Southampton BMP Evaluation

TO: Randall Kemp, Highway Superintendent

FROM: Tracy Adamski, AICP; Jean Christy, PE; Haley Rivers

DATE: November 2022

The Town of Southampton is subject to the requirements of the 2016 Massachusetts Small MS4 General Permit, Section 2.3.6.d which states that "the permittee shall identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area." Based on the results of the Preliminary Retrofit Inventory conducted by Tighe & Bond in Permit Year 3 and the Nitrogen and Phosphorus Source Identification Report completed by the Pioneer Valley Planning Commission (PVPC) in June 2021, five sites have been further evaluated for phosphorus- and/or nitrogen-reduction specific structural BMPs.

The attached evaluation includes an assessment of five Town-owned properties within the drainage area of Pequot Pond and/or the Manhan River, which are:

1. Old Fire Station Building, Bluemer Road; Parcel ID: 44_51
2. Transfer Station, Moose Brook Road; Parcel ID: 35_48
3. 180 Brickyard Road / Gilbert Road; Parcel ID: 34_179
4. Whittemore Conservation Area, Meadow Lane; Parcel ID: 8_36
5. Conant Memorial Park, Clark Street; Parcel ID: 23_78

The attached evaluation provides property descriptions, descriptions and diagrams of proposed BMPs, site photos, conceptual drawings, and a mapbook with priority resource information for each site. It is recommended that the Town consider the challenges, benefits, potential for reduction of nitrogen and/or phosphorus loading, and the constructability of structural BMPs at each site as they move forward with the determination of a construction schedule for the installation of structural BMPs as per the requirements of the 2016 Massachusetts Small MS4 General Permit, which require the installation of one demonstration retrofit BMP in Permit Year 6 (FY 24).

PROPERTY 1 – OLD FIRE STATION BUILDING

Bluemer Road, Parcel ID 44_51

PROPERTY DESCRIPTION

The Old Fire Station Building is a 0.22 acre parcel adjacent to Bull Head Pond to the south. Currently, the property has a paved driveway and a garage used for storing vehicles or other supplies. The area behind the garage is naturally wooded and slopes down to Bull Head Pond. Bull Head Pond connects underground to Pequot Pond, which is phosphorus impaired.



***Figure 1**: Example Sediment Forebay. Source: MA Cleanwater Toolkit*

The area immediately west of the existing building appears to be the lowest point of the road and would provide an opportunity for stormwater to be routed onto the site for treatment before it runs into Bull Head Pond and Pequot Pond.



***Figure 2:** Location of existing catch basin and proposed sediment forebay. Source: Tighe & Bond*

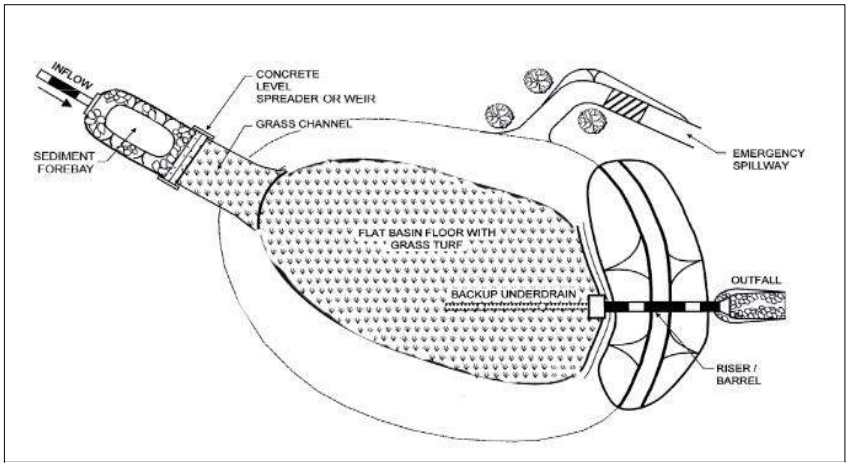


***Figure 3**: Example sediment forebay and infiltration basin. Source: MA Stormwater BMP Manual*



***Figure 4:** Location of proposed infiltration basin. Source: Tighe & Bond*

PROPOSED RETROFIT

The proposed retrofit includes a sediment forebay to the west of the existing building into which stormwater from an existing catch basin would be routed for pretreatment, facilitating gravity separation of suspended solids. From here, the stormwater would flow behind the back of the structure into an infiltration basin, which would store and filter stormwater as it permeates into the soil. Overflow would continue into the outlet control structure and exit toward the water body.

