THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
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June 3, 2016

TOWN OF NANTUCKET
PLANNING BOARD
2 Fairgrounds Road
Nantucket, Massachusetts 02554

Attention: Leslie Woodson Snell, AICP, LEED AP, Deputy Director of Planning

Subject: Submittal of Modified Plans and Revised Technical Materials
"Form B" Application for Approval of a Definitive Subdivision Plan
42 (Rear) 48 (Rear) and 54 (Rear) Skyline Drive Properties and 20 Davkim Lane Property
(Planning Board File # 7918)

Dear Ms. Snell:

The purpose of this correspondence, issued in our capacity as the applicant and development manager, on behalf of the owner of the subject properties (Richmond Great Point Development LLC) is to submit the enclosed modified plans and revised technical materials related to the "Form B" "Application for Approval of a Definitive Subdivision Plan" for the series of adjoining properties located at 42 (Rear), 48 (Rear), and 54 (Rear) Skyline Drive, and 20 Davkim Lane.

The submittal is being made in accordance with and conforms to the provisions of Section 2.06 of "*The Rules and Regulations Governing the Subdivision of Land, Nantucket, Massachusetts*" as well as "*The Subdivision Control Law of Massachusetts*" (M.G.L. Chapter 41, Sections 81K-81GG, inclusive).

The initial submittal to your office on this matter, including the "Form B" application form, plans, and technical materials, was made on January 6, 2016. The Planning Board opened the public hearing on the matter, solicited input and testimony on the application and plans, and kept open / continued the public hearing on the matter at its March 3, 2016 meeting.

Since that meeting, in response to comments and input which were offered by the Planning Board, the Planning and Land Use Services staff, including Planning Director Vorce, and several abutters and members of the public, we have modified the proposed subdivision and, as a result, are pleased to submit the enclosed materials, which reflect these modifications. In summary, these revisions are as follows:

- The right of way of the proposed road, shown as "Clay Street" on the subdivision plan, now terminates at the property line / boundary between the 48R / 42R Skyline Drive properties and the 20 Davkim Lane property and does not continue into or through any portion of the 20 Davkim Lane property.

- The proposed improvements within the "Clay Street" right of way have been minimized and are comprised of a 12 foot wide gravel road that transitions into a 17.5 foot wide "hammerhead / turnaround" solely to provide access to the 48R / 54R Skyline Drive property (essentially meeting the standards for driveways set forth in the local subdivision rules and regulations).

- The proposed drainage improvements have also been reduced in scope, accordingly, but continue to meet the standards set forth in the local subdivision rules and regulations (these include the provision of a small, 2 foot wide surface drainage swale along the eastern edge of the right of way / driveway and a series of subterranean "cultec" storm water infiltration chambers along the southeastern boundary of the right of way / driveway).

  A revised "Storm Water Management Report", with a revision date of May 31, 2016, has been prepared for the revised design / plan by Hayes Engineering, with the requisite detailed engineering calculations and analysis documenting the compliance of the (revised) plan with the applicable requirements.

We believe these proposed modifications have served to address many, if not all of the comments which were provided and the questions that were posed by the members of the Planning Board, the Planning and Land Use Services staff, and several abutters and members of the public which were offered at the March 3, 2016 public hearing / meeting of the Planning Board.

Based on the foregoing, we would respectfully request that the Planning Board re-initiate deliberations on the application at its June 13, 2016 meeting, including the solicitation of further input from the public. We look forward to the opportunity to present the details of the proposed modifications to the subdivision at that time.

If you any immediate questions with respect to either the proposed modifications or the enclosed materials, please feel free to contact me at 978-988-3900, Extension # 12.

Very truly yours,

David J. Armanetti, Director of Real Estate Development
The Richmond Company, Inc. (Applicant / Development Manager)
On Behalf of Richmond Great Point Development LLC (Owner)

Cc: Philip Pastan, TRC
Kathryn Fossa, TRC
Patricia Roggeveen, RGPDLLC
Shane Valero, RGPDLLC
John Ogren, Hayes Engineering
Andrew Burek, Esq., TRC
Arthur Reade, Esq.

REQUESTED WAIVERS
CLAY STREET
NANTUCKET, MASSACHUSETTS

December 2015
Revised: May 31, 2016

Town of Nantucket Rules and Regulations

Section 2.06b(10)	The elevations shown on the plan are NAVD88 rather than half-tide datum.
Section 2.06b(14)(a)	Landscaping is not being proposed as the proposed roadway construction consists of only a 12' wide gravel road and drainage swale with minimal disturbance.
Section 2.06b(14)(b)	Existing trees to be saved will be decided during construction.
Section 4.06(b)(3)	Cultec® Contactor 100HD stormwater chambers to be substituted for the leaching basin (Appendix A, Plate No. 12)
Section 4.13	Dry sewer lines are not proposed to be installed.
Section 4.06b(4)	Allow use of minimum 8 inch diameter drain pipe due to the minimal runoff flows.
Section 4.16	Same as Section 2.06b(14)(a) & (b) above.

Waivers associated with Rural Road Alternative (Section 4.05(a))

Section 4.03	The applicant is proposing a Rural Road Alternative (Section 4.05(a)) which requires a waiver of strict compliance with this Section. Included in this section, the applicant requests that the roadway width be reduced to 35 feet wide for a portion of Clay Street. A sidewalk and utility easement is proposed within the area of reduced roadway width.
Section 4.04b	Allow construction of alternative turnaround layout as shown on the proposed plan.
Section 4.09	Allow shoulder as shown in Appendix A, Plate No. 6.
Section 4.18 & 4.19	No sidewalks or bicycle paths are proposed along the sides of the proposed gravel roadway, Clay Street. There are no sidewalks on the adjacent street, Skyline Drive.
Section 4.22	No curbing or berms are being proposed.
Section 4.23	Soil tests will be provided prior to construction.
Appendix A Plate No. 6	Typical Section – Stabilized Gravel Road be waived to allow the cross section as shown on the "Definitive Plan & Profile, Clay Street, Nantucket, Mass.", Sheet 4 of 5 revised through 5/27/2016.

Hayes Engineering, Inc

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Nantucket, MA 02554
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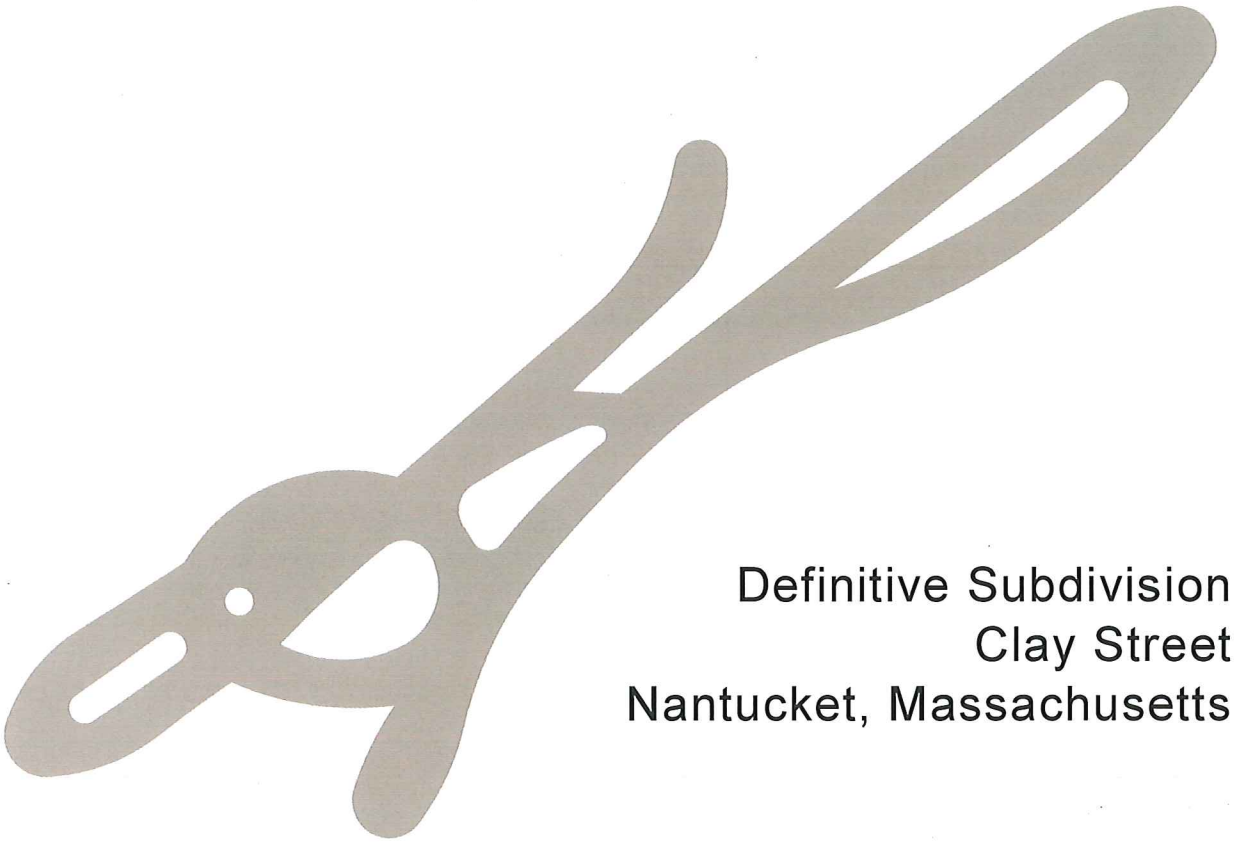
Refer to File No. **NAN-0107M**

Storm Water Management Report



Definitive Subdivision
Clay Street
Nantucket, Massachusetts

December 11, 2015

REVISED: May 31, 2016

Table of Contents

1.0 Introduction 1
1.1 Pre-Development Conditions 1
1.2 Post-Development Conditions 2
1.3 Ground Cover Conditions 2
2.0 Storm Water Management 3
2.1 Pre-Development Conditions 3
2.1.1 Drainage System 3
2.1.2 Watersheds 3
2.1.3 Runoff Calculations 3
2.2 Post-Development Conditions 5
2.2.1 Drainage System 5
2.2.2 Watersheds 5
2.2.3 Runoff Calculations 7
3.0 Massachusetts DEP Storm Water Management Standards 9
3.1 Standard 1: No New Untreated Discharges 9
3.2 Standard 2: Peak Rate Attenuation 9
3.3 Standard 3: Recharge 10
3.4 Standard 4: Water Quality 11
3.5 Standard 5: Land Uses with Higher Potential Pollution Loads 11
3.6 Standard 6: Critical Areas 12
3.7 Standard 7: Redevelopment Projects 12
3.8 Standard 8: Construction Period Pollution Prevention 12
3.9 Standard 9: Operation and Maintenance Plan 13
3.10 Standard 10: Illicit Discharges 13
4.0 Conclusion 14

List of Tables

Table 1 - Ground Cover Conditions....2
Table 2 - Design Storms....5
Table 3 - Pre-Development Condition Peak Rates of Runoff....5
Table 4 - Pre-Development Condition Peak Volume of Runoff....5
Table 5 - Hydrologic Soil Properties by Soil Texture (Rawls, Brakensiek & Saxton, 1982)....8
Table 6 - Post-Development Peak Rate of Runoff....8
Table 7 - Post-Development Peak Volume of Runoff....8
Table 8 - Peak Rates of Runoff Comparison....10
Table 9 - Runoff Volume Comparison....10
Table 10 - Recharge Target Depth by Hydrologic Soil Group....11

List of Figures

Figure 1- USGS Vicinity Map....1
Figure 2 - Pre-Development Watershed Map....4
Figure 3 - Post-Development Watershed Map....6

List of Appendices

Appendix A: NRCS Soil Mapping and Data

Appendix B: HydroCAD® Calculations

Appendix C: Massachusetts DEP Storm Water Checklist

Appendix D: Construction Period Pollution Prevention Plan

Appendix E: Operations and Maintenance Plan

1.0 Introduction

Richmond Great Point Development, LLC and Richmond 54 Skyline Realty Trust (the "Applicants") propose to construct Clay Street, a new subdivision roadway (the "Project") that that originates on Skyline Drive easterly of Woodland Drive. The Project area is depicted on Figure 1 below showing a portion of the United States Geologic Survey (USGS) topographic map. The Project creates frontage and access for an existing lot to the rear of numbers 48 and 54 Skyline Drive. In addition to the proposed Project roadway a swale and sub-surface infiltration area will be constructed to mitigate the effects of the improvements.

