

Appendix II-A7b

Natural Resources Conservation Service (NRCS) Mapped Soil Report –
New York

March 2024

Natural Resources Conservation Service

Mapped Soils Report

Boroughs of Brooklyn and Staten Island
Kings and Richmond Counties, New York

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1.0 INTRODUCTION

Atlantic Shores Offshore Wind, LLC (Atlantic Shores) is a 50/50 joint venture between EDF-RE Offshore Development, LLC (an indirect wholly owned subsidiary of EDF Renewables, Inc. [EDF Renewables]) and Shell New Energies US, LLC (Shell). Atlantic Shores is submitting this Construction and Operations Plan to the Bureau of Ocean Energy Management for the development of an offshore wind energy generation project (Project) within Lease Area OCS-A 0549 (the Lease Area).

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C., (EDR) was contracted by Atlantic Shores to identify the Natural Resources Conservation Service (NRCS) soil types mapped within an approximate 150-foot Study Area of the onshore portions of the proposed Project within New York, hereafter referred to as the Study Area (Figure 1). Onshore Project components in New York consist of the landfall locations, onshore interconnection cable routes (cable routes), onshore substation/converter station options and points of interconnection within the Boroughs of Brooklyn and Staten Island, Kings and Richmond Counties.

1.1 Purpose

The purpose of this report is to identify NRCS soil units that are mapped within the Study Area and describe specific characteristics such as physical attributes, soil inclusions, hydric status, acidity, and construction suitability.

This report is intended to provide the information necessary to guide the identification of onshore geotechnical investigation locations within the Study Area.

1.2 Data Sources

Information supporting this report was largely obtained from the NRCS Web Soil Survey (Soil Survey Staff 2023) with supplemental information used from the NRCS List of Hydric Soils of the State of New Jersey (NRCS 2023).

2.0 SOIL DESCRIPTIONS

The Study Area is located within the Atlantic Coastal Plain physiographic province of the State of New York (New York State Museum 2022). The geography of this province consists of moraines and outwash aprons cause by glacial activities that slope south to the Atlantic Ocean (NYSDOT 2013). The entire province has relatively low relief, with the highest elevation occurring on Long Island at around 400 feet above mean sea level (msl) (NYSDOT 2013). Elevations within the Study Area range from 1 to 177 feet above msl.

Sections 2.1 and 2.2 identifies the soil types mapped within the Study Area, provides a physical description and summary of other soil characteristics such as hydric rating, acidity, and construction limitations.

2.1 Soil Types

A total of 70 soils are mapped within the Study Area as shown in Figure 2. Table 1 provides a list of the soil types, inclusions, and acres within the Study Area.

Table 1. Study Area Mapped Soils

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
ApA	Appoquinimink mucky peat	0 to 1	14.3	Ipswich (8%), Westbrook sandy substratum (3%), Secaucus (2%), Preakness very poorly drained (2%)
BHBu	Boonton-Haledon complex	0 to 8	8.8	Hasbrouck (8%), Greenbelt (1%)
BiB	Bigapple fine sand	3 to 8	7.4	Baren (2%), Hooksan (2%), Fortress (2%), Urban Land sandy substratum (2%), Jamaica (2%), Verrazano (2%), Breeze (2%)
BmA	Boonton loam	0 to 3	2.5	Haledon (10%), Hasbrouck (6%), North Meadow (2%), Deerfield (2%)
BmB	Boonton loam	3 to 8	12.7	Haledon (8%), Hasbrouck (2%), North Meadow (2%)
BtA	Boonton loam	0 to 3	0.6	Haledon (10%), Hasbrouck (3%), North Meadow (2%)

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
BtB	Boonton loam	3 to 8	0.6	Haledon (10%), Hasbrouck (3%), North Meadow (2%)
BtC	Boonton loam	8 to 15	3.2	Haledon (8%), Greenbelt (2%)
BtD	Boonton loam	15 to 25	0.1	Haledon (8%), Greenbelt (2%)
BtEt	Boonton loam, terminal moraine	15 to 35	2.6	Windsor (8%), Typic Hapludalfs (7%), Hasbrouck (5%)
CaA	Catden muck	0 to 2	19.3	Canandaigua (5%), Natchaug (5%), Alden (5%), Timakwa (5%)
DfA	Deerfield loamy fine sand	0 to 3	3.4	Windsor (7%), Wareham (5%), Sudbury (2%), Ninigret (1%)
FFA	Fluventic Hapludolls-Cumulic Endoaquolls complex	0 to 3	6.2	Fluvaquentic hapludolls (8%), Mixed, mesic aquic udipsamments (5%), Cumulic endoaquolls very poorly drained (4%), Pootatuck (3%), Olinville (3%), Mixed, mesic mollic psammaquents (2%)
FGA	Flatbush-Greenbelt complex	0 to 3	4.7	North Meadow outwash substratum (7%), Ebbets (5%), Laguardia (3%)
FGB	Flatbush-Greenbelt complex	3 to 8	14.5	North Meadow (7%), Ebbets (5%), Laguardia (3%)
FoA	Fortress sand	0 to 3	0.7	Bigapple (5%), Barren (3%), Jamaica (2%), Breeze (2%)
GbA	Greenbelt loam	0 to 3	60.6	Mixed, mesic aquic udipsamments (6%), North Meadow (6%), Centralpark (6%), Ebbets (3%), Laguardia (1%)

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
GbB	Greenbelt loam	3 to 8	1.4	Mixed, mesic aquic udipsamments (6%), North Meadow (6%), Centralpark (6%), Ebbets (3%), Laguardia (1%)
GbC	Greenbelt loam	8 to 15	3.5	Mixed, mesic aquic udipsamments (2%), Centralpark (8%), Ebbets (4%), Laguardia (8%)
GbD	Greenbelt loam	15 to 25	0.1	Mixed, mesic aquic udipsamments (2%), Centralpark (8%), Ebbets (4%), Laguardia (8%)
GbE	Greenbelt loam	25 to 35	2.5	Mixed, mesic aquic udipsamments (2%), Centralpark (8%), Ebbets (4%), Laguardia (8%)
GbF	Greenbelt loam	35 to 60	7.2	Mixed, mesic aquic udipsamments (2%), Centralpark (8%), Ebbets (4%), Laguardia (8%)
GrB	Greatkills gravelly sandy loam	3 to 8	2.1	Urban land, tidal marsh substratum (5%), greenbelt (4%)
GUA	Greenbelt-Urban land complex	0 to 3	55.6	Laguardia (7%), Ebbets (7%), North Meadow (1%)
GUAw	Greenbelt-Urban land complex	0 to 3	42.9	Charlton (3%), Greenbelt cemetery deep water table phase (2%)
GUB	Greenbelt-Urban land complex	3 to 8	1.1	Laguardia (7%), Ebbets (7%), North Meadow (1%)
GUBw	Greenbelt-Urban land complex	3 to 8	3.6	Charlton cemetery (5%)
GUC	Greenbelt-Urban land complex	8 to 15	2.6	Laguardia (7%), Ebbets (7%), North Meadow (1%)
GUCw	Greenbelt-Urban land complex	8 to 15	0.5	Charlton (6%)
GUDw	Greenbelt-Urban land complex	15 to 25	15.2	Charlton (7%)

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
HaA	Hasbrouck silt loam	0 to 3	9.5	Haledon (15%), Boonton moderately well drained (5%)
HHA	Haledon-Hasbrouck complex	0 to 3	3	Boonton moderately well drained (15%)
IPA	Ipswich-Pawcatuck complex	0 to 1	0.4	Matunuck (7%), Sandyhook (7%), Waasents tidal flat (2%)
IwA	Ipswich mucky peat	0 to 2	1.8	Westbook (5%), Pawcatuck (5%)
JaA	Jamaica sand	0 to 3	1	Barren (2%), Fortress (1%), Bigapple (1%), Hooksan (1%)
LGA	Laguardia-Greenbelt complex	0 to 3	2.2	Ebbets (8%), Centralpark (8%), Fragmental mixed mesic typic udorthents (2%), Mixed mesic typic udipsamments (2%)
LGB	Laguardia-Greenbelt complex	3 to 8	85.9	Ebbets (8%), Centralpark (8%), Fragmental mixed mesic typic udorthents (2%), Mixed mesic typic udipsamments (2%)
LUA	Laguardia-Urban land complex	0 to 3	17.1	Greenbelt (7%), Ebbets (7%), Secaucus (1%)
MuA	Mosholu sandy loam	0 to 3	148.3	Aeric endoaquents, coal ash deposits (5%), Rikers deep water table (4%), Secaucus (3%), Rikers very deep water table (2%)
MVA	Marinepark-Verrazano complex	0 to 3	29.9	Fortress (5%), Bigapple sandy loam (5%)
NaA	Natchaug muck	0 to 2	10.4	Catden (8%), Limerick (5%), Sun (4%), Halsey (3%)
NoA	North Meadow sandy loam	0 to 3	4.7	Aeric endoaquepts (7%), Greenbelt (6%), Ebbets (2%)

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
Oi	Oil-waste land	--	4.7	Urban land tidal march (10%), Verrazano (2%), Bigapple (2%)
PkA	Preakness mucky silt loam	0 to 3	4.1	Preakness very poorly drained (8%), Pompton (6%), Deerfield (4%)
PvA	Preakness silt loam	0 to 3	5	Timakwa (8%), Wallkill frequently ponded (7%), Preakness (3%)
SeA	Secaucus artifactual fine sandy loam	0 to 3	45.8	Laguardia (105), Ladyliberty (3%), Aquents (2%)
UFA	Urban land-Flatbush complex	0 to 3	60.4	Greenbelt (5%), Riverhead (3%), Bigapple non-dredge material (2%), Centralpark (1%), Laguardia (1%), North Meadow outwash substratum (1%)
UFAI	Urban land-Flatbush complex	0 to 3	9.4	Greenbelt (5%), Riverhead (10%), Bigapple non-dredge material (2%), Centralpark (1%), Laguardia (1%), North Meadow outwash substratum (1%)
UGA	Urban land-Greenbelt complex	0 to 3	191.4	Laguardia (7%), Centralpark (1%), Ebbets (1%), North Meadow (1%)
UGAI	Urban land-Greenbelt complex	0 to 3	62.2	Laguardia (9%), Centralpark (2%), Ebbets (3%), North Meadow (1%)
UGB	Urban land-Greenbelt complex	3 to 8	11.3	Laguardia (7%), Centralpark (1%), Ebbets (1%), North Meadow (1%)
UGBI	Urban land-Greenbelt complex	3 to 8	1.6	Laguardia (9%), Centralpark (2%), Ebbets (3%), North Meadow (1%)

