

269 North Avenue

Weston, Massachusetts

March 2016

POST CONSTRUCTION STORMWATER MANAGEMENT REPORT

Prepared For:

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590 Main Street
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DEI #2013-0008

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1.0 PROJECT OVERVIEW

The Applicant plans to develop a multi-family, affordable housing project under chapter 40B at 269 North Avenue, a 1.46-acre parcel of land abutting North Avenue or Route 117 (the "Property"). The proposed project includes three buildings and associated driveway, parking and utilities for 8 apartment units and 8 townhouse units with a total of 32 bedrooms. The project includes two septic systems to serve the dwellings, a stormwater management system consisting of a closed pipe network and underground retention systems and the required utilities to serve the project.

Several years ago, a multi-family residential dwelling and separate garage/barn were located on the Property. All of the buildings were destroyed by fire. The proposed project calls for the redevelopment of the lot.

2.0 DESIGN OBJECTIVE AND METHODOLOGY

The proposed drainage design is based on the requirements and standards of the Massachusetts Department of Environmental Protection's ("DEP") "Massachusetts Stormwater Handbook" (the "Handbook"). The Weston Stormwater and Erosion Control Bylaw and the Weston Stormwater and Erosion Control Regulations are local regulations that do not apply to this project under chapter 40B. The project complies with the Handbook's Standards as follows:

Standard #1 – No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The project does not propose any new stormwater outfalls to wetlands or waterways.

Standard #2 – Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

For the relevant watershed, the total peak rate of runoff for the 2, 10, 25, and 100-year storm events was modeled. To mitigate the peak rate of runoff, the system was designed to match the pre-development peak discharge rates to the post-developed peak discharge rates. The models show that, in fact, the post-development peak discharge rate will be less than pre-development rate for the watershed thereby negating the adverse drainage impacts to the abutting properties and North Avenue under existing conditions.

Standard #3 - Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance.

Loss of annual recharge to groundwater has been minimized all of the stormwater mitigation measures proposed for the project provide for infiltration.

Standard #4 - Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

The system has been designed to provide greater than the required TSS removal. Calculations are provided in this report.

Standard #5 - For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to

eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

This project is not considered a higher potential pollutant load and this standard does not apply.

Standard #6 - Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures.....

This project is not located within a Zone II or Interim Wellhead Protection Area and this standard does not apply.

Standard #7 - A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable.

Although a portion of the property was previously developed with a residential home the project has not been designed as a re-development.

Standard #8 - A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

A plan compliant with National Pollution Discharge Elimination Systems, (NPDES) will be prepared before the commencement of construction. The contractor and the developer will both be responsible for implementing this plan. The contractor has not been selected at this time. This permit will be applied for and submitted to the approving authority prior to construction.

Standard #9 - A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An operation and maintenance plan has been included with this report.

Standard #10 - All illicit discharges to the stormwater management system are prohibited.

The project does not propose any illicit discharges

DESIGN CRITERIA

The Natural Resources Conservation Services ("NRCS"), formerly the Soil Conservation Service ("SCS"), Technical Releases number 20 and 55 (TR-20 and TR-55), were used in the HydroCAD[®] computer software program to model the hydrology of the watershed. This program was used to calculate existing and proposed conditions.

Design criteria included the following:

- The stormwater management system is designed for the 2, 10, 25, and 100-year storm event using HydroCAD[®], a TR-20 and TR-55 based hydrologic software program.
- Post-development peak discharge rates will not exceed pre-development peak discharge rates for the 2, 10, 25, and 100-year storm events.
- Times of Concentration ("Tc") were arrived at using TR-55 methodologies. Sheet flow lengths of 75-feet maximum were used, as appropriate for the Northeast. Minimum Tc is five minutes.
- Group A and B soils were assumed, in accordance with the USDA-Natural Resources Conservation Service (NRCS) Custom Web Soil Survey for Middlesex County, Massachusetts, (See Appendix B –Soil Survey).
- The proposed drainage system provides infiltration opportunity through the proposed stormwater system.

- Infiltration structures are design so that there is a minimum of 2 feet of separation from estimated seasonal high groundwater.
- Any pipe velocities are maintained at a minimum of 2 feet per second (“fps”) and a maximum of 12 fps.
- The following rainfall amounts were used:

Table 1: Type III – 24 Hour Rainfall

Storm Event		
2	Year	3.20 Inches
10	Year	4.70 Inches
25	Year	6.00 Inches
100	Year	8.50 Inches

Source: Northeast Regional Climate Center
 “Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada”

3.0 STORMWATER MANAGEMENT

Existing Conditions

There are currently no buildings on the Property. The front half of the Property closest to North Avenue is relatively flat (elevation 130-meadow land with some trees). The rear portion of the property is forested (about 26 percent) and slopes upward from elevation 132 to elevation 170. There is a stone wall along the rear and south side property lines and portions of a stone wall remain along North Avenue. An existing hedge separates the Property from the abutter directly to the north at 273 North Avenue. The Project is not located within a Flood Zone or Riverfront or within 100 feet of a wetland resource area.

Runoff from the sloped wooded area of the Property flows overland, towards a low spot on the southeastern property line, near North Avenue and was historically discharged via an 18-inch drain pipe that ran from the Property directly to the Town’s drainage system in North Avenue.

In accordance with the Handbook and the concurrence of municipal staff, DEI based its modeling on the entire watershed that drained to the 18-inch pipe and did not limit its analysis to the Property. As a result, the existing conditions modeling studied a catchment area of approximately 16 acres in order to determine flow to North Avenue under current conditions. Like the Property, the overall watershed is wooded with single family residences and slopes down to the middle of the Property.

