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## EXHIBIT A

### VIA EMAIL

August 29, 2019  
File No. 04.0191010.00

Mr. Bruce Scamman, P.E.  
Emanuel Engineering, Inc.  
118 Portsmouth Avenue  
Stratham, New Hampshire 03885

Re: Site Specific Soil Mapping  
Property of Richmond Property Group, Ltd.  
18 Garrison Avenue, Tax Map 2 Lot 12-12  
Durham, New Hampshire

Dear Mr. Scamman:

This letter report presents the findings of a Site-Specific Soil Mapping survey conducted by GZA GeoEnvironmental, Inc. (GZA) at 18 Garrison Avenue (i.e. Tax Map 2, Lot 12-12) in the Town of Durham, New Hampshire (Site) on August 23, 2019. The Site totals approximately 1.6 acres and is bounded by Garrison Avenue to the north, developed property to the east, and by Pettee Brook and associated wetlands to the west. The northern portion of the Site is developed and contains a building known as the Elizabeth DeMeritt House and associated parking. The southern portion of the property contains a forested wetland system. It is our understanding that the Site-Specific Soil Mapping is needed in support of the redevelopment of the property. This report is subject to the limitations in **Appendix A**.

The Site-Specific Soil Mapping was conducted by New Hampshire Certified Soil Scientist, James H. Long, (CSS No. 15) in accordance with the *New Hampshire Supplement of the Site-Specific Soil Mapping Standard for New Hampshire and Vermont*, Version 5.0, February 2017, published by the Society of Soil Scientists of Northern New England. Soil map units identified on the Site were classified using the *New Hampshire State-Wide Numerical Soils Legend*, United States Department of Agriculture (USDA) Natural Resource Conservation Service, Issue No. 10, January 2011. The Site-Specific Standards are based on a universally recognized taxonomic system of soil classification and are supported by national soil mapping standards established by the USDA National Cooperative Soil Survey. The attached Site-Specific Soil Map (see **Appendix B**) has been prepared to comply with soil mapping requirements of RSA 485 A:17 and New Hampshire Department of Environmental Services (DES) Env-Wq 1500, Alteration of Terrain rules.



This report and the attached soil series descriptions (see **Appendix C**) provide soil information such as soil drainage classification, physical characteristics, and depth to bedrock (if encountered). Soil characteristics on the property were evaluated through the tile spade and hand-auger probe observations conducted on Site. Slope phases were measured using a clinometer and augmented by the topography shown on the base plan prepared Doucet Survey. Slope is depicted on the base plan at a contour interval of two feet. The accompanying Site-Specific Soil Map (**Appendix B**) was developed by GZA in August 2019 using the plan titled “Existing Conditions Plan,” prepared by Doucet Survey, LLC dated 8/19/19 as the mapping base.

Soil parent materials encountered consist of marine deposits, organic soils, and anthropogenic soils. The Soil Map Units identified during the soil survey are briefly described below. Soil characteristics for each Soil Map Unit comply with the Range in Characteristics described in the Official Series Descriptions for each Soil Map Unit (see **Appendix C**).

Based on our observations, the Site contains disturbed areas that are the result of anthropogenic processes and consist of excavated, regraded, and filled areas (i.e. map units 299A, 299B, 299C, 299D, and 299E, see **Table 1**). In GZA’s opinion, fill material has been added to the native site soils. Also, the soil material making up the map units appear to have come from near the immediate area, as the excavated, filled, and regraded materials contains characteristics similar to the marine soils and glacial till that is mapped in the area. The undisturbed Scitico soils are most likely the soils that are underlain by the fill material. Scitico soils are classified as hydrologic soil Group D as they have an estimated seasonal high-water table of less than 24 inches and have a saturated hydraulic conductivity (Ksat) value of 0.00 inches per hour in the lower C horizon. This value is in the lower end of the range based on the most limiting soil layer.