NOTES:

-POTENTIAL TO INSTALL SEDIMENT FOREBAY AND INFILTRATION BASINS TO TREAT AND INFILTRATE RUNOFF FROM BLUEMER ROAD.

-ESTIMATED POTENTIAL TP LOADING TO BMP: .09 LB P/YEAR

ASSUMPTIONS:

-GROUNDWATER DEPTH IS NOT SHALLOW

-BEDROCK DEPTH IS NOT SHALLOW

-SOILS ARE WELL-DRAINED

-THE REQUIRED SPACE FOR AN ADEQUATELY SIZED INFILTRATION BASIN IS AVAILABLE

-EXISTING UTILITIES AND DRAINAGE INFRASTRUCTURE SHOULD BE VERIFIED

-SEE FULL ATTACHED MAPBOOK FOR ENVIRONMENTAL INFORMATION. ADDITIONAL PERMITTING MAY BE REQUIRED WHERE SENSITIVE ENVIRONMENTAL AREAS ARE LOCATED

DRAINAGE PIPE

PROPOSED OUTFALL

RELOCATE EXISTING OUTFALL

SEDIMENT FOREBAY

INFILTRATION BASIN

OUTLET CONTROL STRUCTURE

PROPOSED OUTFALL

BLUEMER ROAD

COUNTY ROAD

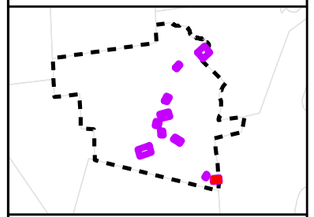
CAMP JAHN ROAD

CAMP JAHN ROAD

Areas For Index
Outfall
DrainManhole
CatchBasin
GRAVITY
Parcels
LiDAR 2ft (2015)
MassDEP 100ft Buffer

BMP RETROFIT INVENTORY-DRAFT

LOCUS MAP



N

0 80 160

Feet

1 inch = 125 feet

Mapsheet: 1

Bluemer Road

Parcel ID:
44_51

Southampton, Massachusetts

October 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

PROPERTY 2 – TRANSFER STATION

Moose Brook Road, Parcel 35_48

PROPERTY DESCRIPTION

The Transfer Station on Moose Brook Road is a 0.97 acre parcel that is located about 1,000 feet east from Moose Brook. Existing structures include a paved driveway and several containers used to store waste located along the northeast edge of the site, parallel to Moose Brook Road. The remaining area of the parcel contains a capped landfill. There are currently no formal stormwater management structures present on the site.

The western area of the site has potential for BMP retrofit, as it drains to a wetland area and into Moose Brook, which runs to the Manhan River, which drains to the Connecticut River, which drains to Long Island Sound, which is nitrogen impaired.



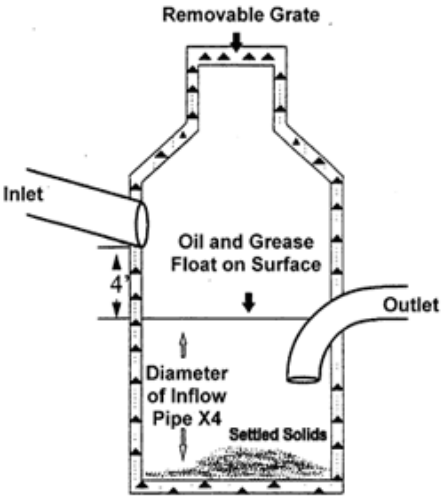
Figure 1: *Example Outlet Control Structure.*
Source: MA Clean Water Toolkit

PROPOSED RETROFIT

Stormwater from Moose Brook Road and the Southampton Transfer Station Facility area would first run into a deep sump hooded catch basin, where it would remove trash, debris, and coarse sediment from runoff and serve as a temporary spill containment device for floatables such as oil and grease. The stormwater is then proposed to undergo two types of pretreatment in order to account for the on-site landfill, which should be considered a land use with higher potential pollutant load. The water would route into a water quality unit such as a hydrodynamic separator, where the flow would be slowed for pretreatment facilitated by gravity separation of total suspended solids. From there, stormwater would flow into an infiltration basin, where it would be stored and filtered as it permeates into the soil. Overflow would outflow through the outlet control structure and toward the wetland.



