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VIA EMAIL

September 23, 2021
File No. 04.0191303.00

Mr. Barry Gier, P.E.
Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, New Hampshire 03885

Re: Wetland Delineation Report
Mooers Road, Tax Map 72, Lot 13-1
Nottingham, New Hampshire

Dear Mr. Gier:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide this letter report detailing the completion of wetland delineation field work at the parcel identified as Tax Map 72, Lot 13-1, located off Moores Road in Nottingham, New Hampshire (i.e. Site). The Site is approximately 56 acres of predominantly forested land and contains an existing residential building and associated maintained lawn. The Site is bordered to the east, south, and north by Mooers Road and to the west by Sach's Road. The delineation field work was performed by Mr. James Long, State of New Hampshire Certified Wetland Scientist (#007) and Certified Soil Scientist (#015), and Peter Petkauskos on September 14 and September 15, 2021. This report is subject to the attached **Limitations**.

The purpose of the work was to evaluate and flag the boundaries of wetlands on the Site. GZA understands that survey location of wetland flags will be completed by Jones & Beach, Engineers, Inc. (J&B), and that the data from the wetland delineation will be used in permit applications for the construction of proposed site development.

The wetland delineation was conducted in accordance with the 1987 Corps of Engineers *Corps of Engineers Wetlands Delineation Manual*¹, using the *Routine Determination Method*; in conjunction with the *Regional Supplement*² to the *Corps of Engineers Wetland Delineation Manual*, the National Plant List: 2018 wetlands rankings³, *Field Indicators of Hydric Soils in the United States Version 8.2*,⁴ and *Field Indicators for Identifying*

¹ U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

² U.S. Army Corps of Engineers, 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, Mississippi; U.S. Army Engineer Research and Development Center.

³ U.S. Army Corps of Engineers, Engineer Research and Development Center. 2018. *National Wetland Plant List, Version 3.4*. Cold Regions Research and Engineering Laboratory, Hanover, NH.

⁴ United States Department of Agriculture, Natural Resource Conservation Service, 2018. *Field Indicators of Hydric Soils in the United States*, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.



Hydric Soils in New England.⁵ Observed wetlands were classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States*.⁶

The presence of potential vernal pools was evaluated in accordance with *Identification and Documentation of Vernal Pools in New Hampshire*, Third Edition, 2016, New Hampshire Fish and Game Department, Nongame and Endangered Wildlife Program. Vernal pool areas exist as confined basins and exhibit vernal pool criteria as outlined in the New Hampshire Code of Administrative Rules, Env-Wt 103.64, 104.15, and 104.44. GZA noted six potential vernal pools during the time of field work (see Figure 1). However, confirmation of vernal pools can only occur during the typical breeding season from April through June. Therefore, GZA conducted dry basin surveys to the extent possible to identify the potential vernal pools.

Wetland boundaries were witnessed with pink and black flagging on vegetation at approximate 50-foot intervals. A wetland flag sketch was completed on September 15, 2021 and provided to Jones and Beach by e-mail for use in field location of wetland flags. GZA delineated the wetland systems using the following flag series and noted wetland classification descriptions (see **Table 1**):

- Wetland 1 – Flag Series
 - A1-A162 (A162 connects to B135)
 - B1-B135 (B135 connects to A162)
- Wetland 2 – Flag Series
 - C1-C6 (open)
- Wetland 3 – Flag Series
 - D1-D19 (connect)
- Wetland 4 – Flag Series
 - E1-E14 (connect)
- Wetland 5 – Flag Series
 - F1-F35 (open)
- Wetland 6 – Flag Series
 - G1-G14 (open)
- Wetland 7 – Flag Series
 - G1-G6 (open)
- Wetland 8 – Flag Series
 - H1-H44 (connect)

The Site contains eight palustrine emergent, scrub-shrub, and forested wetland systems (Wetlands 1-8 see **Table 1**, and **Figure 1 – Wetland Delineation Sketch**).

⁵ New England Hydric Soils Technical Committee. 2020 Version 4. *Field Indicators for Identifying Hydric Soils in New England*, New England Interstate Water Pollution Control Commission, Lowell, Massachusetts.