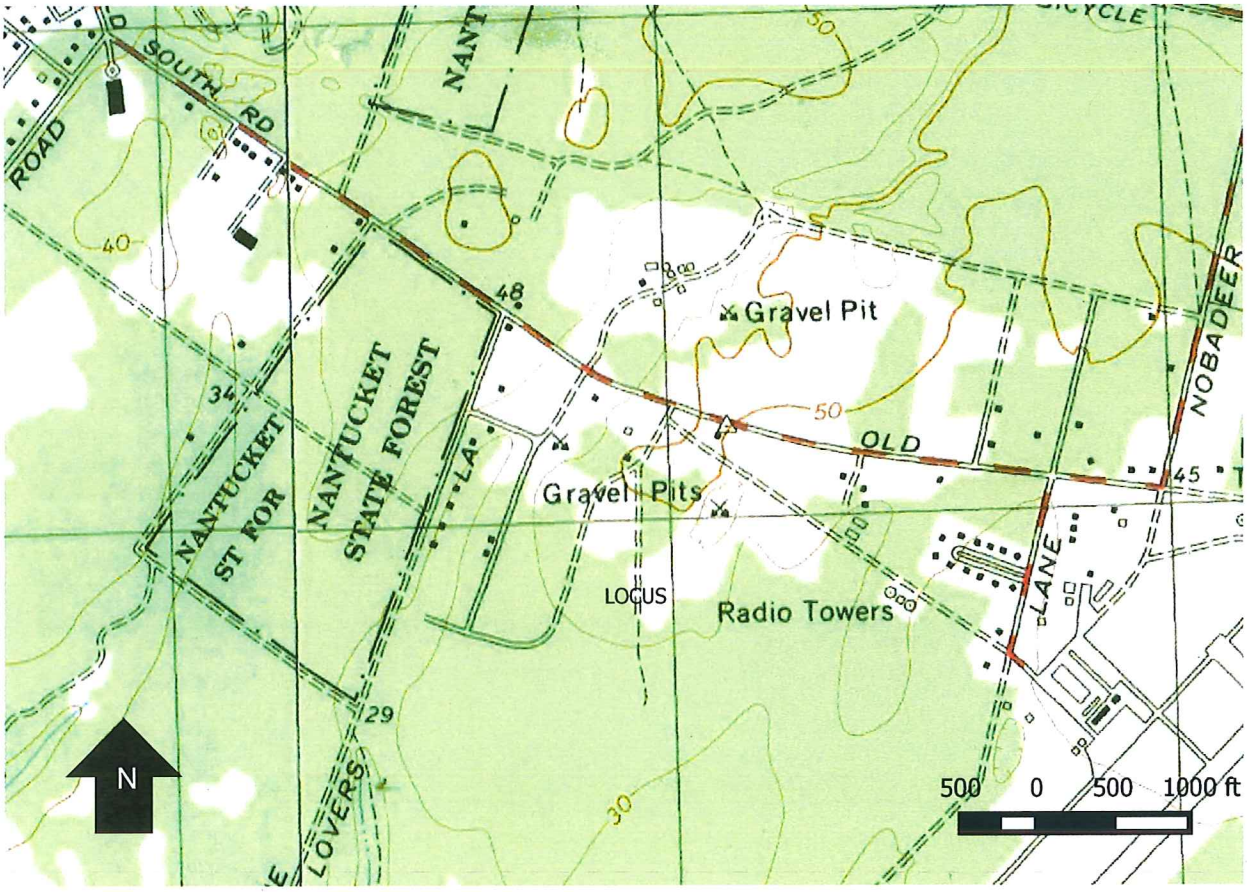
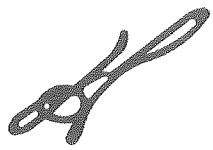


Figure 1- USGS Vicinity Map

1.1 Pre-Development Conditions

The Project site in its existing condition consists of developed and undeveloped residential areas.

The United States Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey mapping indicates a mixture of Riverhead sandy loam, Pits and Evesboro sand within the Project area. These well drained soils



have deep ground water tables and are classified as Hydrologic Soil Group (HSG) "A."

The NRCS identifies the following characteristics of soils classified as Group A:

Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

NRCS Soil Survey Mapping and Soil Data accompany this report as Appendix A.

1.2 Post-Development Conditions

The Project as proposed includes the construction of a 525 linear foot gravel roadway having a width of 12-feet and a 2-foot wide swale along the easterly sideline. A comprehensive storm water management plan and drainage system will also be constructed to capture, convey and treat runoff from the roadway. The proposed Clay Street roadway will be constructed to the easterly side of the centerline of the way.

1.3 Ground Cover Conditions

The hydrologic study area consists of approximately 6 acres in land area. The following table summarizes the pre- and post-development ground cover conditions for the study area(s):

Table 1 - Ground Cover Conditions

Cover Type	**Existing Area (Acres)**	**Proposed Area (Acres)**	**Change (Acres)**
Impervious Surfaces	0.64	0.63	-0.01
Bare Soil	0.94	0.56	-0.38
Brush, Fair	2.07	1.95	-0.12
Gravel Road	0.00	0.17	+0.17
Grass, Good	2.15	2.50	+0.35
Total	**5.80**	**5.81**	**+0.01**

Note: HydroCAD® Calculations provided in Appendix B summarize cover conditions for each sub-catchment.

2.0 Storm Water Management

2.1 Pre-Development Conditions

2.1.1 Drainage System

The existing residential lots do not have a structured drainage system for the collection of storm water runoff. Existing storm water runoff flows overland, primarily over gravel drives and bare soil toward Skyline Drive.

2.1.2 Watersheds

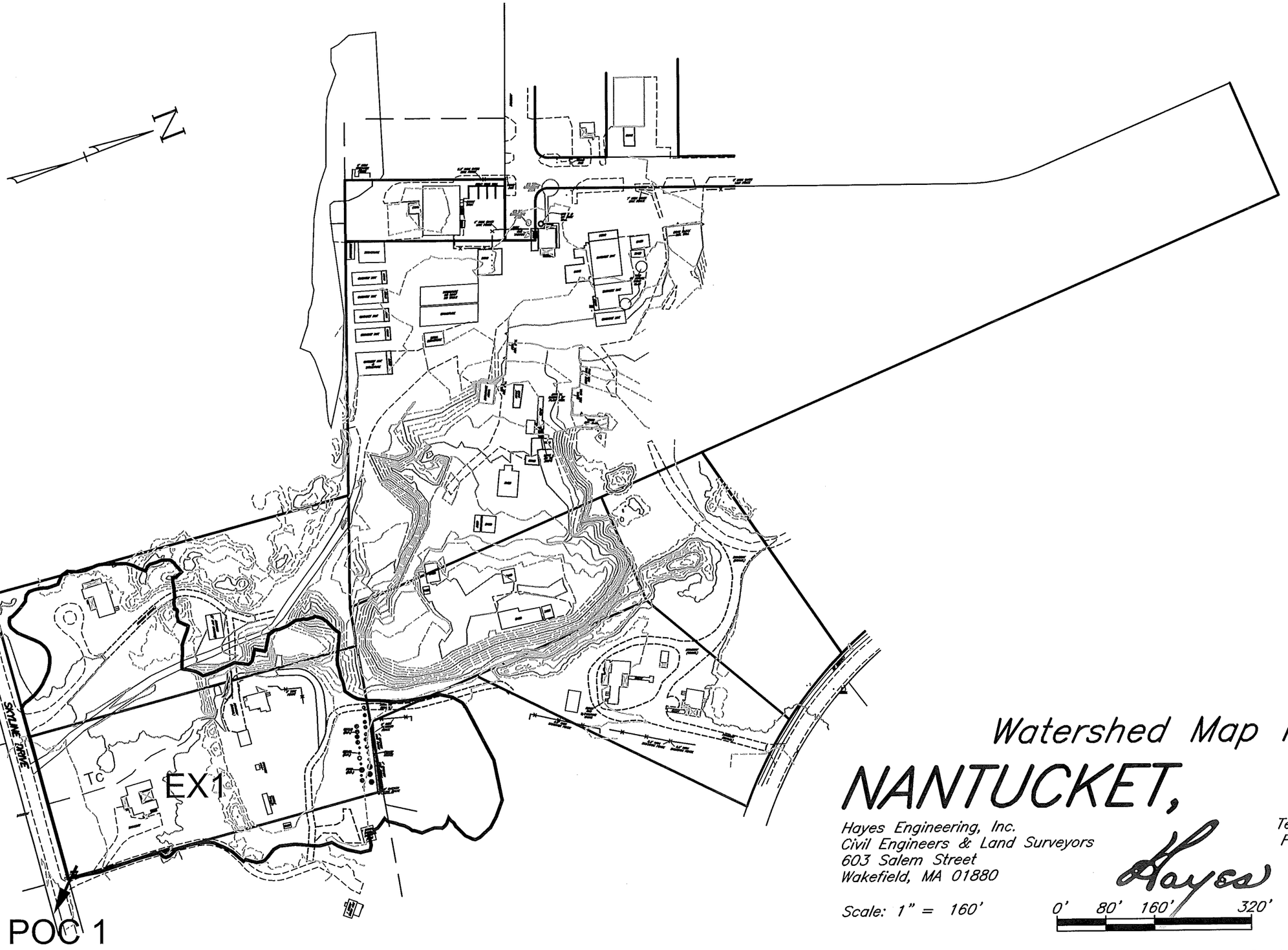
Under existing conditions, the site is divided into one (1) sub-catchment area. (See Figure 2 – Pre-Development Watershed Map).

The study point of comparison, Point of Comparison 1, flows tributary to the northerly gutterline of Skyline Drive.

Sub-catchments EX1 is tributary to Study Point of Comparison 1 (POC1). EX1 is the southerly extent of the study area and consists of mainly developed residential lands, buildings and driveways with areas of scrub oak and pines (brush) to the west.

2.1.3 Runoff Calculations

Runoff calculations were performed in accordance with the methodology outlined in the NRCS Soil Conservation Service (SCS) methods as defined in Technical Release 55 (TR-55) and Technical Release 20 (TR-20) which are the basis for they HydroCAD® hydrologic model. Existing cover conditions and times of concentrations were used to generate runoff hydrographs for each of the three (3) sub-catchments in each of the Type III design storms in accordance with Technical Paper 40 (TP-40) as identified in Table 2.



Watershed Map in NANTUCKET, MASS.

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Scale: 1" = 160'

0' 80' 160' 320'

December 11, 2015
Rev. May 31, 2016

Figure 2: Existing Conditions Sub-Catchments

Table 2 - Design Storms

DESIGN STORM (RETURN FREQUENCY)	RAINFALL (INCHES/24-HOURS)
2-year	2.6
10-year	4.9
25-year	5.4
50-year	6.5
100-year	7.2

Pre-development peak rate and volumes of runoff to the Study Points of Comparison are shown in Table 3 and Table 3, below.

Table 3 - Pre-Development Condition Peak Rates of Runoff

Study Point	2-yr Storm Peak Flow (Q_p) (cfs)	10-yr Storm Peak Flow (Q_p) (cfs)	25-yr Storm Peak Flow (Q_p) (cfs)	50-yr Storm Peak Flow (Q_p) (cfs)	100-yr Storm Peak Flow (Q_p) (cfs)
POC1	0.1	1.3	2.9	4.6	6.4

Table 4 - Pre-Development Condition Peak Volume of Runoff

Study Point	2-yr Storm Peak Volume (V_p) (ac-ft.)	10-yr Storm Peak Volume (V_p) (ac-ft.)	25-yr Storm Peak Volume (V_p) (ac-ft.)	50-yr Storm Peak Volume (V_p) (ac-ft.)	100-yr Storm Peak Volume (V_p) (ac-ft.)
POC1	0.1	0.2	0.4	0.6	0.7

2.2 Post-Development Conditions

2.2.1 Drainage System

The proposed drainage system consists of an open swale and a deep sump catch basin that discharges to an underground stormwater infiltration system.

2.2.2 Watersheds

The Project as proposed divides the study area into two (2) sub-catchments that are ultimately tributary to the Study Point of Comparison (See Figure 3 – Post-Development Watershed Map). Study Points of