Figure 2: *Location of proposed sediment forebay and infiltration basin.*
Source: Tighe & Bond



Deep Sump Catch Basin

Figure 3: *Example Deep Sump Catch Basin.*
Source: MA Clean Water Toolkit

NOTES:

-POTENTIAL TO INSTALL DEEP-SUMP HOODED CATCH BASIN, WATER QUALITY UNIT, SEDIMENT FOREBAY, AND INFILTRATION BASIN TO TREAT AND INFILTRATE RUNOFF FROM LANDFILL ACCESS ROAD.

-ESTIMATED POTENTIAL TP LOADING TO BMP: 2.24 LB P/YEAR

ASSUMPTIONS:

-GROUNDWATER DEPTH IS NOT SHALLOW

-BEDROCK DEPTH IS NOT SHALLOW

-SOILS ARE WELL-DRAINED

-THE REQUIRED SPACE FOR AN ADEQUATELY SIZED INFILTRATION BASIN IS AVAILABLE

-THE EXISTING IMPERVIOUS AREA IS PITCHED TOWARD THE PROPOSED CATCH BASIN

-SEE FULL ATTACHED MAPBOOK FOR ENVIRONMENTAL INFORMATION. ADDITIONAL PERMITTING MAY BE REQUIRED WHERE SENSITIVE ENVIRONMENTAL AREAS ARE LOCATED

DRAINAGE PIPE

PROPOSED OUTFALL

OUTLET CONTROL DEVICE

DEEP-SUMP HOODED CATCH BASIN

WATER QUALITY UNIT

SEDIMENT FOREBAY

INFILTRATION BASIN

MADELINE WAY

MOOSEBROOK RD

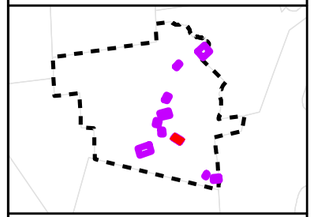
STRONG ROYD

CHERYL LANE

Areas For Index
Outfall
DrainManhole
CatchBasin
GRAVITY
Parcels
LiDAR 2ft (2015)
MassDEP 100ft Buffer

BMP RETROFIT INVENTORY-DRAFT

LOCUS MAP



N

0 110 220

Feet

1 inch = 175 feet

Mapsheet: 2

Moosebrook Rd at Southampton Transfer Station

Parcel ID:
35_48

Southampton, Massachusetts

October 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

PROPERTY 3 – GILBERT AND 180 BRICKYARD ROAD

Undeveloped Area, Parcel 34-179

PROPERTY DESCRIPTION

The 22.70 acres of undeveloped area that constitutes 180 Brickyard Road is located next to a residential area. Much of the area is comprised of wetlands. The Manhan River runs through the site, which drains to the Connecticut River, which drains to Long Island Sound, which is nitrogen impaired. BMPs in this area would filter runoff from Brickyard Road and Gilbert Road; however, the area grade may not channel sufficient stormwater to this area to be effective at removing pollutants from roadway stormwater runoff.



Figure 1: *Location of proposed sediment forebay and infiltration basin off Brickyard Road.*
Source: Tighe & Bond

PROPOSED RETROFITS

Stormwater from Brickyard Road and Gilbert Road would flow into respective deep sump hooded catch basins, where any trash, debris, and sediment would separate out and serve as a temporary spill containment device for floatables such as oil and grease. Next, the stormwater would run into sediment forebays, where stormwater would be pretreated by gravity separation of suspended solids. The pretreated stormwater would then flow into infiltration basins, where the water will be stored and filtered as it permeates the soil. Overflow would route through the outlet control devices through two separate channels and towards the wetland which surrounds the Manhan River.



Figure 2: *Location of proposed sediment forebay and infiltration basin off Gilbert Road.*
Source: Tighe & Bond