⁶ Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Federal Geographic Data Committee and U.S. Fish and Wildlife Service.



Table 1. Summary of wetland delineation

Wetland Identification	Wetland Classification	Notes
Wetland 1	PEM1Fg, PFO1/4E, PFO1/4Fg, PUBHb, R4SB	Located throughout the central and southerly portions of the Site.
Wetland 2	PFO14E	Located in the southwestern portion of the site just west of Jamps Trail.
Wetland 3	PFO14E/PFO14Fg	Located in the northeastern portion of the Site.
Wetland 4	PFO14E	Located in the northern portion of the Site.
Wetland 5	PFO1/4E, PFO1/4Fg	Located in the eastern portion of the Site.
Wetland 6	PEM1, PSS1Fg	Located in the southeasterly portion of the Site.
Wetland 7	PFO1/4E	Located in the northwestern portion of the Site.
Wetland 8	PFO1/4E	Located in the central portion of the Site.

WETLAND 1

Wetland 1 is located in the central and southernmost portions of the Site and is demarcated by the A-line and B-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 1 is classified as a palustrine emergent and forested wetland system dominated by broad leaved deciduous and evergreen vegetation that is seasonally and permanently flooded/saturated (PEM1Fg,PFO1,4E,PFO1/4Fg). The ponded portion of Wetland 1 is classified as a palustrine emergent wetland system with unconsolidated bottom that is permanently flooded/saturated with beaver activity (PUBHb/PEM1Fgb). Wetland 1 contains an unnamed intermittent stream that is classified as an intermittent riverine system with unconsolidated bottom (R4UB) Dominant vegetation in the wetland includes cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), fringed sedge (*Carex crinita*), sphagnum moss (*Sphagnum spp.*), American bur-reed (*Sparganium Americanum*), goldthread (*Coptis trifolia*), highbush blueberry (*Vaccinium corymbosum*), meadowsweet (*Spiraea alba*), maleberry (*Lyonia ligustrina*), common winterberry (*Ilex verticillate*), American witch-hazel (*Hamamelis virginiana*), red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), black gum (*Nyssa sylvatica*), eastern hemlock (*Tsuga canadensis*), and white pine (*Pinus strobus*). The soils in the exterior portion of the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). The soils on the interior of the wetland are classified as hydric soils that have organic soil material at or near the soil surface that are greater than 16 inches thick (hydric soil indicator A1).

WETLAND 2

Wetland 2 is located in the southwestern portion of the Site and is demarcated by the C-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 2 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that seasonally flooded/saturated (PFO1/4E). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, sphagnum moss, highbush blueberry, maleberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11).



WETLAND 3

Wetland 3 is located in the northernmost portion of the Site and is demarcated by the D-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 3 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that seasonally flooded/saturated (PFO1/4E). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, highbush blueberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the exterior portion of the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). The soils within the interior of the wetland are classified as hydric soils that have organic soil material at or near the soil surface that are greater than 8 inches and less than 16 inches thick (hydric soil indicator A2).

WETLAND 4

Wetland 4 is located in the westernmost portion of the Site and is demarcated by the E-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 4 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that seasonally flooded/saturated (PFO1/4E). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, highbush blueberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). Wetland 4 connects to Wetland 1 through an existing culvert under Jamps Trail.

WETLAND 5

Wetland 5 is located in the northernmost portion of the Site and is demarcated by the F-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 5 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that permanently flooded/saturated (PFO/4E, PFO1/4Fg). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, highbush blueberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the exterior portion of the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). The soils on the interior of the wetland are classified as hydric soils that have organic soil material at or near the soil surface that are greater than 16 inches thick (hydric soil indicator A1).

WETLAND 6

Wetland 6 is located in the northeastern portion of the Site and contains the G-line wetland flags 1-14 (see **Figure 1 – Wetland Delineation Sketch**). Wetland 6 is classified as a palustrine emergent and scrub-shrub wetland system dominated by broad leaved deciduous vegetation that permanently flooded/saturated (PFO1/4E, PFO1/4Fg). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, marsh fern (*Thelypteris palustris*), sphagnum moss, highbush blueberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the exterior portion of the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). The soils on the interior of the wetland are classified as hydric soils that have organic soil material at or near the soil surface that are greater than 16 inches thick (hydric soil indicator A1).