In the well-drained and moderately well drained filled area, GZA has estimated a moderate Ksat value and assigned a hydrologic soil Group of B. The well-drained and moderately well-drained filled areas contain a mix of soils and no mineral restrictive feature in our control section (40 inches). The moderately well drained fill area that has a mineral restrictive feature in the disturbed soil areas has a low Ksat value and GZA assigned a hydrologic soil Group of D with soils having an estimated seasonal high water table of less than 24 inches. This is based on field observations and standards outlined in “Site Specific Soil Mapping Standards for New Hampshire and Vermont,” dated December 2017. The disturbed areas have been identified using the *Disturbed Soil Mapping Unit Supplement for DES AOT Site Specific Soil Maps* section of the standards (see **Appendix D**).

Table 1. Description of the soils mapped on site on August 23, 2019.

MAP UNIT NO.	SOIL TAXONOMIC NAME	DESCRIPTION
<u>33A</u> P	Scitico.	Poorly drained soils formed in marine material. These soils are on marine terraces. Saturated hydraulic conductivity is slow and the K sat value is low. Slopes range from 0-3%.
<u>134A</u> VP	Maybid 0-3% slope	Very deep, very poorly drained soils formed in marine sediments. They are nearly level on lowlands. Saturated hydraulic conductivity is moderately high or high in the surface layer and very low to moderately high in the subsoil and substratum. Slopes range from 0-3%.
299A/ccabb	Udorthents, smooth 3-8% slope	This map unit represents areas that have been cut and filled to create a large level on nearly level area. Soil material making up the map units typically comes from the immediate area. The drainage class is well drained and there is no natural soil within 60”. There is no restrictive layer. The Ksat value is moderate and the hydrologic soil group is B. Slopes range from 0-3%.
299C/ccabb	Udorthents, smooth 8-15% slope	. This map unit represents areas that have been cut and filled to create a large level on nearly level area. Soil material making up the map units typically comes from the immediate area. The drainage class is well drained and there is no natural soil





MAP UNIT NO.	SOIL TAXONOMIC NAME	DESCRIPTION
		within 60". There is no restrictive layer. The Ksat value is moderate and the hydrologic soil group is B. Slopes range from 8-15%.
299A/deccd	Udorthents, smooth 0-3% slope	This map unit represents areas that have been cut and filled to create a large level on nearly level area. Soil material making up the map units typically comes from the immediate area. The drainage class is moderately well drained, and the parent material is glacial till with a mineral restrictive feature. The Ksat value is low and the hydrologic soil group is D. Slopes range from 0-3%.
299D /deccd	Udorthents, smooth 15-25% slope	This map unit represents areas that have been cut and filled to create a large level on nearly level area. Soil material making up the map units typically comes from the immediate area. The drainage class is moderately well drained, and the parent material is glacial till with a mineral restrictive feature. The Ksat value is low and the hydrologic soil group is D. Slopes range from 15-25%.
299E/deccd	Udorthents, smooth 25-50% slope	This map unit represents areas that have been cut and filled to create a large level on nearly level area. Soil material making up the map units typically comes from the immediate area. The drainage class is moderately well drained, and the parent material is glacial till with a mineral restrictive feature. The Ksat value is low and the hydrologic soil group is D. Slopes range from 25-50%.

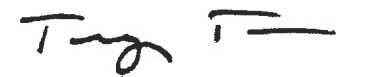
GZA submits this report and Site-Specific Soil map in support of your current planning needs consistent with our correspondence. Once you have reviewed the report and soils information, please do not hesitate to contact Mr. James Long at 603-232-8756 if you have any questions or require additional information.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

  
 James H. Long, CSS, CWS  
 Senior Technical Specialist

  
 Deborah M. Zarta Gier, CNRP  
 Consultant / Reviewer

  
 Tracy L. Tarr, CWS, CESSWI, CWB  
 Principal-in-Charge

JHL/DMZ/TLT

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- Attachments: Appendix A - Limitations  
 Appendix B - Site-Specific Soil Map  
 Appendix C - Official Series Descriptions  
 Appendix D - Disturbed Soil Mapping Unit Supplement



## **Appendix A - Natural Resource Limitations**



## **USE OF REPORT**

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Emanuel Engineering, Inc. ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

## **STANDARD OF CARE**

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

## **LIMITS TO OBSERVATIONS**

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.
5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.
6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

## **RELIANCE ON INFORMATION FROM OTHERS**

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

## **COMPLIANCE WITH REGULATIONS AND CODES**

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.



