STORMWATER
MANAGEMENT PLAN
FOR
NUPRO INDUSTRIAL PROJECT DEVELOPMENT
LOCATED AT
LOT 21 & 21.2 on Map 168
OFF OF **MERRIGAN WAY**

Aug. 22, 2022
Revised: 11/2/22

SVE Project No.: G2073

PREPARED FOR:
NUPRO, LLC.
10 Sandy Lane
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&
One Development & Construction, LLC.
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Westfield, MA 01085

PREPARED BY:
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R.C.E.: 55402

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1.0 Introduction

This Stormwater Management Plan (SWMP) documents the drainage impacts associated with the redevelopment of Parcel 21 and 21.2 (Map 168) in South Deerfield, MA. The property is approximately 8.88 acres in size and is owned by NUPRO, LLC. (Parcel 21 – Deed Bk.: 8052, Pg.: 32; Parcel 21.2 – Deed Bk.: 8052, Pg.: 37). NUPRO, LLC., a protective polyurethane film producer, is in discussions with the Town to purchase the properties to relocate their operation to a larger facility. The property is a portion of the old Oxford Foods site. The site had been utilized by the Oxford Foods company as a pickling facility from the late 1800's until it closed in 2006 at which time the Town of Deerfield purchased the property. The town subdivided the existing pickling facility property into multiple lots with a proposed public road (Merrigan Way) for access. The Town sold the development property to New England Natural Bakers who then sold the property back to the Town after an unsuccessful development program. The Town then divided the property to create a non-building lot from the northern portion of the property (Parcel 21.2). The property is surrounded by residential properties along the west-northwestern and eastern side of the property. To the south is Merrigan Way along with Pilot Precision Products/The DuMont Company. Blacksmtih/Sugarloaf Brook creates the northwestern property line.

The development properties are located within the Town's Expedited Permitting District (EPD).

The proposed development consists of the construction of an approximate 100,357 square foot building, which includes offices, manufacturing, maintenance, and storage warehouse to be constructed on Parcel 21. The development will also involve the construction of a parking area, loading dock apron, relocation of water mains and the construction of stormwater systems. A portion of an infiltration basin will be constructed on Parcel 21.2.

Refer to the vicinity map on page 5 for the specific location of the project.

2.0 Existing Conditions

2.1 Site Characteristics

The site had previously been used to house pickling vats, parking, a pickling, and packaging plant for the pickling facility while the property was used by Oxford Foods. Once the Town had taken control of the property, the existing pickling

facilities were deconstructed, and the property was used for the old Highway Garage. Once the new Highway Garage was constructed on the opposite side of Merrigan Way, the old Highway Garage was deconstructed as well. Currently the proposed development site consists of broken pavement, gravel, numerous underground utilities, and weeds. A small man-made detention basin is in the western edge of the open field and discharges to Blacksmith/Sugarloaf Brook. Blacksmith/Sugarloaf Brook runs southwest from the northern point of Parcel 21.2 along the northwestern property line. The brook then cuts through the western portion of Parcel 21 between the open field and the frontage on South Main Street.

Refer to page 6 for an aerial plan of the existing property.

2.2 Soil Characteristics

A review of the Natural Resources Conservation Services (NRCS) Web Soil Survey (WSS) classifies the majority of the site Agawam fine sandy loam and Udorthents-Urban land complex. Small portions of the site are classified as Windsor loamy sand and Ninigret fine sandy loam. Agawam fine sandy loam has a hydrologic classification of B. Udorthents-Urban land complex and Windsor loamy sand have hydrologic classifications of A. Ningret fine sandy loam has a hydrologic classification of C.

Refer to Appendix B for more information and page 7 for Soil Map

2.3 Floodplain

Review of the Flood Insurance Rate Map (FIRM) for South Deerfield in the Town of Deerfield, Massachusetts, Community Panel Number 250115 0006 B, effective date: July 2, 1980, indicates the subject property falls within zone ‘C’: area of minimum flood hazard. This property is not considered to be in a special flood hazard zone.