WETLAND 7

Wetland 7 is located in the northwestern portion of the Site and contains the G-line wetland flags 1-6 (see **Figure 1 – Wetland Delineation Sketch**). Wetland 7 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that seasonally flooded/saturated (PFO1/4E). Dominant vegetation in the



wetland includes cinnamon fern, meadowsweet, highbush blueberry, red maple, yellow birch, and eastern hemlock. The soils in the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11). Wetland 7 connects to Wetland 1 through an existing culvert under Jampsa Trail.

WETLAND 8

Wetland 8 is located in the central portion of the Site and contains the H-line wetland flags (see **Figure 1 – Wetland Delineation Sketch**). Wetland 8 is classified as a palustrine forested wetland system dominated by broad leaved deciduous and evergreen vegetation that seasonally flooded/saturated (PFO1/4E). Dominant vegetation in the wetland includes cinnamon fern, sensitive fern, gold thread, sphagnum moss, highbush blueberry, common winterberry, red maple, yellow birch, eastern hemlock, and white pine. The soils in the wetland are classified as hydric soils with a depleted matrix below a dark surface (hydric soil indicator A11).

GZA has completed a wetland delineation at the Site resulting in the identification of 8 wetlands and 6 potential vernal pools, as detailed above. Please feel free to contact Ms. Lindsey White at 603-232-8753 or lindsey.white@gza.com if you have any questions regarding this Wetland Delineation Report.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Lindsey White
Project Manager

Tracy L. Tarr, CWS, CESSWI
Associate Principal

Deborah M. Zarta Gier, CNRP
Consultant / Reviewer

James Long, CWS, CSS
Field Lead

LEW/TLT/DMZ: jkm

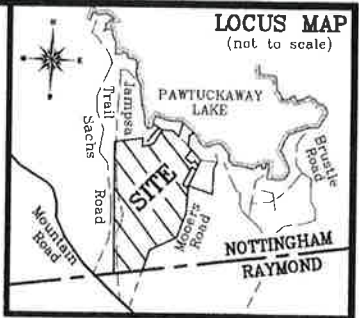
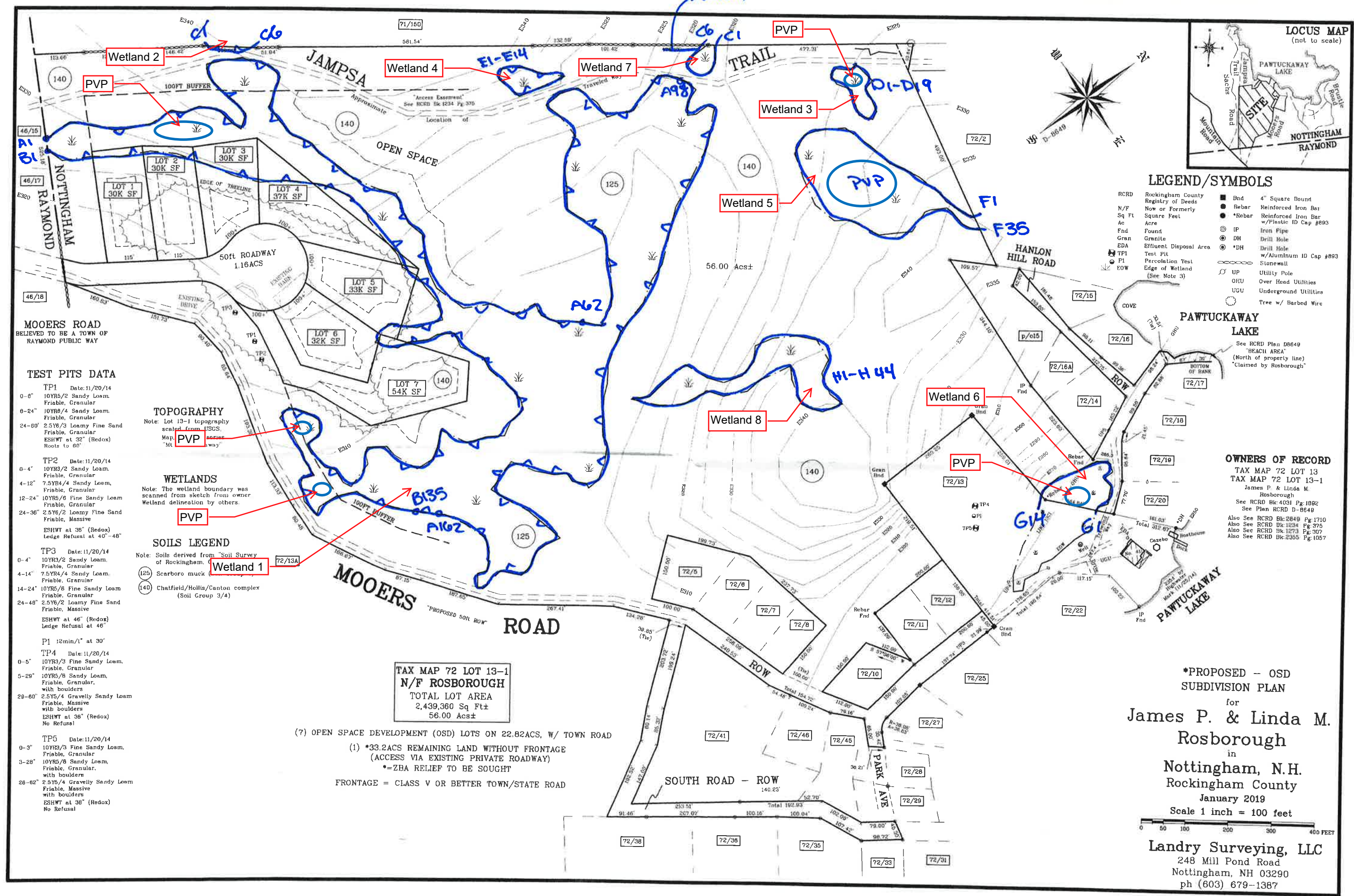
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Attachments: Figure 1 – Wetland Delineation Sketch
Appendix A – Limitations
Appendix B – Photo Log