**NEW INFORMATION**

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

**ADDITIONAL SERVICES**

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.



## **Appendix B - Site-Specific Soil Map**







## **Appendix C - Soil Series Descriptions**

LOCATION SCITICO

CT+MA NH

Established Series  
Rev. MFF-SMF  
07/2003

## SCITICO SERIES

The Scitico series consists of very deep, poorly drained soils formed in silty and clayey sediments. They are nearly level to very gently sloping soils in low-lying positions of glaciolacustrine and marine terraces. Slope ranges from 0 to 5 percent. Permeability is moderate or moderately slow in the surface layer, moderately slow or slow in the upper part of the subsoil, slow or very slow in the lower part of the subsoil, and very slow in the substratum. Mean annual temperature is about 50 degrees F., and mean annual precipitation is about 43 inches.

**TAXONOMIC CLASS:** Fine, mixed, semiactive, nonacid, mesic Typic Endoaquepts

**TYPICAL PEDON:** Scitico silt loam, 1 percent slope in a broad, slightly concave low area. (Colors are for moist soil unless otherwise noted.)

**Ap--** 0 to 8 inches; very dark grayish brown (2.5Y 3/2) silt loam, light gray (5Y 7/1) dry; moderate fine and medium granular structure; friable, sticky, plastic; few very fine, fine and medium roots; slightly acid; clear smooth boundary. (6 to 12 inches thick)

**Eg--** 8 to 11 inches; olive gray (5Y 5/2) silt loam; moderate medium blocky structure; friable, sticky, plastic; few very fine and fine roots; common fine prominent light olive brown (2.5Y 5/4), yellowish brown (10YR 5/4), and dark yellowish brown (10YR 4/4) masses of iron accumulation; slightly acid; clear smooth boundary. (0 to 6 inches thick)

**Bg1--** 11 to 18 inches; olive gray (5Y 5/2 and 5Y 4/2) silty clay loam; moderate coarse blocky structure; firm, very sticky, plastic; few fine roots between peds; continuous distinct gray (5Y 5/1) coatings on ped faces; common fine prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) masses of iron accumulation; neutral; clear smooth boundary.

**Bg2--** 18 to 30 inches; dark gray (5Y 4/1) silty clay loam; moderate coarse prismatic structure parting to coarse blocky; firm, very sticky, plastic; few fine roots between peds; continuous distinct gray (5Y 5/1) coatings on vertical structure faces; few worm casts along prism faces; many fine prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) masses of iron accumulation; neutral; clear smooth boundary.

**Bg3--** 30 to 38 inches; olive gray (5Y 5/2) and grayish brown (2.5Y 5/2) silty clay; weak coarse prismatic structure; firm, very sticky, plastic; few fine roots between prisms; continuous distinct gray (5Y 5/1) coatings on vertical structure faces; few worm casts along prism faces; many fine prominent yellowish brown (10YR 5/6) and dark yellowish brown (10YR 5/6) masses of iron accumulation; neutral; clear smooth boundary. (Combined thickness of the Bg horizons is 10 to 30 inches.)

**Cg1--** 38 to 52 inches; olive gray (5Y 5/2), dark gray (5Y 4/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/4) varved silt and clay (silty clay loam weighted average texture); few yellowish brown (10YR 5/6, 5/8) masses of iron accumulation; massive separating to weak thin plates along varved bedding planes; firm, very sticky, plastic; few fine prominent yellowish brown (10YR 5/6 and 10YR 5/8) masses of iron accumulation; neutral; clear smooth boundary. (0 to 30 inches thick)

**Cg2--** 52 to 65 inches; olive gray (5Y 5/2), gray (5Y 5/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/4) varved silt and clay (silty clay weighted average texture); massive separating to weak thin plates along

varved bedding planes; firm, very sticky, plastic; few fine prominent dark yellowish brown (10YR 4/4 and 10YR 4/6) masses of iron accumulation; neutral.

