



ENGINEERING,
INC.

ENGINEERS
SURVEYORS

October 18, 2024

Town of Plymouth
Zoning Board of Appeals
11 Lincoln Street
Plymouth, MA 02360

**RE: Proposed Earth Removal
Landers Farm, LLC
Landers Farm Way
Parcel ID 061-000-033-002 & 003
G.A.F. Job 19-9277**

Dear Members of the Zoning Board of Appeals,

G.A.F. Engineering, Inc., on behalf of our client, Landers Farm, LLC, Inc., respectfully submits the enclosed application and supporting documentation for a Special Permit associated with earth removal in excess of 10 cubic yards of soil associated with the construction of cranberry beds and attendant facilities.

Sixteen (16) copies of each of the following:

- Zoning Board of Appeals Petition Application
- Zoning Permit Denial
- Environmental Impact Statement and Narrative
- Certified list of Abutters
- Copy of Deed to the subject premises

Sixteen (16) full size copies and one (1) reduced 11"x17" copy of the site plans entitled "Landers Farm, LLC, Plan to Accompany Earth Removal Permit dated October 9, 2024" are also enclosed. Digital pdf's of the plan set are also being submitted electronically.

Please feel free to contact this office should you require any additional information.

Sincerely,
G.A.F. Engineering, Inc.


William F. Madden, P.E.

WFM/brg

Enclosures

cc: Town Clerk
P.A. Landers, Inc.

266 MAIN ST.
WAREHAM, MA 02571

TEL 508.295.6600
FAX 508.295.6634

ZONING BOARD OF APPEALS
PETITION APPLICATION

PETITIONER: LANDERS FARM, LLC DATE: _____

PETITIONER/ADDRESS: PO BOX 217, HANOVER, MA 02339

LOCATION OF PROPERTY: LANDERS FARM WAY

ASSESSORS' PID NO. 061-000-033-002 & 003 ZONE: RR

OWNER OF PROPERTY: P.A. LANDERS, INC.
(IF OTHER THAN PETITIONER)

ADDRESS OF OWNER: PO BOX 217, HANOVER, MA 02339
(IF OTHER THAN PETITIONER)

TITLE REFERENCE:
BOOK NO. 20675 PAGE NO. 87 (UNREGISTERED LAND)

CERTIFICATE OF TITLE NO. _____ (REGISTERED LAND)

DID YOU OWN THIS PROPERTY ON JANUARY 1ST? YES NO

IF NOT, WHO WAS THE OWNER ON JANUARY 1ST? _____

THE PETITIONER/APPLICANT CERTIFIES THAT THERE IS NO INFRINGEMENT OF WORK OR STRUCTURES ON PLYMOUTH TOWN PROPERTY OUTSIDE OF THE RIGHT-OF-WAY AND/OR THE PROJECT DOES NOT REQUIRE ACCESS ON/OVER/THROUGH TOWN PROPERTY. IF WORK, ACCESS, OR STRUCTURES ARE PROPOSED ON TOWN PROPERTY, YOU MUST CONTACT THE TOWN MANAGERS OFFICE, IN WRITING, IMMEDIATELY. FAILURE TO OBTAIN THE TOWN'S PERMISSION OR ACKNOWLEDGMENT OF PLANS THAT INCLUDE WORK, ACCESS, OR STRUCTURES ON TOWN PROPERTY WILL RESULT IN THE DELAY OF THE PERMIT REVIEW PROCESS.

SIGNATURE: _____ (OWNER OR AGENT)

REASONS FOR THIS REQUEST, INCLUDING PROVISIONS OF THE ZONING BY-LAW FROM WHICH RELIEF IS REQUESTED: *(PLEASE CHECK THE ZONING DENIAL FOR THIS INFORMATION)*

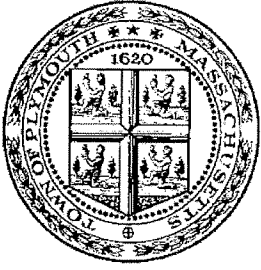
SIGNATURE:  (OWNER OR AGENT)

PRINTED NAME: WILLIAM F. MADDEN (OWNER OR AGENT)

MAILING ADDRESS: 266 MAIN STREET, WAREHAM, MA 02571

PHONE NUMBER: 508-295-6600

EMAIL ADDRESS: bill@gafenginc.com



DEPARTMENT OF INSPECTIONAL SERVICES
**TOWN OF PLYMOUTH,
MASSACHUSETTS**

26 Court Street
Plymouth, Massachusetts 02360
Phone: 508.747.1620
Fax: 508.830.4028

App: Brian Grady
266 Main Street
Wareham, MA 02571

Zoning Permit #: Z-24-724

Appl Date: August 27, 2024

Project Type: Commercial Zoning Permit

Location: 0 LANDERS FARM WAY

Parcel ID: 061-000-033-003

Zoning District: RR

Owner: PA LANDERS INC

Addr: PO BOX 217
HANOVER, MA 02339-0217

Fee Amount: \$100.00 **Fee Paid:** \$100.00

DENIED: SPECIAL PERMIT REQUIRED PER SECTION 205-18.F TO CONDUCT EARTH REMOVAL
IN EXCESS OF TEN (10) CUBIC YARDS.

DENIAL DATE: August 29, 2024

**BUILDING
OFFICIAL:**

James Campbell

NOT A BUILDING PERMIT
ZONING PERMITS ARE GOOD FOR ONE YEAR FROM THE DATE ISSUED

ENVIRONMENTAL IMPACT STATEMENT

Client Name: Landers Farm, LLC

Project No.: _____

Job Location: SE Plymouth

Is the project subject to any of the following? **NO**

If yes, please state the status of permitting.

- | | |
|--|---|
| <input type="checkbox"/> MEPA (Mass. Environmental Protection Act) | <input type="checkbox"/> Mass. Chapter 91 Licensing |
| <input type="checkbox"/> MESA (Mass. Endangered Species Act) | <input type="checkbox"/> Mass. Hwy. Chapter 61 |
| <input type="checkbox"/> Mass. Wetlands Protection Act | |
| <input type="checkbox"/> USACE (U.S. Army Corps of Engineers) | <input type="checkbox"/> EPA NPDES Phase II |

Other state/federal permits not listed above: _____

I. Natural Environment

A. Air

- | | Yes | No |
|--|--------------------------|-------------------------------------|
| 1. Will the project disperse any smoke, dust, dirt, fly ash or any particulate matter into the atmosphere? Only during construction | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Will any radioactive or poisonous gas or material be dispersed into the atmosphere? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Will the project during any phase of the construction or operation, cause thermal pollution to the air? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Will the project emit, produce or store any noxious or odorous materials? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Will any glare be produced during any phase of the construction or operation that would cause a nuisance to surrounding property? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Will any artificial light of an intensity greater than one foot candle, five feet above the ground at the lot line be present? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Will there NOT be adequate air circulation around the structure(s) once completed? | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Will there be any noise generated greater than those allowed in the environmental requirements of this Board of Appeals? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

NOTE: If the "yes" box is checked for any item, please explain or attach comments.

- | B. Land | <u>Yes</u> <u>No</u> |
|--|--|
| 1. Will there be any soil used as fill? If yes, please attach comments - is the fill from on-site or off-site? what is the estimated quantity of fill? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 2. Will the existing soils at the construction site be stripped or removed from their current location and be placed elsewhere? If yes, please attach comments - what is the estimated quantity of earth removal? what is the proposed hauling route? | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| 3. Will any soil be stockpiled on the site? Siltation fence/straw
If yes, state method of erosion control: <u>wattles as needed</u> | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| 4. Will adequate erosion control NOT be implemented during and after construction? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 5. Will construction take place on a wetland or on an area subject to flooding? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 6. Will there be any removal of ledge or other large rock formation? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 7. Are there any natural land features that are peculiar to the area or are of special scenic or historical value? | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| 8. Will there be any disposal or storage of radioactive, poisonous, putrescible, noxious or odorous material in the soil? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 9. What soil types exist at this location, and what method was used to establish this information? | Please attach comments. |
| 10. Are the existing soils previously disturbed, and if so, how? | Please attach comments. |
|
 | |
| C. Water | |
| 1. Will this project discharge any effluent into any stream, brook, lake, pond or any other body of water? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 2. Will the project pipe, divert or alter in way, any body of water? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 3. Are there any underground streams on the site? | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| 4. Will the project affect the existing water table in any way? | <input type="checkbox"/> <input checked="" type="checkbox"/> |

NOTE: If the "yes" box is checked for any item, please explain or attach comments.

- | | <u>Yes</u> | <u>No</u> |
|--|--------------------------------|-------------------------------------|
| 5. Will the project cause thermal pollution of any surface or groundwater? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Will there be any storage of any material on the site that may contaminate surface or groundwater? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Will NO provisions be made for prevention of the diversion of surface water from its natural, existing flow onto abutting land during construction or after completion? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. Is this property within an Aquifer Protection Overlay District per Section 205-57?
Is this property within a DEP-defined Zone II ? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9. What is the water table on this tract of land, and how was this determined? | Please attach comments. | |

D. Wildlife (Flora & Fauna) If yes below, please attach comments.

- | | | |
|---|-------------------------------------|-------------------------------------|
| 1. Will it be necessary to remove trees or natural foliage in areas other than areas within fifteen feet of the sides and rear of any foundation, parking areas drives, leaching areas? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Are there any rare or endangered species of animals present that use the site as a source of food or water, or as a refuge or habitat? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Are there any rare plant or tree species on the site? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Will any new trees be planted? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

E. Scenic Beauty

- | | | |
|--|--------------------------|---|
| 1. Will this project damage any area of uncommon scenic beauty in any way? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Will the structure(s), after completion, contrast sharply with the surrounding environment? | N/A | <input type="checkbox"/> <input type="checkbox"/> |
| 3. Will any signs be used after completion of the project? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Will there NOT be any precautions taken to prevent wind blown litter? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

NOTE: If the “yes” box is checked for any item, please explain or attach comments.