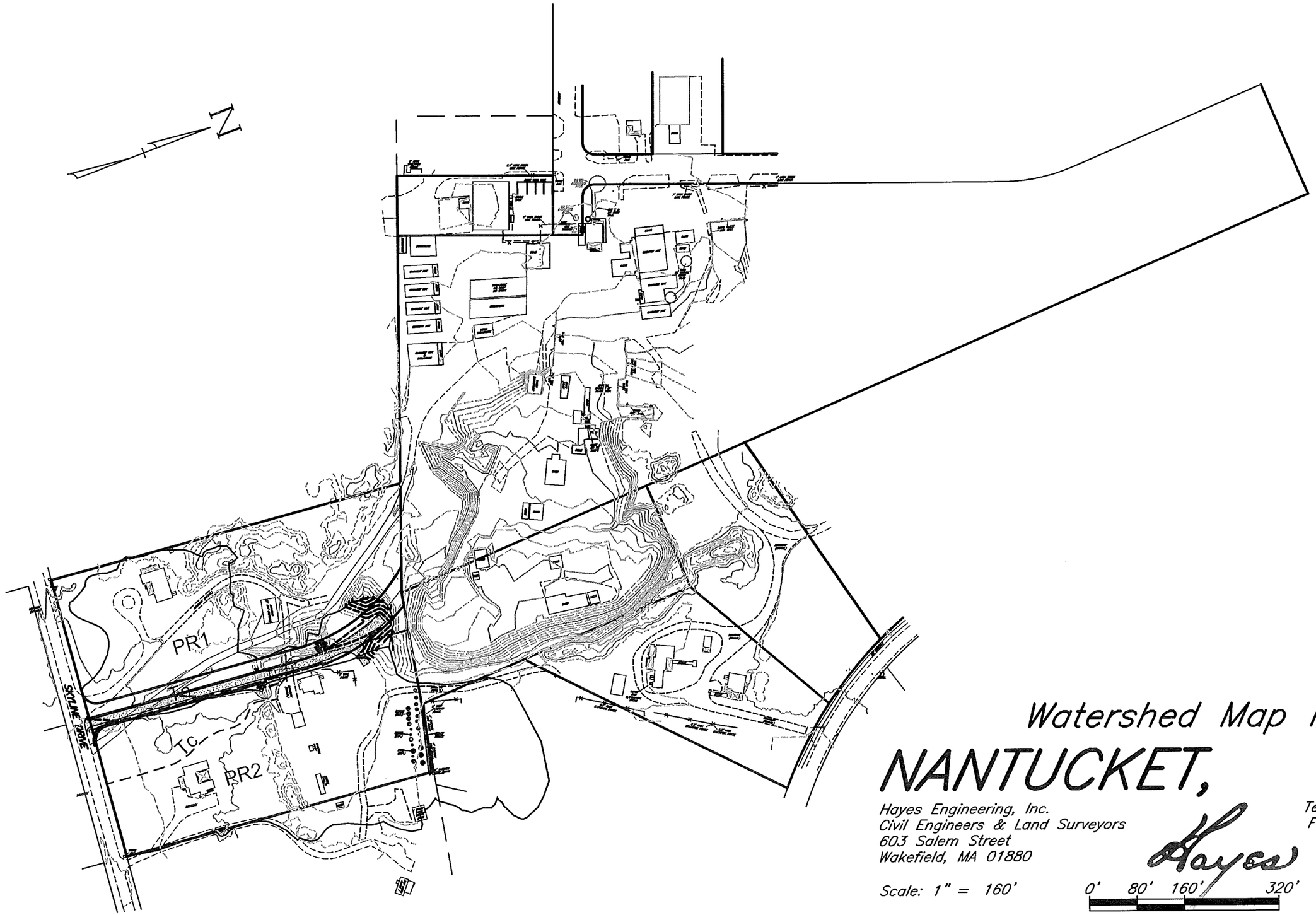

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Figure 3: Proposed Conditions Sub-Catchments

Comparison and their respective sub-catchment areas are described below:

POC1 - Flows tributary to the northerly gutterline of Skyline Drive:

- Sub-catchment PR1 consists of roadway and lot areas tributary to the proposed Swale.
- Sub-catchment PR2 is to the east of PR1 and consists of newly graded, bare soils and smaller areas of brush that flow toward the Skyline Drive roadway.

Sub-catchment PR1 is collected and directed to Proposed Sub-Surface Infiltration System (PSIS) 1, to be constructed under the proposed swale. Runoff in excess of the infiltration capacity of the PSIS will flow overland to Study Point of Comparison 1.

2.2.3 Runoff Calculations

As in the pre-development condition, runoff calculations were performed in accordance with the methodology outlined in the NRCS Soil Conservation Service (SCS) methods as defined in Technical Release 55 (TR-55) and Technical Release 20 (TR-20) which are the basis for they HydroCAD® hydrologic model. Proposed cover conditions and times of concentrations were used to generate runoff hydrographs for each of the fourteen (14) sub-catchments in each of the Type III design storms in accordance with Technical Paper 40 (TP-40) as identified in Table 2.

The developed runoff hydrographs were then flood routed through the existing depressions on-site, the proposed sediment forebay and the proposed sub-surface infiltration system factoring the respective infiltration rates for the corresponding soil types as identified in the Rawls Table of Infiltration Rates (see Table 5, below).

Table 5 - Hydrologic Soil Properties by Soil Texture (Rawls, Brakensiek & Saxton, 1982)

Texture Class	Effective Water Capacity (C_w) (inch per inch)	Minimum Infiltration Rate (*f*) (inches per hour)	Hydrologic Soil Group
Sand	0.35	8.27	A
Loamy Sand	0.31	2.41	A
Sandy Loam	0.25	1.02	A
Loam	0.19	0.52	B
Silt Loam	0.17	0.27	B
Sandy Clay Loam	0.14	0.17	C
Clay Loam	0.14	0.09	D
Silty Clay Loam	0.11	0.06	D
Sandy Clay	0.09	0.05	D
Silty Clay	0.09	0.04	D
Clay	0.08	0.02	D

Post-development peak rate and volumes of runoff to the Study Points of Comparison are shown in Table 6 and Table 7, below.

Table 6 - Post-Development Peak Rate of Runoff

Study Point	2-yr Storm Peak Flow (Q_p) (cfs)	10-yr Storm Peak Flow (Q_p) (cfs)	25-yr Storm Peak Flow (Q_p) (cfs)	50-yr Storm Peak Flow (Q_p) (cfs)	100-yr Storm Peak Flow (Q_p) (cfs)
POC1	0.1	1.0	2.6	4.2	6.1

Table 7 - Post-Development Peak Volume of Runoff

Study Point	2-yr Storm Runoff Volume (V_p) (ac-ft.)	10-yr Storm Runoff Volume (V_p) (ac-ft.)	25-yr Storm Runoff Volume (V_p) (ac-ft.)	50-yr Storm Runoff Volume (V_p) (ac-ft.)	100-yr Storm Runoff Volume (V_p) (ac-ft.)
POC1	0.0	0.2	0.3	0.4	0.6

3.0 Massachusetts DEP Storm Water Management Standards

Although the proposed subdivision is not located within areas under jurisdiction the Massachusetts Department of Environmental Protection's (MaDEPs) Wetlands Protection Act (WPA), the proposed storm water management system has been designed to comply with the ten (10) standards of the MaDEP Storm Water Management Policy to the maximum extent practicable. Each of the standards and the extent of Project compliance are summarized below. Please refer to Appendix D for the completed MassDEP Storm Water Checklist.

3.1 Standard 1: No New Untreated Discharges

No new storm water conveyances (e.g. outfalls) may discharge untreated storm water directly to or cause erosion in wetlands or waters of the Commonwealth.

The Project does not discharge any storm water directly to a wetland or water of the Commonwealth. Storm water quality controls are proposed with the project including: deep-sump and hooded catch basins, and sub-surface infiltration areas.

3.2 Standard 2: Peak Rate Attenuation

Storm water management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Storm water management controls to mitigate peak rates of runoff from the Project were developed for the 2, 10, 25, 50 and 100-year, 24-hour design storm events. As previously stated, runoff calculations were performed in accordance with the methodology outlined in the NRCS Soil Conservation Service (SCS) methods as defined in Technical Release 55 (TR-55) and Technical Release 20 (TR-20) which are the basis for they HydroCAD® hydrologic model. Calculations are provided as Appendix B to this report.

Table 8 summarizes the pre- and post-development peak rates of runoff for the Project and Table 9 summarizes the pre- and post-development volumes of runoff for the Project

Table 8 - Peak Rates of Runoff Comparison

Study Point	2y Storm Q_p (cfs)			10y Storm Q_p (cfs)			25yStorm Q_p (cfs)			50y Storm Q_p (cfs)			100yStorm Q_p (cfs)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
POC1	0.1	0.1	0.0	1.3	1.0	-0.3	2.9	2.6	-0.3	4.6	4.2	-0.4	6.4	6.1	-0.3

Table 9 - Runoff Volume Comparison

Study Point	2y Storm Runoff Volume (V_p) (ac-ft.)			10y Storm Runoff Volume (V_p) (ac-ft.)			25yStorm Runoff Volume (V_p) (ac-ft.)			50y Storm Runoff Volume (V_p) (ac-ft.)			100yStorm Runoff Volume (V_p) (ac-ft.)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
POC1	0.1	0.0	-0.1	0.2	0.2	0	0.4	0.3	-0.1	0.6	0.4	-0.2	0.7	0.6	-0.1

3.3 Standard 3: Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration ... At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the storm water management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm Water Handbook.

The Project approximates the annual recharge to groundwater through the use of structural and non-structural best management practices (BMPs) including a sub-surface infiltration system and existing surface infiltration as well as through implementation of the proposed long-term operations and maintenance plan.

In accordance with the Massachusetts Storm Water Handbook the required recharge volume (R_v) for the Project equals a depth of runoff corresponding to the soil type time the impervious areas covering that soil type at the post-development site.

As previously stated and documented in Appendix A, soils on-site are best represented by hydrologic soil group A. The target depth factor (F) identified for hydrologic soil type A is identified as 0.6-inches in Table 2.3.2: Recharge Depth by Hydrologic Soil Group of the Massachusetts Storm Water Handbook (and included as Table 10, below).

Table 10 - Recharge Target Depth by Hydrologic Soil Group

NRCS HYDROLOGIC SOIL TYPE	APPROX. SOIL TEXTURE	TARGET DEPTH FACTOR (F)
A	sand	**0.6-inch**
B	loam	**0.35-inch**
C	silty loam	**0.25-inch**
D	clay	**0.1-inch**

The project does not propose an increase in impervious area and no recharge is required. The project as designed does infiltrate a portion of the runoff through the use of a subsurface infiltration system.

3.4 Standard 4: Water Quality

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, storm water best management practices sized to capture the required water quality volume, and pretreatment measures.

There are no increases in impervious surfaces associated with the project, as such there is no increase in pollutant loading. A deep-sump and hooded catch-basin is proposed prior to the subsurface infiltration system to provide nominal treatment.

Operations and maintenance plans for construction and post-development phases of the Project are included as Appendix D and Appendix E, respectively, to this report.

3.5 Standard 5: Land Uses with Higher Potential Pollution Loads

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm Water Handbook to eliminate or reduce the discharge of storm water runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and storm water runoff, the proponent shall use the specific structural storm water BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Storm Water Handbook. Storm water discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53

and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Standard 5 is not applicable to the Project. The Project is not associated with uses that will subject the site to higher potential pollutant loads as defined in the MaDEP Wetlands and Water Quality regulations.

Land Uses with Higher Potential Pollutant Loads (LUHPPLs) are identified in 310 CMR 22.20B(2) and C(2) a through k and m and in 310 CMR 22.21(2)(a) 1 through 8 and (b) 1 through 6; areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPRDE Multi-Sector General Permit; automotive fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity use; confined disposal facilities and disposal sites.

3.6 Standard 6: Critical Areas

Storm water discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and storm water discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural storm water best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Storm Water Handbook.

The Project is located within the Zone II of the Town of Nantucket public water supply. However, no increases in impervious surfaces are proposed.

3.7 Standard 7: Redevelopment Projects

A redevelopment project is required to meet the following Storm Water Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing storm water discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Storm Water Management Standards and improve existing conditions.

Standard 7 is not applicable to the Project. The MaDEP Storm Water Management Handbook definition of a redevelopment project identifies the, *"development, rehabilitation, expansion, and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area."*

3.8 Standard 8: Construction Period Pollution Prevention

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), must be developed and implemented.

A Construction Period Pollution Prevention and Erosion Control Plan is included as Appendix F to this report. This program details the construction period operation and maintenance for best management practices employed on the project and provides sequencing for pollution prevention measures and erosion and sedimentation controls. Locations of erosion control measures are depicted on the Definitive Plan set.

3.9 Standard 9: Operation and Maintenance Plan

A long-term operation and maintenance plan must be developed and implemented to ensure that storm water management systems function as designed.

A Long Term Operation and Maintenance Plan is included as Appendix G to this report. The Operation and Maintenance program provides details and scheduled for routine and non-routine maintenance to the selected best management practices used in the Project.

3.10 Standard 10: Illicit Discharges

All illicit discharges to the storm water management system are prohibited.

Illicit discharges to the storm water management system are discharged that are not entirely comprised of storm water. Discharges to the storm water management system from the following activities or facilities are permissible:

- Firefighting
- Water Main Flushing
- Landscape Irrigation
- Uncontaminated Groundwater
- Potable Water Sources
- Foundation Drains
- Air Conditioning Condensation
- Footing Drains
- Individual Resident Car Washing
- Flows from Riparian Habitats and Wetlands
- Dechlorinated Water from Swimming Pools
- Water Used for Street Sweeping
- Water Used to Clean Residential Buildings (without detergents)

All other illicit discharges to the storm water management system are prohibited.