**TYPE LOCATION:** Hartford County, Connecticut; town of East Windsor, 2,000 feet west of the intersection of Newberry Road and Winkler Road, 100 feet north of Newberry Road. USGS Broad Brook topographic quadrangle, latitude 41 degrees 55 minutes 20 seconds N., longitude 72 degrees 35 minutes 22 seconds W., NAD 27

**RANGE IN CHARACTERISTICS:** Thickness of the solum ranges from 20 to 45 inches. Rock fragments, mostly fine gravel, range from 0 to 3 percent by volume throughout. Reaction ranges from very strongly acid to neutral in the A horizon, strongly acid to neutral in the Eg and upper part of the Bg horizons, and moderately acid to slightly alkaline in the lower part of the Bg horizon and in the C horizon.

The Ap horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 to 3. Dry value is 6 or more. Undisturbed pedons have a thin A horizon with value of 2 or 3 and chroma of 1 or 2. The Ap or A horizon is silt loam or silty clay loam. It has weak or moderate granular or subangular blocky structure and is friable or very friable.

The Eg horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam, silty clay loam, or silty clay. The horizon has weak or moderate granular, blocky, or platy structure, or it is massive. Consistence is friable or firm.

The Bg horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam, silty clay loam, or silty clay in the upper part and silty clay loam, silty clay, or clay in the lower part. The Bg horizon has weak or moderate prismatic, blocky, or platy structure. Consistence is friable or firm.

The C horizon is neutral or has hue of 7.5YR to 5Y, value of 3 to 6, and dominant chroma of 0 to 2. Some pedons have individual varves with chroma of 3 or 4, but they make up less than 40 percent of the horizon. Texture of individual varves is silt, silt loam, silty clay loam, silty clay, or clay, but the weighted average texture of the horizon is silty clay, clay, or silty clay loam. The C horizon is massive, or has platy structure, or weak prismatic structure separating to plates. Consistence is firm or very firm.

**COMPETING SERIES:** There are no other soils currently in this family.

The Binghamville, Boxford, Brancroft, Canadice, Canandaiga, Fonda, Latty, Livingston, Maybid, Munson, Parsippany, Raynham, Scantic, and Shaker series are similar soils in related families in LRRs L, R, and S. Bellingham soils have mixed mineralogy. Binghamville and Raynham soils are coarse-silty. Boxford and Brancroft soils have matrix chroma of 3 or more to a depth of 30 inches. Canadice and Parsippany soils have an argillic horizon. Canandaiga soils are fine-silty. Fonda soils have a mollic epipedon. Latty soils have carbonates in the series control section and in the substratum. Livingston soils are in a very fine family. Maybid soils have a thicker, darker A horizon that is high in organic matter. Munson soils are coarse-silty over clayey. Scantic soils are frigid. Shaker soils are coarse-loamy over clayey.

**GEOGRAPHIC SETTING:** Scitico soils are nearly level to very gently sloping soils on lacustrine and marine terraces. Slope ranges from 0 to 5 percent. The soils formed in silty and clayey glaciolacustrine and marine deposits. Typically, these soils are in low-lying, broad, flat or slightly concave areas. Mean annual temperature ranges from 45 to 54 degrees F., mean annual precipitation ranges from 36 to 50 inches, and the growing season ranges from 125 to 190 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Agawam, Amostown, Belgrade, Boxford, Brancroft, Elmridge, Enfield, Haven, Ninigret, Pollux, Raynham, Shaker, and Tisbury soils on nearby landscapes. The moderately well to somewhat poorly drained Boxford and Brancroft soils and the very poorly drained Maybid soils are associated in a drainage sequence. Agawam, Enfield, Haven, Ninigret, and Tisbury soils are terrace associates formed in loamy over stratified sandy and gravelly deposits. Amostown and Pollux

soils are better drained loamy soils underlain by silty lacustrine materials. The silty Belgrade soils and the loamy over clayey Elmridge soils are moderately well drained associates on nearby terraces.