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
UGC	Urban land-Greenbelt complex	8 to 15	12.7	Laguardia (7%), Centralpark (1%), Ebbets (1%), North Meadow (1%)
UGCI	Urban land-Greenbelt complex	8 to 15	0.1	Laguardia (9%), Centralpark (2%), Ebbets (3%), North Meadow (1%)
UGD	Urban land-Greenbelt complex	15 to 25	1.4	Laguardia (7%), Centralpark (1%), Ebbets (1%)
UGDI	Urban land-Greenbelt complex	15 to 25	42.8	Laguardia (9%), Centralpark (3%), Ebbets (3%)
ULA	Urban land-Laguardia complex	0 to 3	8.8	Greenbelt (5%), Ebbets (5%), Secaucus (2%)
ULAI	Urban land-Laguardia complex	0 to 3	4.4	Greenbelt (5%), Ebbets (5%), Secaucus (5%)
UmA	Urban land, tidal marsh substratum	0 to 3	7.4	Laguardia (5%), Ebbets (1%), Greenbelt (1%), Centralpark (1%)
UrA	Urban land, reclaimed substratum	0 to 3	12.7	Laguardia (5%), Ebbets (1%), Greenbelt (1%), Centralpark (1%)
UsA	Urban land, sandy substratum	0 to 3	7.5	Breeze (5%), Hooksan (1%), Verrazano (1%), Bigapple (1%)
UtA	Urban land, till substratum	0 to 3	0.6	Laguardia (2%), Ebbets (2%), Greenbelt (3%), Centralpark (1%)
UtB	Urban land, till substratum	3 to 8	0.6	Laguardia (2%), Ebbets (2%), Greenbelt (3%), Centralpark (1%)
UVA	Urban land-Verrazano complex	0 to 3	3.2	Hooksan (5%), Bigapple (3%), Jamaica (2%)
UVAI	Urban land-Verrazano complex	0 to 3	0.1	Hooksan (9%), Bigapple (8%), Jamaica (3%)
VzA	Verrazano sandy loam	0 to 3	1.1	Hooksan (4%), Greenbelt (2%), Fortress (2%), Bigapple (2%),

Mapping Unit Symbol	Series	Slope (%)	Area in Study Area (Acres)	Soil Series Inclusions
W	Water	--	2.6	--
WbA	Westbrook mucky peat	0 to 1	19.3	Ipswich (5%), Pawcatuck (5%), Preakness very poorly drained (3%), Appoquinimink very frequently flooded (2%)
WiC	Windsor loamy sand	8 to 15	4	Hinckley (10%), Deerfield (5%)
WWB	Windsor complex	0 to 8	11.8	Deerfield (6%), Branford (2%), Boonton (2%)

2.2 Soil Types

Appoquinimink mucky peat – This soil series consists of loamy fluviomarine deposits over herbaceous organic material and is typically located in tidal marshes. A typical profile ranges from mucky peat (0 to 3 inches) to silt loam (3 to 28 inches) to muck (28 to 35 inches) to mucky peat (35 to 47 inches). Soils in this series are very poorly drained, hydric, and not classified as prime farmland. This series consists of the following inclusions: Ipswich (8%), hydric; Westbrook sandy substratum (3%), hydric; Secaucus (2%), not hydric; and Preakness very poorly drained (2%), hydric.

Boonton-Haledon complex – This soil series consists of red coarse-loamy till derived from sedimentary rock and is typically located in ground moraines. A typical profile ranges from moderately decomposed plant material (0 to 1 inch) to loam (1 to 3 inches) to sandy loam (3 to 26 inches) to gravelly sandy loam (26 to 67 inches) to gravelly fine sandy loam (67 to 73 inches). Soils in this series are well drained, partially hydric, and classified as farmland of statewide importance. This series consists of the following inclusions: Hasbrouck (8%), hydric; and Greenbelt (1%), not hydric.

Bigapple fine sand – This soil series consists of sandy dredge spoils located along backslopes. A typical profile consists of fine sand (0 to 72 inches). Soils in this series are well drained, partially hydric, and not classified as prime farmland. This series consists of the following inclusions: Baren (0 to 2%), not hydric; Hooksan (2%), not hydric; Fortress (0 to 2%), not hydric; Urban Land sandy substratum (2%), hydric condition unknown; Jamaica (0 to 2%), hydric; Verrazano (2%), not hydric; and Breeze (2%), not hydric.

Boonton loam – This soil series consists of red coarse-loamy till derived from sedimentary rock and is typically located in ground moraines. A typical profile ranges from moderately decomposed plant material (0 to 1 inch) to loam (1 to 3 inches) to sandy loam (3 to 26 inches) to gravelly sandy loam (26 to 67 inches) to gravelly fine sandy loam (67 to 73 inches). Soils in this series are well drained, partially hydric, and classified as farmland of statewide importance. This series consists of the following inclusions: Haledon (0 to 10%), hydric; Hasbrouck (0 to 3%), hydric; North Meadow (0 to 2%), not hydric; Windsor (0 to 8%), not hydric; Typic haplaudalfs (0 to 7%), not hydric; and Greenbelt (0 to 2%), not hydric.

Catden muck – This soil series consists of highly decomposed herbaceous organic material and/or highly decomposed woody organic material located in depressions, fens, marshes, bogs, and swamps. A typical profile consists of muck (0 to 79 inches) and soils in this series are very poorly drained, hydric, and not classified as prime farmland. This series consists of the following inclusions: Canandaigua (5%), hydric; Natchaug (5%), hydric; Alden (5%), hydric; and Timakwa (5%), hydric.

Deerfield loamy fine sand – This soil series consists of sandy outwash derived from granite, gneiss, and/or quartzite in outwash terraces, deltas, plains, and kame terraces. A typical soil profile ranges from loamy fine sand (0 to 25 inches) to fine sand (25 to 33 inches) to sand (33 to 60 inches). The soils in this series are moderately well drained, partially hydric, and classified as farmland of statewide importance. This series consists of the following inclusions: Windsor (7%), not hydric; Wareham (5%), hydric; Sudbury (2%), not hydric; and Ninigret (1%), not hydric.

Fluventic Hapludolls-Cumulic Endoaquolls complex – This soil series consists of alluvium derived from igneous and metamorphic rock located in floodplains. The typical profile consists of silt loam (0 to 40 inches) and soils are moderately well drained, partially hydric, and not classified as prime farmland. This series consists of the following inclusions: Fluvaquentic hapludolls (8%), not hydric; Mixed, mesic aquic udipsamments (5%), not hydric; Cumulic endoaquolls very poorly drained (4%), hydric; Pootatuck (3%), Olinville (3%), not hydric; Mixed, mesic mollic psammaquents (2%), hydric.

Flatbush-Greenbelt complex – This soil series consists of loamy human-transported material over outwash located in summits, backslope, footslope, and toeslope. The typical profile ranges from loam (0 to 9 inches) to very fine sandy loam (9 to 25 inches) to fine sandy loam (25 to 33 inches) to sandy loam (33 to 42 inches) to very gravelly loamy sand (42 to 72 inches). The soils in this series are well drained, not hydric, and not classified as prime farmland. This series consists of the following inclusions: North Meadow outwash substratum (7%), hydric; Ebbets (5%), hydric; and Laguardia (3%), hydric.

Fortress sand – This soil series consists of sandy dredge soils located in backslopes and toeslopes. A typical profile ranges from (0 to 8 inches) to stratified sand to coarse sand (8 to 72 inches) and soils in the series are moderately well drained, partially hydric, and not classified as prime farmland. This series includes the following inclusions: Bigapple (5%), not hydric; Barren (3%), not hydric; Jamaica (2%), hydric; and Breeze (2%), not hydric.

Greenbelt loam – This soil series consists of loamy human-transported material located in summits, backslopes, and footslopes. A typical profile ranges from loam (0 to 30 inches) to sandy loam (30 to 79 inches) and soils in the series are well drained, not hydric, and not classified as prime farmland. This series consists of the following inclusions: Mixed, mesic aquic udipsamments (2 to 6%), not hydric; North Meadow (0 to 6%), not hydric; Centralpark (6 to 8%), not hydric; Ebbets (3 to 4%), not hydric; and Laguardia (1 to 8%), not hydric.

Greatkills gravelly sandy loam – This soil series consists of loamy human-transported material over unlined refuse human-transported material located in summits. A typical profile ranges from gravelly sandy loam (0 to 2 inches) to very gravelly sandy loams (2 to 7 inches) to very gravelly-artifactual sandy loam (7

to 12 inches) to very cobbly-artifactual sandy loam (12 to 80 inches). This series consists of soils that are well drained, not hydric, and not classified as prime farmland. This series includes the following inclusions: Urban land, tidal marsh substratum (5%), hydric classification not provided; and greenbelt (4%), not hydric.

Greenbelt-Urban land complex – This soil series consists of loamy human-transported material in summits, shoulders, footslopes, and toeslopes. A typical profile ranges from loam (0 to 6 inches) to sandy loam (6 to 28 inches) to loam (28 to 50 inches). This series consists of soils that are well drained, not hydric, and not classified as prime farmland. This series includes the following inclusions: Laguardia (0 to 7%), not hydric; Ebbets (0 to 7%), not hydric; North Meadow (0 to 1%), not hydric; Greenbelt cemetery deep water table phase (0 to 2%), not hydric; and Charlton (0 to 7%), not hydric.

Hasbrouck silt loam – This soil series consists of red fine-loamy till derived from sedimentary rock located in ground moraines. A typical profile ranges from moderately decomposed plant material (0 to 2 inches) to loam (2 to 6 inches) to silt loam (6 to 29 inches) to loam (29 to 63 inches). This series consists of soils that are poorly drained, hydric, and not classified as prime farmland. This series includes the following inclusions: Haledon (15%), hydric; and Boonton moderately well drained (5%), not hydric.

Haledon-Hasbrouck complex – This soil series consists of red coarse-loamy till derived from sedimentary rock located in ground moraines. A typical profile ranges from moderately decomposed plant material (0 to 2 inches) to loam (2 to 10 inches) to fine sandy loam (10 to 63 inches). This series consists of soils that are somewhat poorly drained, hydric, and not classified as prime farmland. This series includes inclusions of Boonton moderately well drained (15%), not hydric.

Ipswich-Pawcatuck complex – This soil series consists of herbaceous organic material located in tidal marshes. A typical profile of this series is composed of mucky peat (0 to 72 inches) and soils are very poorly drained, hydric, and not classified as prime farmland. This series includes the following inclusions: Matunuck (7%), hydric; Sandyhook (7%), hydric; and Waasents tidal flat (2%), hydric.

Ipswich mucky peat – This soil series consists of partially- decomposed herbaceous organic material located in tidal marshes. A typical profile ranges from mucky peat (0 to 42 inches) to muck (42 to 59 inches). Soils in this series are very poorly drained, hydric, and not classified as prime farmland. This series include the following inclusions: Westbook (5%), hydric; and Pawcatuck (5%), hydric.

Jamaica sand – This soil series consists of sandy dredge spoils located in toeslopes. A typical profile ranges from sand (0 to 27 inches) to fine sand (27 to 65 inches). Soils in this series are poorly drained, hydric, and not classified as prime farmland. This series include the following inclusions: Barren (2%), not hydric; Fortress (1%), not hydric; Bigapple (1%), not hydric; and Hooksan (1%), not hydric.

Laguardia-Greenbelt complex – This soil series consists of loamy-skeletal human-transported material located in summits, shoulders, backslopes, footslopes, and toeslopes. A typical profile ranges from cobbly-artifactual coarse sandy loam (0 to 8 inches) to very cobbly-artifactual coarse sandy loam (8 to 79 inches). Soils in this series are well drained, not hydric and not classified as prime farmland. The series consists of the following inclusions: Ebbets (8%), not hydric; Centralpark (8%), not hydric; Fragmental mixed mesic typic udorthents (2%), not hydric; and Mixed mesic typic udipsamments (2%) not hydric.