Yes No

5. Will any land be set aside for conservation purposes?
- If yes, will the land be deeded to the Town?

II. Man Made Environment

A. Surrounding Land Use

If yes below, please attach comments.

1. After completion, will the structure(s) NOT be congruous with the abutting properties? N/A
2. Will the structure(s), after completion detract from the surrounding properties? N/A
3. Are there any "green belts~ or buffer zones within the project?

B. Density

1. Assuming 3.5 persons per dwelling unit, what will the population density per acre be? N/A
2. What is the population density per acre of the surrounding area (within a radius of 1/2 mile)? 1 PERSON/ACRE +/-

C. Construction Plan

1. Complete the following:
- a. Building Type N/A
 - b. Size _____
 - c. Floor Area _____
 - d. No. of Bedrooms 0
 - e. Type of Construction _____
2. What is the percentage of the tract of land to be occupied by buildings, parking and drives? < 1%
3. Is this project proposed in phases?

If yes, please attach comments.

NOTE: If the "yes" box is checked for any item, please explain or attach comments.

III. Public Services and Facilities

A. What type of sewerage facilities will be provided? N/A

What is the public or centralized wastewater facility proposal or the projected sewage flow generated per unit, as defined by Title V of the State's Sanitary Code and the Town of Plymouth's Board of Health? _____

B. What type of water supply will be provided? N/A

C. Will easements be needed to complete drainage and/or sewer systems? N/A

1. Are easements within tract of land? _____

2. Are easements outside tract of land? _____

3. Will easements be deeded to the Town? _____

D. How many automobile vehicle trips per hour will be generated in the immediate vicinity of the project? **Peak:** 10 **Average:** 6

E. What roads will provide the primary & secondary access to the project? Hedges Pond Road

F. How many school aged children will this development generate? 0

G. What is the distance to the nearest:

1. Elementary School? 4 miles northerly-Indian Brook School

2. Junior High School? 2 miles southerly-New Testament Christian School

3. High School? 4 miles northerly Plymouth South High School

4. Shopping Center? >1.5 miles Wareham, 6.5 miles Carver, 9 miles Plymouth

5. Fire Station? 1 mile southerly

6. Police Station? >8 miles northerly Plymouth, 7 miles southerly Bourne

H. Is development on existing bus route? _____

NOTE: If the "yes" box is checked for any item, please explain or attach comments.

IV. Recreation

- A. What community facilities are within one mile of the development? _____
- B. What recreation facilities are to be provided by the developer? N/A
- C. Is any part of the tract of land set aside for recreation area? NO How Much? _____
- D. Will the land set aside for recreation, be deeded to the Town? NO
- E. Are there any public/private open lands, trails or walkways within the project?

	<u>Yes</u>	<u>No</u>
	<input type="checkbox"/>	<input type="checkbox"/>
- Are there any public/private open lands, trails or walkways abutting the project?

	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------
- Are there any public/private open lands or trails within 500 feet of the project?

	<input type="checkbox"/>	<input type="checkbox"/>
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If yes to any of E. above, please attach comments - have links been included within the project?

V. Economic Considerations

- A. What is the estimated tax return Plymouth will receive upon completion? _____
- B. Will this project involve State or Federal Funds? _____
- If so, copies of any required environmental impact assessment forms & statements must be submitted to the Board of Appeals.**
- C. What is the estimated construction time? 6-8 years
- D. Will this project cause the Town to expand any of its existing community services?

	<u>Yes</u>	<u>No</u>
	<input type="checkbox"/>	<input type="checkbox"/>
- If yes, please attach comments.**

VI. GENERAL

- Will this project affect the Town, environment, or people in any way not mentioned?
- If yes, please attach comments.**

DATE: 10/16/24

SIGNATURE OF OWNER/AGENT: Mumtaz Madder GAF ENGINEERING

ADDRESS: 200 Main St Waverham Ma 02571

NOTE: If the "yes" box is checked for any item, please explain or attach comments.

Narrative to Accompany Environmental Impact Statement

P.A. Landers, Inc.
Off Hedges Pond Road

The petition filed in this case requests a Special Permit per section 205.18 and section 205.40 subject to Environmental Design Criteria to construct an additional 9.23 acres of new style cranberry beds and a 6.0-acre reservoir/tailwater pond on land currently in agricultural use. This submittal is being made pursuant to the “Zoning Bylaw of the Town of Plymouth” Dated 2004 as Amended through October 2012. The land included as part of this application is identified as Lots 33-2 and 33-3 on a Definitive Subdivision Plan entitled “Landers Farm Definitive Subdivision Plan off Quail Run, Plymouth, Massachusetts”, prepared by G.A.F. Engineering, Inc. and dated revised March 6, 2018. This plan was approved by the Plymouth Planning Board on March 12, 2018, and the plan mylars were endorsed on April 23, 2018, and is therefore governed by the zoning bylaw in effect at the time of the Definitive Plan submission. This plan is recorded with the Plymouth County Registry of Deeds in Plan Book 62, Page 949.

The property consists of two lots totaling 129.91 acres. These parcels are identified as 061-000-033-002 and 003. This property currently contains 17.2 acres of cranberry bogs. When completed there will be a total of 26.43 acres cranberry bog and a 6.0-acre reservoir/tailwater pond.

This project will be the culmination of the expansion envisioned and approved in Board of Appeals Decision Case NO. 3515. That decision was for the expansion of an agricultural property located directly south of this project site. The applicants/landowners for that project were the Jeannine Anderson Realty Trust and P.A. Landers. The “Master Plan” referred to in the decision showed future expansion onto the current project site. See Appendix 1 for the Master Plan. At that time the expansion showed additional Phases 5, 6 and 7. These phases included 18.57 acres of cranberry bogs and a 6.84-acre reservoir/tailwater pond. The current proposal scales back those numbers to 8.38 acres of cranberry bog and a 6.0-acre reservoir/tailwater pond.

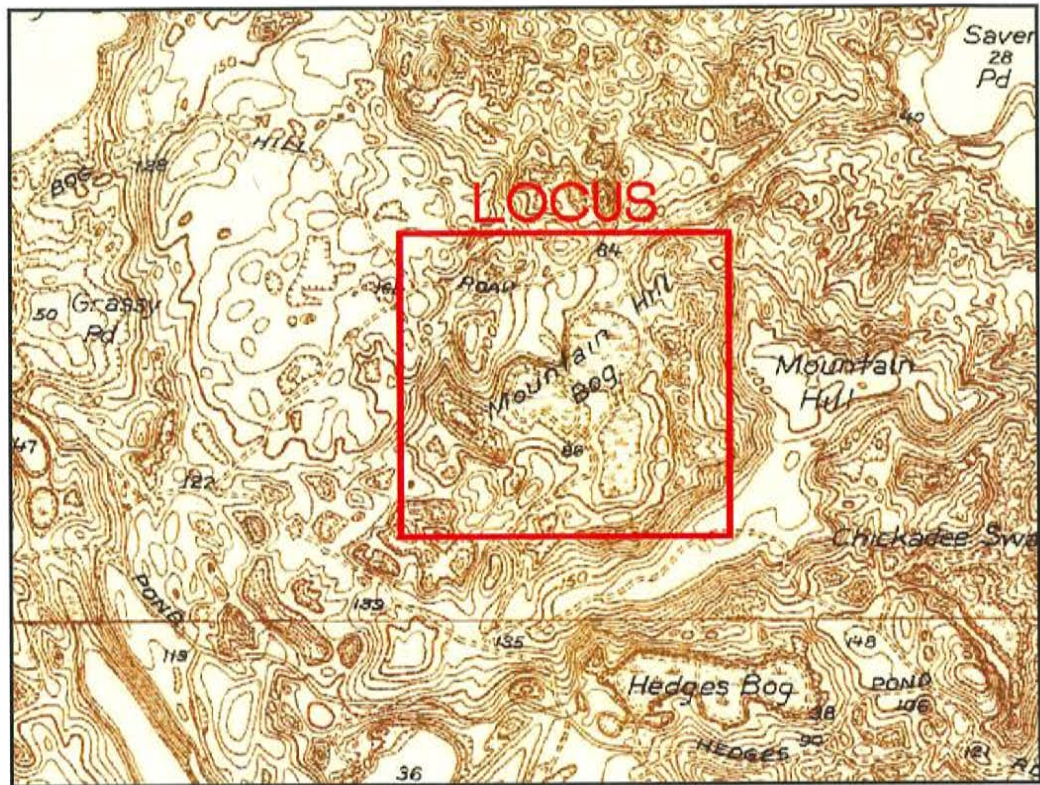
For the purpose of this narrative the word “property” will mean the entirety of the locus property containing 129.91 acres. Refer to Figure 1. The word “site” will mean the area located to the north and center of the property as is shown on sheet ER-3 of ER-8 within the site plan entitled “Landers Farm, LLC, Plan to Accompany Earth Removal Permit, Plymouth Massachusetts”, prepared by G.A.F. Engineering, Inc. and dated October 9, 2024.

Existing Site

P.A. Landers, Inc. purchased this property in 2001 from the Mountain Hill Cranberry Trust. The deed is recorded with the Plymouth County Registry of Deeds in Book 20675, page 87. A copy of the deed is attached as Appendix 2. This site has a long agricultural history. The existing cranberry bogs are estimated

to be nearly 100 years old. Refer to the map below, which is a portion of the 1933 USGS-Sagamore Quadrangle. This map shows the existing bogs, then called “Mountain Hill Bog”. It also shows the “Hedges Bog” located on property directly to the south.