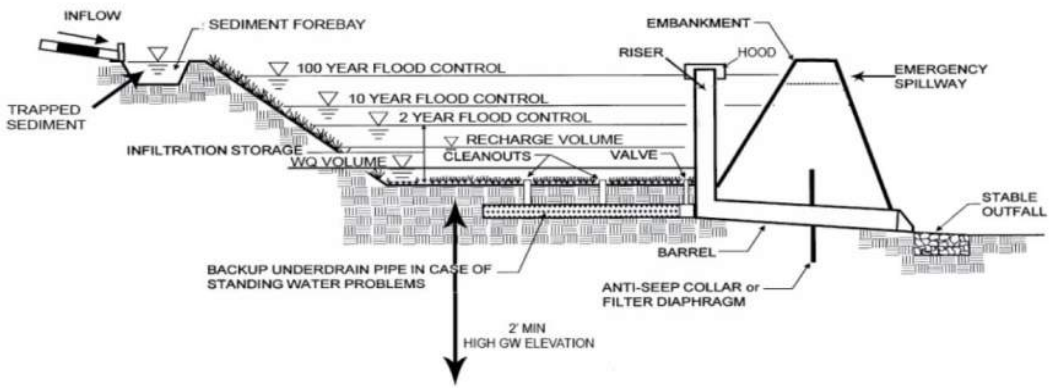


Figure 3: *Example of a pretreatment sediment forebay and infiltration basin.*
Source: MA Stormwater BMP Manual

Tighe&Bond

NOTES:

-POTENTIAL TO INSTALL 2 DEEP-SUMP HOODED CATCH BASINS, WATER QUALITY UNITS, SEDIMENT FOREBAYS, AND INFILTRATION BASINS TO TREAT AND INFILTRATE RUNOFF FROM BRICKYARD ROAD AND GILBERT ROAD.

-ESTIMATED POTENTIAL TP LOADING TO BMP: 2.88 LB P/YEAR

ASSUMPTIONS:

-GROUNDWATER DEPTH IS NOT SHALLOW

-BEDROCK DEPTH IS NOT SHALLOW

-SOILS ARE WELL-DRAINED

-THE REQUIRED SPACE FOR AN ADEQUATELY SIZED INFILTRATION BASIN IS AVAILABLE

-THE EXISTING IMPERVIOUS AREA IS PITCHED TOWARD THE PROPOSED CATCH BASIN

-SEE FULL ATTACHED MAPBOOK FOR ENVIRONMENTAL INFORMATION. ADDITIONAL PERMITTING MAY BE REQUIRED WHERE SENSITIVE ENVIRONMENTAL AREAS ARE LOCATED

PROPOSED OUTFALL

OUTLET CONTROL DEVICE

INFILTRATION BASIN

SEDIMENT FOREBAY

DEEP-SUMP HOODED CATCH BASIN

OUTLET CONTROL DEVICE

PROPOSED OUTFALL

DRAINAGE PIPE

INFILTRATION BASIN

SEDIMENT FOREBAY

DRAINAGE PIPE

DEEP-SUMP HOODED CATCH BASIN

BRICKYARD ROAD

GILBERT ROAD

CANFIELD CIRCLE

COOLIDGE DRIVE

MADISON AVENUE

BUCHANAN CIRCLE

Areas For Index
Outfall
DrainManhole
CatchBasin
GRAVITY
Parcels
LiDAR 2ft (2015)
MassDEP 100ft Buffer

BMP RETROFIT INVENTORY-DRAFT

LOCUS MAP

0 160 320
Feet

1 inch = 250 feet

Mapsheet: 3

180 Brickyard Rd

Parcel ID:
34_179

Southampton, Massachusetts

October 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

PROPERTY 4 – WHITTEMORE CONSERVATION AREA

Meadow Lane, Parcel 8_36

PROPERTY DESCRIPTION

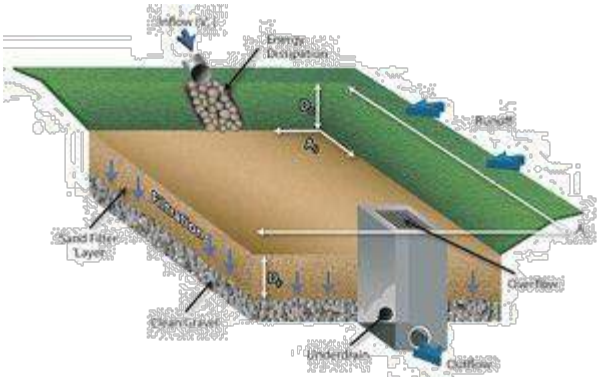


Figure 1: *Example of a sand filter.*
Source: MN Stormwater Manual

The Whittemore Conservation Area is a 34.30 acre parcel located off Meadow Lane. The property is near residential areas, but it is a public area with established hiking trails. There would be opportunities at this location for educational components, such as interpretive signs or viewing areas. The implementation of BMPs with a focus on infiltration and dissipation of stormwater may also help with existing drainage and erosion problems. However, this site may pose a challenge to work around priority resource areas. The stormwater would flow toward the Manhan River, which drains into the Connecticut River, which drains into the Long Island Sound, which is nitrogen impaired.