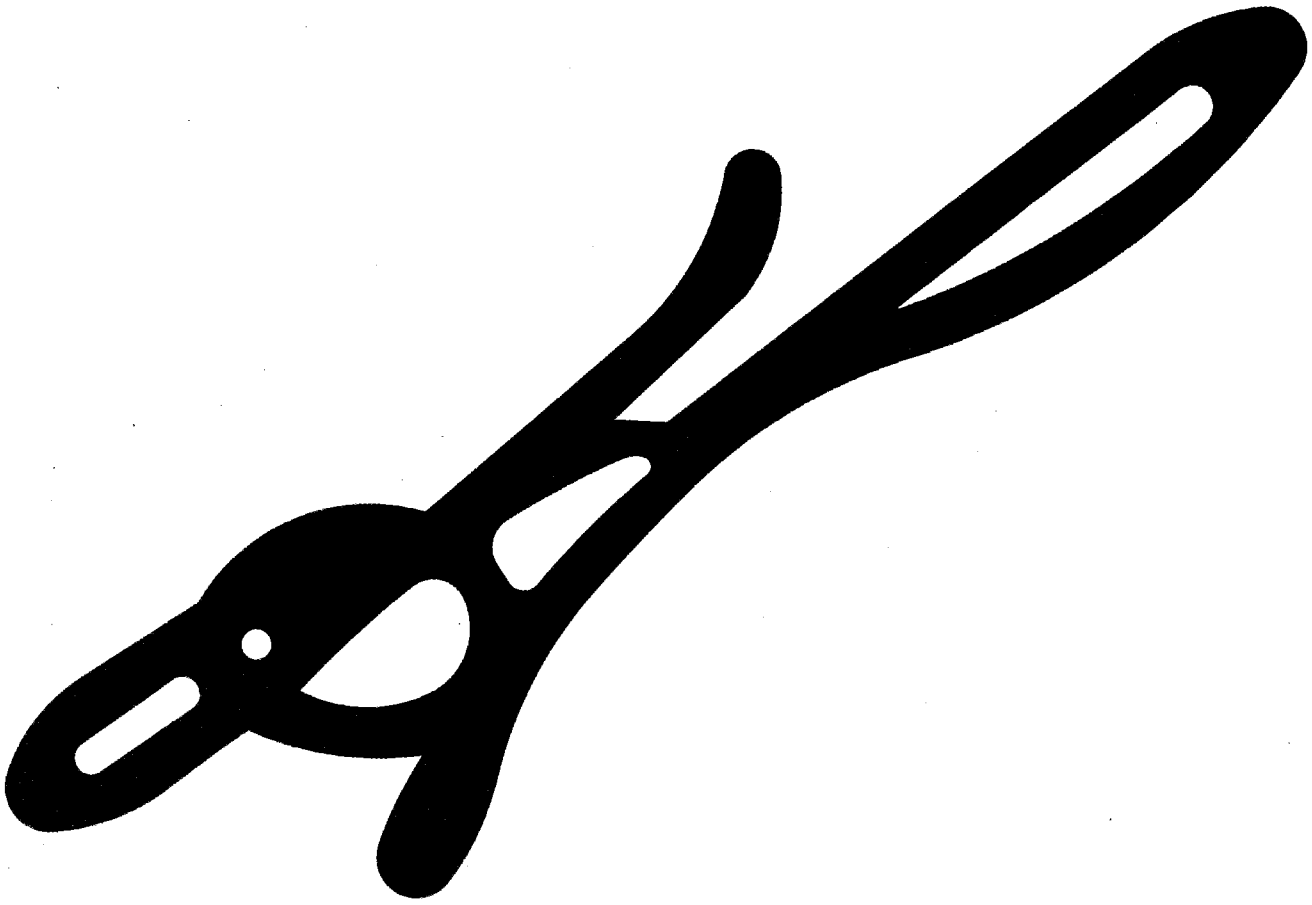
There are no known illicit discharges anticipated through the completion of this project. Post-construction prevention of illicit discharges is addressed in the Good Housekeeping Practices section of Appendix G.

4.0 Conclusion

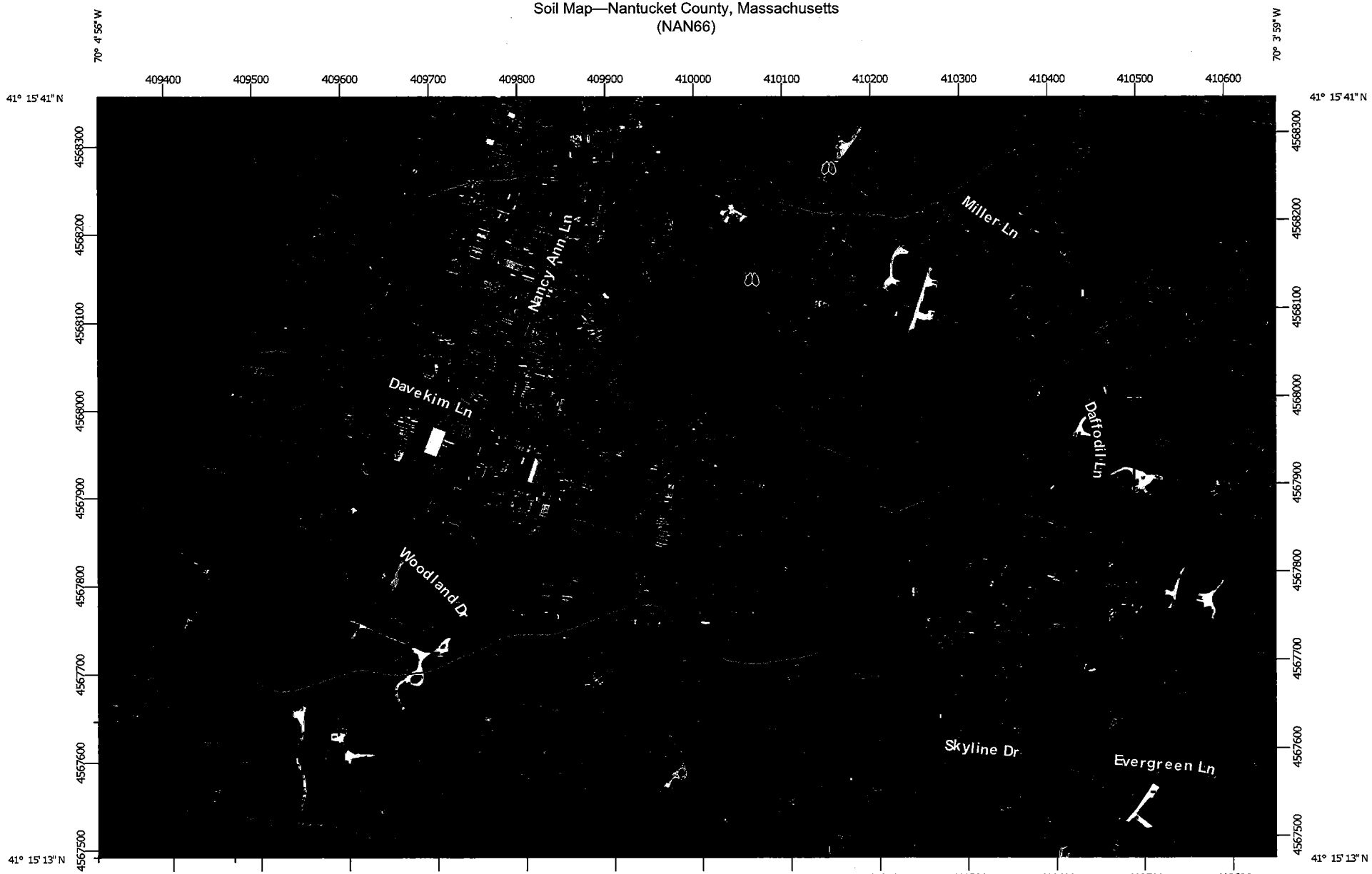
The Project as proposed has been designed to address both the quality and quantity of storm water runoff from the site improvements. The Project is not subject to the MaDEP Storm Water Standards; however, it has been designed to meet or exceed each of the ten (10) standards to the maximum extent practicable.

APPENDIX A:

NRCS Soil Mapping and Data



Soil Map—Nantucket County, Massachusetts
(NAN66)



Map Scale: 1:6,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Nantucket County, Massachusetts
Survey Area Data: Version 12, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—Oct 8, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Nantucket County, Massachusetts (MA019)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
180B	Chilmark sandy loam, 3 to 8 percent slopes	3.4	1.9%
288A	Riverhead sandy loam, 0 to 3 percent slopes	60.1	33.2%
288B	Riverhead sandy loam, 3 to 8 percent slopes	3.3	1.8%
294A	Evesboro sand, 0 to 3 percent slopes	102.9	56.8%
294B	Evesboro sand, 3 to 8 percent slopes	6.3	3.5%
600	Pits	5.3	2.9%
Totals for Area of Interest		**181.3**	**100.0%**

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba).

Engineering Properties–Nantucket County, Massachusetts

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
288A—Riverhead sandy loam, 0 to 3 percent slopes														
Riverhead	85	A	0-4	Sandy loam	ML, SM	A-2, A-4	0- 0- 0	0- 3- 5	95-98-100	90-95-100	55-75-95	30-53-75	14-16-18	1-2 -3
			4-19	Gravelly sandy loam, fine sandy loam, sandy loam	GM, SM	A-1, A-2, A-4	0- 0- 0	0- 3- 5	65-83-100	60-78-95	40-60-80	20-33-45	14-16-18	1-2 -3
			19-30	Very gravelly fine sandy loam, gravelly loamy sand, loamy sand	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	0- 0- 0	0- 3- 5	60-75-90	55-70-85	30-50-70	10-28-45	—	NP
			30-60	Error	GP, SP, SP-SM, SW	A-1	0- 0- 0	0- 5- 10	40-68-95	35-63-90	25-38-50	0- 5- 10	—	NP

Engineering Properties–Nantucket County, Massachusetts														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
294A—Evesboro sand, 0 to 3 percent slopes														
Evesboro	85	A	0-6	Sand	SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	90-95-100	85-93-100	40-65-90	0- 6- 12	10-13-15	NP-2 -3
			6-20	Loamy sand	SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	90-95-100	85-93-100	40-65-90	0- 6- 12	10-13-15	NP-2 -3
			20-60	Stratified sand to sandy loam	SC-SM, SM, SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	75-88-100	65-83-100	35-65-95	0-18- 35	10-13-15	NP-3 -5
294B—Evesboro sand, 3 to 8 percent slopes														
Evesboro	85	A	0-6	Sand	SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	90-95-100	85-93-100	40-65-90	0- 6- 12	10-13-15	NP-2 -3
			6-26	Loamy sand	SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	90-95-100	85-93-100	40-65-90	0- 6- 12	10-13-15	NP-2 -3
			26-60	Stratified sand to sandy loam	SC-SM, SM, SP, SP-SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	75-88-100	65-83-100	35-65-95	0-18- 35	10-13-15	NP-3 -5

Data Source Information

Soil Survey Area: Nantucket County, Massachusetts
Survey Area Data: Version 12, Sep 19, 2014

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Nantucket County, Massachusetts

288A—Riverhead sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 997b
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 175 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riverhead and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy glaciofluvial deposits derived from granite and gneiss

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 19 inches: sandy loam
H3 - 19 to 30 inches: very gravelly fine sandy loam
H4 - 30 to 60 inches: Error

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A

Minor Components

Evesboro

Percent of map unit: 5 percent

Klej

Percent of map unit: 5 percent

Katama

Percent of map unit: 3 percent

Tisbury

Percent of map unit: 2 percent

294A—Evesboro sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 996v
Elevation: 10 to 450 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 175 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Evesboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Evesboro

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 20 inches: loamy sand
H3 - 20 to 60 inches: stratified sand to sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Udipsamments

Percent of map unit: 5 percent

Klej
Percent of map unit: 5 percent

Riverhead
Percent of map unit: 3 percent

Katama
Percent of map unit: 2 percent

294B—Evesboro sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 996w
Elevation: 10 to 450 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 175 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Evesboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Evesboro

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 26 inches: loamy sand
H3 - 26 to 60 inches: stratified sand to sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Riverhead

Percent of map unit: 5 percent

Klej

Percent of map unit: 5 percent

Udipsamments

Percent of map unit: 5 percent

600—Pits

Map Unit Setting

National map unit symbol: 9975
Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Parent material: Loose sandy and gravelly glaciofluvial deposits and/or friable sandy basal till

Data Source Information

Soil Survey Area: Nantucket County, Massachusetts
Survey Area Data: Version 12, Sep 19, 2014

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Nantucket County, Massachusetts			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
288A—Riverhead sandy loam, 0 to 3 percent slopes			
Riverhead	85	Very low	A