The proposed cranberry bog development will occur on land currently in agricultural use. The property contains approximately 17.2 acres of existing cranberry bogs. The property consists of two lots totaling 129.91 acres. These parcels are identified as 061-000-033-002 and 003. The site is located in southeasterly Plymouth. Route 3 directly abuts the site to the west. A 100’-wide NSTAR easement parallels Route 3 to the west providing a buffer from Route 3.



1933 USGS-Sagamore Quadrangle

Town of Plymouth property is located to the east of the site. A residential subdivision is located to the north/northeast and additional agricultural property and a commercial subdivision is located directly south of the site. Conservation land owned by the Town of Plymouth and Wildlands Trust are located to the north of the site, just on the northerly side of Bay Hill Road. These properties can also be seen on Figure 2 as properties highlighted in green. No land alteration is proposed within 500 feet of these properties.

The property is in active agricultural use with the cultivation of cranberries. The remainder of the property is agricultural support land and upland forest. The forested portion of the site is vegetated with species typical to the region

including a mix of coniferous and deciduous trees such as pitch pine, white pine and oaks.

Phasing

The project is intended to be constructed in phases over a 6–8-year time frame resulting in the removal of approximately 2,007,086 cubic yards of material.

Phase I will consist of constructing the reservoir/tailwater pond and access roads. Phase 1 is located nearest to the project site access point. Constructing the reservoir first will provide increased water availability for existing agricultural operations.

Phase II will consist of reconstructing and replanting the existing 4.5-acre cranberry bog and constructing access roads. This bog will also be enlarged by 3.38 acres to a finished size of 7.88 acres.

Phase III will consist of constructing a new cranberry bog totaling 5.85 acres with access roads.

When completed there will be a total of 26.43 acres of cranberry bog.

Zoning

The cranberry bog development project is an allowed use located within the Rural Residential Zone. In this zoning district the intent is to discourage development in areas remote from public utilities and to preserve valuable rural character of the Town by prohibiting scattered small lot development.

Water Supply

The 5.5-acre bog section was entirely reconstructed and replanted in 2017. The 4.5-acre bog section will be reconstructed, replanted and expanded as part of Phase 2 of the project. This new acreage will replace old style bogs. The design and construction standards and methodologies for new bog construction significantly reduce the water usage per acre of cultivation. Best Management Practice and Integrated Pest Management techniques will continue for all existing bogs and be implemented for all new acreage.

All existing water withdrawals points are currently registered with the Department of Environmental Protection through the Water Management Act Program. Landers Farm, LLC has a Registration Statement, Reg. No.4-21-239.17, under the Water Management Act. All appropriate permits will be obtained, as needed, for the cranberry bog acreage expansion and the new reservoir/tailwater pond.

The project is not located in a DEP mapped Zone II or within the Town of Plymouth Aquifer Protection Overlay District. See Figure 2.

Special Permits subject to Environmental Design Criteria (EDC) call for a review of sand and gravel extractions subject to section 205.18 Natural Features Conservation Requirements. Applications are required for projects involving the grading and excavation of more than 10 cubic yards of material or the removal of more than 3,000 SF of trees taller than three feet. Section 205.18 calls for the review of the following elements among other things.

General

1. Relation to Surroundings

The project site is comprised of 129.91 acres. This property currently contains 17.2 acres of cranberry bogs. When completed there will be a total of 26.43 acres cranberry bog and a 6.0-acre reservoir/tailwater pond. Additional cranberry cultivation occurs on the property located directly to the south. That property contains approximately 19.5 acres of cranberry bogs with associated support land and water supply reservoirs. Refer to Figure 1, an aerial photo referencing the site location with adjacent properties.

2. Top Soil

Top soil will remain on site for reuse as slope stabilization material. Additional top soil, if needed, will be provided from an off site source. All other soil will be generated from on-site sources. There will be no material introduced to the site with the possible exception of top soil or material needed in forming the slowly permeable confining layer.

3. Grading Topography Soils

Excavation is necessary to construct the cranberry beds, and the reservoir/tailwater recovery pond. No excavation will occur within 50 feet of any abutting property line. No slope will exceed 1:3 or 33% when grading is completed.

Interior and exterior slopes will be stabilized with erosion control blankets and seed or hydro seeded, as necessary.

Erosion control during construction is unlikely as the reservoir and each cranberry bed section is to be excavated into the surrounding land. This bowl like feature, coupled with the coarse granular nature of the soil, will prevent erosion and off-site sedimentation.

The USDA Soil Survey of Plymouth County identifies the soils as "Plymouth-Carver" sands with a small portion of Hinckley loamy sand. Refer to Appendix 3.

4. Vegetation

The project will involve the phased removal of surficial vegetation within the project limits. No trees outside the project limits are intended to be removed. The forested portion of the site is vegetated with species typical to the region including a mix of coniferous and deciduous trees such as pitch pine, white pine and oaks.

5. Excavation of Materials

The excavation of materials are included and required in connection with the construction of the project. The system is designed so that upgradient water use will flow by gravity through the cranberry beds and ultimately to the tailwater recovery system for reuse. It is estimated that slightly over

2 million yards of material will be removed from the project site. Material removed from the site will use the truck route identified on Figure 3 and Sheet 8 of the project plan.

6. Conditions for Excavation

Excess excavated material will be removed from the site. No excavation or stockpile will be made within 50 feet of any abutting property line. Any stockpiled material will be placed within an excavated area, confining the stockpile. Refer to the “Dust Mitigation Plan” attached as Appendix 4 for the methods and activities which will be employed to mitigate dust. Stumps are proposed to be retained on-site and ground utilizing a commercial stump grinder. The stump grindings will be used as temporary slope stabilization and stormwater diversion berms as this material is an effective erosion control material. Stump grindings will also be used as a temporary erosion control device. Unused grindings will be removed from the site. A water truck will be stationed on-site during the excavation period. Water and surface wetting will be the primary measures used to minimize the effect of dust.

Due to the size and nature of the project we request that the site disturbance area of 5 acres be increased for each of the phases as follows:

- Phase 1 area is 25.43 acres. A total of 1,480,853cy will be removed over a 5–6-year period.
- Phase 2 area is 20.32 acres. A total of 176,965cy will be removed a 1–2-year period.
- Phase 3 area is 24.30 acres. A total of 349,468cy will be removed over a 1–2-year period.

We request that a limit of 40 truckloads of material per day be authorized to be removed from the site.

7. Erosion & Sedimentation Control

The cranberry bogs and the reservoir will be constructed at elevations, which are lower than the surrounding ground elevations. There will be no off-site migration of sediment resulting from erosion. Once a bog section is complete permanent slope stabilization consisting of loam and seed or hydroseed will be provided.

All heavy equipment and truck traffic will be confined to the on-site work area and existing internal roadways. Access drives to public ways are currently in place to support existing operations.

There are no driveways, roadways or drainage structures, such as, catch basins, manholes and drainage outfalls within the site roadway system as all roads are gravel. Due to this, there is no need to provide temporary

sediment control devices. All sediment control will occur within the areas associated with the bogs and reservoir excavations.

8. Conservation of Resources

The project is proposed within the Rural Residential District and is subject to a special permit. The work is not located within 50 feet of any public owned property or within 50 feet of property managed by or owned by a non-profit agency or private landowner.

9. Vehicular and Pedestrian Circulation

The cranberry bog construction project is estimated to require 55 vehicle trips per day during initial construction and gravel removal operations. Most of these vehicle trips will consist of dump trailers (provided that 40 loads per day are authorized for removal). The remaining 15 vehicle trips will consist of employee vehicle trips and other construction-related activities. The project does not require any permits or approvals from MassDOT.

10. Rare Species

The project is not located within Estimated Habitats of Rare Wildlife or within Priority Habitats Rare Species per MASSGIS mapping and the Natural Heritage and Endangered Species Program database. Refer to Figure 4.

11. Wetlands

There are no protected wetland resource areas located on the site, other than the existing cultivated cranberry bogs, per MASSGIS mapping.

12. Water

A small portion of the project site is within a mapped DEP Zone II of a Public Water Supply Well per MASSGIS mapping. This area is located in the northwesterly portion of the site. No activities or alterations are proposed within this area as part of this project. No activities associated with this project will occur within the Town of Plymouth Aquifer Protection Overlay District or within Contributing Areas to Significant Recreational Water Bodies. Refer to Figure 2.

The water table within the project area has been determined by on-site irrigation well development and by the map entitled "Altitude of the Water Table in Plymouth-Carver Area, Southeastern Massachusetts" dated November 30-December 2, 1984, by Bruce P. Hansen and Wayne W. Lapham. Refer to Figure 5. The cranberry bed elevations are set 30-40 feet above the water table.

In summary, we believe a Special Permit should be granted for this project for the following reasons:

- The proposed construction of additional cranberry bog acreage and the reservoir/tailwater pond is an appropriate use on this specific site. The property has been in agricultural use for approximately 100 years. The Town of Plymouth Master Plan identifies cranberry bogs as a “scenic resource” and an important feature of the Plymouth landscape.
- Adequate and appropriate facilities exist on the site for the future operation of the expanded agricultural operations. Bog operations will continue to utilize Best Management Practices and Integrated Pest Management Techniques for all existing and new acreage. The new reservoir/tailwater pond and reconstructing “old style bogs” will facilitate Best Management Practices, minimizing water consumption.
- There will be no hazard to pedestrians or vehicles because the earth removal portion of the project will limit the total vehicle trips per day and hours of operation will also be limited. There is no public access to the property and vehicles will be limited to those associated with Landers Farm, LLC.
- There will be no nuisance or adverse effect on the neighborhood. Agricultural activities have been occurring on this property for approximately 100 years. The majority of the work associated with this project is contained well within the limits of the property. The construction of the 5.85-acre cranberry bog section is the closest activity to occur to residential dwellings. A minimum 50-foot buffer will be maintained to the adjacent property line for all clearing and grading activities. The nearest residential dwelling to any clearing or grading activities is approximately 330-feet.