Figure 2: *Example of an infiltration basin.*
Source: MA Stormwater BMP Manual

PROPOSED RETROFITS

There are two existing catch basins on Meadow Lane, which each drain to separate outfalls. Each outfall would be fitted with a water quality unit such as a hydrodynamic separator to adequately treat the runoff prior to entering the infiltration basin due to available constructable space. Stormwater would then flow to an infiltration basin, where stormwater would be stored and filtered as it permeates the soil.



Figure 3: *Location of proposed infiltration basin at southernmost existing outfall.*
Source: Tighe & Bond

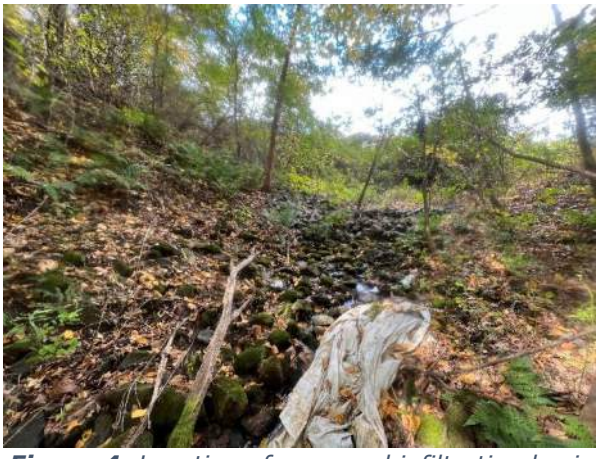


Figure 4: *Location of proposed infiltration basin at northernmost existing outfall.*
Source: Tighe & Bond

NOTES:

-POTENTIAL TO INSTALL 2 WATER QUALTY UNITS AND INFILTRATION BASINS TO TREAT AND INFILTRATE RUNOFF FROM MEADOW LANE.

-ESTIMATED POTENTIAL TP LOADING TO BMP: .09 LB P/YEAR

ASSUMPTIONS:

-GROUNDWATER DEPTH IS NOT SHALLOW

-BEDROCK DEPTH IS NOT SHALLOW

-SOILS ARE WELL-DRAINED

-THE REQUIRED SPACE FOR AN ADEQUATELY SIZED INFILTRATION BASIN IS AVAILABLE

-EXISTING UTILITIES AND DRAINAGE INFRASTRUCTURE SHOULD BE VERIFIED

-SEE FULL ATTACHED MAPBOOK FOR ENVIRONMENTAL INFORMATION. ADDITIONAL PERMITTING MAY BE REQUIRED WHERE SENSITIVE ENVIRONMENTAL AREAS ARE LOCATED

DRAINAGE PIPE

WATER QUALITY UNIT

WATER QUALITY UNIT

EXISTING OUTFALLS

INFILTRATION BASIN

MEADOW LANE

POMEROY MEADOW ROAD

DUGGAN LANE

KINGSBERRY LANE

Areas For Index
Outfall
DrainManhole
CatchBasin
GRAVITY
Parcels
LiDAR 2ft (2015)
MassDEP 100ft Buffer

BMP RETROFIT INVENTORY-DRAFT

LOCUS MAP

1

0 190 380
Feet

1 inch = 300 feet

Mapsheet: 4

Whittemore Conservation Area- Meadow Ln

Parcel ID:
8_36

Southampton, Massachusetts

October 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

PROPERTY 5 – CONANT MEMORIAL PARK

Clark Street, Parcel 23_78

PROPERTY DESCRIPTION

Conant Memorial Park, located on Clark Street, is an 18.55 acre parcel with a baseball field, tennis courts, a basketball court, and several parking areas. It also contains a wooded area to the east. There is a wetland area that runs from the northwest edge to the southeast edge of the site which follows a stream that connects to the Manhan River, which drains to the Connecticut River, which drains to Long Island Sound, which is nitrogen impaired. BMPs proposed for this site would manage stormwater runoff from Clark Street, the baseball fields, and the nearby parking area as it drains toward the wetland area. This location would provide the opportunity to include educational signage explaining the treatment of stormwater.