Refer to page 8 for a copy of the FIRM.

VICINITY MAP

Parcel 21 & 21.2

Deerfield, MA

March 29, 2022

1 inch = 400 Feet

0 400 800 1200

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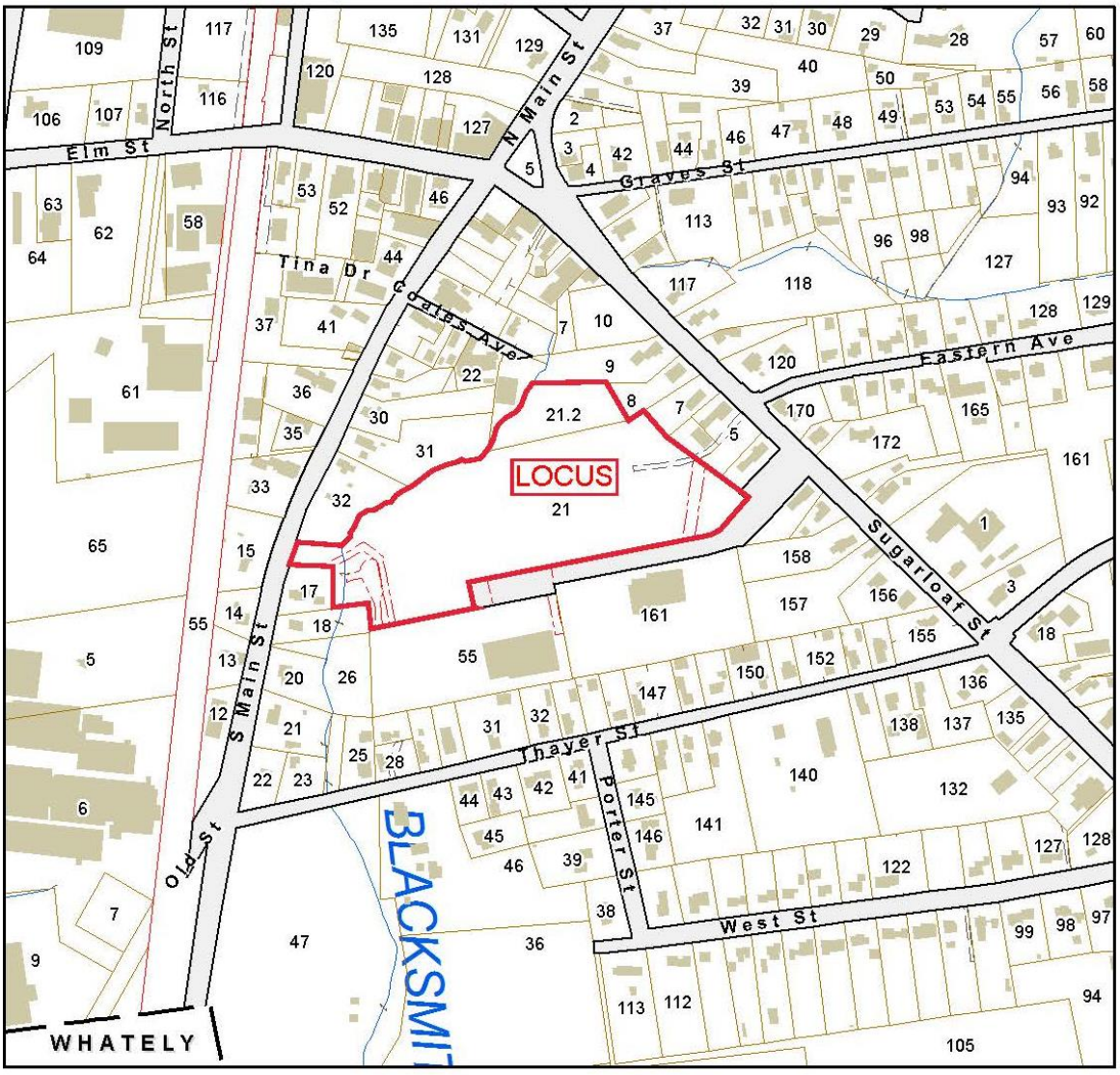