Town of Plymouth
Abutters List

Subject Parcel ID: 061-000-033-002 and 061-000-033-003
Subject Property Location: 0 Landers Farm Way

Parcel ID	Comment	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
055-000-052A-001	includes lot 52B	143 HEDGES POND RD	JEANNINE ANDERSON REALTY TR	ELDRIDGE WARNER J TRS	881 SCENIC HIGHWAY	BUZZARDS BAY	MA	02532
055-000-053-000		143R HEDGES POND RD	JEANNINE ANDERSON REALTY TR	ELDRIDGE WARNER J TRS	881 SCENIC HIGHWAY	BUZZARDS BAY	MA	02532
060-000-020-001		159 HEDGES POND RD	WHITEHOUSE IRREVOCABLE TRUST	PALMERINO SHARON TR	159 HEDGES POND RD	PLYMOUTH	MA	02360
061-000-014-013		67 QUAIL RUN	LABOSSIERE RANDY R TR	LABOSSIERE LIZABETH M TR	67 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-014		73 QUAIL RUN	SULLIVAN TRACY L		73 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-015		85 QUAIL RUN	WENDEL MATTHEW JAMES	WENDEL AMANDA JUNE	85 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-016		95 QUAIL RUN	BAZAREWSKY TODD K	BAZAREWSKY TARA L	95 QUAIL RUN	PLYMOUTH	MA	02360-1835
061-000-014-017		99 GREAT WOODS RD	FELTRE PRISCILA	FERREIRA ELIZABEL	9 KARA'S WAY	PLYMOUTH	MA	02360
061-000-014-018		105 GREAT WOODS RD	CUMMINGS CHRISTOPHER J	CUMMINGS PATRICIA A	105 GREAT WOODS RD	PLYMOUTH	MA	02360
061-000-014-019		115 GREAT WOODS RD	PA LANDERS INC		PO BOX 217	HANOVER	MA	02339-0217
061-000-014-030		62 QUAIL RUN	CASSIDY PATRICK T	CASSIDY JODY A	62 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-032		86 QUAIL RUN	GOLBRANSON STEVEN C	GOLBRANSON LAURIE A	86 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-036		98 QUAIL RUN	DZENGELESKI RICHARD J	DZENGELESKI KAREN J	98 QUAIL RUN	PLYMOUTH	MA	02360
061-000-014-052		58 BUCKSKIN PATH	CHAMP PATRICIA A		116 BROOK RD	PLYMOUTH	MA	02360
061-000-014-053		60 BUCKSKIN PATH	LINCOLN PATRICIA M		60R BUCKSKIN PATH	PLYMOUTH	MA	02360
061-000-014-093		GREAT WOODS RD	PA LANDERS INC		PO BOX 217	HANOVER	MA	02339-0217
061-000-014D-002		QUAIL RUN	PLYMOUTH TOWN OF		26 COURT ST	PLYMOUTH	MA	02360-3325
061-000-014D-003		LANDERS FARM WAY	PA LANDERS INC		PO BOX 217	HANOVER	MA	02339-0217
061-000-020B-000		63-R QUAIL RUN	CASELAND TRUST	CASE GRACEANN	63 R QUAIL RUN	PLYMOUTH	MA	02360-1835
061-000-020C-000		61-R QUAIL RUN	PLYMOUTH TOWN OF	WATER DEPT	26 COURT ST	PLYMOUTH	MA	02360
061-000-021D-000		-OFF STATE HWY RTE 3	WILDLANDS TRUST INC		675 LONG POND RD	PLYMOUTH	MA	02360
061-000-021E-000		65-R QUAIL RUN	HOLMES KURT M	ISENOR ELIZABETH	65-R QUAIL RUN	PLYMOUTH	MA	02360
061-000-028-000		MOUNTAIN HILL RD	PLYMOUTH TOWN OF		26 COURT ST	PLYMOUTH	MA	02360
061-000-029-000		MOUNTAIN HILL RD	PLYMOUTH TOWN OF		26 COURT ST	PLYMOUTH	MA	02360
061-000-030-000		MOUNTAIN HILL RD	PLYMOUTH TOWN OF	BOARD OF SELECTION	26 COURT ST	PLYMOUTH	MA	02360
061-000-033-002		LANDERS FARM WAY	PA LANDERS INC		PO BOX 217	HANOVER	MA	02339-0217
061-000-033-003		LANDERS FARM WAY	PA LANDERS INC		PO BOX 217	HANOVER	MA	02339-0217
064-000-019-000	includes lot 20	STATE HWY RTE 3	PLYMOUTH TOWN OF	CONSERVATION COMMISSION	26 COURT ST	PLYMOUTH	MA	02360-3325



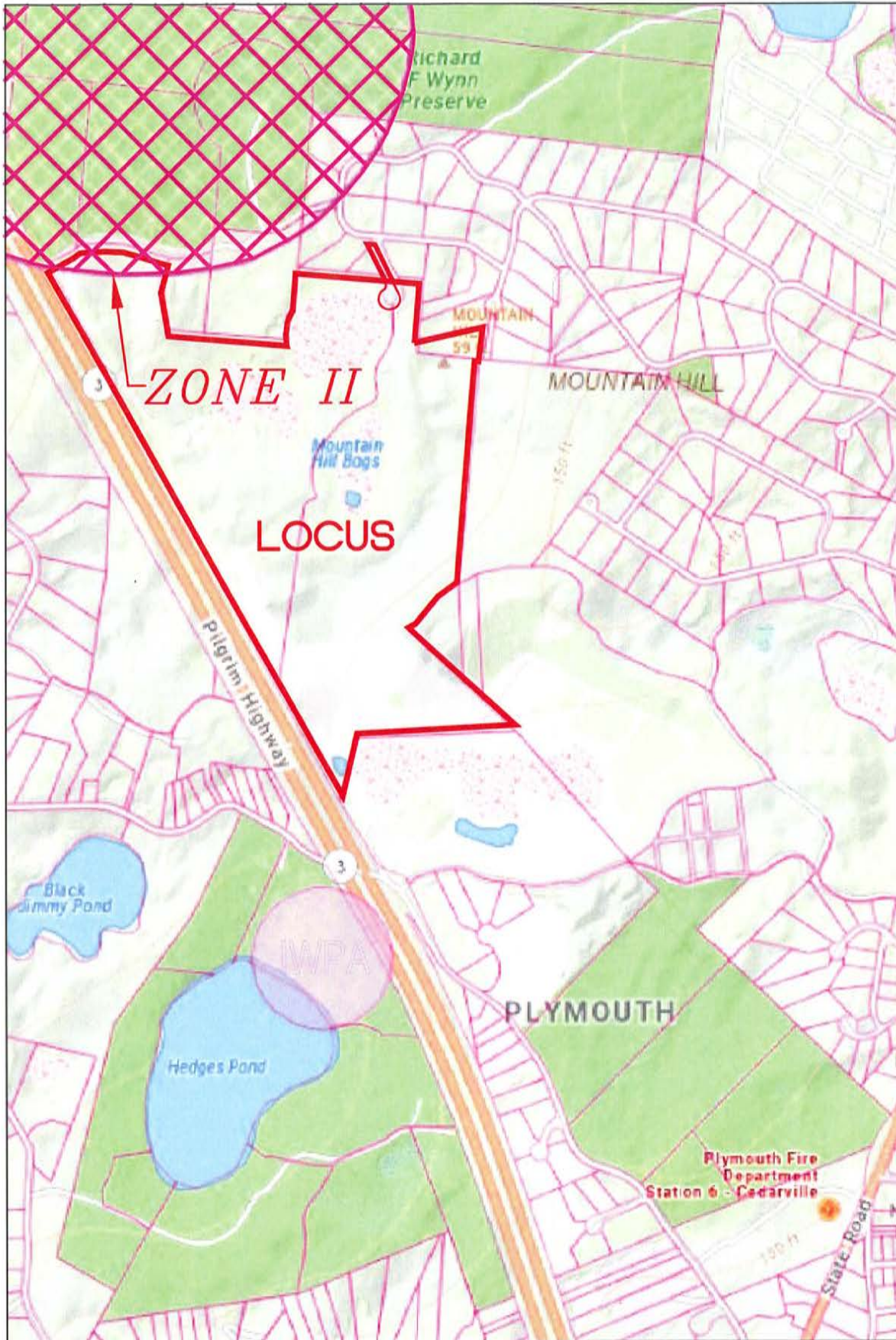
SCALE: 1" = 1000'
LANDERS FARM, LLC

LOCUS PLAN

SOURCE: MASS GIS
PLYMOUTH, MA



ENGINEERING, INC.