DEI understands that shortly after Polymath purchased the Property in late 2012, the Town, without notice to Polymath, disconnected the 18-inch drain pipe from the Town’s drainage system. Made aware of this disconnection during the planning stages of this project, DEI accordingly based its existing conditions drainage analysis on existing conditions; that is, with no connection between the Property and the Town’s drainage system in Route 117 via the 18-inch pipe.

As a result, it was determined through modeling that runoff from the watershed in all of the storm events will likely pond in the southeastern corner of the Property and then runoff onto North Avenue and neighboring properties at approximately elevation 130 in that southeasterly corner of the Property. Runoff entering the neighboring property or North Avenue will drain towards the existing catch basin in North Avenue approximately 50 feet east of the southeasterly corner of the Property.

Proposed Conditions

The proposed development increases the larger catchments impervious area by approximately 0.69 acres or 4.2 percent. See Table 2 below for a breakdown of the existing and proposed pervious and impervious areas.

Table 2: Surface Comparison

	Pervious	Impervious
Existing Conditions	15.27 Acres	0.83 Acres
Proposed Conditions	14.58 Acres	1.52 Acres

The total area indicated above represents the entire catchment area that drains to the design point as described above. The proposed site design implements stormwater mitigation measures designed to address the increase in impervious area. Stormwater runoff collected from the property is conveyed as follows:

1. Roof runoff is collected via rain gutters and roof leaders and directed to infiltration areas to mitigate peak rates of runoff and mimic current groundwater recharge regimes.
2. Driveway and parking area runoff is collected in a closed drainage system with deep sump catch basins and directed to infiltration areas to mitigate peak rates of runoff.

The design point for the system is the existing catch basin located in North Avenue to the southeast of the property.

Subwatershed P-1

P-1 consists of the upper watershed area that drains through the Property. This subwatershed is 12.89 acres and is largely wooded with single family residences along the roadways to the north and south of the Property.

Runoff from this watershed flows towards the Property and is collected in a subsurface drainage system and directed to an underground infiltration system located under Parking Lot A. Overflow is directed to the proposed drainage system under the driveway.

Subwatershed P-2

P-2 consists of 2.02 acres of land to the north of the Property. Runoff is directed around the proposed townhouse units and is directed to infiltration areas under Parking Lot C. Overflow is directed to the closed drainage system under the driveway.

Subwatershed P-3

P-3 consists of the proposed development. Runoff from the buildings is collected and directed to the infiltration areas located under the parking areas. The parking areas and driveways are similarly directed to the infiltration areas. Overflow from the infiltration areas is directed to the closed drainage system under the driveway.

Table 3 indicates the existing and proposed peak rates of runoff and how the proposed project reduces those rates in the proposed conditions to lower than the existing conditions.

Table 3: Peak Runoff Rates

Point of Analysis , (POA)	2-Year	10-Year	25-Year	100-Year
Existing Runoff (CFS)	0.51	9.88	27.47	49.02
Proposed Runoff (CFS)	0.00	9.73	19.76	42.57

4.0 CONCLUSIONS

Mitigation measures have been designed and specifically tailored to the Property and the project to meet the ten standards and requirements of the Handbook. The design incorporates a closed drainage system with infiltration areas for roof runoff and deep sump catch basins for driveway runoff to remove sediments, replicate peak rate of runoff and infiltrate stormwater.

The proposed stormwater management techniques and systems implemented in this design meet or exceed the Stormwater Management Standards in the Handbook, including controlling the peak rates of runoff and providing TSS removal.

269 NORTH AVE

Weston, Massachusetts

December 7, 2015

Stormwater Best Management Practices (BMP's) Operation and Maintenance Plan

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DEI #2013-0008

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1.0 INTRODUCTION

On behalf of 269 North Ave LLC, Doyle Engineering, Inc., as part of the site design for the property at 269 North Ave in Weston, Massachusetts, using guidelines implemented by the Department of Environmental Protection in the Commonwealth of Massachusetts, presents this Operation and Maintenance plan.

2.0 PURPOSE

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type, the location of each individual BMP and an inspection form for each BMP. The owner of the property is the owner and operator of the stormwater system and is responsible for its upkeep and maintenance.

3.0 BMP DESCRIPTION AND LOCATIONS

3.1 Deep Sump Catch Basins

There are deep sump catch basins located in the shared driveway and parking areas associated with the proposed development. Deep sump catch basins are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.2 Infiltration Basins

Infiltration systems are located under the parking areas for the project. The infiltration systems are constructed using permeable gravel that promotes infiltration. Pretreatment is critical for effective performance of infiltration basins which is why the deep sump catch basins precede the infiltration systems. Runoff from the design storm is stored until it infiltrates through the soil of the basin floor.

4.0 INSPECTION, MAINTENANCE CHECKLIST AND SCHEDULE

4.1 Deep Sump Catch Basins

The Deep Sump Catch Basin and shall be inspected two times per year to determine the depth of sediment in basin. If the amount of sediment in the bottom of the basin is over 2-feet in depth, then the basin shall be cleaned.

4.2 InfiltrationBasin

Infiltration basins shall be inspected twice per year and after any storm event greater than a 2-year event (3.2 inches or greater).

At least twice a year, remove trash, debris and sediment form the basin as necessary; work shall be completed under dry conditions.

4.3 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed
- A binder should be kept at the North Ave property (Main Condominium Association Building) that contains all of the completed inspection forms and any other related materials

- A review of all Operation & Maintenance actions should take place annually to ensure that these stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