Large Scale	Public Road	Property Hook	Right of Ways
CAI Town Line	Railroad	Property TIC	
PWater	Right of Way	WaterLines	
Property Line	Utility	Buildings	

Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

EXISTING AERIAL SITE MAP

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AERIAL MAP

NUPRO INDUSTRIAL PROJECT DEVELOPMENT

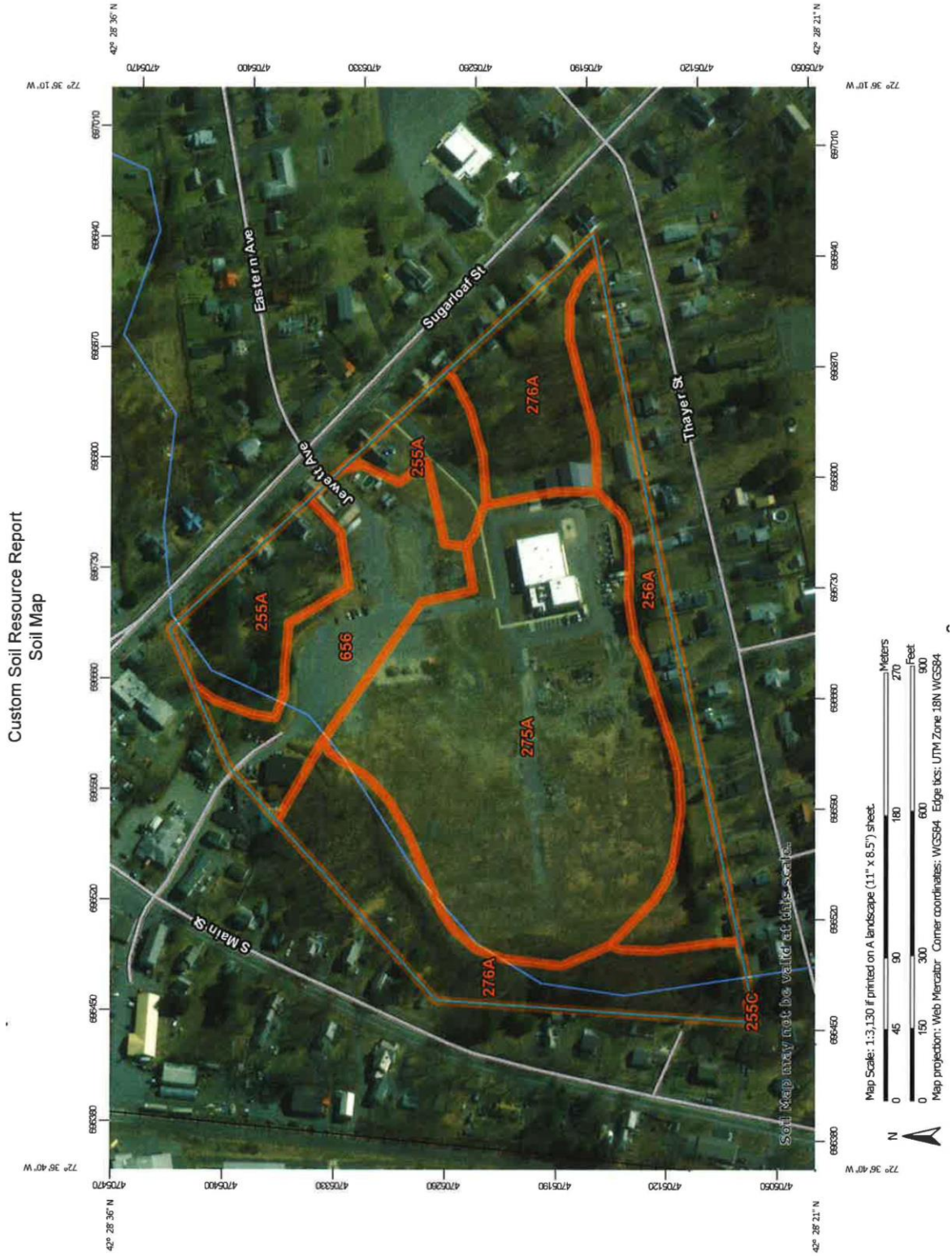
ONE DEVELOPMENT & CONSTRUCTION, LLC.
68 UNION STREET
WESTFIELD, MA 01085

0 100 200 GRAPHIC SCALE: 1" = 200'