Laguardia-Urban land complex – This soil series consists of loamy-skeletal human-transported material located in summits, shoulders, backslopes, footslopes, and toeslopes. A typical profile ranges from cobbly-artifactual coarse sandy loam (0 to 8 inches) to very cobbly-artifactual coarse sandy loam (8 to 79 inches). Soils in this series are well drained, not hydric and not classified as prime farmland. The series consists of the following inclusions: Greenbelt (7%), not hydric; Ebbets (7%), not hydric; and Secaucus (1%), not hydric.

Mosholu sandy loam – This soil series consists of coal ash/slag human-transported material over slope alluvium and/or till located in depressions. A typical profile ranges from sandy loam (0 to 2 inches) to coarse sandy loam (2 to 4 inches) to artifactual loamy coarse sand (4 to 56 inches) to very fine sandy loam (56 to 63 inches) to clay loam (63 to 72 inches). Soils in this series are moderately well drained, not hydric, and not classified as prime farmland. The series consists of the following inclusions: Aeric endoaquepts, coal ash deposits (5%), not hydric; Rikers deep water table (4%), not hydric; Secaucus (3%), not hydric; and Rikers very deep water table (2%), not hydric.

Marinepark-Verrazano complex – This soil series consists of loamy human-transported material over sandy beach sand and/or outwash and/or dredge spoils located in footslopes and toeslopes. A typical profile ranges from sandy loam (0 to 4 inches) to gravelly-artifactual sandy loam (4 to 19 inches) to sand (19 to 72 inches). Soils in this series are well drained, not hydric, and not classified as prime farmland. The series consists of the following inclusions: Fortress (5%), not hydric; and Bigapple sandy loam (5%), not hydric.

Natchaug muck – This soil series consists of highly decomposed organic material over loamy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy till located in depressions. A typical profile ranges from muck (0 to 31 inches) to silt loam (31 to 39 inches) to fine sandy loam (39 to 79 inches). Soils in this series are very poorly drained, hydric, and not classified as prime farmland. The series consists of the following inclusions: Catden (8%), hydric; Limerick (5%), hydric; Sun (4%), hydric; and Halsey (3%), hydric.

North Meadow sandy loam – This soil series consists of loamy human-transported material over till located in backslopes, footslopes, and toeslopes. A typical profile ranges from highly decomposed plant material (0 to 1 inch) to fine sandy loam (1 to 2 inches) to stony fine sandy loam (2 to 20 inches) to sandy loam (20 to 28 inches) to silt loam (28 to 72 inches). Soils in this series are moderately well drained, not hydric, and not classified as prime farmland. The series consists of the following inclusions: Aeric endoaquepts (7%), not hydric; Greenbelt (6%), not hydric; and Ebbets (2%), hydric.

Oil-waste land – This soil series consists of barren human-transported material located in dips, rises and talfs. A typical profile is not provided by the NRCS for this series. Soils in this series are not hydric and not classified as prime farmland and consists of the following inclusions: Urban land tidal marsh (10%), hydric rating not provided; Verrazano (2%), not hydric; and Bigapple (2%), not hydric.

Preakness mucky silt loam – This soil series consists of coarse-loamy outwash over gravelly outwash and/or sandy outwash located in depressions and drainageways. A typical profile ranges from slightly decomposed plant material (0 to 3 inches) to mucky silt loam (3 to 5 inches) to silt loam (5 to 15 inches) to sandy loam (15 to 25 inches) to loamy sand (25 to 72 inches). Soils in this series are poorly drained, hydric,

and classified as farmland of statewide importance. The series consists of the following inclusions: Preakness very poorly drained (8%), hydric; Pompton (6%), not hydric; and Deerfield (4%), not hydric.

Preakness silt loam – This soil series consists of coarse-loamy outwash over gravelly outwash and/or sandy outwash located in depressions and drainageways. A typical profile ranges from slightly decomposed plant material (0 to 3 inches) to mucky silt loam (3 to 5 inches) to silt loam (5 to 15 inches) to sandy loam (15 to 25 inches) to loamy sand (25 to 72 inches). Soils in this series are very poorly drained, hydric, and not classified as prime farmland. The series consists of the following inclusions: Timakwa (8%), hydric; Wallkill frequently ponded (7%), hydric; and Preakness (3%), hydric.

Secaucus artificial fine sandy loam – This soil series consists of loamy-skeletal human-transported material located in backslopes. A typical profile ranges from gravelly-artifactual fine sandy loam (0 to 6 inches) to very artifactual fine sandy loam (6 to 17 inches) to extremely cobbly-artifactual fine sandy loam (7 to 65 inches). Soils in this series are moderately well drained, partially hydric, and not classified as prime farmland. The series consists of the following inclusions: Laguardia (105), not hydric; Ladyliberty (3%), not hydric; and Aquents (2%), hydric.

Urban land-Flatbush complex – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 20 inches) to gravelly sand (20 to 72 inches). Soils in this series have a high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Greenbelt (5%), not hydric; Riverhead (3 to 10%), not hydric; Bigapple non-dredge material (2%), not hydric; Centralpark (1%), not hydric; Laguardia (1%), not hydric; and North Meadow outwash substratum (1%), not hydric.

Urban land-Greenbelt complex – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 15 inches) to gravelly sandy loam (15 to 79 inches). Soils in this series have a high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Laguardia (7 to 9%), not hydric; Centralpark (1 to 3%), not hydric; Ebbets (1 to 3%), not hydric; and North Meadow (0 to 1%), not hydric.

Urban land-Laguardia complex – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 15 inches) to gravelly sandy loam (15 to 79 inches). Soils in this series have a very high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Greenbelt (5%), not hydric; Ebbets (5%), not hydric; and Secaucus (2 to 5%), not hydric.

Urban land, tidal marsh substratum – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 20 inches) to very gravelly sand (20 to 79 inches). Soils in this series have a very high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Laguardia (5%), not hydric; Ebbets (1%), not hydric; Greenbelt (1%), not hydric; and Centralpark (1%), not hydric.

Urban land, reclaimed substratum – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 15 inches) to gravelly sandy loam

(15 to 79 inches). Soils in this series have a very high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Laguardia (5%), not hydric; Ebbets (1%), not hydric; Greenbelt (1%), not hydric; and Centralpark (1%), not hydric.

Urban land, sandy substratum – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 20 inches) to very gravelly sand (20 to 72 inches). Soils in this series have a very high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Breeze (5%), not hydric; Hooksan (1%), not hydric; Verrazano (1%), not hydric; and Bigapple (1%), not hydric.

Urban land, till substratum – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 15 inches) to gravelly sandy loam (15 to 79 inches). Soils in this series have a very high run-off rate, are not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Laguardia (2%), not hydric; Ebbets (2%), not hydric; Greenbelt (3%), not hydric; and Centralpark (1%), not hydric.

Urban land-Verrazano complex – This soil series consists of asphalt over human-transported material located in summits. A typical profile ranges from cemented material (0 to 20 inches) to coarse sand (20 to 72 inches). Soils in this series have a very high run-off rate, are partially hydric, and are not classified as prime farmland. Hooksan (5 to 9%), not hydric; Bigapple (3 to 8%), not hydric; and Jamaica (2 to 3%), hydric.

Verrazano sandy loam – This soil series consists of loamy human-transported material over beach sand and/or sandy outwash and/or dredge spoils located in summits, backslopes, footslopes, and toeslopes. A typical profile ranges from sandy loam (0 to 17 inches) to loam (17 to 24 inches) to sand (24 to 72 inches). Soils in this series are well drained, not hydric, and are not classified as prime farmland. The series consists of the following inclusions: Hooksan (4%), not hydric; Greenbelt (2%), not hydric; Fortress (2%), not hydric; and Bigapple (2%), not hydric.

Westbrook mucky peat – This soil series consists of herbaceous organic material over loamy fluviomarine deposits over sandy fluviomarine deposits located in tidal marshes. A typical profile ranges from mucky peat (0 to 36 inches) to fine sandy loam (36 to 56 inches) to loamy sand (56 to 72 inches). Soils in this series are very poorly drained, hydric, and are not classified as prime farmland. The series consists of the following inclusions: Ipswich (5%), hydric; Pawcatuck (5%), hydric; Preakness very poorly drained (3%), hydric; and Appoquinimink very frequently flooded (2%), hydric.

Windsor loamy sand – This soil series consists of loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss located in summits, shoulders, and backslopes. A typical profile ranges from moderately decomposed plant material (0 to 1 inch) to loamy sand (1 to 31 inches) to sand (31 to 65 inches). The series consists of the following inclusions: Hinckley (10%), not hydric; and Deerfield (5%), not hydric.

Windsor complex – This soil series consists of sandy glaciofluvial deposits over loamy glaciolacustrine deposits located in outwash plains. A typical profile ranges from slightly decomposed plant material (0 to 2 inches) to loamy sand (2 to 27 inches) to sand (27 to 50 inches) to sandy loam (50 to 71 inches). The series

consists of the following inclusions: Deerfield (6%), not hydric; Branford (2%), not hydric; and Boonton (2%), not hydric.

Additional physical characteristics of these mapped soils such as slope, acidity, construction limitations and hydric ratings are summarized in Table 2.

Table 2. Soil Series Characteristics

Mapping Unit Symbol	Series	Slope (%)	pH (Acidity)¹	Construction Limitations/Suitability²	Hydric³
ApA	Appoquinimink mucky peat	0 to 1	7.8	Severe/Ponding, Flooding	Yes
BHBu	Boonton-Haledon complex	0 to 8	4.9	Moderate/Wetness	Partially
BiB	Bigapple fine sand	3 to 8	4.6	Slight/Low Strength	Partially
BmA	Boonton loam	0 to 3	4.9	Moderate/Depth to Saturated Zone, Rock Fragments	Partially
BmB	Boonton loam	3 to 8	4.9	Moderate/ Depth to Saturated Zone	Partially
BtA	Boonton loam	0 to 3	4.9	Moderate/ Depth to Saturated Zone, Wetness	Partially
BtB	Boonton loam	3 to 8	4.9	Moderate/ Depth to Saturated Zone, Wetness	Partially
BtC	Boonton loam	8 to 15	4.9	Moderate/ Depth to Saturated Zone, Slope, Wetness	Partially
BtD	Boonton loam	15 to 25	4.9	Moderate/ Depth to Saturated Zone, Slope, Wetness	Partially
BtEt	Boonton loam, terminal moraine	15 to 35	4.9	Moderate/ Depth to Saturated Zone, Slope	Partially
CaA	Catden muck	0 to 2	NP	Moderate/Ponding, Depth to Saturated Zone	Hydric
DfA	Deerfield loamy fine sand	0 to 3	5.1	Severe/ Depth to Saturated Zone, Low Strength, Wetness	Partially
FFA	Fluventic Hapludolls-Cumulic Endoaquolls complex	0 to 3	6	Moderate/ Depth to Saturated Zone, Flooding	Partially