**DRAINAGE AND PERMEABILITY:** Poorly drained. Surface runoff is slow. Permeability is moderate or moderately slow in the surface layer, moderately slow or slow in the upper part of the subsoil, slow or very slow in the lower part of the subsoil, and very slow in the substratum. Scitico soils have a water table at or near the surface much of the year.

**USE AND VEGETATION:** Cleared areas are used for hay or pasture. A few areas are used for silage corn and a small acreage is used for sod farming. Some areas are wooded and a few areas are in community development. Common trees are red maple, gray birch, alder, aspen, white pine, and swamp oak.

**DISTRIBUTION AND EXTENT:** Glaciolacustrine and marine terraces in The Connecticut Valley Lowland of Connecticut and Massachusetts and coastal areas of Massachusetts and New Hampshire; MLRAS 144A AND 145. The series is of moderate extent.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Amherst, Massachusetts.

**SERIES ESTABLISHED:** Hampshire County, Massachusetts, Central Part, 1980.

**REMARKS:** This revision reflects a change in classification to the 8th Edition of the Keys. Cation exchange activity class placement determined from a review of limited lab data and similar or associated soils.

Scitico soils were previously classified as Typic Haplaquepts and Typic Endoaquepts.

Diagnostic horizons and features recognized in this pedon are:

1. Ochric epipedon - the zone from 0 to 11 inches (Ap and Eg horizons).
2. Cambic horizon - the zone from 11 to 38 inches (Bg horizons).
3. Typic Endoaquepts subgroup - saturation in all layers from the upper boundary of saturation to a depth of 200 cm from the mineral surface layer and dominant chroma of 2 or less to a depth of 75 cm. (Eg and Bg horizons).

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National Cooperative Soil Survey  
U.S.A.

LOCATION MAYBID

MA +CT NH

Established Series

Rev. WHT-SMF-MFF

08/2004

## MAYBID SERIES

The Maybid series consists of very deep, very poorly drained soils formed in lacustrine or marine sediments. They are nearly level or level soils on lowlands. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity is moderately high or high in the surface layer and very low to moderately high in the subsoil and substratum. Mean annual temperature is about 48 degrees F. and the mean annual precipitation is about 45 inches.

**TAXONOMIC CLASS:** Fine, mixed, semiactive, nonacid, mesic Typic Humaquepts

**TYPICAL PEDON:** Maybid silt loam forested, at an elevation of about 85 feet. (Colors are for moist soils.)

**A--**0 to 7 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable, slightly sticky, nonplastic; many fine, medium and coarse woody roots; moderately acid; clear smooth boundary. (6 to 10 inches thick)

**Bg1--**7 to 11 inches; gray (5Y 5/1) silty clay loam; moderate medium and coarse blocky structure; friable, sticky, slightly plastic; common fine, medium and coarse woody roots; moderately acid; clear wavy boundary.

**Bg2--**11 to 19 inches; greenish gray (5GY 5/1) silty clay; massive; firm, sticky, plastic; very few fine woody roots; few fine prominent brown (7.5YR 4/4) masses of iron accumulation; neutral; gradual smooth boundary. (Combined thickness of the Bg horizons is 6 to 22 inches.)

**Cg1--**19 to 27 inches; greenish gray (5GY 5/1) silty clay; massive; firm, sticky, plastic; neutral; gradual smooth boundary. (0 to 30 inches thick)

**Cg2--**27 to 65 inches; dark greenish gray (5GY 4/1) silty clay; massive; firm, sticky, plastic; neutral.

**TYPE LOCATION:** Essex County, Massachusetts; Town of Amesbury, 100 yards east of Woodward Road at the Massachusetts - New Hampshire state line. USGS Exeter, NH-MASS 7 1/2 minute quadrangle; latitude 42 degrees 52 minutes 55 seconds N., longitude 70 degrees 56 minutes 11 seconds W., NAD 27.