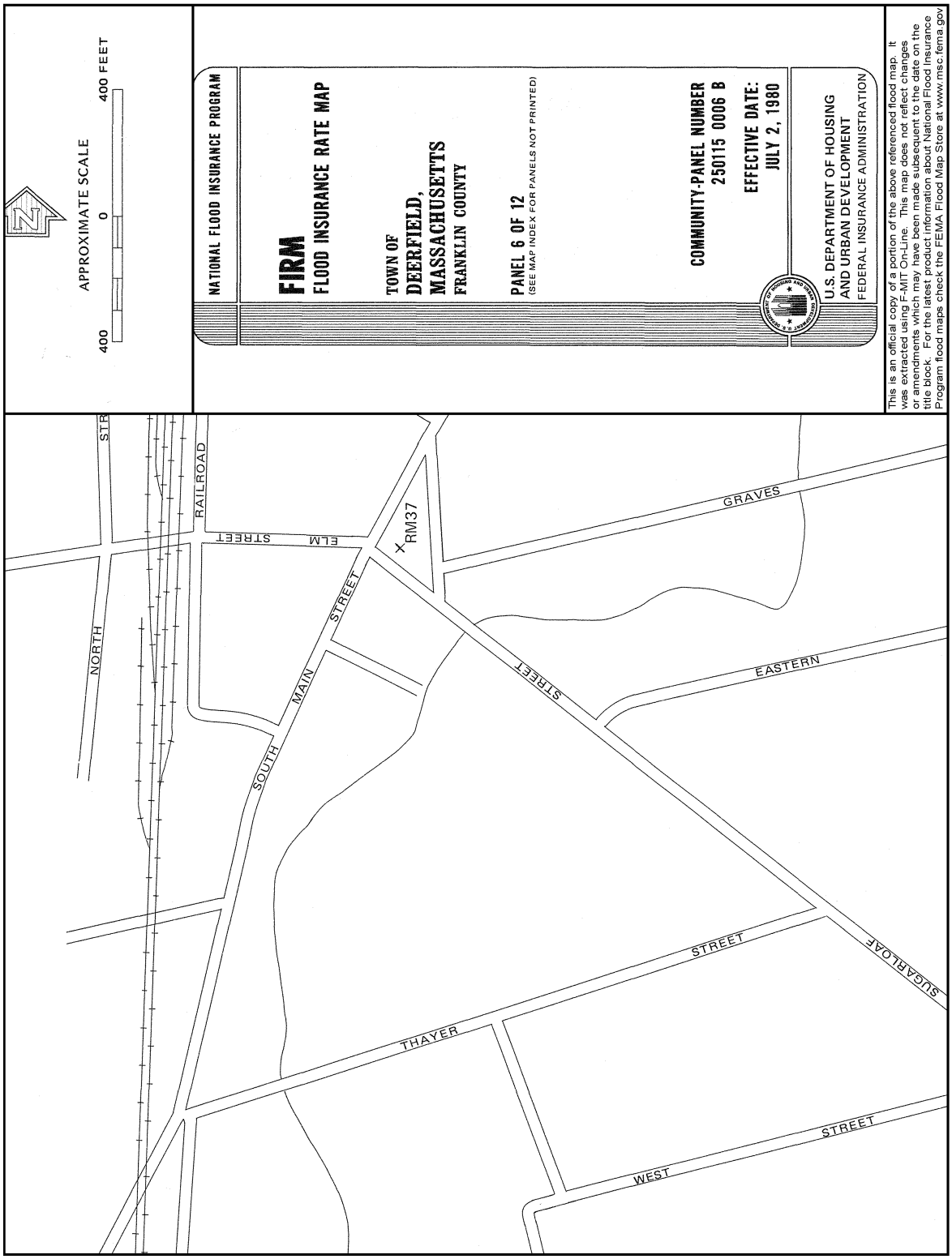
N

PROJ. #: G2073
DATE: 23-MAR-22
DRAWN: MJS
SHEET 1/1

SOIL MAP


Custom Soil Resource Report
Soil Map
Eastern Ave
Sugarloaf St
Jewett Ave
Thayer St
S Main St
255A
255A
276A
656
275A
256A
276A
255C
Soil Map may not be valid at this scale.
Map Scale: 1:3,130 if printed on A landscape (11" x 8.5") sheet.
Meters
Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84
N

FLOOD INSURANCE RATE MAP (FIRM)



2.3 Existing Hydrology

The Drainage area studied for this project is approximately 8.4 acres in size. Existing stormwater runoff flows to three areas. The stormwater which falls onto the western portion of the property collects in existing catch basins and is then discharged to the man-made detention basin located at the edge of the open field, or sheet flows to swales which direct the stormwater to the same man-made detention basin. The man-made detention basin then discharges the stormwater to a manhole before releasing the stormwater to Blacksmith/Sugarloaf Brook. Stormwater which falls onto the northern portion of the properties either sheet flows to Blacksmith/Sugarloaf Brook or is collected and routed to the brook via an underground drainage system. Stormwater which falls in the southeastern portion of the properties sheet flows onto Merrigan Way which collects into the municipal drainage system on the street.

Refer to Pocket #1 for the existing conditions hydrology exhibit to designate areas used for the analysis.

