINAL DOCUMENT AND MAY HAVE BEEN ALTERED.

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2023-11-01 - REVISED PER PINELANDS COMMENTS
revisions

SOIL EROSION AND SEDIMENT CONTROL NOTES
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
TOWNSHIP OF PEMBERTON, BURLINGTON COUNTY, NEW JERSEY

date: SEPT. 22, 2023
scale: AS SHOWN
drawn by: P.T.
checked: M.H.
proj no.: 5052894.01

6 of 7

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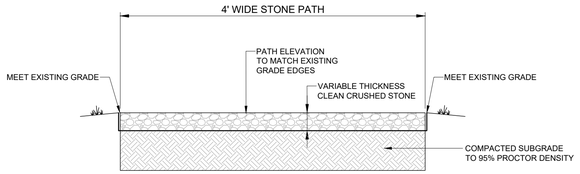
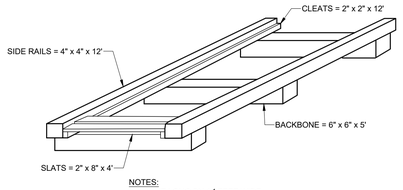
LAST DATE SAVED 10/31/2023
LAST SAVE BY ptucker



STONE PATH DETAIL

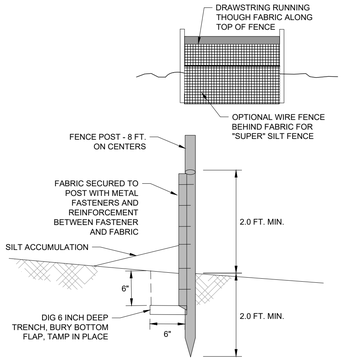
N.T.S.



NOTES:
- 12 FEET LONG BY 4 $\frac{1}{2}$ FEET WIDE
- PRESSURE-TREATED LUMBER
- NOT ANCHORED

BOARDWALK SEGMENT DETAIL

N.T.S.



SILT FENCE DETAIL

NTS

SILT FENCE REQUIREMENTS NOTES:

1. FENCE POSTS SHALL BE SPACED 8 FEET CENTER-TO-CENTER OR CLOSER. THEY SHALL EXTEND TO AT LEAST 2 FEET INTO THE GROUND AND EXTEND AT LEAST 2 FEET ABOVE GROUND. POSTS SHALL BE CONSTRUCTED OF HARDWOOD WITH A MINIMUM DIAMETER THICKNESS OF 1-1/2 INCHES.
2. "SUPER" SILT FENCE- A METAL FENCE WITH 6 INCH OR SMALLER MESH OPENINGS AND AT LEAST 2 FEET HIGH MAY BE UTILIZED. FASTENED TO THE FENCE POSTS, TO PROVIDE REINFORCEMENT AND SUPPORT TO THE GEOTEXTILE FABRIC. POSTS MAY BE SPACED LESS THAN 8 FEET ON CENTER AND MAY BE CONSTRUCTED OF HEAVIER WOOD OR METAL AS NEEDED TO WITHSTAND HEAVIER SEDIMENT LOADING. THIS PRACTICE IS APPROPRIATE WHERE SPACE FOR OTHER PRACTICES IS LIMITED AND HEAVY SEDIMENT LOADING IS EXPECTED. "SUPER" SILT FENCE IS NOT TO BE USED N PLACE OF PROPERLY DESIGNED DIVERSIONS WHICH MAY BE NEEDED TO CONTROL SURFACE RUNOFF RATES AND VELOCITIES.
3. A GEOTEXTILE FABRIC, RECOMMENDED FOR SUCH USE BY MANUFACTURER, SHALL BE BURIED AT LEAST 6 INCHES DEEP IN THE GROUND. THE FABRIC SHALL EXTEND AT LEAST 2 FEET ABOVE THE GROUND. THE FABRIC MUST BE SECURELY FASTENED TO THE POSTS USING A SYSTEM CONSISTING OF METAL FASTENERS (NAILS OR STAPLES) AND A HIGH STRENGTH REINFORCEMENT MATERIAL (NYLON WEBBING, GROMMETS, WASHERS ETC.) PLACED BETWEEN THE FASTENER AND THE GEOTEXTILE FABRIC. THE FASTENING SYSTEM SHALL RESIST TEARING AWAY FROM THE POST. THE FABRIC SHALL INCORPORATE A DRAWSTRING IN THE TOP PORTION OF THE FENCE FOR ADDED STRENGTH.

SILT FENCE MAINTENANCE NOTES:

1. SEDIMENT SHALL BE REMOVED FROM THE UPSTREAM FACE OF THE BARRIER WHEN IT HAS REACHED A DEPTH OF $\frac{1}{3}$ THE BARRIER HEIGHT.
2. REPAIR OR REPLACE BARRIER (FABRIC, POSTS, BALES, ETC.) WHEN DAMAGED.
3. BARRIERS SHALL BE INSPECTED DAILY FOR SIGNS OF DETERIORATION AND SEDIMENT REMOVAL.

DRAWING LOCATION	W:\FILEROOM\HQ\5052894\ENG\DWGS_5052894-SES.DWG
LAST DATE SAVED	10/31/2023
LAST SAVE BY	plucker

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revisions
2023-11-01 - REVISED PER PINELANDS COMMENTS

SOIL EROSION AND SEDIMENT CONTROL DETAIL & CONSTRUCTION DETAILS
FOR
PEMBERTON LAKE
ACCESSIBLE TRAIL IMPROVEMENT PLANS
BLOCK 825, LOTS 7.01, 7.04 & 7.05
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