**RANGE IN CHARACTERISTICS:** Thickness of the solum ranges from 18 to 30 inches. Content of rock fragments is usually less than 1 percent by volume. The soil ranges from strongly acid to moderately acid in the A horizon and from strongly acid to neutral in the B and C horizons. At least one horizon within 40 inches is moderately acid to neutral.

The A horizon is neutral or has hue of 10YR to 5Y, value of 2 or 3, and chroma of 0 to 2. It is silt loam or silty clay loam. It is nonsticky or slightly sticky.

The upper part of the Bg horizon is neutral or has hue of 5Y, 5G, 5GY or 5BG, value of 3 to 6, and chroma of 0 to 2. Some redoximorphic features are present in some pedons. It is silt loam, silty clay loam, or silty clay. It has weak platy, weak to moderate subangular blocky or blocky, or moderate fine granular structure, or the horizon is massive. It is friable or firm and slightly sticky or sticky.

The lower part of the Bg horizon is neutral or has hue of 5Y or 5GY, value of 4 to 6, and chroma of 0 to 2. It has distinct to prominent high chroma iron accumulations that comprise less than 40 percent of the matrix. The Bg

horizon is silty clay, silty clay loam, or clay. It has weak to moderate prismatic or blocky structure, or the horizon is massive.

The Cg horizon is neutral or has hue of 5Y, 5GY, 5G, or 5BG, value of 4 to 6, and chroma of 0 or 1. It is silty clay loam, silty clay, or clay.

**COMPETING SERIES:** The Maybid series is the only known member of this family.

The [Alden](#), [Biddeford](#), [Birdsall](#), [Canandaigua](#), [Clatsop](#), [Defiance](#), [Dunning](#), [Fonda](#), [Livingston](#), [Madalin](#), [Papakating](#), [Toledo](#) and [Tughill](#) series are in related families. Alden, Birdsall, Canandaigua, and Tughill soils have less than 35 percent clay in the particle-size control section. Biddeford soils have histic epipedons. Madalin soils have an argillic horizon. Clatsop soils have acid reaction. Defiance, Dunning, and Papakating soils have irregular decrease in organic matter with depth. In addition, the Papakating soils have less than 35 percent clay. Fonda, Livingston, and Toledo soils have ochric epipedons; the Livingston soils, in addition, have more than 60 percent clay.

**GEOGRAPHIC SETTING:** Maybid soils are level or nearly level soils on lowlands of silty and clayey sediments. The soils formed in water deposited material of marine or lacustrine origin. Slope ranges from 0 to 3 percent. Mean annual temperature ranges from 45 to 50 degrees F.; mean annual precipitation ranges from 40 to 50 inches; and mean growing season ranges from 120 to 180 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the [Belgrade](#), [Birdsall](#), [Boxford](#), [Brancroft](#), [Elmwood](#), [Raynham](#), [Scitico](#), [Scio](#), [Suffield](#), [Swanton](#), [Unadilla](#), and [Whately](#) soils. Belgrade, Birdsall, Raynham, Scio, and Unadilla soils have coarse-silty particle-size control sections. Brancroft soils are fine-silty. The moderately well and somewhat poorly drained Boxford soils, the poorly drained Scitico soils, and well drained Suffield soils are members of a drainage sequence in the same landscape. Elmwood, Swanton, and Whately soils have coarse-loamy over clayey particle-size control sections.

**DRAINAGE AND PERMEABILITY:** Very poorly drained. Internal drainage is very slow. Permeability is slow or very slow. Saturated hydraulic conductivity is moderately high or high in the surface layer very low to moderately high in the subsoil and substratum. The soil is intermittently ponded or has very low runoff.

**USE AND VEGETATION:** Mostly brush land and woodland. Woodland consists of red maple, elm, tamarack, willow, alder, black spruce, and white pine. Cattails and sedges are common in nonwooded areas.