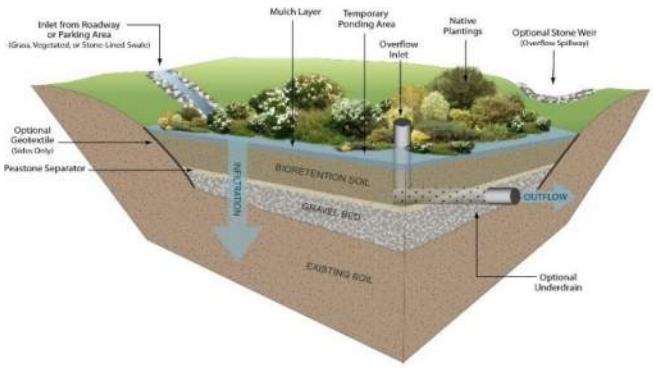


Figure 1: *Example of a bioretention basin.*
Source: MA Clean Water Toolkit



Figure 2: *Example of a deep sump hooded catch basin.*
Source: MA Stormwater BMP Manual

PROPOSED RETROFITS

The proposed retrofit would include the installation of a deep sump hooded catch basin at the parking area on the southwest corner of the site. The catch basin would route stormwater to a sediment forebay, where it would facilitate gravity separation of suspended solids and pretreat the stormwater. From there, stormwater would enter a bioretention basin and percolate through the soil for storage and removal of suspended solids, metals, and nutrients. It would also be aesthetically pleasing to park visitors. From there, the water would flow to an outlet control device and exit through the proposed outfall into a depression about 250 feet from the wetland area.



Figure 3: *Location of proposed sediment forebay and bioretention basin.*
Source: Tighe & Bond

NOTES:

-POTENTIAL TO INSTALL DEEP-SUMP HOODED CATCH BASIN, SEDIMENT FOREBAY, AND BIORETENTION BASIN TO TREAT AND INFILTRATE RUNOFF FROM BASEBALL FIELD PARKING AREA.

-ESTIMATED POTENTIAL TP LOADING TO BMP: 2.84 LB P/YEAR

ASSUMPTIONS:

-GROUNDWATER DEPTH IS NOT SHALLOW

-BEDROCK DEPTH IS NOT SHALLOW

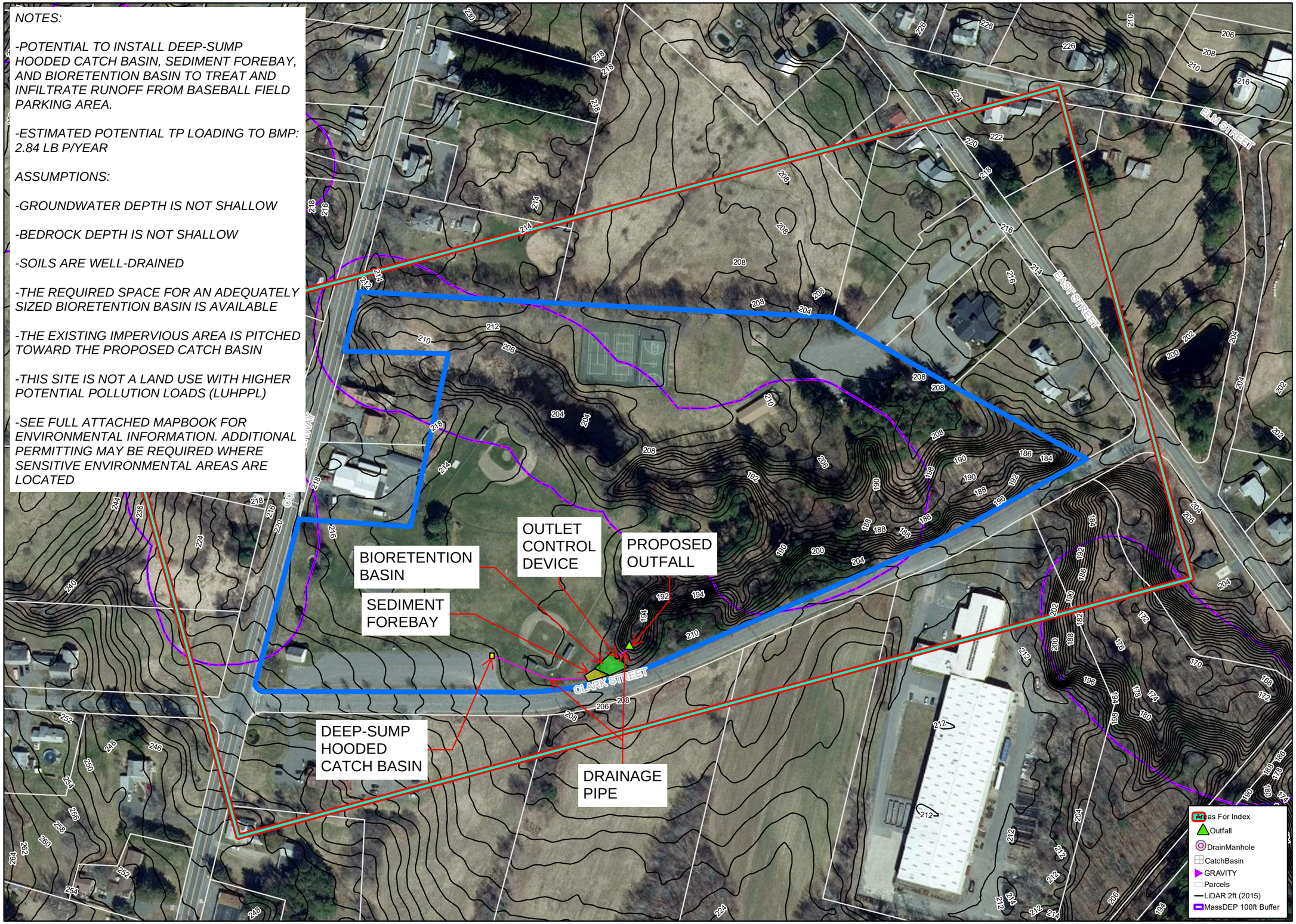
-SOILS ARE WELL-DRAINED

-THE REQUIRED SPACE FOR AN ADEQUATELY SIZED BIORETENTION BASIN IS AVAILABLE

-THE EXISTING IMPERVIOUS AREA IS PITCHED TOWARD THE PROPOSED CATCH BASIN

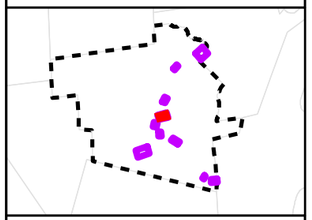
-THIS SITE IS NOT A LAND USE WITH HIGHER POTENTIAL POLLUTION LOADS (LUHPPL)

-SEE FULL ATTACHED MAPBOOK FOR ENVIRONMENTAL INFORMATION. ADDITIONAL PERMITTING MAY BE REQUIRED WHERE SENSITIVE ENVIRONMENTAL AREAS ARE LOCATED



BMP RETROFIT INVENTORY-DRAFT

LOCUS MAP



N

0 110 220

Feet

1 inch = 175 feet

Mapsheet: 5

Clark Street at Conant Park

Parcel ID:
23_78

Southampton, Massachusetts

October 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

Tighe&Bond

MAPBOOK

BMP RETROFIT INVENTORY-DRAFT

BLUEMER ROAD

BULLHEAD ROAD

COUNTY ROAD

CAMP JAHN ROAD

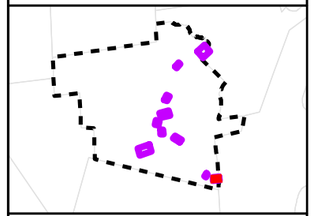
CAMP JAHN ROAD

Areas For Index
LiDAR 2ft (2015)
Streams
MassDEP 100ft Buffer
MassDEP 50ft Buffer
MassDEP 25ft Buffer
MassDEP Inland Wetlands
Depth to Water Table
0 - 39
40 - 153
Depth to Any Soil Restrictive Layer
0
1 - 53
54 - 71
72 - 92

Hydrologic Soil Group
A
A/D
B
B/D
C
C/D
D
FEMA Flood Zone*

* IndicatesTransparency

LOCUS MAP



N

0 80 160
Feet

1 inch = 125 feet

Mapsheet: 1

Bluemer Road

Parcel ID:
44_51

Southampton, Massachusetts

September 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

BMP RETROFIT INVENTORY-DRAFT

MADELINE WAY

MADELINE WAY

MOOSE BROOK ROAD

STRONG ROAD

Areas For Index
LiDAR 2ft (2015)
Streams
MassDEP 100ft Buffer
MassDEP 50ft Buffer
MassDEP 25ft Buffer
MassDEP Inland Wetlands