Mapping Unit Symbol	Series	Slope (%)	pH (Acidity)¹	Construction Limitations/Suitability²	Hydric³
FGA	Flatbush-Greenbelt complex	0 to 3	5.2	Slight	No
FGB	Flatbush-Greenbelt complex	3 to 8	5.4	Slight	No
FoA	Fortress sand	0 to 3	5.4	Severe/ Depth to Saturated Zone, Low Strength, Wetness	Partially
GbA	Greenbelt loam	0 to 3	6.2	Slight/Rock Fragments	No
GbB	Greenbelt loam	3 to 8	6.2	Slight/Rock Fragments	No
GbC	Greenbelt loam	8 to 15	6.2	Slight/Slope, Rock Fragments	No
GbD	Greenbelt loam	15 to 25	6.2	Slight/Slope, Rock Fragments	No
GbE	Greenbelt loam	25 to 35	6.2	Slight/Slope, Rock Fragments	No
GbF	Greenbelt loam	35 to 60	6.2	Slight/Slope, Rock Fragments	No
GrB	Greatkills gravelly sandy loam	3 to 8	6.5	Slight/Large Stones	No
GUA	Greenbelt-Urban land complex	0 to 3	6.2	Slight	No
GUAw	Greenbelt-Urban land complex	0 to 3	5.6	Slight	No
GUB	Greenbelt-Urban land complex	3 to 8	6.2	Slight/Rock Fragments	No
GUBw	Greenbelt-Urban land complex	3 to 8	5.6	Slight	No
GUC	Greenbelt-Urban land complex	8 to 15	6.2	Slight/Rock Fragments	No
GUCw	Greenbelt-Urban land complex	8 to 15	5.3	Slight	No
GUDw	Greenbelt-Urban land complex	15 to 25	5.3	Slight	No
HaA	Hasbrouck silt loam	0 to 3	5.2	Moderate/Ponding, Depth to Saturated Zone, Rock Fragments	Yes
HHA	Haledon-Hasbrouck complex	0 to 3	5.0	Moderate/Ponding, Depth to Saturated Zone	Yes

Mapping Unit Symbol	Series	Slope (%)	pH (Acidity)¹	Construction Limitations/Suitability²	Hydric³
IPA	Ipswich-Pawcatuck complex	0 to 1	NP	Severe/Ponding, Flooding, Depth to Saturated Zone	Yes
IwA	Ipswich mucky peat	0 to 2	NP	Severe/Ponding, Flooding, Depth to Saturated Zone	Yes
JaA	Jamaica sand	0 to 3	5	Severe/Ponding, Depth to Saturated Zone, Low Strength	Yes
LGA	Laguardia-Greenbelt complex	0 to 3	7.4	Slight/Large Stones, Sandiness	No
LGB	Laguardia-Greenbelt complex	3 to 8	7.4	Slight/Large Stones, Sandiness	No
LUA	Laguardia-Urban land complex	0 to 3	7.4	Slight/Large Stones, Sandiness	No
MuA	Mosholu sandy loam	0 to 3	5.4	Moderate/ Depth to Saturated Zone, Wetness, Rock Fragment	No
MVA	Marinepark-Verrazano complex	0 to 3	4.4	Moderate/ Depth to Saturated Zone, Low Strength, Rock Fragments	No
NaA	Natchaug muck	0 to 2	7.0	Moderate/Ponding, Depth to Saturated Zone	Yes
NoA	North Meadow sandy loam	0 to 3	5.3	Moderate/ Depth to Saturated Zone, Wetness, Rock Fragments	No
Oi	Oil-waste land	--	NP	--	No
PkA	Preakness mucky silt loam	0 to 3	5.4	Moderate/ Depth to Saturated Zone	Yes
PvA	Preakness silt loam	0 to 3	5.4	Moderate/Ponding, Depth to Saturated Zone	Yes
SeA	Secaucus artifactual fine sandy loam	0 to 3	7.8	Severe/Ponding, Depth to Saturated Zone, Large Stones	Partially
UFA	Urban land-Flatbush complex	0 to 3	8.6	Slight/Rock Fragments	No
UFAI	Urban land-Flatbush complex	0 to 3	8.6	Slight/Rock Fragments	No

Mapping Unit Symbol	Series	Slope (%)	pH (Acidity)¹	Construction Limitations/Suitability²	Hydric³
UGA	Urban land-Greenbelt complex	0 to 3	6.6	Slight	No
UGAI	Urban land-Greenbelt complex	0 to 3	6.6	Slight	No
UGB	Urban land-Greenbelt complex	3 to 8	6.6	Slight	No
UGBI	Urban land-Greenbelt complex	3 to 8	6.6	Slight	No
UGC	Urban land-Greenbelt complex	8 to 15	6.6	Slight	No
UGCI	Urban land-Greenbelt complex	8 to 15	6.6	Slight	No
UGD	Urban land-Greenbelt complex	15 to 25	6.6	Slight	No
UGDI	Urban land-Greenbelt complex	15 to 25	6.6	Slight	No
ULA	Urban land-Laguardia complex	0 to 3	6.6	Slight	No
ULAI	Urban land-Laguardia complex	0 to 3	6.6	Slight	No
UmA	Urban land, tidal marsh substratum	0 to 3	7.8	Slight	No
UrA	Urban land, reclaimed substratum	0 to 3	6.6	Slight	No
UsA	Urban land, sandy substratum	0 to 3	7.8	Slight/Rock Fragments	No
UtA	Urban land, till substratum	0 to 3	6.6	Slight	No
UtB	Urban land, till substratum	3 to 8	6.6	Slight	No
UVA	Urban land-Verrazano complex	0 to 3	7.8	Slight/Rock Fragments	Partially

Mapping Unit Symbol	Series	Slope (%)	pH (Acidity)¹	Construction Limitations/Suitability²	Hydric³
UVAI	Urban land-Verrazano complex	0 to 3	7.8	Slight/Rock Fragments	Partially
VzA	Verrazano sandy loam	0 to 3	4.4	Slight/ Low Strength	No
W	Water	--	NP	--	--
WbA	Westbrook mucky peat	0 to 1	7.8	Severe/Ponding, Flooding, Depth to Saturated Zone	Yes
WiC	Windsor loamy sand	8 to 15	5.3	Slight/Low Strength	No
WWB	Windsor complex	0 to 8	5.4	Slight/Low Strength	No

¹ NP – Not Provided

² Construction suitability and limitations criteria are derived from NRCS Web Soil Survey.

³ Hydric soil determined using the NRCS's Hydric Soil List. Partially Hydric Status indicates that the major soil component is classified as not hydric but includes minor soil components that are classified as hydric.

The location and extent of the mapped soils within the Study Area are shown in Figure 2.

3.0 CONCLUSIONS

There is a total of 70 soil units mapped within the Study Area. The information provided in this report is based on publicly available NRCS soils data and is provided for the purpose of guiding the determination of geotechnical investigation locations within the Study Area to support onshore design.

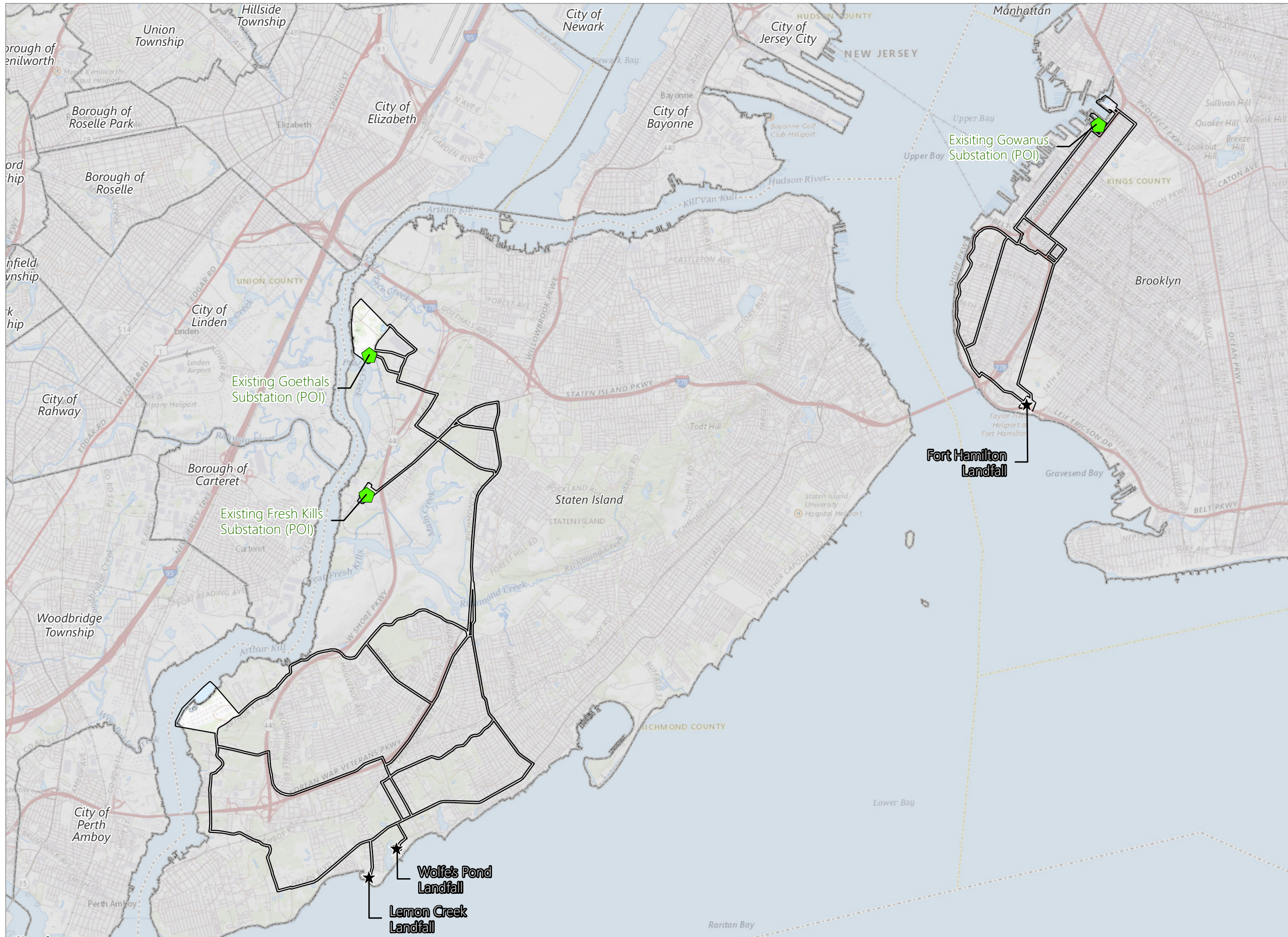
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Appendix A