**DISTRIBUTION AND EXTENT:** Glaciolacustrine or marine lowlands in MLRA 144A in Massachusetts, Connecticut, New Hampshire, and possibly eastern New York. The series is of small extent.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Amherst, Massachusetts

**SERIES ESTABLISHED:** Essex County, Massachusetts, 1977.

**REMARKS:** The Maybid soils were formerly included with the Biddeford series which has a histic epipedon. Mineralogy and cation exchange activity class are changed in this revision from illitic to mixed based upon a review of similar soils.

Diagnostic horizons and other features recognized in this pedon are:

1. Umbric epipedon - the zone from the surface of the soil to a depth of 10 inches, when mixed (A and part of the Bg1 horizon).
2. Cambic horizon - the zone from 7 inches to a depth of 19 inches (Bg horizon).
3. Particle size class - the zone from 10 to 40 inches averages about 55 percent clay (fine).

**ADDITIONAL DATA:** The A horizon of the typical pedon was sampled (RT77-MA173) for base saturation (B.S.- 44 percent).



**Appendix D - Disturbed Soil Mapping Unit Supplement**

## Map Symbol Denominators for Disturbed Unit Supplements

The map symbols for Site-Specific Soil Mapping of disturbed soils in New Hampshire is a two part symbol with parts separated by a forward slash ( / ).

The first part consists of the USDA-NRCS Disturbed Map Unit symbol from the NH State-Wide Numerical Soil Legend. The map symbol is composed of 1 to 3 digits followed by a capital letter designating slope.

The second part consists of symbols of the SSSNNE NH Disturbed Soil Supplement to the Site Specific Soil Survey Standards, as detailed below. The disturbed map symbol is composed of 5 lower case letters.

Thus a Site Specific map symbol for a map prepared for an AoT application would be formatted as follows:

**400A/aaaaa**

These SSSNNE NH Disturbed Soil Supplemental symbols can only be used in conjunction with the USDA-NRCS Disturbed Map Unit symbols for the NH Statewide Numerical Soil Legend.

### Supplemental Symbols

Supplemental symbols may be used at the discretion of the Certified Soil Scientist who creates the Site Specific Soil Survey. The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

#### Symbol 1: Drainage Class

- a-Excessively Drained
- b-Somewhat Excessively Drained
- c-Well Drained
- d-Moderately Well Drained
- e-Somewhat Poorly Drained
- f-Poorly Drained
- g-Very Poorly Drained
- h-Not Determined

#### Symbol 2: Parent Material (of naturally formed soil only, if present)

- a-No natural soil within 60"
- b-Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel)
- c-Glacial Till Material (active ice)
- d-Glaciolacustrine very fine sand and silt deposits (glacial lakes)
- e-Loamy/sandy over Silt/Clay deposits
- f-Marine Silt and Clay deposits (ocean waters)
- g-Alluvial Deposits (floodplains)



- h-Organic Materials-Fresh water wetlands
- i- Organic Materials-Tidal wetlands

**Symbol 3: Restrictive/Impervious Layers**

- a-None
- b-Bouldery surface with more than 15% of the surface covered with boulders
- c-Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as hard pan, platy structure or clayey texture with consistence of at least firm (i.e. more than 20 newtons). For other examples of soil characteristics that qualify for restrictive layers, see "Soil Manual for Site evaluations in NH" 2<sup>nd</sup> Ed., (page 3-17, figure 3-14)
- d-Bedrock in the soil profile; 0-20 inches
- e-Bedrock in the soil profile; 20-60 inches
- f-Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types
- g-Subject to Flooding
- h-Man-made impervious surface including pavement, concrete, or built-up surfaces (i.e. buildings) with no morphological restrictive layer within control section

**Symbol 4: Estimated Ksat\* (most limiting layer excluding symbol 3h above).**

- a- High.
- b- Moderate
- c- Low
- d- Not determined \*See "Guidelines for Ksat Class Placement" in Chapter 3 of the Soil Survey Manual, USDA

**Symbol 5: Hydrologic Soil Group\***

- a-Group A
- b-Group B
- c-Group C
- d-Group D
- e-Not determined

\*excluding man-made surface impervious/restrictive layers