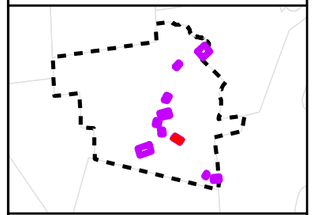
Depth to Water Table
0 - 39
40 - 153

Depth to Any Soil Restrictive Layer
0
1 - 53
54 - 71
72 - 92

Hydrologic Soil Group
A
A/D
B
B/D
C
C/D
D
FEMA Flood Zone*

* IndicatesTransparency

LOCUS MAP



0 100 200
Feet

1 inch = 167 feet

Mapsheet: 2

Moosebrook Rd at Southampton Transfer Station

Parcel ID:
35_4

Southampton, Massachusetts

September 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

BMP RETROFIT INVENTORY-DRAFT

GILBERT ROAD

BRICKYARD ROAD

CARFIELD CIRCLE

COOLIDGE DRIVE

MADISON AVENUE

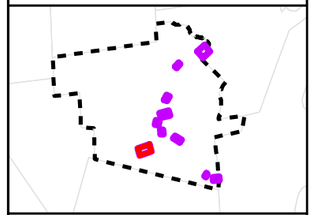
BUCHANAN CIRCLE

Areas For Index
LiDAR 2ft (2015)
Streams
MassDEP 100ft Buffer
MassDEP 50ft Buffer
MassDEP 25ft Buffer
MassDEP Inland Wetlands
Depth to Water Table
0 - 39
40 - 153
Depth to Any Soil Restrictive Layer
0
1 - 53
54 - 71
72 - 92

Hydrologic Soil Group
A
A/D
B
B/D
C
C/D
D
FEMA Flood Zone*

* IndicatesTransparency

LOCUS MAP



N

0 160 320
Feet

1 inch = 250 feet

Mapsheet: 3

180 Brickyard Rd

Parcel ID:
34_179

Southampton, Massachusetts

September 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

BMP RETROFIT INVENTORY-DRAFT

MEADOW LANE

POMEROY MEADOW ROAD

DUGGAN LANE

KINGSBERRY LANE

Areas For Index
LiDAR 2ft (2015)
Streams
MassDEP 100ft Buffer
MassDEP 50ft Buffer
MassDEP 25ft Buffer
MassDEP Inland Wetlands

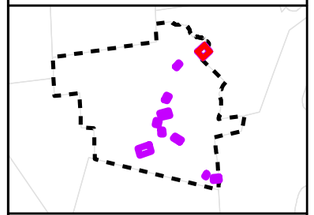
Depth to Water Table
0 - 39
40 - 153

Depth to Any Soil Restrictive Layer
0
1 - 53
54 - 71
72 - 92

Hydrologic Soil Group
A
A/D
B
B/D
C
C/D
D
FEMA Flood Zone*

* IndicatesTransparency

LOCUS MAP



N

0 180 360
Feet

1 inch = 292 feet

Mapsheet: 4

Whittemore Conservation Area- Meadow Ln

Parcel ID:
8_30

Southampton, Massachusetts

September 2022

Tighe&Bond

Path: G:\GIS\MA\SouthamptonMA\MapDocs\Southampton_BMP_MapBook.mxd

BMP RETROFIT INVENTORY-DRAFT

ELM STREET

EAST STREET

COLLEGE HIGHWAY

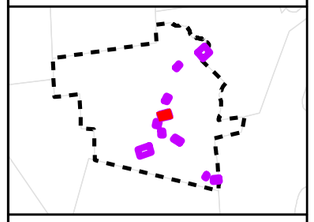
CLARK STREET

Areas For Index
LiDAR 2ft (2015)
Streams
MassDEP 100ft Buffer
MassDEP 50ft Buffer
MassDEP 25ft Buffer
MassDEP Inland Wetlands
Depth to Water Table
0 - 39
40 - 153
Depth to Any Soil Restrictive Layer
0
1 - 53
54 - 71
72 - 92

Hydrologic Soil Group
A
A/D
B
B/D
C
C/D
D
FEMA Flood Zone*

* IndicatesTransparency

LOCUS MAP



0 100 200
Feet

1 inch = 167 feet

Mapsheet: 5

Clark Street at Conant Park

Parcel ID:
23_78

Southampton, Massachusetts

September 2022

Tighe&Bond

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