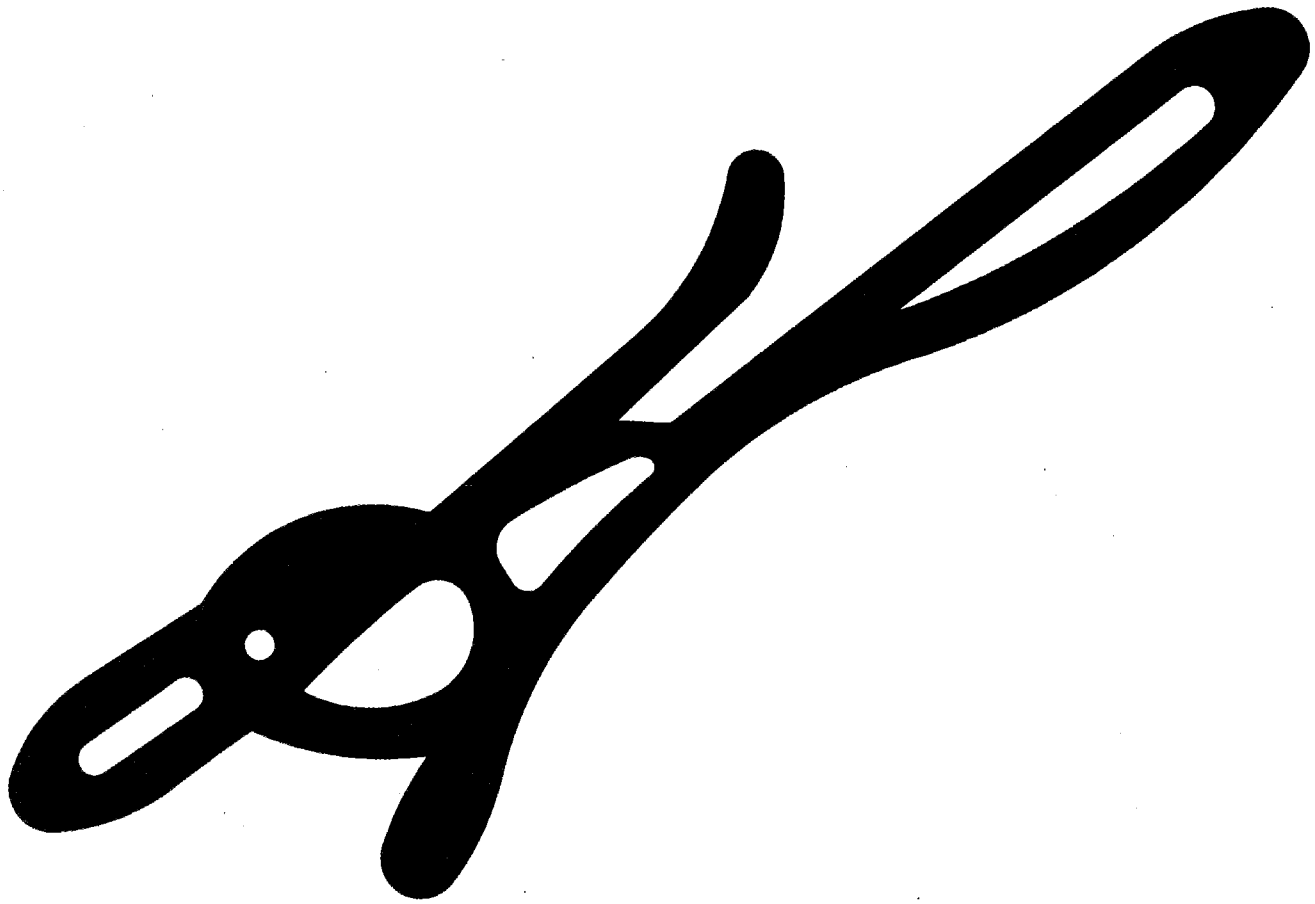
Hydrologic Soil Group and Surface Runoff–Nantucket County, Massachusetts			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
294A—Evesboro sand, 0 to 3 percent slopes			
Evesboro	85	Very low	A
294B—Evesboro sand, 3 to 8 percent slopes			
Evesboro	85	Low	A
600—Pits			
Pits	100	—	—

Data Source Information

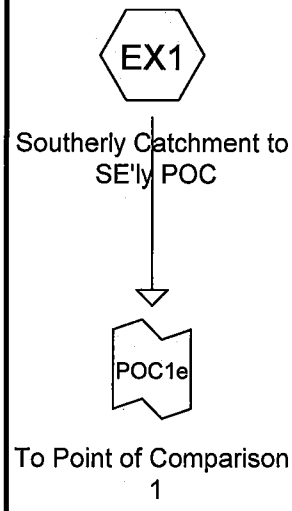
Soil Survey Area: Nantucket County, Massachusetts
Survey Area Data: Version 12, Sep 19, 2014

APPENDIX B:

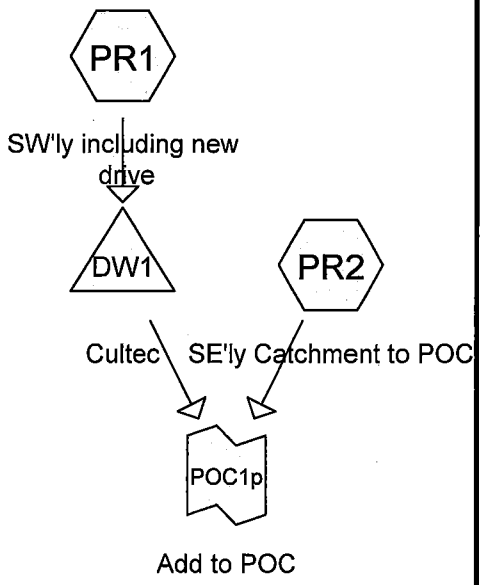
HydroCAD® Calculations

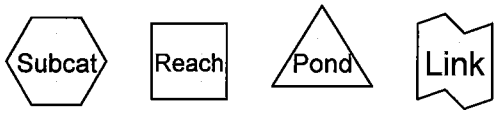


Existing Conditions
Clay Street NAN-0107



Proposed Conditions
Clay Street NAN-0107





Routing Diagram for NAN-0107Ex
Prepared by Hayes Engineering, Inc., Printed 6/1/2016

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
202,415	39	>75% Grass cover, Good, HSG A (EX1, PR1, PR2)
175,433	35	Brush, Fair, HSG A (EX1, PR1, PR2)
7,415	96	Gravel surface, HSG A (PR1)
65,392	77	Newly graded area, HSG A (EX1, PR1, PR2)
55,668	98	Unconnected pavement, HSG A (EX1, PR1, PR2)
506,323	**50**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
506,323	HSG A	EX1, PR1, PR2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
506,323		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchme Numbers
202,415	0	0	0	0	202,415	>75% Grass cover, Good	EX1, PR1, PR2
175,433	0	0	0	0	175,433	Brush, Fair	EX1, PR1, PR2
7,415	0	0	0	0	7,415	Gravel surface	PR1
65,392	0	0	0	0	65,392	Newly graded area	EX1, PR1, PR2
55,668	0	0	0	0	55,668	Unconnected pavement	EX1, PR1, PR2

Ground Covers (all nodes) (continued)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchme Numbers
506,323	**0**	**0**	**0**	**0**	**506,323**	**TOTAL AREA**	

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: Southerly Catchment to SE'ly Runoff Area=252,793 sf 11.11% Impervious Runoff Depth=0.14"
Flow Length=400' Slope=0.0050 '/' Tc=14.3 min UI Adjusted CN=47 Runoff=0.13 cfs 3,018 cf

Subcatchment PR1: SW'ly including new drive Runoff Area=81,847 sf 8.77% Impervious Runoff Depth=0.12"
Flow Length=456' Tc=16.1 min UI Adjusted CN=46 Runoff=0.03 cfs 823 cf

Subcatchment PR2: SE'ly Catchment to POC Runoff Area=171,683 sf 11.88% Impervious Runoff Depth=0.14"
Flow Length=330' Slope=0.0050 '/' Tc=13.3 min UI Adjusted CN=47 Runoff=0.09 cfs 2,050 cf

Pond DW1: Cultec Peak Elev=23.54' Storage=3 cf Inflow=0.03 cfs 823 cf
Discarded=0.03 cfs 823 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 823 cf

Link POC1e: To Point of Comparison 1 Inflow=0.13 cfs 3,018 cf
Primary=0.13 cfs 3,018 cf

Link POC1p: Add to POC Inflow=0.09 cfs 2,050 cf
Primary=0.09 cfs 2,050 cf

Total Runoff Area = 506,323 sf Runoff Volume = 5,891 cf Average Runoff Depth = 0.14"
89.01% Pervious = 450,655 sf 10.99% Impervious = 55,668 sf

Summary for Subcatchment EX1: Southerly Catchment to SE'ly POC

Runoff = 0.13 cfs @ 12.62 hrs, Volume= 3,018 cf, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Adj	Description
28,087	98		Unconnected pavement, HSG A
40,923	77		Newly graded area, HSG A
90,327	35		Brush, Fair, HSG A
93,456	39		>75% Grass cover, Good, HSG A
252,793	50	47	Weighted Average, UI Adjusted
224,706			88.89% Pervious Area
28,087			11.11% Impervious Area
28,087			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
5.1	350	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
14.3	400	Total			

Summary for Subcatchment PR1: SW'ly including new drive

Runoff = 0.03 cfs @ 13.83 hrs, Volume= 823 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Adj	Description
7,177	98		Unconnected pavement, HSG A
335	77		Newly graded area, HSG A
7,415	96		Gravel surface, HSG A
30,812	35		Brush, Fair, HSG A
36,108	39		>75% Grass cover, Good, HSG A
81,847	48	46	Weighted Average, UI Adjusted
74,670			91.23% Pervious Area
7,177			8.77% Impervious Area
7,177			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0070	0.07		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.60"
2.5	206	0.0070	1.35		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	200	0.0130	1.84		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
16.1	456	Total			

Summary for Subcatchment PR2: SE'ly Catchment to POC

Runoff = 0.09 cfs @ 12.60 hrs, Volume= 2,050 cf, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Adj	Description
20,404	98		Unconnected pavement, HSG A
24,134	77		Newly graded area, HSG A
54,294	35		Brush, Fair, HSG A
72,851	39		>75% Grass cover, Good, HSG A
171,683	50	47	Weighted Average, UI Adjusted
151,279			88.12% Pervious Area
20,404			11.88% Impervious Area
20,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
4.1	280	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
13.3	330	Total			

Summary for Pond DW1: Cultec

Inflow Area = 81,847 sf, 8.77% Impervious, Inflow Depth = 0.12" for 2 Year event
Inflow = 0.03 cfs @ 13.83 hrs, Volume= 823 cf
Outflow = 0.03 cfs @ 13.87 hrs, Volume= 823 cf, Atten= 0%, Lag= 2.4 min
Discarded = 0.03 cfs @ 13.87 hrs, Volume= 823 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 23.54' @ 13.87 hrs Surf.Area= 163 sf Storage= 3 cf

Plug-Flow detention time= 1.3 min calculated for 823 cf (100% of inflow)
Center-of-Mass det. time= 1.3 min (1,036.6 - 1,035.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	23.50'	110 cf	**5.00'W x 32.50'L x 2.04'H Field A** 332 cf Overall - 57 cf Embedded = 275 cf x 40.0% Voids
#2A	24.00'	57 cf	**Cultec C-100HD** x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
#3	23.54'	402 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		568 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
23.54	4	0	0	4
26.50	4	12	12	25
27.00	36	9	21	58
27.50	310	75	96	333
28.00	975	306	402	999

Device	Routing	Invert	Outlet Devices
#1	Discarded	23.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 7.00'
#2	Primary	27.50'	**20.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 13.87 hrs HW=23.54' (Free Discharge)
↑**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=23.50' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link POC1e: To Point of Comparison 1

Inflow Area = 252,793 sf, 11.11% Impervious, Inflow Depth = 0.14" for 2 Year event
Inflow = 0.13 cfs @ 12.62 hrs, Volume= 3,018 cf
Primary = 0.13 cfs @ 12.62 hrs, Volume= 3,018 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link POC1p: Add to POC

Inflow Area = 253,530 sf, 10.88% Impervious, Inflow Depth = 0.10" for 2 Year event
Inflow = 0.09 cfs @ 12.60 hrs, Volume= 2,050 cf
Primary = 0.09 cfs @ 12.60 hrs, Volume= 2,050 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: Southerly Catchment to SE'ly Runoff Area=252,793 sf 11.11% Impervious Runoff Depth=0.50"
Flow Length=400' Slope=0.0050 '/' Tc=14.3 min UI Adjusted CN=47 Runoff=1.33 cfs 10,584 cf

Subcatchment PR1: SW'ly including new drive Runoff Area=81,847 sf 8.77% Impervious Runoff Depth=0.46"
Flow Length=456' Tc=16.1 min UI Adjusted CN=46 Runoff=0.36 cfs 3,109 cf

Subcatchment PR2: SE'ly Catchment to POC Runoff Area=171,683 sf 11.88% Impervious Runoff Depth=0.50"
Flow Length=330' Slope=0.0050 '/' Tc=13.3 min UI Adjusted CN=47 Runoff=0.92 cfs 7,188 cf

Pond DW1: Cultec Peak Elev=27.52' Storage=269 cf Inflow=0.36 cfs 3,109 cf
Discarded=0.14 cfs 2,921 cf Primary=0.20 cfs 188 cf Outflow=0.35 cfs 3,109 cf

Link POC1e: To Point of Comparison 1 Inflow=1.33 cfs 10,584 cf
Primary=1.33 cfs 10,584 cf

Link POC1p: Add to POC Inflow=1.02 cfs 7,376 cf
Primary=1.02 cfs 7,376 cf

Total Runoff Area = 506,323 sf Runoff Volume = 20,881 cf Average Runoff Depth = 0.49"
89.01% Pervious = 450,655 sf 10.99% Impervious = 55,668 sf

Summary for Subcatchment EX1: Southerly Catchment to SE'ly POC

Runoff = 1.33 cfs @ 12.40 hrs, Volume= 10,584 cf, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Adj	Description
28,087	98		Unconnected pavement, HSG A
40,923	77		Newly graded area, HSG A
90,327	35		Brush, Fair, HSG A
93,456	39		>75% Grass cover, Good, HSG A
252,793	50	47	Weighted Average, UI Adjusted
224,706			88.89% Pervious Area
28,087			11.11% Impervious Area
28,087			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
5.1	350	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
14.3	400	Total			