Figures

Figure 1. Project Location

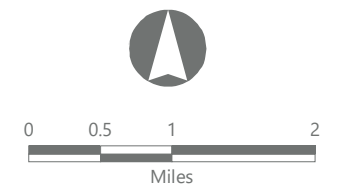


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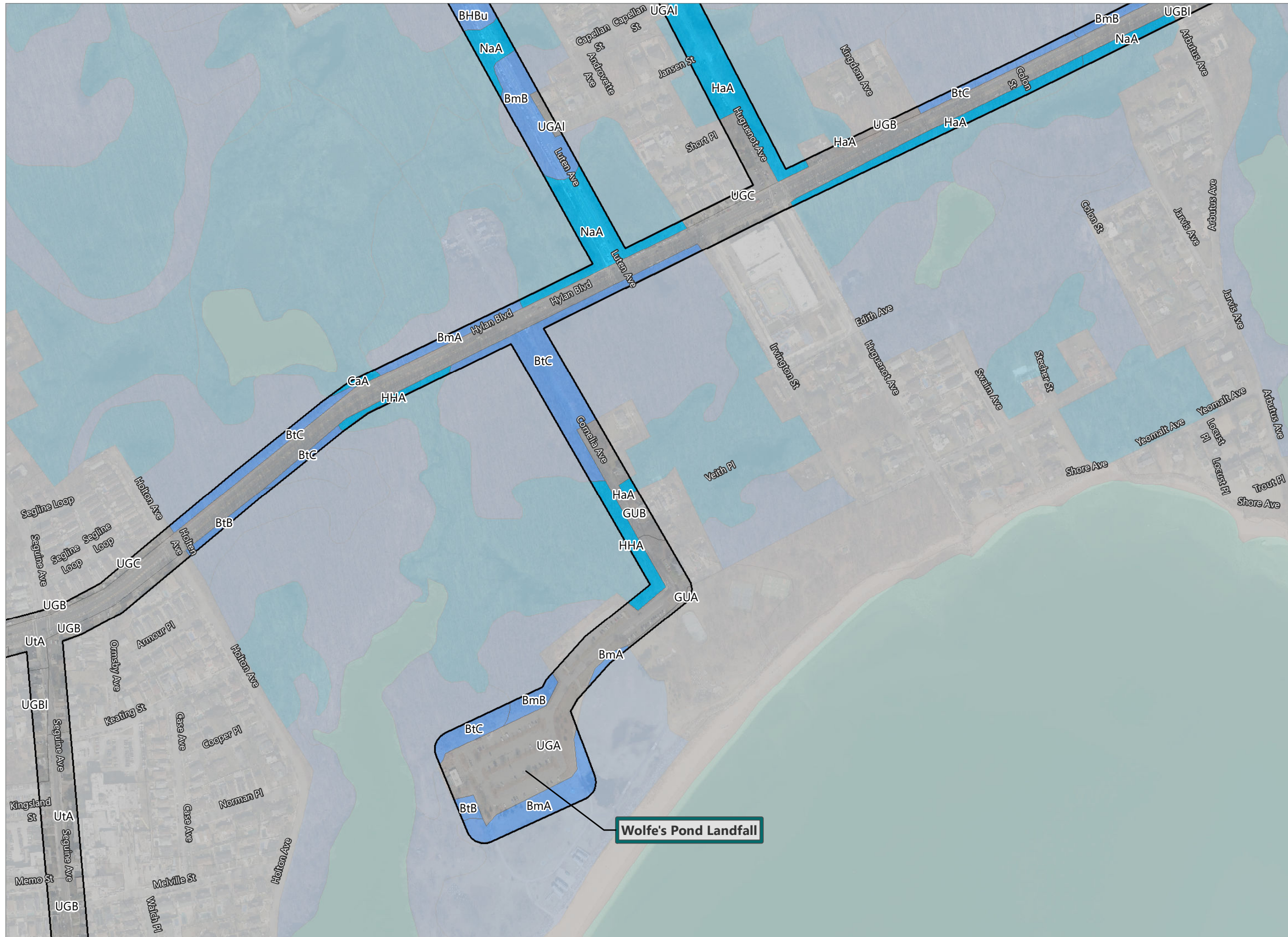
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- ★ Landfall Location
- ◼ Point of Interconnection
- ▭ Study Area
- ▭ Municipal Boundary



Prepared August 31, 2023
Basemap: Esri ArcGIS Online "USGS Topo" map service.

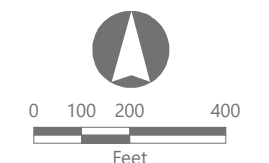
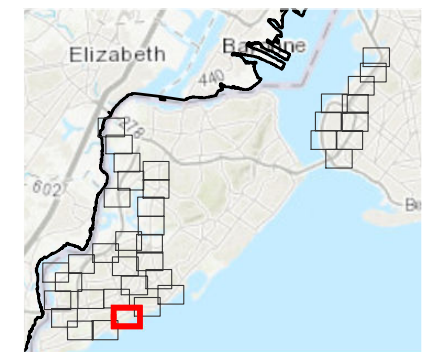


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**Natural Resources Conservation
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- Study Area
- NRCS (SSURGO) Soils
- Hydric
- Partially Hydric*
- Water
- Not Hydric



Prepared August 31, 2023
Basemap: NYSDOP "2020" orthoimagery map service.

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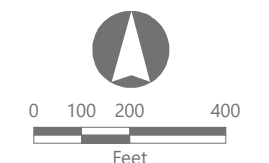
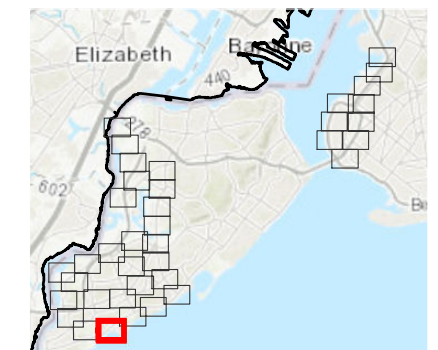


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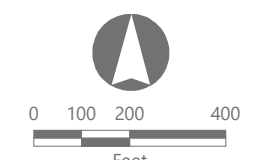
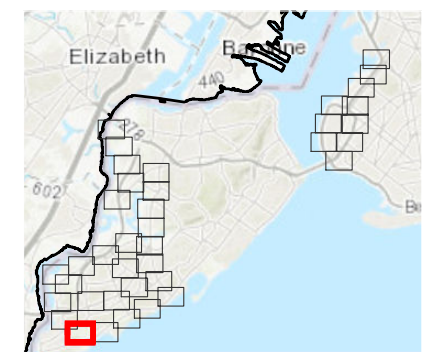


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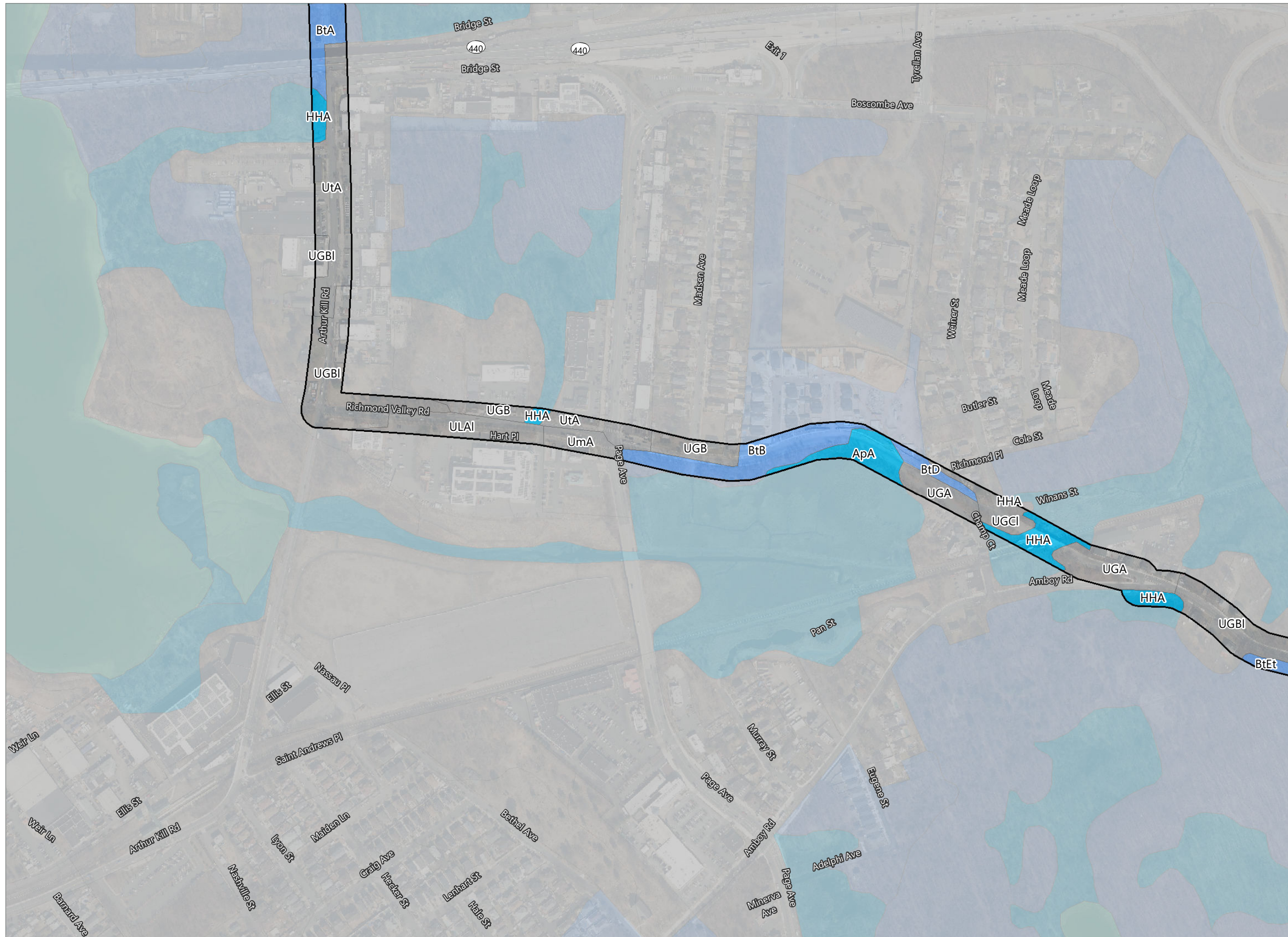
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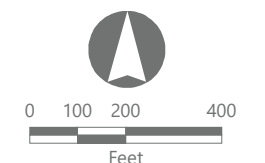
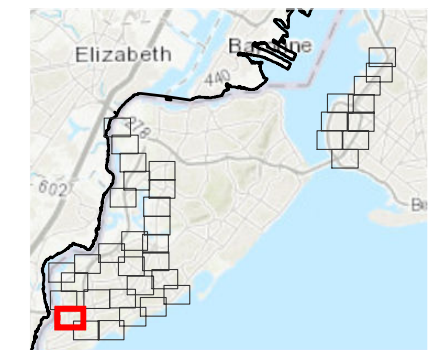


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



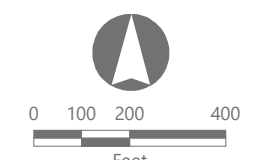
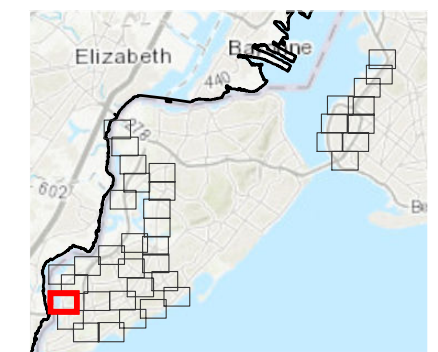