The table below summarizes the results of the existing runoff calculations for the property.

	Existing Runoff Amounts & Discharge Locations		
Design Storm	Existing Area 1 (Out of Basin)	Existing Area 2 (Flow North)	Existing Area 3 (Flow to Merrigan Way)
Q_2	0.06 cfs	1.06 cfs	0.36 cfs
Q_{10}	1.02 cfs	3.60 cfs	1.59 cfs
Q_{25}	2.57 cfs	5.50 cfs	2.60 cfs
Q_{100}	4.24 cfs	8.67 cfs	4.36 cfs

3.0 Developed Conditions

3.1 Design Objectives

The objective of this SWMP is to analyze the pre- and post-development stormwater runoff conditions and impacts to downstream properties associated with the proposed development. There will be approximately 75,575 square feet of new impervious area which will increase the amount of runoff generated from the property. To mitigate this, new infiltration/detention basins, with dry wells,

will be created to reduce the flow off site and promote groundwater recharge in accordance with Town and State Regulations.

The proposed drywells will be utilized to evenly distribute stormwater into the basins as well as allow infiltration during periods of ground frost. Stormwater which falls onto the proposed parking and loading dock apron will be collected by deep sump catch basins and routed through oil/water separators before being discharged to the infiltration/detention basins. Stormwater which falls onto the proposed building will be collected via downspouts and channeled in underground drainage piping to be discharged into the infiltration/detention basin. Clean stormwater will be allowed to sheet flow off site.