SCALE: 1" = 1000'
 LANDERS FARM, LLC

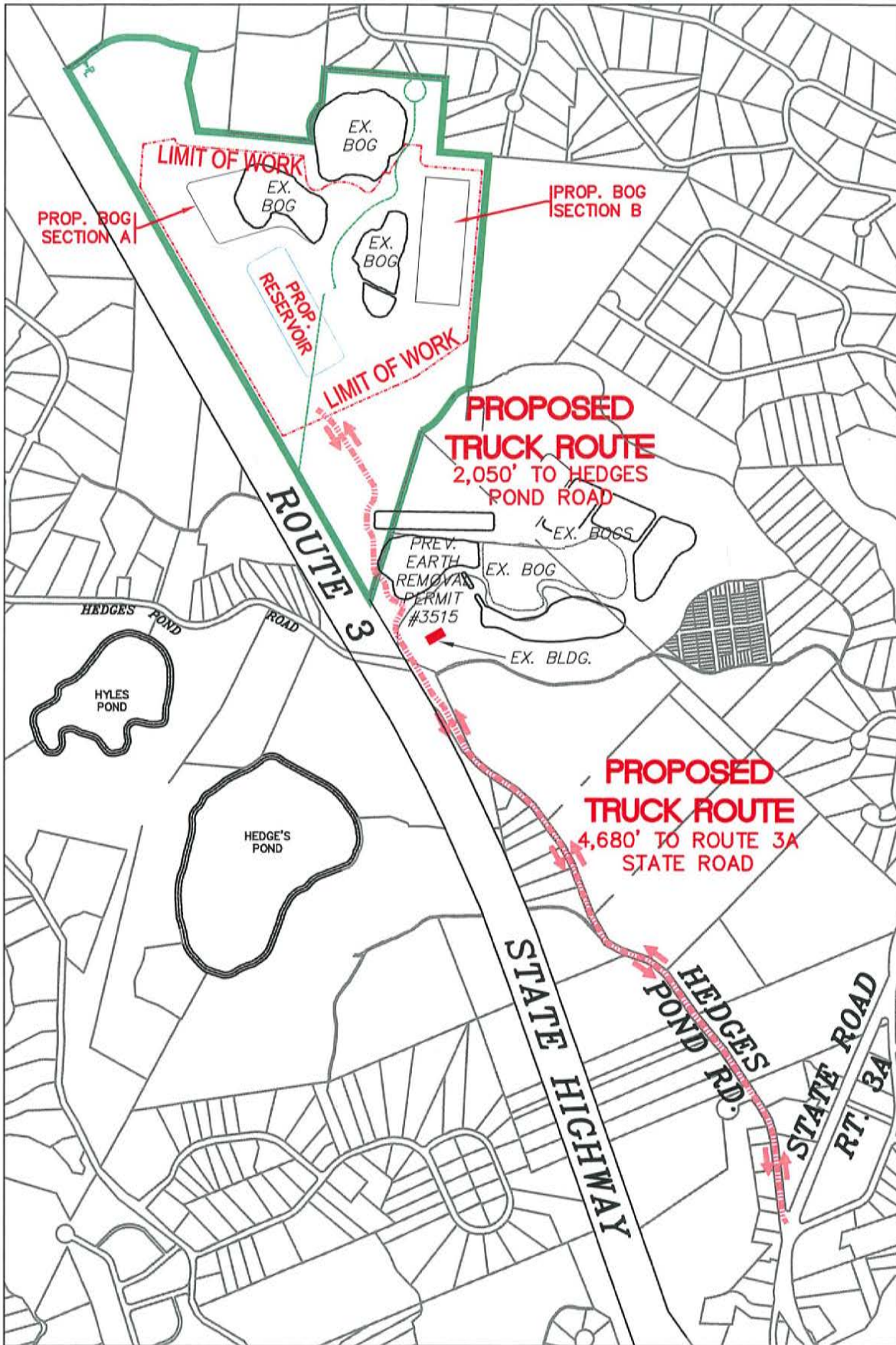
ZONE II
 AQUIFER PROTECTION

SOURCE: MASS MAPPER
 PLYMOUTH, MA



ENGINEERING, INC.

FIGURE 2



SCALE: 1" = 1000'
 LANDERS FARM, LLC

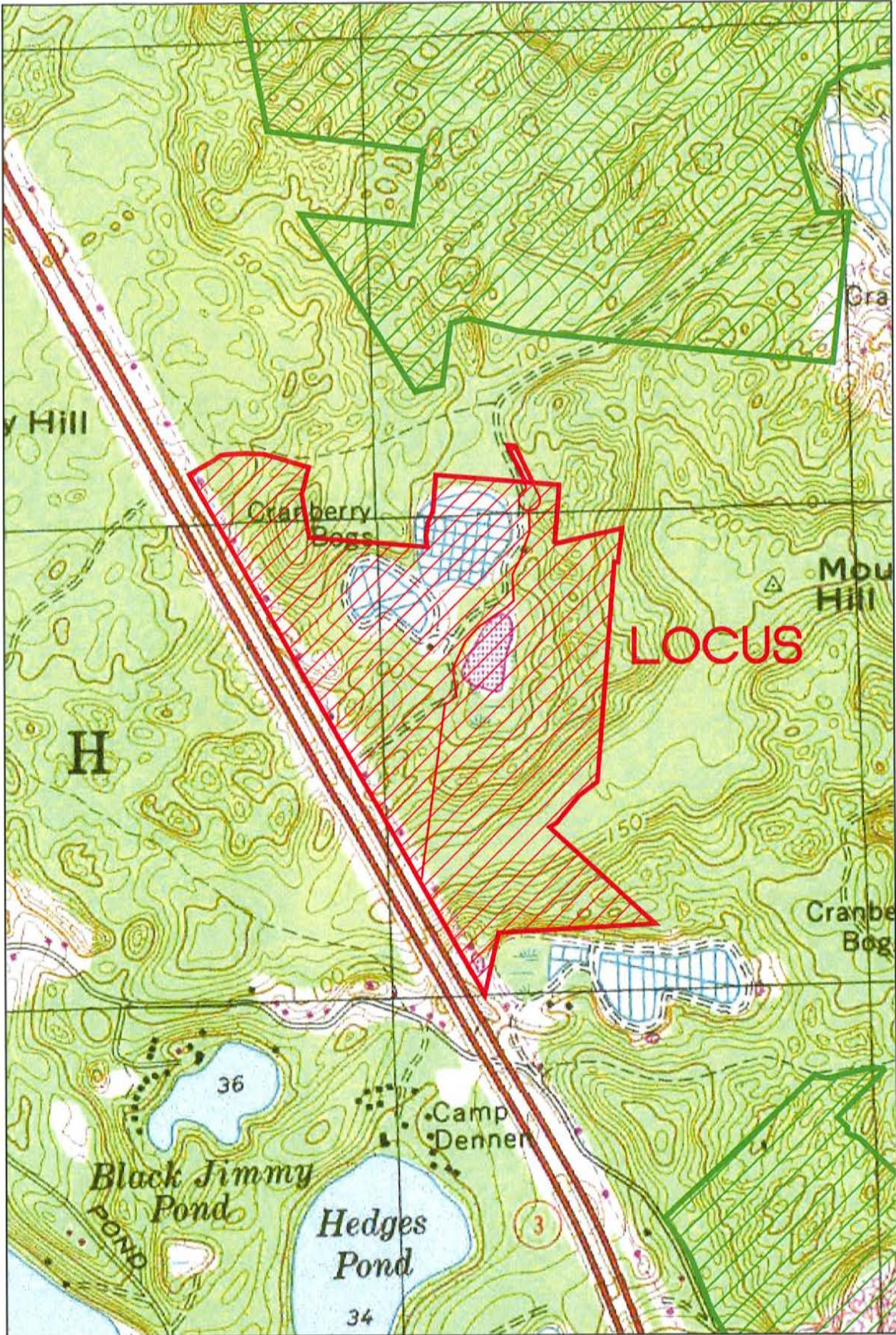
TRUCK ROUTE

SOURCE: MASS GIS
 PLYMOUTH, MA



FIGURE 3

ENGINEERING, INC.



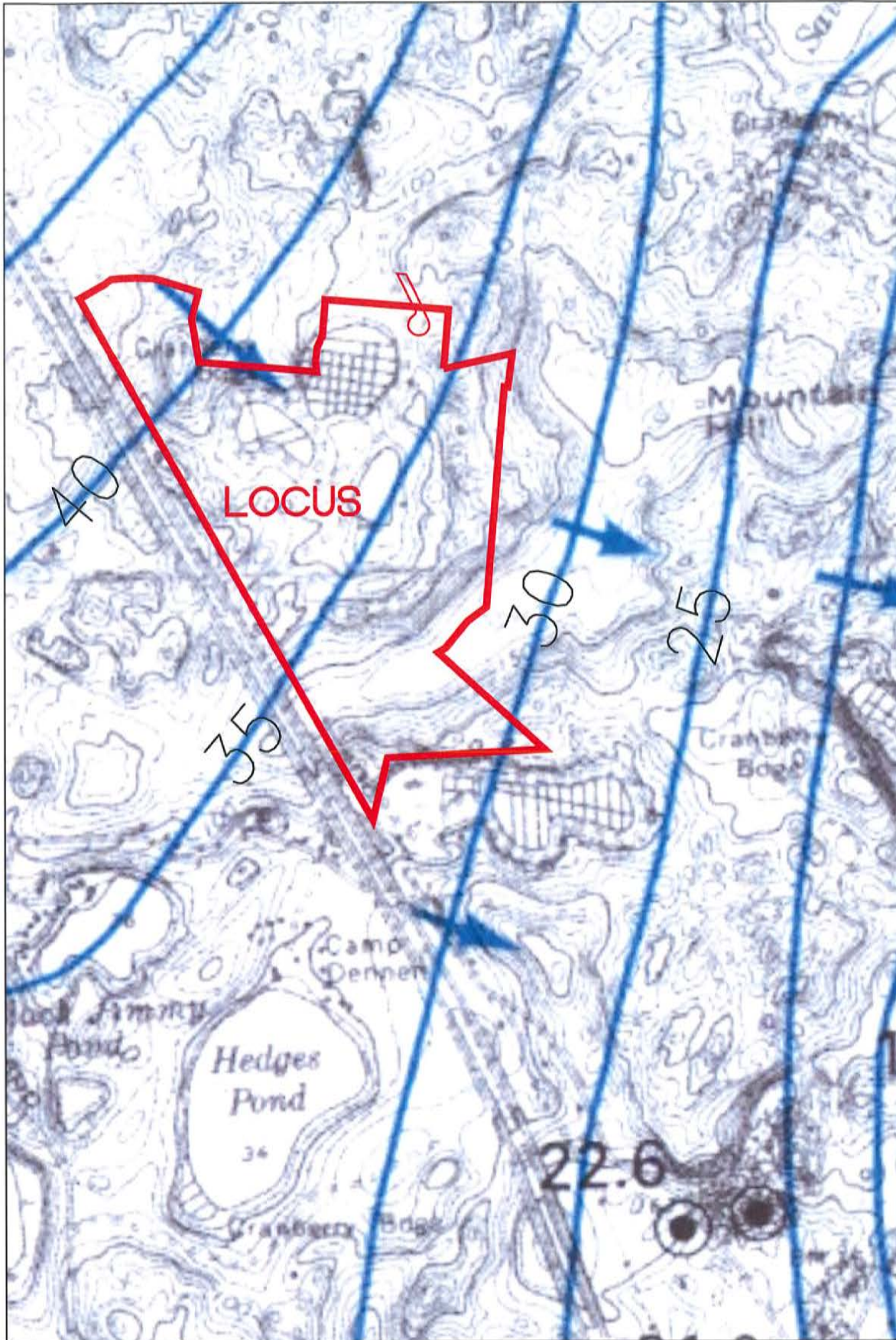
ESTIMATED & PRIORITY HABITAT
 NHESP LOCUS MAP
 SCALE: 1" = 1000'
 LANDERS FARM, LLC