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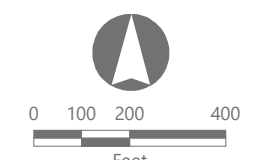
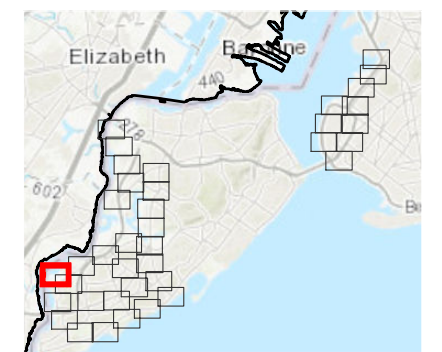


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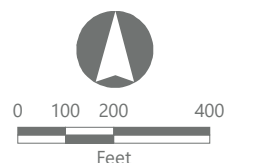
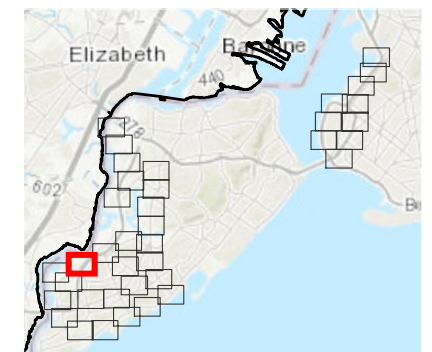


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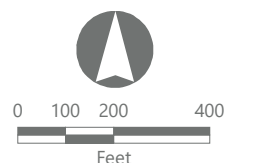
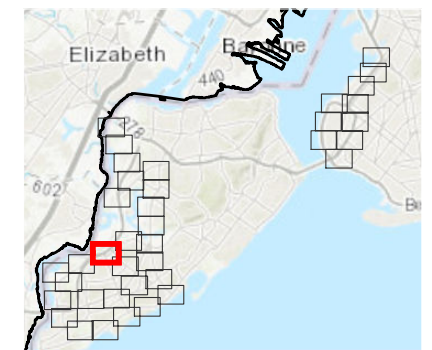


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



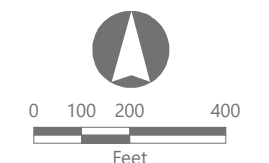
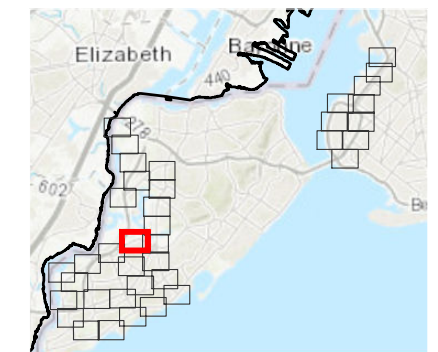


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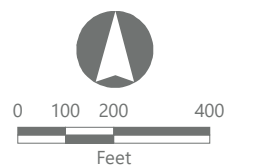
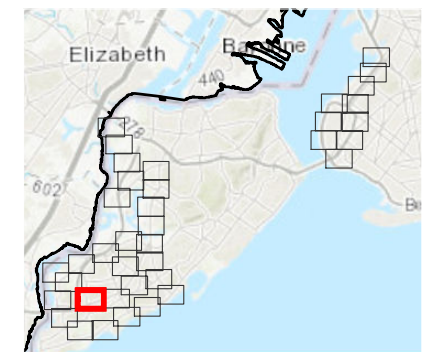


Atlantic Shores North Offshore Wind – New York Onshore Project Study Area

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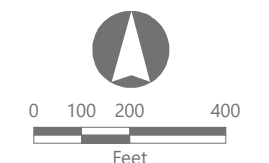
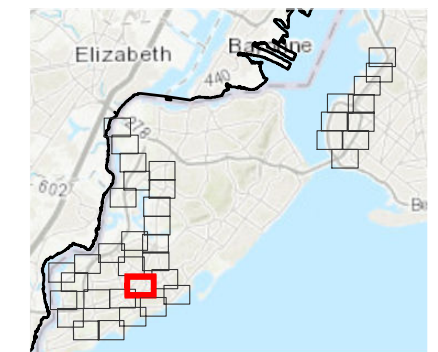


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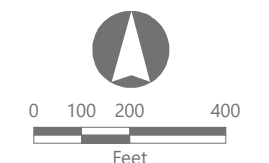
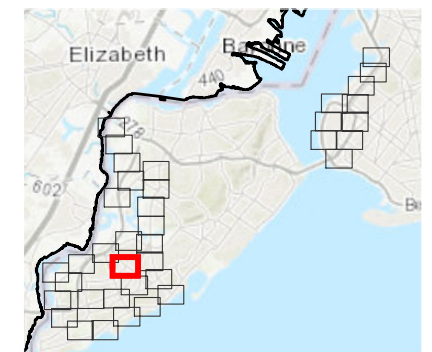


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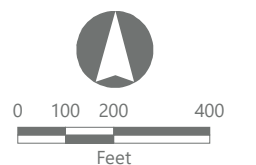
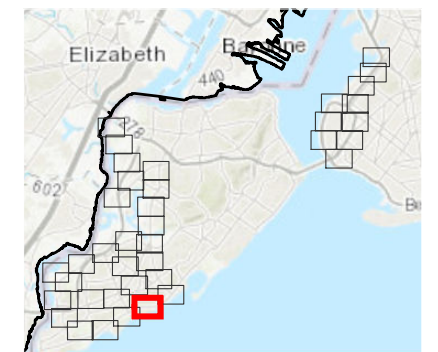


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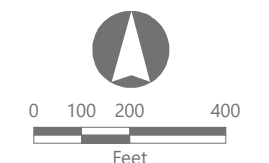
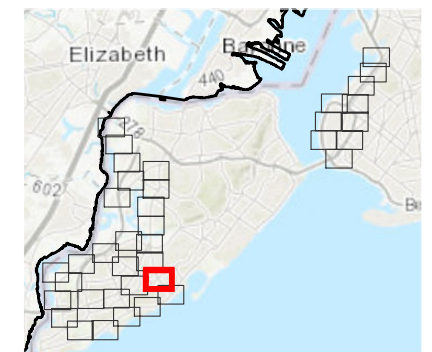


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




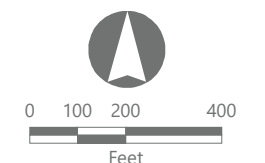
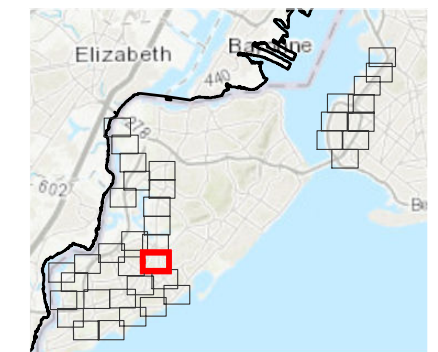


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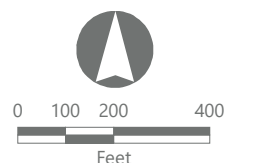
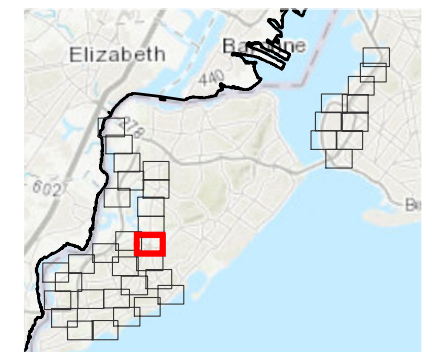


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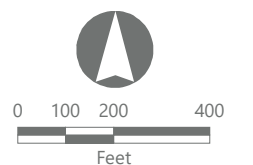
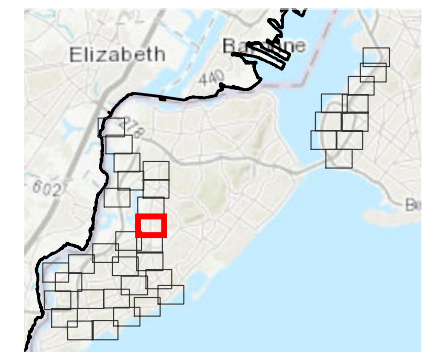


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




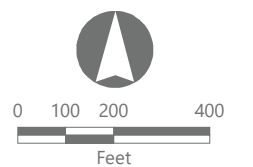
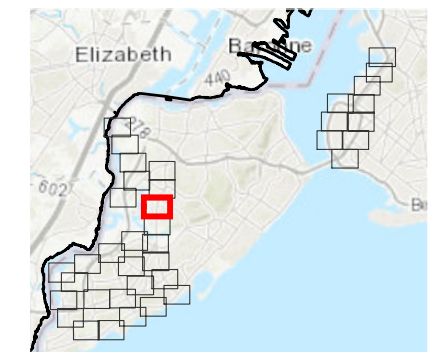


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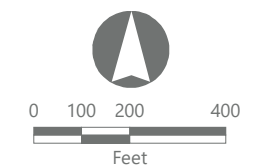
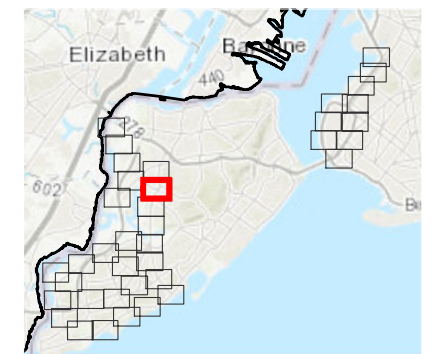


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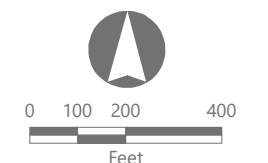
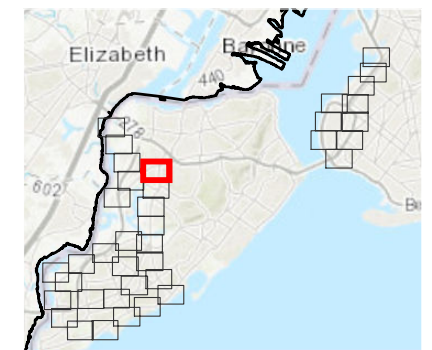