3.2 Developed Hydrology

The area studied for the post-developed conditions is the 8.4 acres studied for the existing conditions. Stormwater which falls on new impervious area will be directed to two proposed large shallow infiltration/detention basins. The first proposed infiltration/detention basin is located on the western side of the proposed building. The second infiltration/detention basin is located on the northern and eastern side of the proposed building. Stormwater which falls onto the loading dock apron will be collected in deep sump catch basins then will flow through an oil/water separator before discharging into a drywell located within the infiltration/detention basin on the western side. Stormwater which falls onto the southern half of the proposed building's roof will be collected in downspouts and directed to a drywell within the infiltration/detention basin via underground drainage pipes. Stormwater which falls onto the southern lawn and the extension of Merrigan Way will sheet flow to a small forebay before it enters the proposed infiltration/detention basin. The western basin has a proposed 10ft wide broad crested weir that will discharge to the existing infiltration/detention basin located at the western edge of the existing field. The depth of the proposed basin is based off the approved plans of the New England Bakers project.

Stormwater which falls onto the proposed employee and customer parking area will be collected in deep sump catch basins then will flow through an oil/water separator before discharging into a drywell located within the northern/eastern infiltration/detention basin. Stormwater which falls on the northern half and flat roof, in the southeastern corner, of the proposed building will be collected in downspouts and directed to a drywell within the northern infiltration/detention basin. The northern/eastern infiltration/detention basin has a 10ft wide broad crested weir that discharges overflow to Blacksmith/Sugarloaf Brook to the north.

Stormwater which falls outside of the proposed basin and impervious area in the western portion of the property will sheet flow to Blacksmith/Sugarloaf Brook or be captured by an existing swale which runs along the edge of the field that discharges to the existing infiltration/detention basin at the western edge of the existing field. Stormwater which doesn't fall onto the impervious area or within the proposed northern basin will sheet flow north/northwest to Blacksmith/Sugarloaf Brook. Stormwater which falls on the grass south of the building as well as in the southeastern corner of the property will sheet flow onto Merrigan Way and enter the municipal drainage system.

Refer to Appendix A for Hydrology Calculations.

Refer to Pocket #2 for Redeveloped Hydrology Maps.

3.3 Summary of Post Development Hydrology (CFS)

	Change in outflow from Existing Basin		
Design Storm	Existing Area 1 (Out of Existing Basin)	Developed (Out of Existing Basin)	$\triangle$ (Out of Existing Basin)
Q_2	0.05 cfs	0.06 cfs	0.01 cfs
Q_{10}	1.02 cfs	0.38 cfs	-0.64 cfs
Q_{25}	2.35 cfs	0.60 cfs	-1.75 cfs
Q_{100}	4.24 cfs	1.34 cfs	-2.90 cfs

	Change in outflow to North		
Design Storm	Existing Area 2 (Flow North)	Developed (Flow North)	$\triangle$ (Flow North)
Q_2	1.06 cfs	0.02 cfs	-1.04 cfs
Q_{10}	3.61 cfs	0.28 cfs	-3.33 cfs
Q_{25}	5.50 cfs	0.60 cfs	-4.90 cfs
Q_{100}	8.71 cfs	2.57 cfs	-6.14 cfs

	Change in flow to Merrigan Way		
Design Storm	Existing Area 3 (Flow to Merrigan Way)	Developed (Flow to Merrigan Way)	$\triangle$ (Flow to Merrigan Way)
Q_2	0.36 cfs	0.26 cfs	-0.10 cfs
Q_{10}	1.59 cfs	0.65 cfs	-0.94 cfs
Q_{25}	2.60 cfs	0.93 cfs	-1.67 cfs
Q_{100}	4.36 cfs	1.42 cfs	-2.94 cfs

From the hydrology calculations there are reductions of runoff from the pre- and post-development values. The runoff associated with the increased impervious area is retained and infiltrated within the two proposed basins.

4.0 Stormwater Management Standards

Standard No. 1 – There are no new stormwater conveyances (e.g. outfalls) discharging untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth. Onsite stormwater from impervious areas will be conveyed to the proposed infiltration basins. Emergency spillways will discharge stormwater to existing locations.

Standard No. 2 – There will be a reduction in stormwater runoff from the development site compared to existing conditions.