SOURCE: MASS GIS
 PLYMOUTH, MA



ENGINEERING, INC.

FIGURE 4



SCALE: 1" = 1000'
LANDERS FARM, LLC

WATER TABLE MAP

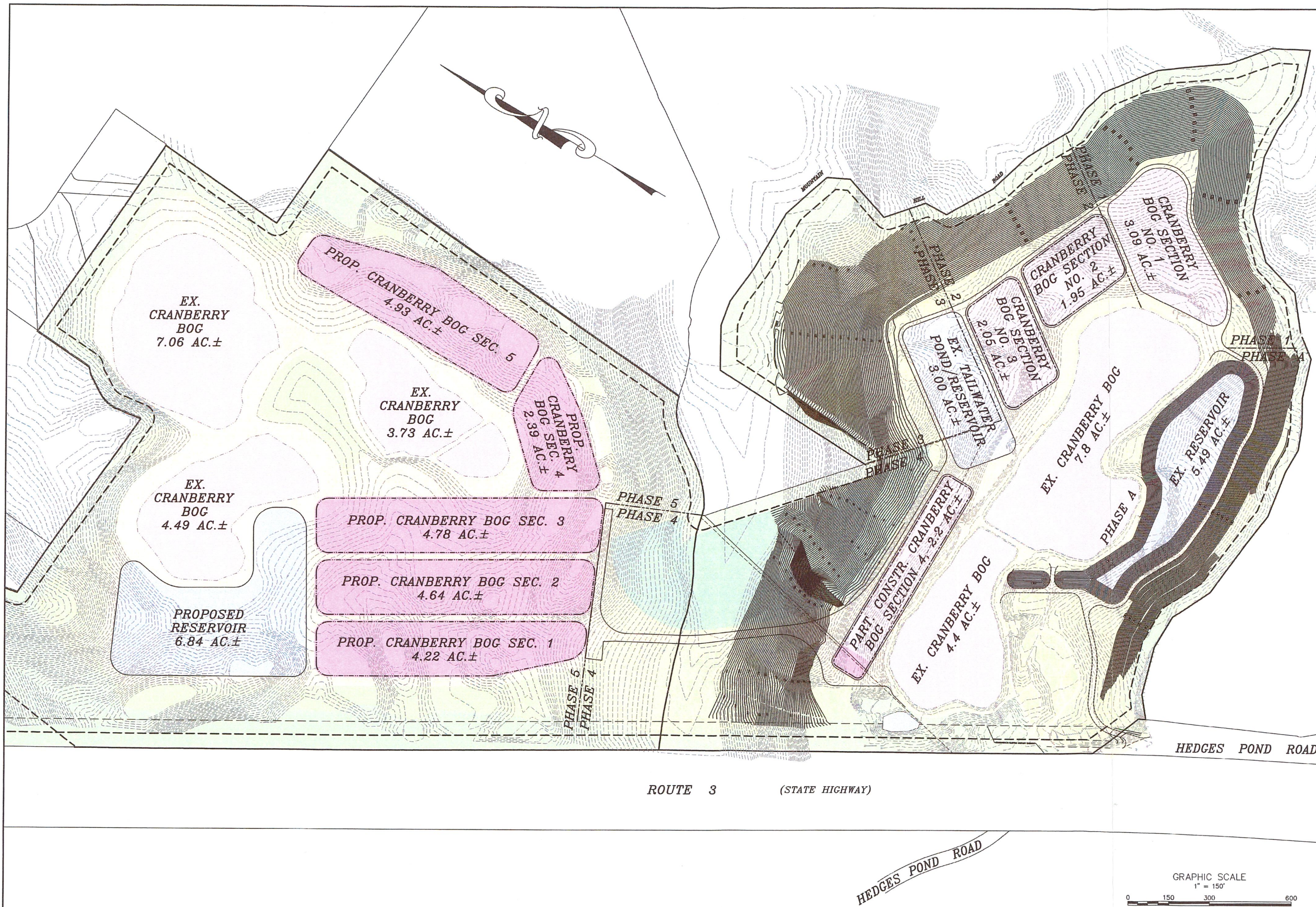
SOURCE: MASS GIS
PLYMOUTH, MA



FIGURE 5

ENGINEERING, INC.

APPENDIX 1

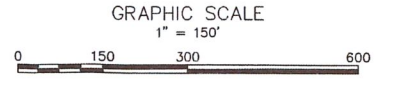


DATE: FEB. 10, 2016		APPROVED BY:	DATE: 2/10/16	
DRAWN BY: JH				
CHECKED BY: WFM				
JOB NO.: 01-5265		G.A.F. ENGINEERING, INC. PROFESSIONAL ENGINEERS & LAND SURVEYORS 266 MAIN STREET - WAREHAM, MA 02571 TEL: (508) 295-6600 FAX: (508) 295-6634 E-MAIL: gaf.eng@verizon.net or info@gaf-eng.com		
SCALE: 1" = 150'		<small> COPYRIGHT © 2016 G.A.F. ENGINEERING, INC. NO PART OF THIS DOCUMENT MAY BE REPRODUCED, STORED, OR TRANSMITTED BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION SYSTEM, WITHOUT THE EXPRESS WRITTEN PERMISSION OF G.A.F. ENGINEERING, INC. ANY REPRODUCTION OR TRANSMISSION IN ANY MANNER WITHOUT THE EXPRESS WRITTEN PERMISSION OF G.A.F. ENGINEERING, INC. SHALL BE SUBJECT TO PROSECUTION. </small>		
REV.	DATE	BY	APP'D	DESCRIPTION

OVERALL SITE PHASE PLAN
 HEDGES POND ROAD
 PREPARED FOR:
P.A. LANDERS, INC.
 226 NICKS ROCK ROAD
 PLYMOUTH, MA.

JOB NO.: 01-5265
 DWG. 1 OF 1

ROUTE 3 (STATE HIGHWAY)



H:\GAF DRAWINGS\2016\01-5265\PA LANDERS\2016\01-5265\01-5265-OVERALL_PHASE_PLAN.dwg

APPENDIX 2

Received & Recorded
 PLYMOUTH COUNTY
 REGISTRY OF DEEDS
 09 OCT 2001 12:25PM
 JOHN R. BUCKLEY, JR.
 REGISTER
 Bk 20675 Pg 87-88

DEED

JANE R. COOMBS, TRUSTEE OF MOUNTAIN HILL CRANBERRY TRUST, under Declaration of Trust, dated June 27, 1991 and recorded at Plymouth Deeds in Book 10353, Page 127, of 234 Gunners Exchange Road, Plymouth, MA 02360, in consideration of One Million Two Hundred Thousand and 00/100 Dollars (\$1,200,000.00), grants to P.A. LANDERS, INC., a duly licensed Massachusetts corporation, having a principal place of business at 226 Nick's Rock Road, Plymouth, MA 02360,* with quitclaim covenants:

*(Grantee's mailing address: P.O. Box 217, Hanover, MA 02339)

The following parcels of land situated in Plymouth, Plymouth County, Massachusetts:

- | I. | <u>PLAT</u> | <u>LOT</u> | <u>STREET</u> |
|------|-------------|------------|---|
| 1. | 61 | 14-D3 | Quail Run
Meaning and intending to convey, and hereby conveying, Lot 14D-2 on Plan #514 of 1989 in Plan Book 32, Page 420. |
| 2. | 61 | 14-92 | Quail Run
Meaning and intending to convey, and hereby conveying, right of way located east of Lot 14D-2 and west of Lot 14-15 on Plan #514 of 1989 in Plan Book 32, Page 420. |
| 3. | 61 | 14-19 | Off Great Woods Road
Meaning and intending to convey, and hereby conveying, Lot 14-19 on Plan #514 of 1989 in Plan Book 32, Page 420. |
| 4. | 61 | 14-93 | Great Woods Road
Meaning and intending to convey, and hereby conveying, right of way located east of Lots 14-18 and 14-19 and west of Lots 14-21 and 14-20 on Plan #514 of 1989 in Plan Book 32, Page 420. |
|
 | | | |
| II. | <u>PLAT</u> | <u>LOT</u> | <u>STREET</u> |
| 1. | 61 | 14-91 | Quail Run
Meaning and intending to convey, and hereby conveying, right of way located south of Lot 14-12 and north of Lot 14-13 on Plan #514 of 1989 in Plan Book 32, Page 420. |
| 2. | 61 | 11-D2A | Great Woods Road
Meaning and intending to convey, and hereby conveying, Lot 11-D2A on Plan #707 of 1989 in Plan Book 32, Page 727. |
| 3. | 61 | 14-D1 | Quail Run
Meaning and intending to convey, and hereby conveying, Lot 14D-1 on Plan #514 of 1989 in Plan Book 32, Page 420. |
| 4. | 61 | 14-90 | Quail Run
Meaning and intending to convey, and hereby conveying, right of way located east of Lot 14-D1 and west of Lot 14-8 on Plan #514 of 1989 in Plan Book 32, Page 420. |

5. 61 14-D2 Quail Run
Meaning and intending to convey, and hereby conveying, Lot 14D-3 on Plan #514 of 1989 in Plan Book 32, Page 420.
6. 61 14-94 Buckskin Path
Meaning and intending to convey, and hereby conveying, right of way located east of Lot 14-43 on Plan #514 of 1989 in Plan Book 32, Page 420 and west of Lot 11-19C on Plan #707 of 1989 in Plan Book 32, Page 727.