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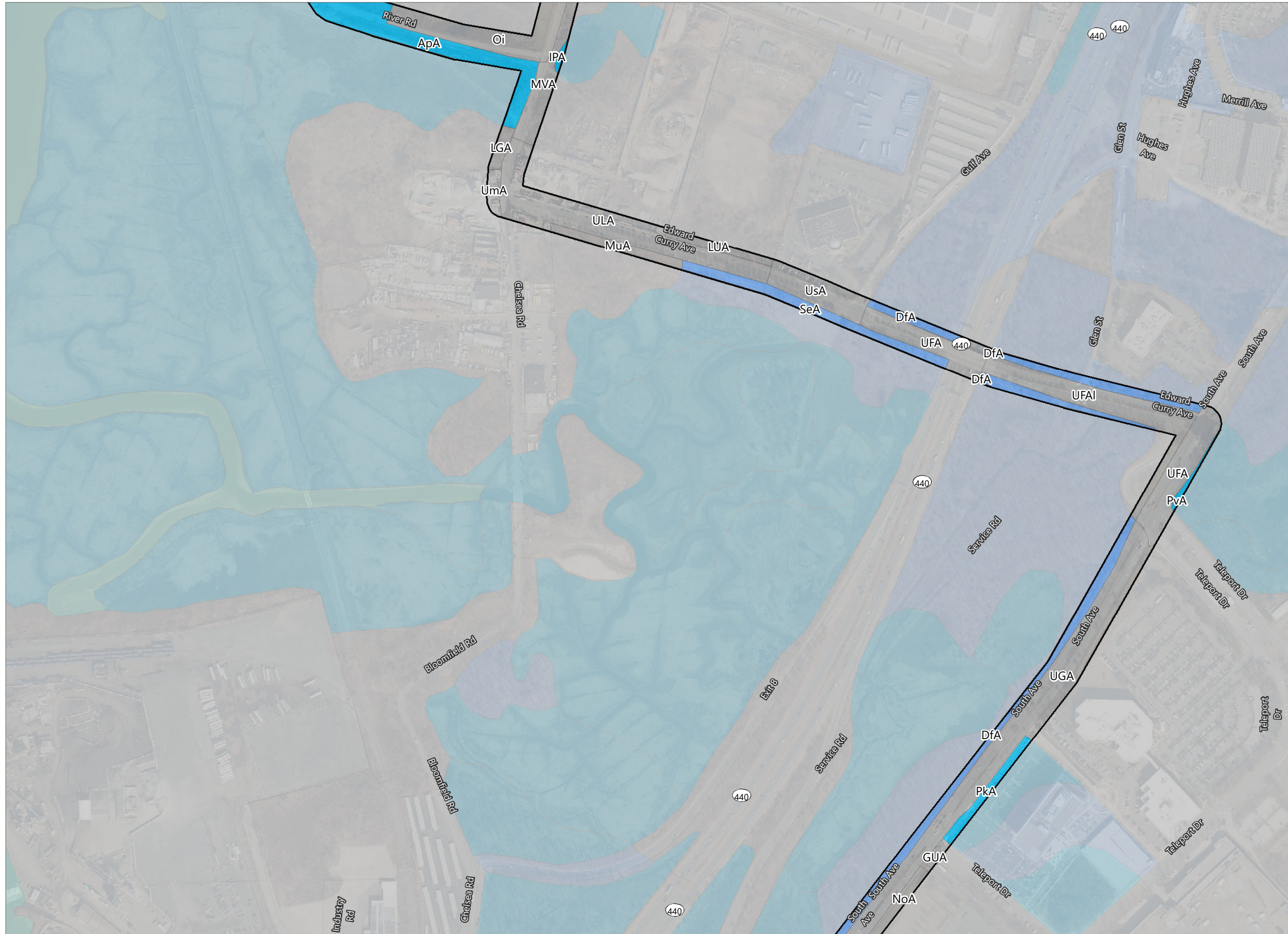
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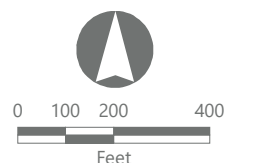
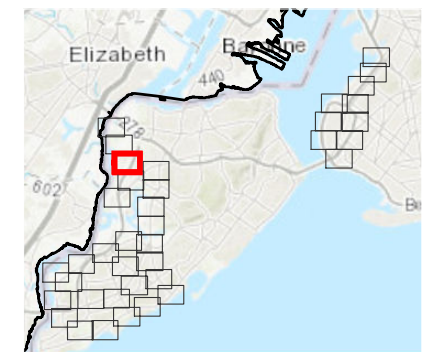


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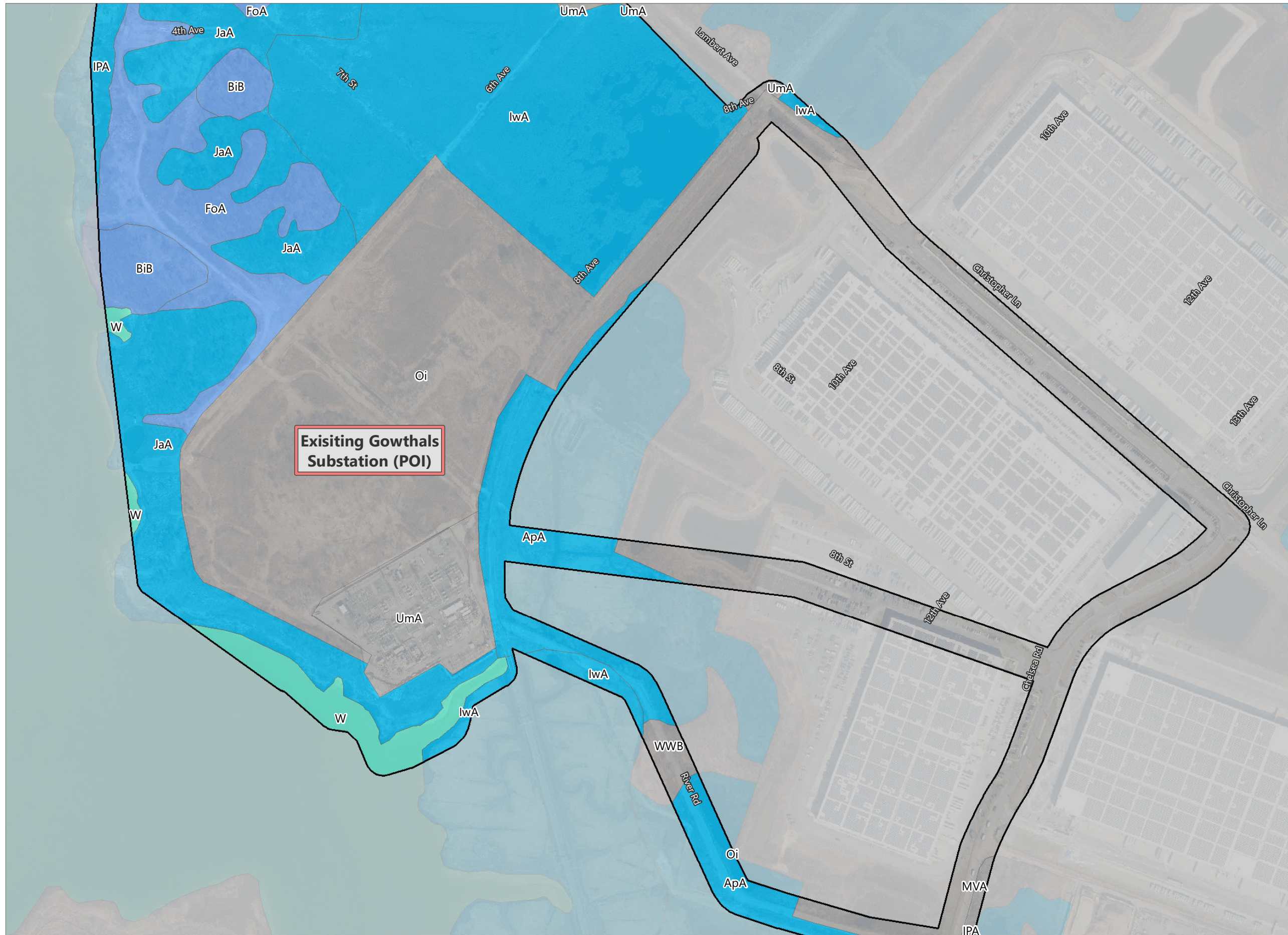
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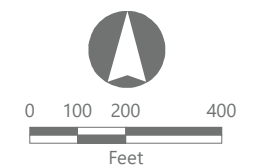
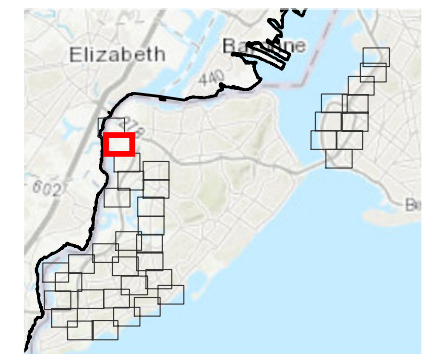


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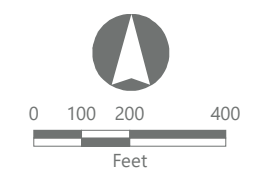
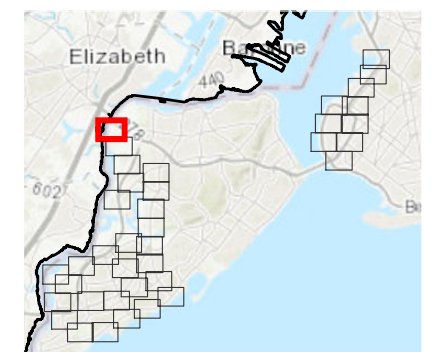
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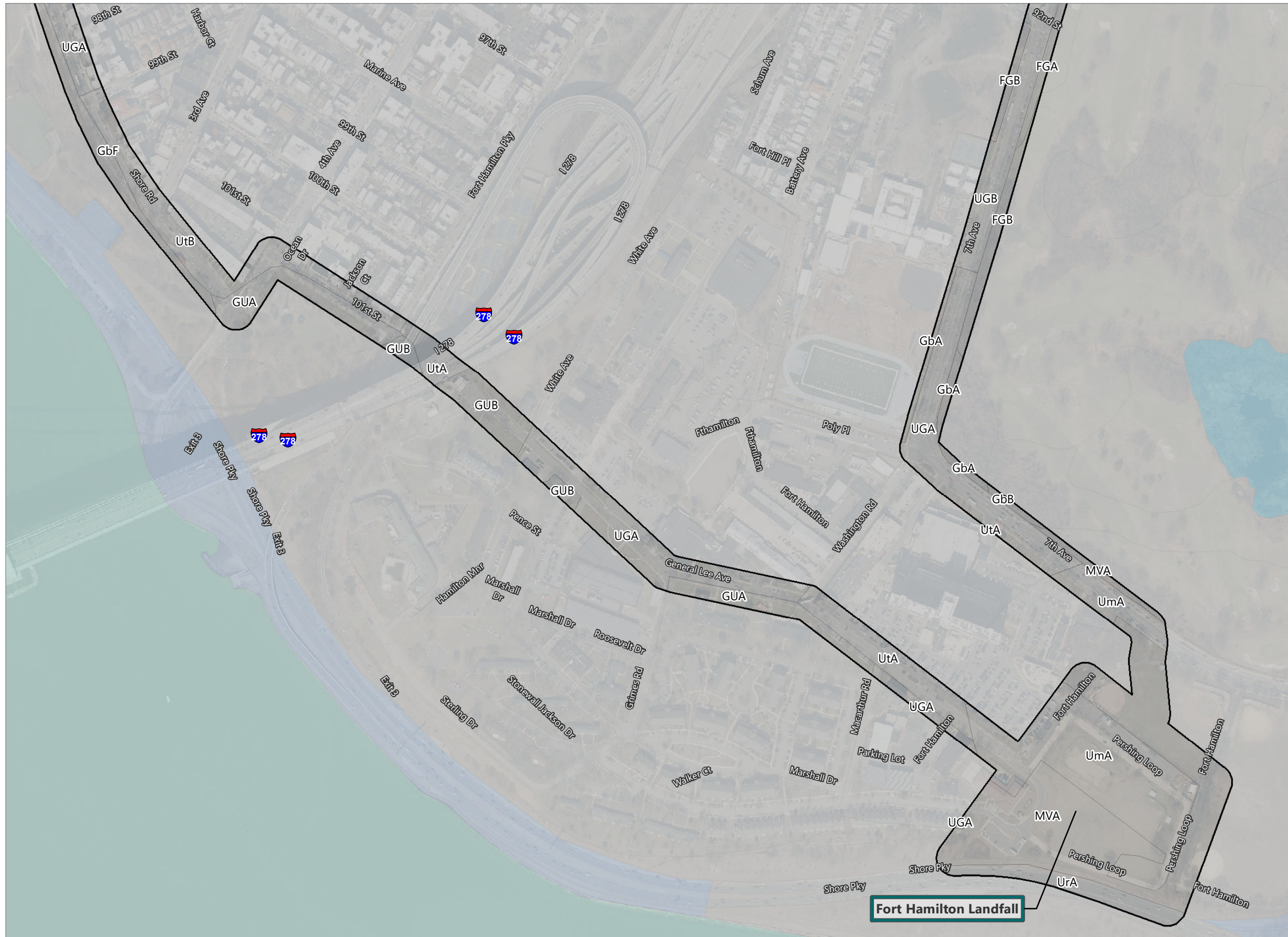
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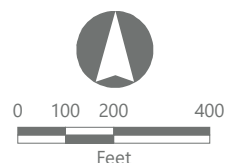
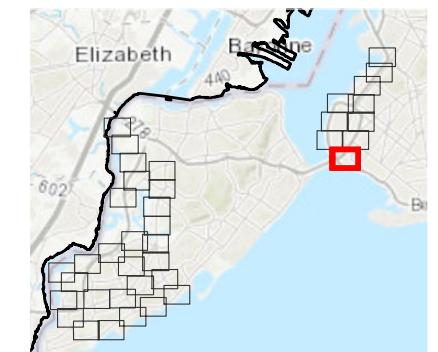