Standard No. 3 – The loss of annual recharge from the development will be mitigated using infiltration basins. The development will increase the amount of impervious area by approximately 75,575square feet.

Existing Impervious Area = 105,228 sf
Developed Impervious Area = 180,803 sf
$\triangle$ Impervious Area = +75,575 sf

The required recharge volume based on the increased impervious area and Hydrologic Soil Classification A (used for most extreme case) is as follows:

$$Required\ Recharge\ Volume\ (R_v) = F\ \times Impervious\ Area$$

F = Target Depth Factor = 0.60 inch (Hydrologic Soil Classification A used for most extreme case)

$$R_v = 0.60in \times {}^{1\ ft}/_{12\ in} \times 75{,}575\ sf = 3{,}779\ cf$$

Proposed Western Basin will provide 5,321 cf of stormwater volume during a 2-yr design storm.

Proposed Northern basin will provide 3,353 cf of stormwater volume during a 2-yr design storm.

Combined available stormwater amount to recharge during a 2-yr design storm is 10,101 cf.

Drawdown Time Calculation

Eastern/northern basin

$$T = \frac{Volume}{(k)(Bottom\ Area)}$$

$$T_{Northern} = \frac{3{,}353\ cf}{(2.41\ {}^{in}/_{hr})({}^{1ft}/_{12in})(12{,}155sf)} = 1.37\ hrs < 72\ hrs$$

$$T_{Western} = \frac{5{,}321\ cf}{(2.41\ {}^{in}/_{hr})({}^{1ft}/_{12in})(3{,}640\ sf)} = 7.28\ hrs < 72\ hrs$$

The proposed development site is located within a Zone II well protection area. Therefore, the design must remove at least 44% of the Total Suspended Solids (TSS) prior to reaching the infiltration area. The proposed design will remove the required percentage of TSS before reaching the infiltration from stormwater that falls onto traveled impervious area. The proposed drainage system will meet the removal requirements with the use of treatment trains made up of deep sump catch basins and oil/water separators.

Standard No. 4 – The proposed storm drain system will remove at a minimum 80% of TSS from the runoff of the development. Refer to the attached spreadsheets for particulars in Appendix C. These also show that 44% of TSS is expected to be removed from runoff prior to discharge to the proposed infiltration basins.

Water Quality Volume would equal 1-inch of runoff for the project increase impervious area.

$$75{,}575\ sf\ \times\ 1in\ \times {}^{1ft}/_{12in} = 6{,}298\ cf$$

Total stored runoff after a 2-yr storm is 8,674 cf in the two proposed basins.

Standard No. 5 – This Standard is not applicable. The function of the proposed property is not considered a land with higher potential pollutant loads.

Standard No. 6 – The property is located within a Zone II Wellhead Protection Area. Therefore, the treatment trains proposed with this development accommodates the 80% TSS Removal Requirement. It also accommodates the required 44% TSS removal prior to runoff discharging to the proposed infiltration basins.

Standard No. 7 – This Standard is met. The required standards were met to the maximum extent practicable.

Standard No. 8 – A plan to control construction related sediment is provided. Refer to project plans.

Standard No. 9 – A Long-Term Operation and Maintenance Plan is provided. See Appendix D.

Standard No. 10 – There are no known illicit discharges to the stormwater management system. Refer to Appendix E for Illicit Discharge Compliance Statement.

5.0 Conclusion

This SWMP has been prepared to document the stormwater impacts associated with the development of Lots 21 and 21.2 off Merrigan Way in South Deerfield, MA. Analysis was performed for the 2-, 10-, 25- and 100-yr design storms. Runoff from the proposed development will be treated, recharged, and attenuated to below existing conditions using low impact development practices and traditional storm drain conveyance systems. The analysis shows that using deep sump catch basins, oil/water separators and infiltration/detention basins, the proposed development does not adversely affect the existing downstream properties, natural habitats, or the public right-of-way and will improve the expected runoff conditions for the 2-, 10-, 25- and 100-yr design storms.