III. PLAT LOT STREET

1. 61 33 Mountain Hill Road
Meaning and intending to convey, and hereby conveying, Lot 33 on Plan #54 of 1988 in Plan Book 30, Page 276, and the land described in deed from George R. Courtney dated June 27, 1991 in Book 10353, Page 133.

For title, see the following deeds:

- (a) Book 19619, Page 209 and Confirmatory Deed recorded immediately prior hereto for I and II.
- (b) Book 10353, Page 133 for III.

The address of the subject premises is as stated above.

Executed as a sealed instrument this 5th day of October, 2001.

PLYMOUTH
DEEDS REG#18
CANCELLED
PLYMOUTH

10/09/01 11:52AM 01
000000 #7970

Jane R. Coombs
Jane R. Coombs, Trustee as aforesaid

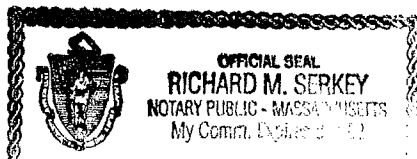
FEE \$5472.00
CASH \$5472.00

COMMONWEALTH OF MASSACHUSETTS

Plymouth, ss.

October 5, 2001

Then personally appeared the above-named JANE R. COOMBS, Trustee as aforesaid, and acknowledged the foregoing instrument to be her free act and deed, before me,



rms/coombs/deed9-19-01.doc

8/9/02

Tom Servey
Notary Public:
My commission expires:
Richard M. Serkey

APPENDIX 3



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Plymouth County, Massachusetts**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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60A—Swansea coarse sand, 0 to 2 percent slopes.....	15
253C—Hinckley loamy sand, 8 to 15 percent slopes.....	17
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480C—Plymouth - Carver complex, 8 to 15 percent slopes.....	21
480E—Plymouth - Carver complex, 15 to 35 percent slopes.....	23
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

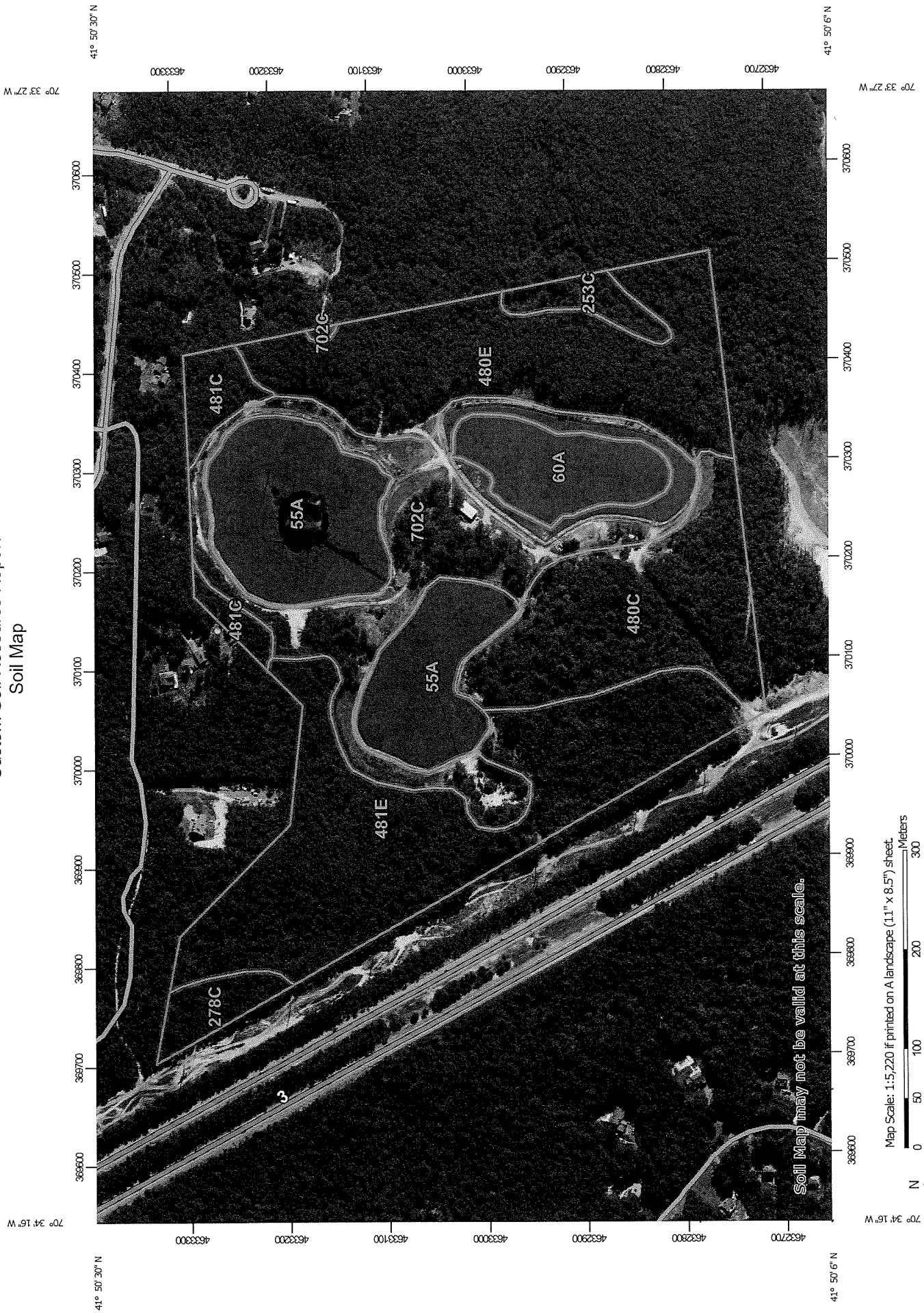
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

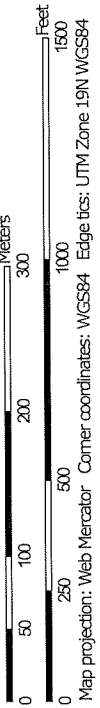
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.

Map Scale: 1:5,220 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features
- Water Features**
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plymouth County, Massachusetts
 Survey Area Data: Version 16, Sep 10, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
55A	Freetown coarse sand, 0 to 3 percent slopes, sanded surface	11.9	15.7%
60A	Swansea coarse sand, 0 to 2 percent slopes	3.9	5.1%
253C	Hinckley loamy sand, 8 to 15 percent slopes	1.4	1.8%
278C	Carver-Merrimac complex, 8 to 15 percent slopes	1.5	1.9%
480C	Plymouth - Carver complex, 8 to 15 percent slopes	10.4	13.7%
480E	Plymouth - Carver complex, 15 to 35 percent slopes	13.3	17.5%
481C	Plymouth - Carver complex, 8 to 15 percent slopes, bouldery	2.1	2.8%
481E	Plymouth - Carver complex, 15 to 35 percent slopes, bouldery	17.7	23.4%
702C	Udipsamments, 8 to 15 percent slopes	13.8	18.2%
Totals for Area of Interest		75.8	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

Custom Soil Resource Report

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Plymouth County, Massachusetts

55A—Freetown coarse sand, 0 to 3 percent slopes, sanded surface

Map Unit Setting

National map unit symbol: 2t2qj
Elevation: 0 to 180 feet
Mean annual precipitation: 40 to 52 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 190 to 250 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Freetown, sanded surface, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown, Sanded Surface

Setting

Landform: Kettles, bogs, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy human-transported material over highly decomposed organic material

Typical profile

^Ap - 0 to 15 inches: coarse sand
2Oa - 15 to 79 inches: muck

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 20.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Swansea, sanded surface, inactive

Percent of map unit: 5 percent
Landform: Kettles, bogs, depressions

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Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Talf

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Rainberry, sanded surface

Percent of map unit: 4 percent

Landform: Kettles, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

Udipsammments, wet substratum

Percent of map unit: 3 percent

Landform: Dikes on bogs

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex

Across-slope shape: Concave, linear

Hydric soil rating: No

Tihonet

Percent of map unit: 3 percent

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Yes

60A—Swansea coarse sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w68y

Elevation: 0 to 170 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Swansea, sanded surface, and similar soils: 86 percent

Minor components: 14 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea, Sanded Surface

Setting

Landform: Kettles, bogs, depressions

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Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy human-transported material over highly decomposed organic material over sandy and gravelly glaciofluvial deposits

Typical profile

^Ap - 0 to 15 inches: coarse sand
2Oab - 15 to 36 inches: muck
2Cg - 36 to 79 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Freetown, sanded surface

Percent of map unit: 5 percent
Landform: Kettles, bogs, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Aquic udipsamments