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


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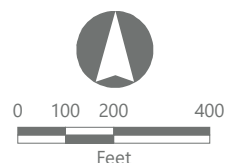
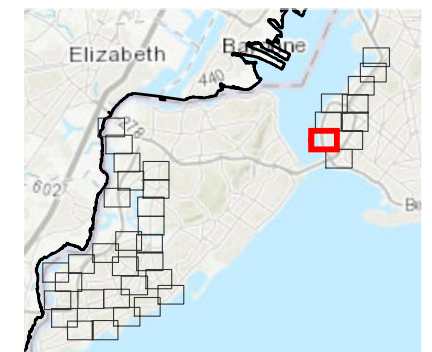


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




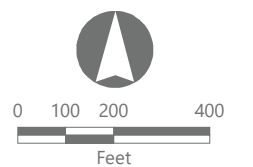
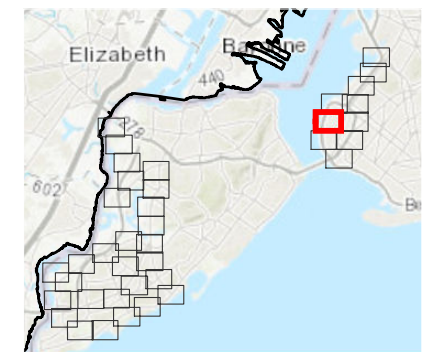


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offshore wind

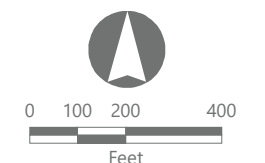
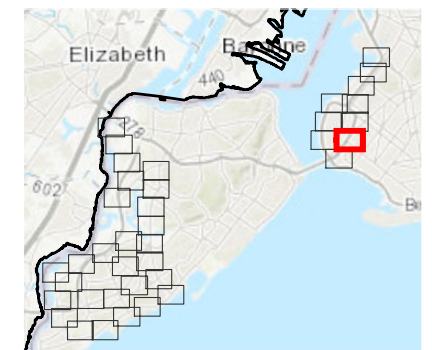


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




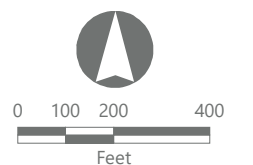
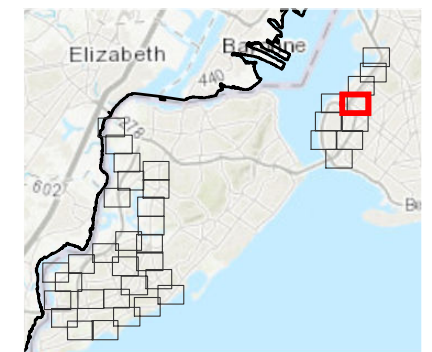


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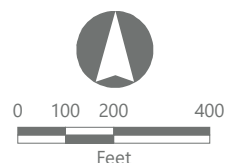
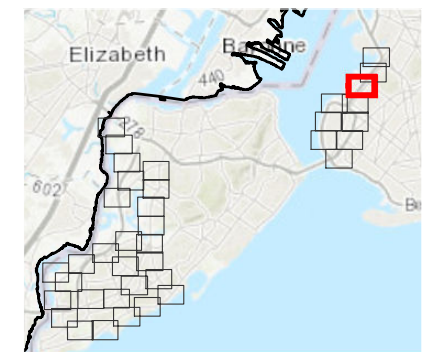
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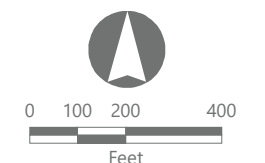
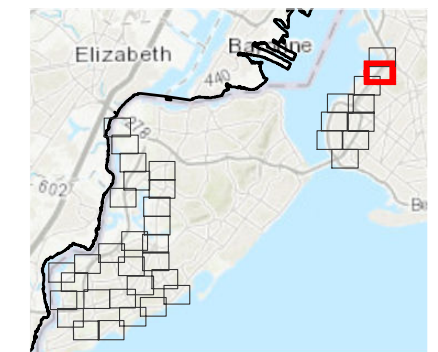


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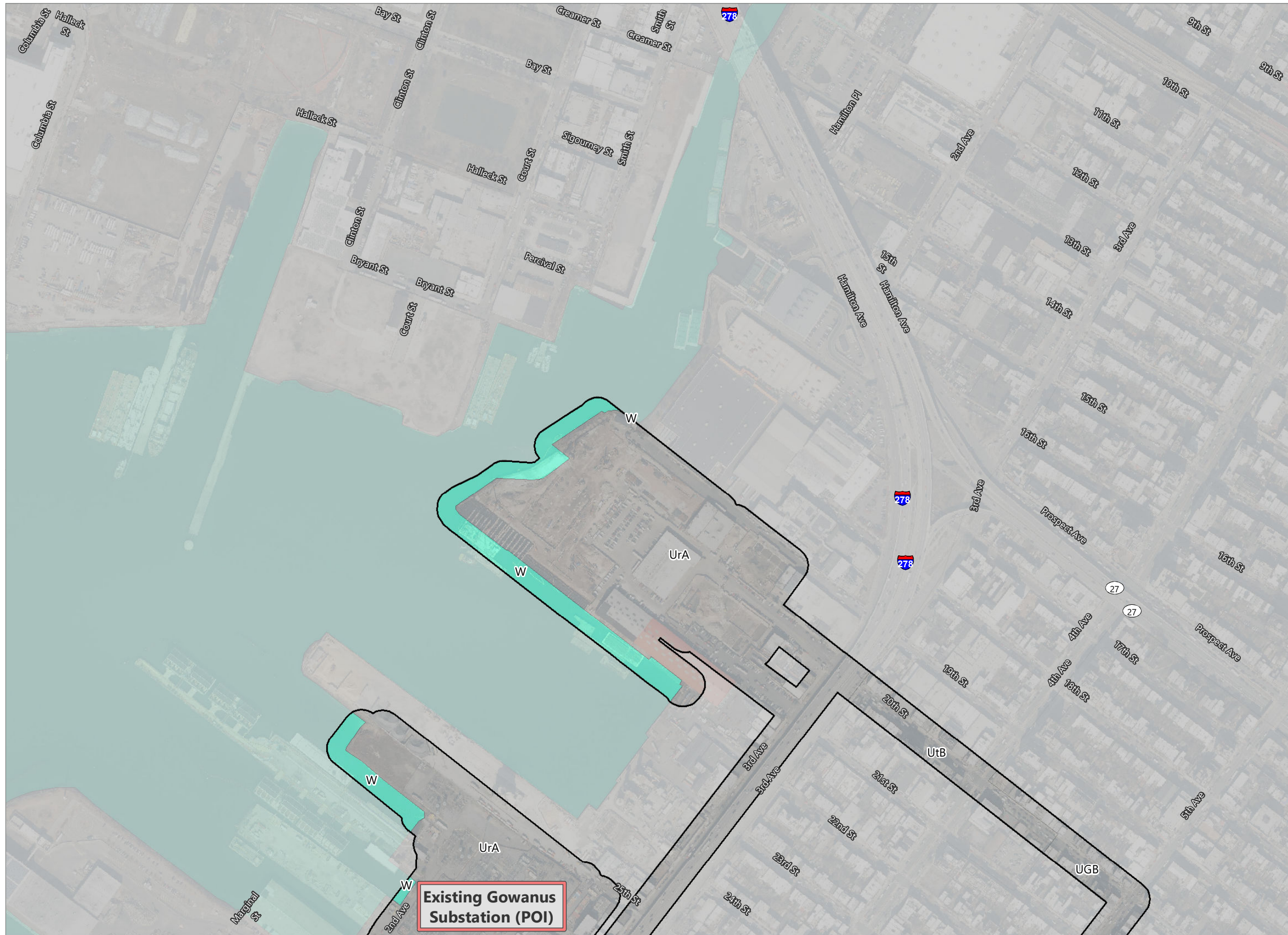
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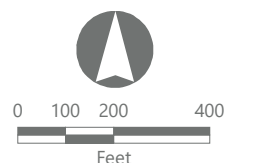
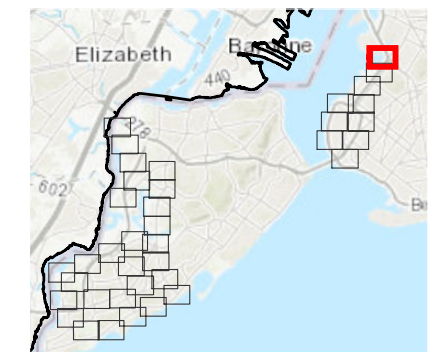


Atlantic Shores North Offshore Wind – New York Onshore Project Study Area

Boroughs of Brooklyn and
Staten Island, Kings and Richmond
County, New York

**Natural Resources Conservation
Service Soils Report**

- Study Area
- NRCS (SSURGO) Soils
- Hydric
- Partially Hydric*
- Water
- Not Hydric



Prepared August 31, 2023
Basemap: NYS DOP "2020" orthoimagery map service.

*Partially Hydric Status indicates that the major soil component is classified as not hydric but includes minor soil components that are classified as hydric