Figure 1 – Wetland Delineation Sketch

9/14/21 + 9/15/21



LEGEND/SYMBOLS

RCRD	Rockingham County Registry of Deeds	■ Bnd	4" Square Bound
N/F	Now or Formerly	● Rebar	Reinforced Iron Bar
Sq Ft	Square Feet	● *Rebar	Reinforced Iron Bar w/Plastic ID Cap #893
Ac	Acre	⊙ IP	Iron Pipe
Fnd	Found	⊙ DH	Drill Hole
Gran	Granite	⊙ *DH	Drill Hole w/Aluminum ID Cap #893
EDA	Effluent Disposal Area	⊙ TP1	Test Pit
P1	Percolation Test	⊙ P1	Percolation Test
EOW	Edge of Wetland (See Note 3)	⊙ UG	Underground Utilities
		⊙ OHU	Over Head Utilities
		⊙ UGU	Underground Utilities
		⊙	Tree w/ Barbed Wire

TEST PITS DATA

TP1	Date: 11/20/14
0-8"	10YR5/2 Sandy Loam, Friable, Granular
8-24"	10YR6/4 Sandy Loam, Friable, Granular
24-60"	2.5Y6/3 Loamy Fine Sand, Friable, Granular
	ESHWT at 32" (Redox) Roots to 60"
TP2	Date: 11/20/14
0-4"	10YR3/2 Sandy Loam, Friable, Granular
4-12"	7.5YR4/4 Sandy Loam, Friable, Granular
12-24"	10YR5/6 Fine Sandy Loam, Friable, Granular
24-36"	2.5Y6/2 Loamy Fine Sand, Friable, Massive
	ESHWT at 36" (Redox) Ledge Refusal at 40"-48"
TP3	Date: 11/20/14
0-4"	10YR3/2 Sandy Loam, Friable, Granular
4-14"	7.5YR4/4 Sandy Loam, Friable, Granular
14-24"	10YR5/6 Fine Sandy Loam, Friable, Granular
24-48"	2.5Y6/2 Loamy Fine Sand, Friable, Massive
	ESHWT at 46" (Redox) Ledge Refusal at 46"
P1	12min/1" at 30"
TP4	Date: 11/20/14
0-5"	10YR3/3 Fine Sandy Loam, Friable, Granular
5-29"	10YR5/8 Sandy Loam, Friable, Granular, with boulders
29-60"	2.5Y5/4 Gravely Sandy Loam, Friable, Massive with boulders
	ESHWT at 36" (Redox) No Refusal
TP5	Date: 11/20/14
0-3"	10YR3/3 Fine Sandy Loam, Friable, Granular
3-28"	10YR5/8 Sandy Loam, Friable, Granular, with boulders
28-62"	2.5Y5/4 Gravely Sandy Loam, Friable, Massive with boulders
	ESHWT at 36" (Redox) No Refusal