Summary for Subcatchment PR1: SW'ly including new drive

Runoff = 0.36 cfs @ 12.45 hrs, Volume= 3,109 cf, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Adj	Description
7,177	98		Unconnected pavement, HSG A
335	77		Newly graded area, HSG A
7,415	96		Gravel surface, HSG A
30,812	35		Brush, Fair, HSG A
36,108	39		>75% Grass cover, Good, HSG A
81,847	48	46	Weighted Average, UI Adjusted
74,670			91.23% Pervious Area
7,177			8.77% Impervious Area
7,177			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0070	0.07		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.60"
2.5	206	0.0070	1.35		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	200	0.0130	1.84		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
16.1	456	Total			

Summary for Subcatchment PR2: SE'ly Catchment to POC

Runoff = 0.92 cfs @ 12.38 hrs, Volume= 7,188 cf, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Adj	Description
20,404	98		Unconnected pavement, HSG A
24,134	77		Newly graded area, HSG A
54,294	35		Brush, Fair, HSG A
72,851	39		>75% Grass cover, Good, HSG A
171,683	50	47	Weighted Average, UI Adjusted
151,279			88.12% Pervious Area
20,404			11.88% Impervious Area
20,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
4.1	280	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
13.3	330	Total			

Summary for Pond DW1: Cultec

Inflow Area = 81,847 sf, 8.77% Impervious, Inflow Depth = 0.46" for 10 Year event
Inflow = 0.36 cfs @ 12.45 hrs, Volume= 3,109 cf
Outflow = 0.35 cfs @ 12.52 hrs, Volume= 3,109 cf, Atten= 3%, Lag= 4.2 min
Discarded = 0.14 cfs @ 12.52 hrs, Volume= 2,921 cf
Primary = 0.20 cfs @ 12.52 hrs, Volume= 188 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 27.52' @ 12.52 hrs Surf.Area= 491 sf Storage= 269 cf

Plug-Flow detention time= 27.5 min calculated for 3,108 cf (100% of inflow)
Center-of-Mass det. time= 27.5 min (979.5 - 952.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	23.50'	110 cf	**5.00'W x 32.50'L x 2.04'H Field A** 332 cf Overall - 57 cf Embedded = 275 cf x 40.0% Voids
#2A	24.00'	57 cf	**Cultec C-100HD** x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
#3	23.54'	402 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		568 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
23.54	4	0	0	4
26.50	4	12	12	25
27.00	36	9	21	58
27.50	310	75	96	333
28.00	975	306	402	999

Device	Routing	Invert	Outlet Devices
#1	Discarded	23.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 7.00'
#2	Primary	27.50'	**20.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.14 cfs @ 12.52 hrs HW=27.52' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.14 cfs @ 12.52 hrs HW=27.52' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.14 cfs @ 0.37 fps)

Summary for Link POC1e: To Point of Comparison 1

Inflow Area = 252,793 sf, 11.11% Impervious, Inflow Depth = 0.50" for 10 Year event
Inflow = 1.33 cfs @ 12.40 hrs, Volume= 10,584 cf
Primary = 1.33 cfs @ 12.40 hrs, Volume= 10,584 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link POC1p: Add to POC

Inflow Area = 253,530 sf, 10.88% Impervious, Inflow Depth = 0.35" for 10 Year event
Inflow = 1.02 cfs @ 12.51 hrs, Volume= 7,376 cf
Primary = 1.02 cfs @ 12.51 hrs, Volume= 7,376 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: Southerly Catchment to SE'ly Runoff Area=252,793 sf 11.11% Impervious Runoff Depth=0.85"
Flow Length=400' Slope=0.0050 '/' Tc=14.3 min UI Adjusted CN=47 Runoff=2.91 cfs 17,859 cf

Subcatchment PR1: SW'ly including new drive Runoff Area=81,847 sf 8.77% Impervious Runoff Depth=0.78"
Flow Length=456' Tc=16.1 min UI Adjusted CN=46 Runoff=0.80 cfs 5,351 cf

Subcatchment PR2: SE'ly Catchment to POC Runoff Area=171,683 sf 11.88% Impervious Runoff Depth=0.85"
Flow Length=330' Slope=0.0050 '/' Tc=13.3 min UI Adjusted CN=47 Runoff=2.02 cfs 12,129 cf

Pond DW1: Cultec Peak Elev=27.55' Storage=280 cf Inflow=0.80 cfs 5,351 cf
Discarded=0.15 cfs 3,945 cf Primary=0.65 cfs 1,406 cf Outflow=0.80 cfs 5,351 cf

Link POC1e: To Point of Comparison 1 Inflow=2.91 cfs 17,859 cf
Primary=2.91 cfs 17,859 cf

Link POC1p: Add to POC Inflow=2.62 cfs 13,534 cf
Primary=2.62 cfs 13,534 cf

Total Runoff Area = 506,323 sf Runoff Volume = 35,338 cf Average Runoff Depth = 0.84"
89.01% Pervious = 450,655 sf 10.99% Impervious = 55,668 sf

Summary for Subcatchment EX1: Southerly Catchment to SE'ly POC

Runoff = 2.91 cfs @ 12.27 hrs, Volume= 17,859 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Adj	Description
28,087	98		Unconnected pavement, HSG A
40,923	77		Newly graded area, HSG A
90,327	35		Brush, Fair, HSG A
93,456	39		>75% Grass cover, Good, HSG A
252,793	50	47	Weighted Average, UI Adjusted
224,706			88.89% Pervious Area
28,087			11.11% Impervious Area
28,087			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
5.1	350	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
14.3	400	Total			

Summary for Subcatchment PR1: SW'ly including new drive

Runoff = 0.80 cfs @ 12.33 hrs, Volume= 5,351 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Adj	Description
7,177	98		Unconnected pavement, HSG A
335	77		Newly graded area, HSG A
7,415	96		Gravel surface, HSG A
30,812	35		Brush, Fair, HSG A
36,108	39		>75% Grass cover, Good, HSG A
81,847	48	46	Weighted Average, UI Adjusted
74,670			91.23% Pervious Area
7,177			8.77% Impervious Area
7,177			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0070	0.07		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.60"
2.5	206	0.0070	1.35		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	200	0.0130	1.84		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
16.1	456	Total			

Summary for Subcatchment PR2: SE'ly Catchment to POC

Runoff = 2.02 cfs @ 12.25 hrs, Volume= 12,129 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Adj	Description
20,404	98		Unconnected pavement, HSG A
24,134	77		Newly graded area, HSG A
54,294	35		Brush, Fair, HSG A
72,851	39		>75% Grass cover, Good, HSG A
171,683	50	47	Weighted Average, UI Adjusted
151,279			88.12% Pervious Area
20,404			11.88% Impervious Area
20,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
4.1	280	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
13.3	330	Total			

Summary for Pond DW1: Cultec

Inflow Area = 81,847 sf, 8.77% Impervious, Inflow Depth = 0.78" for 25 Year event
Inflow = 0.80 cfs @ 12.33 hrs, Volume= 5,351 cf
Outflow = 0.80 cfs @ 12.33 hrs, Volume= 5,351 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.15 cfs @ 12.33 hrs, Volume= 3,945 cf
Primary = 0.65 cfs @ 12.33 hrs, Volume= 1,406 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 27.55' @ 12.33 hrs Surf.Area= 525 sf Storage= 280 cf

Plug-Flow detention time= 24.5 min calculated for 5,349 cf (100% of inflow)
Center-of-Mass det. time= 24.5 min (950.3 - 925.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	23.50'	110 cf	**5.00'W x 32.50'L x 2.04'H Field A** 332 cf Overall - 57 cf Embedded = 275 cf x 40.0% Voids
#2A	24.00'	57 cf	**Cultec C-100HD** x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
#3	23.54'	402 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		568 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
23.54	4	0	0	4
26.50	4	12	12	25
27.00	36	9	21	58
27.50	310	75	96	333
28.00	975	306	402	999

Device	Routing	Invert	Outlet Devices
#1	Discarded	23.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 7.00'
#2	Primary	27.50'	**20.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.15 cfs @ 12.33 hrs HW=27.55' (Free Discharge)
↑**1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.64 cfs @ 12.33 hrs HW=27.55' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.64 cfs @ 0.61 fps)

Summary for Link POC1e: To Point of Comparison 1

Inflow Area = 252,793 sf, 11.11% Impervious, Inflow Depth = 0.85" for 25 Year event
Inflow = 2.91 cfs @ 12.27 hrs, Volume= 17,859 cf
Primary = 2.91 cfs @ 12.27 hrs, Volume= 17,859 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link POC1p: Add to POC

Inflow Area = 253,530 sf, 10.88% Impervious, Inflow Depth = 0.64" for 25 Year event
Inflow = 2.62 cfs @ 12.29 hrs, Volume= 13,534 cf
Primary = 2.62 cfs @ 12.29 hrs, Volume= 13,534 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: Southerly Catchment to SE'ly Runoff Area=252,793 sf 11.11% Impervious Runoff Depth=1.16"
Flow Length=400' Slope=0.0050 '/' Tc=14.3 min UI Adjusted CN=47 Runoff=4.55 cfs 24,454 cf

Subcatchment PR1: SW'ly including new drive Runoff Area=81,847 sf 8.77% Impervious Runoff Depth=1.08"
Flow Length=456' Tc=16.1 min UI Adjusted CN=46 Runoff=1.27 cfs 7,400 cf

Subcatchment PR2: SE'ly Catchment to POC Runoff Area=171,683 sf 11.88% Impervious Runoff Depth=1.16"
Flow Length=330' Slope=0.0050 '/' Tc=13.3 min UI Adjusted CN=47 Runoff=3.17 cfs 16,608 cf

Pond DW1: Cultec Peak Elev=27.57' Storage=288 cf Inflow=1.27 cfs 7,400 cf
Discarded=0.15 cfs 4,539 cf Primary=1.12 cfs 2,861 cf Outflow=1.27 cfs 7,400 cf

Link POC1e: To Point of Comparison 1 Inflow=4.55 cfs 24,454 cf
Primary=4.55 cfs 24,454 cf

Link POC1p: Add to POC Inflow=4.22 cfs 19,468 cf
Primary=4.22 cfs 19,468 cf

Total Runoff Area = 506,323 sf Runoff Volume = 48,461 cf Average Runoff Depth = 1.15"
89.01% Pervious = 450,655 sf 10.99% Impervious = 55,668 sf

Summary for Subcatchment EX1: Southerly Catchment to SE'ly POC

Runoff = 4.55 cfs @ 12.25 hrs, Volume= 24,454 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Adj	Description
28,087	98		Unconnected pavement, HSG A
40,923	77		Newly graded area, HSG A
90,327	35		Brush, Fair, HSG A
93,456	39		>75% Grass cover, Good, HSG A
252,793	50	47	Weighted Average, UI Adjusted
224,706			88.89% Pervious Area
28,087			11.11% Impervious Area
28,087			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
5.1	350	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
14.3	400	Total			

Summary for Subcatchment PR1: SW'ly including new drive

Runoff = 1.27 cfs @ 12.29 hrs, Volume= 7,400 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Adj	Description
7,177	98		Unconnected pavement, HSG A
335	77		Newly graded area, HSG A
7,415	96		Gravel surface, HSG A
30,812	35		Brush, Fair, HSG A
36,108	39		>75% Grass cover, Good, HSG A
81,847	48	46	Weighted Average, UI Adjusted
74,670			91.23% Pervious Area
7,177			8.77% Impervious Area
7,177			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0070	0.07		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.60"
2.5	206	0.0070	1.35		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	200	0.0130	1.84		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
16.1	456	Total			

Summary for Subcatchment PR2: SE'ly Catchment to POC

Runoff = 3.17 cfs @ 12.22 hrs, Volume= 16,608 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Adj	Description
20,404	98		Unconnected pavement, HSG A
24,134	77		Newly graded area, HSG A
54,294	35		Brush, Fair, HSG A
72,851	39		>75% Grass cover, Good, HSG A
171,683	50	47	Weighted Average, UI Adjusted
151,279			88.12% Pervious Area
20,404			11.88% Impervious Area
20,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
4.1	280	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
13.3	330	Total			

Summary for Pond DW1: Cultec

Inflow Area = 81,847 sf, 8.77% Impervious, Inflow Depth = 1.08" for 50 Year event
Inflow = 1.27 cfs @ 12.29 hrs, Volume= 7,400 cf
Outflow = 1.27 cfs @ 12.29 hrs, Volume= 7,400 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.15 cfs @ 12.29 hrs, Volume= 4,539 cf
Primary = 1.12 cfs @ 12.29 hrs, Volume= 2,861 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 27.57' @ 12.29 hrs Surf.Area= 547 sf Storage= 288 cf

Plug-Flow detention time= 20.8 min calculated for 7,400 cf (100% of inflow)
Center-of-Mass det. time= 20.8 min (932.9 - 912.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	23.50'	110 cf	**5.00'W x 32.50'L x 2.04'H Field A** 332 cf Overall - 57 cf Embedded = 275 cf x 40.0% Voids
#2A	24.00'	57 cf	**Cultec C-100HD** x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
#3	23.54'	402 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		568 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
23.54	4	0	0	4
26.50	4	12	12	25
27.00	36	9	21	58
27.50	310	75	96	333
28.00	975	306	402	999

Device	Routing	Invert	Outlet Devices
#1	Discarded	23.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 7.00'
#2	Primary	27.50'	**20.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.15 cfs @ 12.29 hrs HW=27.57' (Free Discharge)
↑**1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=1.08 cfs @ 12.29 hrs HW=27.57' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.08 cfs @ 0.73 fps)