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Rainberry, sanded surface

Percent of map unit: 3 percent
Landform: Kettles, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Tihonet

Percent of map unit: 3 percent
Landform: Bogs
Landform position (two-dimensional): Toeslope

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Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

253C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

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Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Outwash deltas, moraines, outwash plains, kame terraces, outwash terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

278C—Carver-Merrimac complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tx0g
Elevation: 0 to 280 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 48 to 55 degrees F

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Frost-free period: 190 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Carver and similar soils: 45 percent

Merrimac and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver

Setting

Landform: Deltas, outwash terraces, moraines, eskers, kames, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 7 inches: coarse sand

E - 7 to 10 inches: coarse sand

Bw1 - 10 to 15 inches: coarse sand

Bw2 - 15 to 28 inches: coarse sand

C - 28 to 67 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very high (14.17 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent

Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2c

Hydrologic Soil Group: A

Ecological site: F149BY005MA - Dry Outwash

Hydric soil rating: No

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

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Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent

Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, eskers, outwash plains, kames

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Windsor

Percent of map unit: 5 percent

Landform: Outwash terraces, dunes, outwash plains, deltas

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Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

480C—Plymouth - Carver complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: bcyy
Elevation: 0 to 400 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 45 percent
Carver and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Moraines, outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and gravelly supraglacial meltout till over sandy and gravelly glaciofluvial deposits

Typical profile

O_i - 0 to 4 inches: slightly decomposed plant material
O_e - 4 to 6 inches: moderately decomposed plant material
A - 6 to 7 inches: loamy coarse sand
E - 7 to 11 inches: coarse sand
B_s - 11 to 15 inches: loamy coarse sand
B_w - 15 to 20 inches: coarse sand
BC - 20 to 29 inches: coarse sand
C - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (K_{sat}): High (1.98 to 5.95 in/hr)

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Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Description of Carver

Setting

Landform: Moraines, pitted outwash plains, outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
O_e - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw₁ - 10 to 15 inches: coarse sand
Bw₂ - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Barnstable

Percent of map unit: 10 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope

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Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Kames, terraces, outwash plains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

480E—Plymouth - Carver complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: bcyx

Elevation: 0 to 400 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 45 percent

Carver and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Moraines, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy and gravelly supraglacial meltout till over sandy and gravelly glaciofluvial deposits

Typical profile

O_i - 0 to 4 inches: slightly decomposed plant material

O_e - 4 to 6 inches: moderately decomposed plant material

A - 6 to 7 inches: loamy coarse sand

E - 7 to 11 inches: coarse sand

B_s - 11 to 15 inches: loamy coarse sand

B_w - 15 to 20 inches: coarse sand

BC - 20 to 29 inches: coarse sand

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C - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 15 to 35 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Ecological site: F149BY005MA - Dry Outwash

Hydric soil rating: No

Description of Carver

Setting

Landform: Moraines, pitted outwash plains, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

Oe - 2 to 3 inches: moderately decomposed plant material

A - 3 to 7 inches: coarse sand

E - 7 to 10 inches: coarse sand

Bw1 - 10 to 15 inches: coarse sand

Bw2 - 15 to 28 inches: coarse sand

BC - 28 to 32 inches: coarse sand

C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 15 to 35 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

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Ecological site: F149BY005MA - Dry Outwash

Hydric soil rating: No

Minor Components

Barnstable

Percent of map unit: 10 percent

Landform: Moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Kames, terraces, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

481C—Plymouth - Carver complex, 8 to 15 percent slopes, bouldery

Map Unit Setting

National map unit symbol: bcz1

Elevation: 0 to 400 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth, bouldery, and similar soils: 45 percent

Carver, bouldery, and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth, Bouldery

Setting

Landform: Moraines, outwash plains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope, riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy and gravelly supraglacial meltout till over sandy and gravelly glaciofluvial deposits

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Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
Oe - 4 to 6 inches: moderately decomposed plant material
A - 6 to 7 inches: loamy coarse sand
E - 7 to 11 inches: coarse sand
Bs - 11 to 15 inches: loamy coarse sand
Bw - 15 to 20 inches: coarse sand
BC - 20 to 29 inches: coarse sand
C - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Description of Carver, Bouldery

Setting

Landform: Moraines, pitted outwash plains, outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw1 - 10 to 15 inches: coarse sand
Bw2 - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low

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Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Ecological site: F149BY005MA - Dry Outwash

Hydric soil rating: No

Minor Components

Poquonock, bouldery

Percent of map unit: 5 percent

Landform: Till plains, ground moraines, drumlins

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Kames, terraces, outwash plains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Barnstable, bouldery

Percent of map unit: 5 percent

Landform: Moraines

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

481E—Plymouth - Carver complex, 15 to 35 percent slopes, bouldery

Map Unit Setting

National map unit symbol: bcz0

Elevation: 0 to 400 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

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Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Plymouth, bouldery, and similar soils: 45 percent

Carver, bouldery, and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth, Bouldery

Setting

Landform: Moraines, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, riser

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy and gravelly supraglacial meltout till over sandy and gravelly glaciofluvial deposits

Typical profile

O_i - 0 to 4 inches: slightly decomposed plant material

O_e - 4 to 6 inches: moderately decomposed plant material

A - 6 to 7 inches: loamy coarse sand

E - 7 to 11 inches: coarse sand

B_s - 11 to 15 inches: loamy coarse sand

B_w - 15 to 20 inches: coarse sand

BC - 20 to 29 inches: coarse sand

C - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 15 to 35 percent

Surface area covered with cobbles, stones or boulders: 0.1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (K_{sat}): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Ecological site: F149BY005MA - Dry Outwash

Hydric soil rating: No

Description of Carver, Bouldery

Setting

Landform: Moraines, pitted outwash plains, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

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Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
O_e - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw₁ - 10 to 15 inches: coarse sand
Bw₂ - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Poquonock, bouldery

Percent of map unit: 5 percent
Landform: Till plains, ground moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, terraces, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Barnstable, bouldery

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder

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Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

702C—Udipsamments, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: bd03
Elevation: 0 to 390 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments

Setting

Landform: Dikes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy human transported material over sandy and gravelly glaciofluvial deposits

Typical profile

^Ap - 0 to 9 inches: loamy sand
C1 - 9 to 22 inches: sand
C2 - 22 to 49 inches: coarse sand
C3 - 49 to 54 inches: sand
C4 - 54 to 79 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

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Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: F149BY100NY - Urban Site Complex

Hydric soil rating: No

Minor Components

Udipsamments

Percent of map unit: 10 percent

Landform: Dikes

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Linear, convex

Across-slope shape: Linear

Hydric soil rating: No

Udipsamments, wet substratum

Percent of map unit: 5 percent

Landform: Dikes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear, convex

Across-slope shape: Linear

Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX 4

DUST MITIGATION PLAN

1.0 GENERAL

It is proposed to progressively develop the site by expanding the existing cranberry operations in three phases as illustrated on the plans. The progression of activities in general consist of:

- Land clearing, grubbing and stumping.
- Stripping and stockpiling of topsoil and subsoil for future use on site.
- Excavation & removal of mineral soils from the site.
- Grading and constructing the proposed reservoir/tailwater pond and access road in shape and form.
- Grading and constructing cranberry bogs and access road in shape and form.
- Planting of cranberry vines.
- Provide temporary slope stabilization with unsuitable material.
- Cover slopes with topsoil & seed with a cover crop.

2.0 DUST SOURCES AND CONTROL

Complete elimination of dust originating at the site is difficult although preventive measures can be taken to reduce these factors to negligible amounts.

Dust emissions from the site consist of fine soil particles which move by air currents. Heaviest particles will fall out within a half (1/2) mile radius of the activating source. However, wind velocities determine the dust carrying range and direction of predominant particle movement. Other off site sources of dust over which Landers Farm has no control include that which originates from traffic or agricultural operations on adjacent properties.

Operational areas on site which produce dust are categorized in the following order of importance:

2.1 HIGH USE VEHICLE ROUTES

High use vehicle routes within the site can be primary contributors to dust emissions. These roads and areas are non-surfaced which allow soil breakdown by heavy earth moving equipment and trucks hauling material.

2.2 EARTH REMOVAL PROCESS

Earth removal process is the secondary contributor of dust. The operational process of excavating and loading operations are contributors of dust emittance

2.3 THE EXCAVATION AREA

The finished excavation area produces the least amount of dust as this surface contains surface moisture sufficient to prevent dust. Surface slopes which lack moisture contribute as a minor source of dust.

3.0 DUST MITIGATION CONTROL

In order to mitigate dust concerns on site the following dust control practices, currently being utilized on site, will be continued and expanded as follows:

3.1 SURFACE WETTING

The truck route (high use vehicle routes) in the area of pit excavation will be wetted by the use of an on-site water truck. The water truck will wet soil surfaces in the areas utilized by trucks and equipment on an as-needed basis throughout a typical work day. Surface wetting is a practical and easily employable methodology used in minimizing dust emissions.

3.2 MODIFICATION OF EARTH REMOVAL PROCESS.

In each phase excavation and loading of material will proceed in a generally southerly to northerly direction.

3.3 MAINTAIN VEGETATIVE COVER TO THE MAXIMUM PRACTICAL DEGREE

Land clearing will be limited to that area necessary to provide access to areas which will provide one year's excavation. The conservation of the wooded areas for that longest term possible will assist in absorbing dust and noise.

3.4 CONTINGENCY PLAN

In the event dust emissions emanate from the active face of excavation, temporary moveable surface mounted irrigation sprinklers will be placed at the top elevation of excavation. These sprinklers will be put in operation intermittently during the term of the excavation activities. Water will be supplied from the existing water supplies and pumping systems.

Should wind become excessive, rendering mitigation controls ineffective excavation and removal will cease until such time mitigation control regain effectiveness.