TOPOGRAPHY
 Note: Lot 13-1 topography scaled from USGS Map. PVP series "M" way.

WETLANDS
 Note: The wetland boundary was scanned from sketch from owner Wetland delineation by others.

SOILS LEGEND
 Note: Soils derived from "Soil Survey of Rockingham."
 (125) Scarborough
 (140) Chatfield/Hollis/Canton complex (Soil Group 3/4)

TAX MAP 72 LOT 13-1 N/F ROSBOROUGH
 TOTAL LOT AREA 2,439,360 Sq Ft±
 56.00 Acs±

(7) OPEN SPACE DEVELOPMENT (OSD) LOTS ON 22.82ACS, W/ TOWN ROAD
 (1) *33.2ACS REMAINING LAND WITHOUT FRONTAGE (ACCESS VIA EXISTING PRIVATE ROADWAY)
 *-ZBA RELIEF TO BE SOUGHT
 FRONTAGE = CLASS V OR BETTER TOWN/STATE ROAD

OWNERS OF RECORD
 TAX MAP 72 LOT 13
 TAX MAP 72 LOT 13-1
 James P. & Linda M. Rosborough
 See RCRD Bk: 4031 Pg: 1892
 See Plan RCRD D-8649
 Also See RCRD Bk: 2849 Pg: 1710
 Also See RCRD Bk: 1234 Pg: 375
 Also See RCRD Bk: 1273 Pg: 307
 Also See RCRD Bk: 2355 Pg: 1057

***PROPOSED - OSD SUBDIVISION PLAN**
 for
James P. & Linda M. Rosborough
 in
Nottingham, N.H.
 Rockingham County
 January 2019
 Scale 1 inch = 100 feet

Landry Surveying, LLC
 248 Mill Pond Road
 Nottingham, NH 03290
 ph (603) 679-1387



Appendix A – Limitations



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Jones & Beach Engineers, 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 - Photo Log

PHOTO LOG
Mooers Road
Nottingham, New Hampshire
Photos Taken: September 14 and September 15, 2021



Photograph No. 1: Looking northwesterly into Wetland 1 from wetland flag B20.



Photograph No. 2: Looking northerly into the ponded portion of Wetland 1.

PHOTO LOG
Mooers Road
Nottingham, New Hampshire
Photos Taken: September 14 and September 15, 2021



Photograph No. 3: Looking northerly at an existing beaver dam within Wetland 1 near wetland flag B64.



Photograph No. 4: Looking easterly into a potential vernal pool within Wetland 1 near wetland flag B99.

PHOTO LOG
Mooers Road
Nottingham, New Hampshire
Photos Taken: September 14 and September 15, 2021



Photograph No. 5: Looking westerly into Wetland 2 from Jamps Trail.



Photograph No. 6: Looking southerly into a potential vernal pool within Wetland 3 near wetland flag D6.

PHOTO LOG
Mooers Road
Nottingham, New Hampshire
Photos Taken: September 14 and September 15, 2021



Photograph No. 7: Looking easterly into the Wetland 5 near wetland flag F6.



Photograph No. 8: Looking southeasterly into Wetland 6 near wetland flag G14.

PHOTO LOG
Mooers Road
Nottingham, New Hampshire
Photos Taken: September 14 and September 15, 2021



Photograph No. 9: Looking easterly into the Wetland 7 and existing culvert at Jamps Trail.



Photograph No. 10: Looking into Wetland 8 near wetland flag H37.