Summary for Link POC1e: To Point of Comparison 1

Inflow Area = 252,793 sf, 11.11% Impervious, Inflow Depth = 1.16" for 50 Year event
Inflow = 4.55 cfs @ 12.25 hrs, Volume= 24,454 cf
Primary = 4.55 cfs @ 12.25 hrs, Volume= 24,454 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link POC1p: Add to POC

Inflow Area = 253,530 sf, 10.88% Impervious, Inflow Depth = 0.92" for 50 Year event
Inflow = 4.22 cfs @ 12.25 hrs, Volume= 19,468 cf
Primary = 4.22 cfs @ 12.25 hrs, Volume= 19,468 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: Southerly Catchment to SE'ly Runoff Area=252,793 sf 11.11% Impervious Runoff Depth=1.51"
Flow Length=400' Slope=0.0050 '/' Tc=14.3 min UI Adjusted CN=47 Runoff=6.42 cfs 31,752 cf

Subcatchment PR1: SW'ly including new drive Runoff Area=81,847 sf 8.77% Impervious Runoff Depth=1.42"
Flow Length=456' Tc=16.1 min UI Adjusted CN=46 Runoff=1.82 cfs 9,679 cf

Subcatchment PR2: SE'ly Catchment to POC Runoff Area=171,683 sf 11.88% Impervious Runoff Depth=1.51"
Flow Length=330' Slope=0.0050 '/' Tc=13.3 min UI Adjusted CN=47 Runoff=4.49 cfs 21,564 cf

Pond DW1: Cultec Peak Elev=27.60' Storage=298 cf Inflow=1.82 cfs 9,679 cf
Discarded=0.16 cfs 5,063 cf Primary=1.66 cfs 4,616 cf Outflow=1.82 cfs 9,679 cf

Link POC1e: To Point of Comparison 1 Inflow=6.42 cfs 31,752 cf
Primary=6.42 cfs 31,752 cf

Link POC1p: Add to POC Inflow=6.06 cfs 26,180 cf
Primary=6.06 cfs 26,180 cf

Total Runoff Area = 506,323 sf Runoff Volume = 62,995 cf Average Runoff Depth = 1.49"
89.01% Pervious = 450,655 sf 10.99% Impervious = 55,668 sf

Summary for Subcatchment EX1: Southerly Catchment to SE'ly POC

Runoff = 6.42 cfs @ 12.23 hrs, Volume= 31,752 cf, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Adj	Description
28,087	98		Unconnected pavement, HSG A
40,923	77		Newly graded area, HSG A
90,327	35		Brush, Fair, HSG A
93,456	39		>75% Grass cover, Good, HSG A
252,793	50	47	Weighted Average, UI Adjusted
224,706			88.89% Pervious Area
28,087			11.11% Impervious Area
28,087			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
5.1	350	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
14.3	400	Total			

Summary for Subcatchment PR1: SW'ly including new drive

Runoff = 1.82 cfs @ 12.26 hrs, Volume= 9,679 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Adj	Description
7,177	98		Unconnected pavement, HSG A
335	77		Newly graded area, HSG A
7,415	96		Gravel surface, HSG A
30,812	35		Brush, Fair, HSG A
36,108	39		>75% Grass cover, Good, HSG A
81,847	48	46	Weighted Average, UI Adjusted
74,670			91.23% Pervious Area
7,177			8.77% Impervious Area
7,177			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0070	0.07		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.60"
2.5	206	0.0070	1.35		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	200	0.0130	1.84		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
16.1	456	Total			

Summary for Subcatchment PR2: SE'ly Catchment to POC

Runoff = 4.49 cfs @ 12.22 hrs, Volume= 21,564 cf, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Adj	Description
20,404	98		Unconnected pavement, HSG A
24,134	77		Newly graded area, HSG A
54,294	35		Brush, Fair, HSG A
72,851	39		>75% Grass cover, Good, HSG A
171,683	50	47	Weighted Average, UI Adjusted
151,279			88.12% Pervious Area
20,404			11.88% Impervious Area
20,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0050	0.09		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.60"
4.1	280	0.0050	1.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
13.3	330	Total			

Summary for Pond DW1: Cultec

Inflow Area = 81,847 sf, 8.77% Impervious, Inflow Depth = 1.42" for 100 Year event
Inflow = 1.82 cfs @ 12.26 hrs, Volume= 9,679 cf
Outflow = 1.82 cfs @ 12.27 hrs, Volume= 9,679 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.16 cfs @ 12.27 hrs, Volume= 5,063 cf
Primary = 1.66 cfs @ 12.27 hrs, Volume= 4,616 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 27.60' @ 12.27 hrs Surf.Area= 574 sf Storage= 298 cf

Plug-Flow detention time= 17.4 min calculated for 9,676 cf (100% of inflow)
Center-of-Mass det. time= 17.5 min (919.1 - 901.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	23.50'	110 cf	**5.00'W x 32.50'L x 2.04'H Field A** 332 cf Overall - 57 cf Embedded = 275 cf x 40.0% Voids
#2A	24.00'	57 cf	**Cultec C-100HD** x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
#3	23.54'	402 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		568 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
23.54	4	0	0	4
26.50	4	12	12	25
27.00	36	9	21	58
27.50	310	75	96	333
28.00	975	306	402	999

Device	Routing	Invert	Outlet Devices
#1	Discarded	23.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 7.00'
#2	Primary	27.50'	**20.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.16 cfs @ 12.27 hrs HW=27.60' (Free Discharge)
└**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=1.65 cfs @ 12.27 hrs HW=27.60' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.65 cfs @ 0.84 fps)

Summary for Link POC1e: To Point of Comparison 1

Inflow Area = 252,793 sf, 11.11% Impervious, Inflow Depth = 1.51" for 100 Year event
Inflow = 6.42 cfs @ 12.23 hrs, Volume= 31,752 cf
Primary = 6.42 cfs @ 12.23 hrs, Volume= 31,752 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

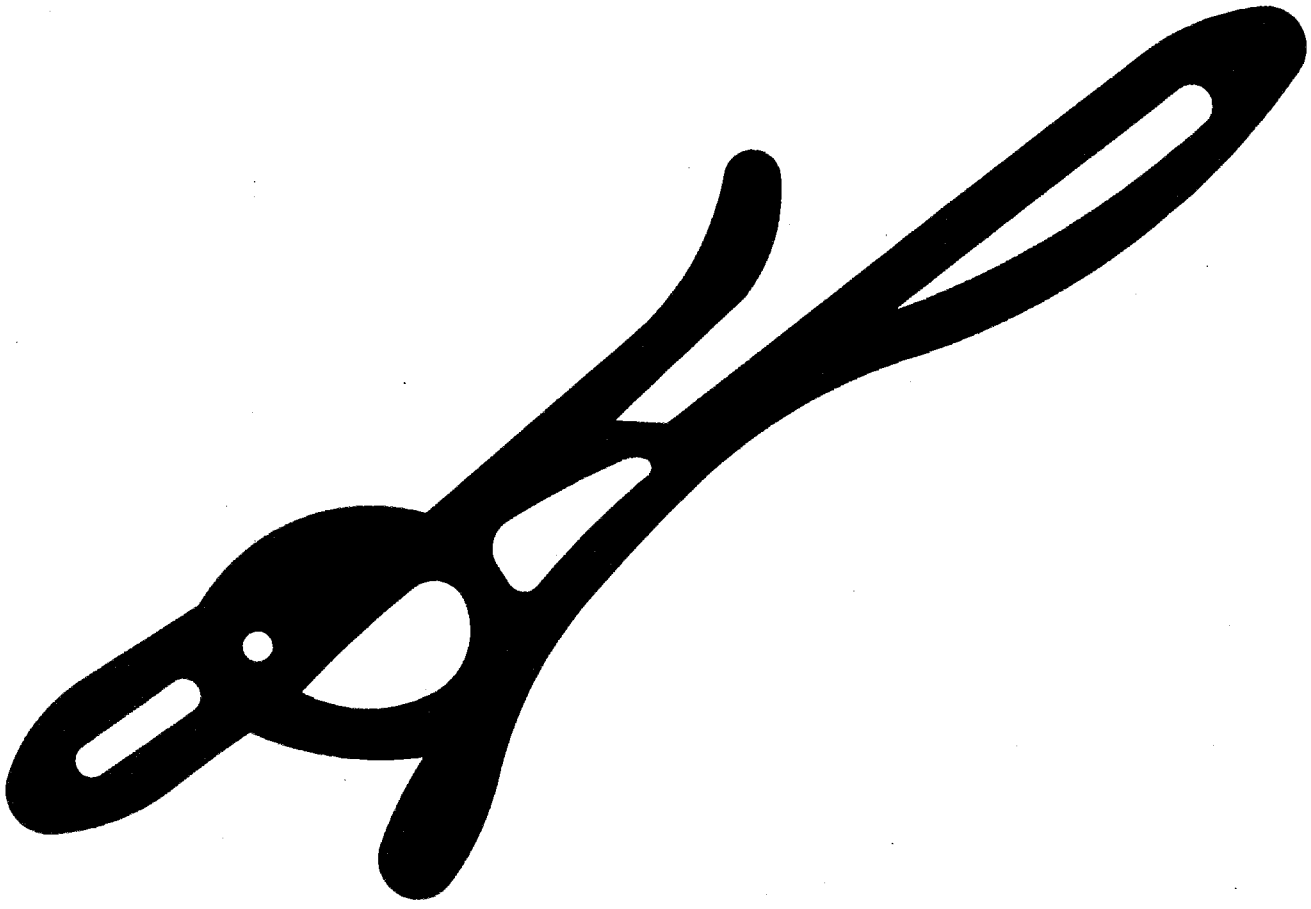
Summary for Link POC1p: Add to POC

Inflow Area = 253,530 sf, 10.88% Impervious, Inflow Depth = 1.24" for 100 Year event
Inflow = 6.06 cfs @ 12.23 hrs, Volume= 26,180 cf
Primary = 6.06 cfs @ 12.23 hrs, Volume= 26,180 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

APPENDIX C:

Massachusetts DEP Storm Water Checklist

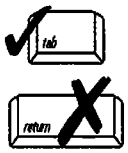


Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

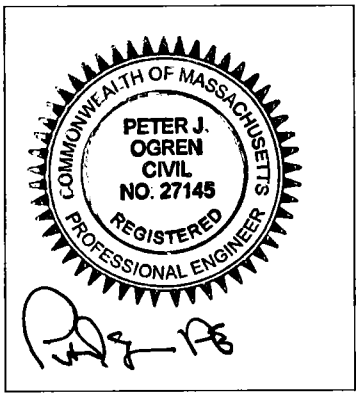
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



PE 6/2/16

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☒ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☒ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

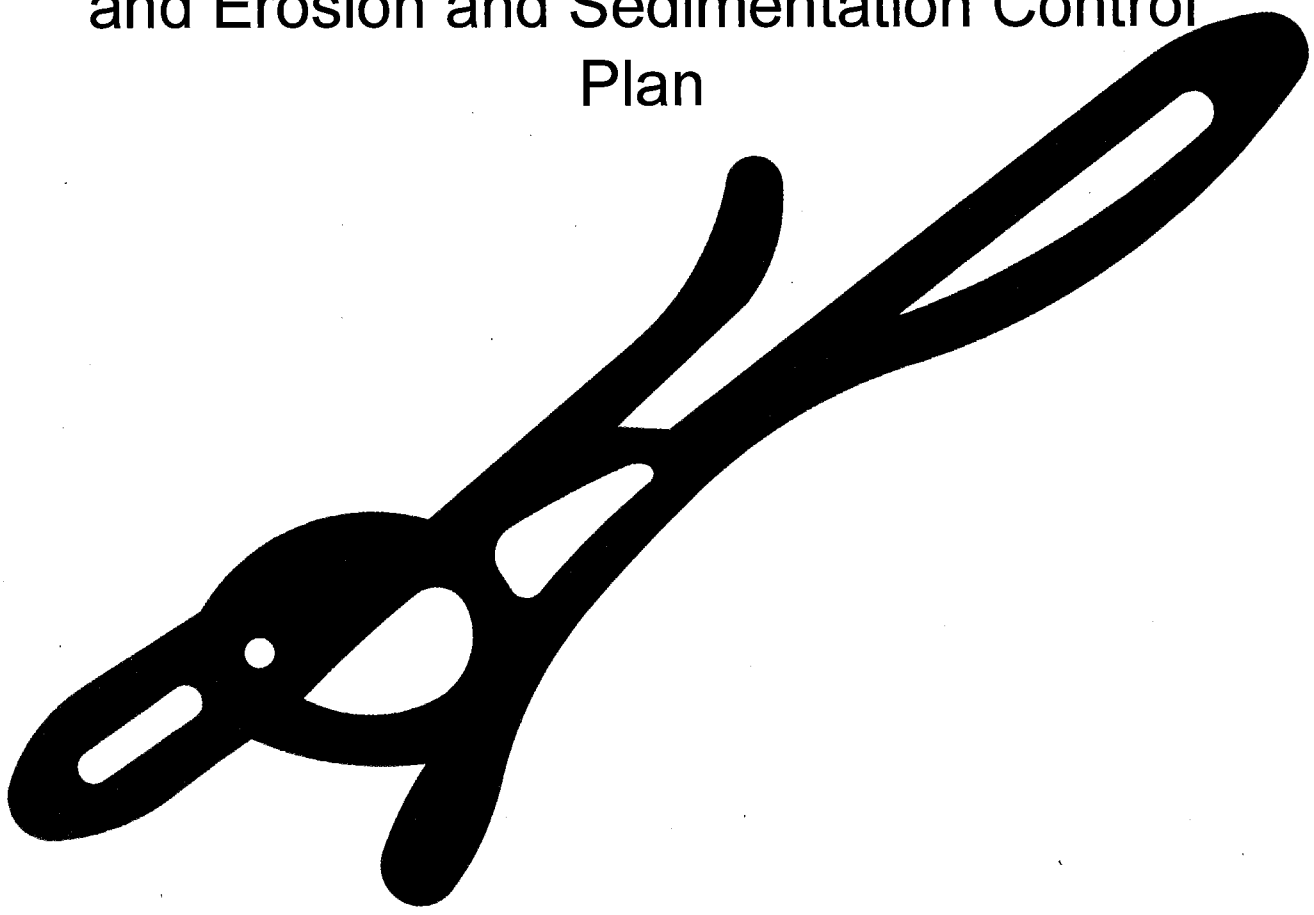
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX D:

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan



Construction Period Pollution Prevention Plan
Clay Street – Nantucket, MA
May 31, 2016

Project Name: Clay Street Definitive Subdivision
Davkim Lane
Nantucket, MA

Owner's Name: Richmond Great Point Development, LLC and
Richmond 54 Skyline Realty Trust
23 Concord Street
Wilmington, MA

Applicant's Name: Same as above

Party Responsible for Maintenance: To be determined

Project Description:

Richmond Great Point Development, LLC and Richmond 54 Skyline Realty Trust (the "Applicants") propose to construct Clay Street, a new subdivision roadway (the "Project") located off Skyline Drive.

The Project as proposed includes the construction of a 525 linear foot gravel roadway having a width of 12-feet

Erosion and Sedimentation Control Measures During Construction Activities:

Siltation Fence and Hay Bales

Silt fence with hay bales are to be installed as shown on Sheet 8 of 8 (Erosion Control Plan) of the Definitive Plan Set. Silt fence and hay bales are to be installed prior to the commencement of work on the site and in accordance with the design plans. An additional supply of silt fence and hay bales shall be maintained on-site for repair and/or replacement of any disturbed silt fence or hay bales. The silt fence and hay bale line(s) shall be inspected and maintained on a weekly basis. Deposited sediment shall be removed when the level of deposition reaches approximately one-third (1/3) the height of the fence.

Storm Drain Inlet Protection

A temporary storm inlet protection filter will be placed in all catch basin units. The purpose of the filter is to prevent the inflow of sediment into the closed drainage system(s). The filters shall remain in place until a permanent vegetative cover is established and the transport of sediment is no longer visibly apparent. The filter shall be inspected and maintained on a weekly basis and after significant storm events. Significant storm events are those having greater than one-quarter (1/4) inch of precipitation in a 24-hour period.

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and sedimentation. No construction sediment shall be allowed to enter infiltration areas. All

disturbed slopes shall be stabilized with a permanent vegetative cover. Some or all of the following measures can be used on the Project as conditions may warrant:

- Temporary Seeding
- Temporary Mulching
- Placement of Hay
- Placement of Geo-Synthetic Fabrics
- Hydroseeding
- Permanent Seeding
- Placement of Sod

Surface and Subsurface Infiltration Facilities

No construction period runoff should be directed toward infiltration facilities. The performance of these facilities shall be checked weekly and after significant storm events throughout construction.

INSPECTION SCHEDULE and EVALUATION CHECKLIST

To be completed weekly and within 24-hours of significant rainfall events (greater than 1/4-inches in a 24-hour period).

Inspector's Name: _____ Date: _____

Qualifications: _____

_____

Days since last rainfall: _____ days Amount of last rainfall: _____inches

Stabilization Measures

Sub-Catchment	Date of Last Disturbance	Date of Next Disturbance	Stabilized (Yes or No)	Stabilized With:	Condition
PR1					

Stabilization required: _____

_____

_____

_____

_____

_____

_____

To be performed by: _____ on or before: _____

PERIMETER CONTROLS

Date of Inspection: _____

Silt Fence and Hay Bales:

To Study Area:	Has sediment reached 1/3 height of silt fence? (Yes or No)	Depth of Silt (inches)	Is fence secure? (Yes or No)	Is there evidence of bypass or overtopping? (Yes or No)	Describe location of Problem(s), if any.
POC1					

Maintenance required for silt fence and hay bales: _____

_____

_____

To be performed by: _____ on or before: _____

Stabilized Construction Entrance:

Location	Does much sediment get tracked onto roadway? (Yes or No)	Is gravel clean or full of sediment?	Is all traffic using the entrance to access/exit the site? (Yes or No)	Is the culvert beneath the entrance working? (Yes or No)
Skyline Drive				

Maintenance required for stabilized construction entrance: _____

_____

_____

To be performed by: _____ on or before: _____

Other Best Management Practices:

BMP	In use? (Yes or No)	Maintenance Required? (Yes or No)	Describe location of Problem(s), if any.
Sweeping of Adjacent Roads			
Catch Basin Inlet Protection			
Sub-surface Infiltration Area PSIS1			

Maintenance required: _____

_____

_____

_____

_____

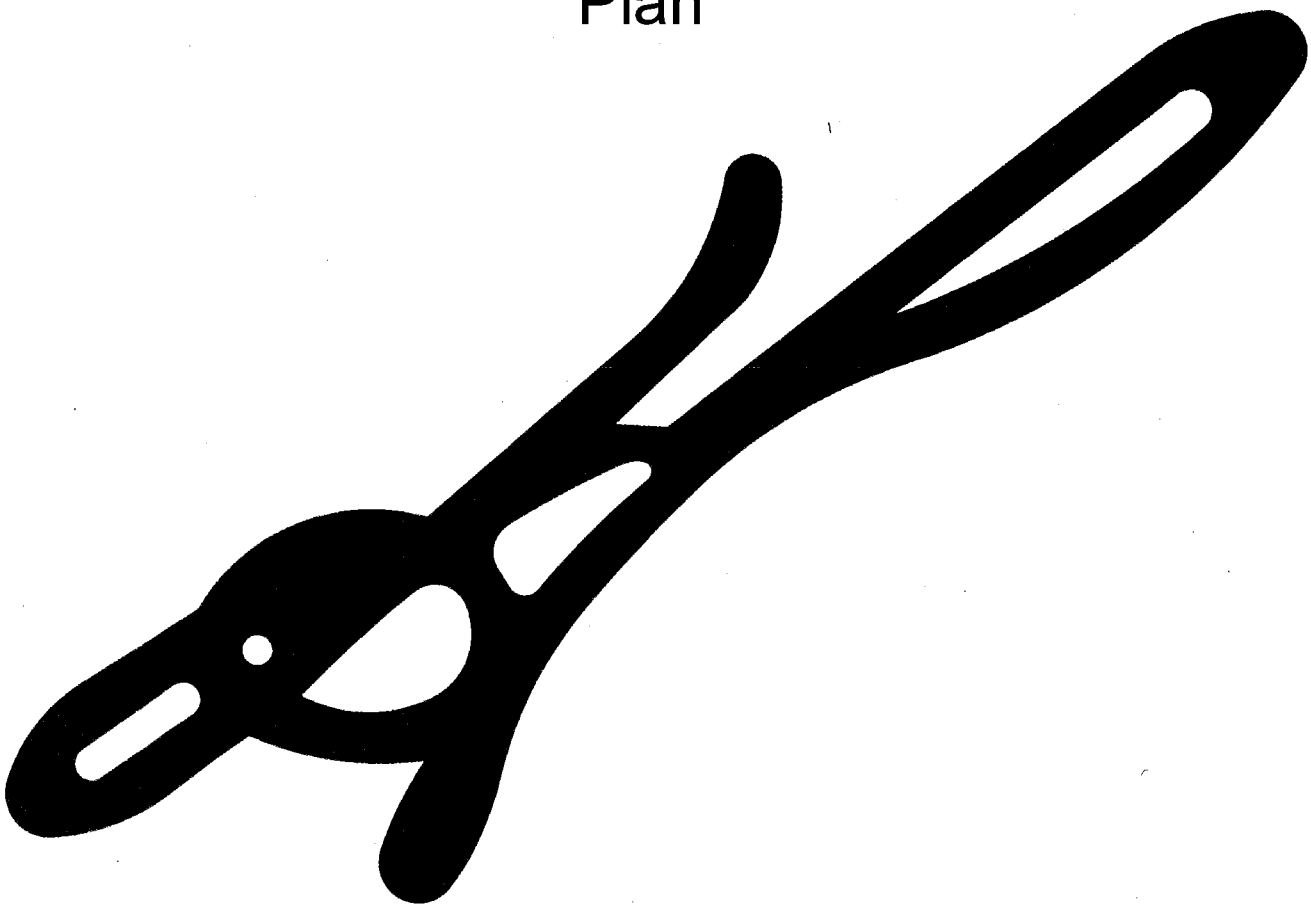
To be performed by: _____ on or before: _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature: _____ Date: _____

APPENDIX E:

Long Term Operation and Maintenance Plan



Long Term Operations and Maintenance Plan
Clay Street – Nantucket, MA
May 31, 2016

Project Name: Clay Street Definitive Subdivision
Davkim Lane
Nantucket, MA

Owner's Name: Richmond Great Point Development, LLC and
Richmond 54 Skyline Realty Trust
23 Concord Street
Wilmington, MA

Applicant's Name: Same as above

Party Responsible for Maintenance: To be determined

Project Description:

Richmond Great Point Development, LLC and Richmond 54 Skyline Realty Trust (the "Applicants") propose to construct Clay Street, a new subdivision roadway (the "Project") located off Skyline Drive.

The Project as proposed includes the construction of a 525 linear foot gravel roadway having a width of 12-feet

Post-Construction Inspection and Maintenance Measures:

Erosion Control

Sedimentation caused from erosion of soils can adversely affect the performance of the storm water management system. Areas that are barren and/or showing signs of erosion should be stabilized through immediate re-vegetation.

Debris and Litter Removal

Litter and other debris may collect in storm water best management practices (BMPs), potentially causing clogging of facilities. All debris and litter shall be removed as necessary, at a minimum of four (4) times per year in the spring, summer, fall and winter.

Deep Sump and Hooded Catch Basins

In accordance with Volume 2, Chapter 2 of the MaDEP Storm Water Handbook as summarized below:

Inspect or clean deep sump catch basins at least four (4) times per year and at the end of the foliage and snow-removal seasons. Sediments must also be removed four (4) times per year or whenever the depth of deposits is greater than or equal to one-half (1/2) the depth from the invert of the lowest pipe in the basin to the bottom of the basin (the sump). If handling runoff from land uses with higher potential pollutant loads (LUHPPLs) or discharging near or to a critical area, more frequent cleaning may be necessary.

Deep sump and hooded catch basins should be cleaned with vacuum trucks only. Clamshell buckets shall not be used to clean hooded catch basins. Vacuum trucks remove more sediment and supernatant, and is less likely to snap the hood within the deep sump basin.

Always consider the safety of the staff cleaning deep sump catch basins. Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous, and a police detail may be necessary to safeguard workers.

Although catch basin debris often contains concentrations of oil and hazardous materials such

as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP. However, some landfills require catch basin cleanings to be tested before they are accepted.

With prior MassDEP approval, catch basin cleanings may be used as grading and shaping materials at landfills undergoing closure (see Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites) or as daily cover at active landfills. MassDEP also encourages the beneficial reuse of catch basin cleanings whenever possible. A Beneficial Reuse Determination is required for such use.

MassDEP regulations prohibit landfills from accepting materials that contain free-draining liquids. One way to remove liquids is to use a hydraulic lift truck during cleaning operations so that the material can be decanted at the site. After loading material from several catch basins into a truck, elevate the truck so that any free-draining liquid can flow back into the structure. If there is no free water in the truck, the material may be deemed to be sufficiently dry. Otherwise the catch basin cleanings must undergo a Paint Filter Liquids Test. Go to www. Mass.gov/dep/ recycle/laws/cafacts.doc for information on all of the MassDEP requirements pertaining to the disposal of catch basin cleanings.

Sub-Surface Infiltration Basin

In accordance with Volume 2, Chapter 2 of the MaDEP Storm Water Handbook and Manufacturer's recommendations as summarized below:

Inspect inlets at least twice per year.

Good Housekeeping Practices:

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover:

- All materials stored on-site shall be in a neat, orderly manner in their appropriate containers with original manufacturer's label(s);
- Only store enough material as needed; whenever possible, all of a product shall be used prior to disposing of container;
- Manufacturer, federal, state and local recommendations for proper use and disposal shall be followed.

Vehicle Washing Controls:

- Use commercial car washes whenever possible. Car washes treat and/or recycle wash water;
- Cars shall be washed on gravel, grass or other permeable surfaces to allow filtration to occur;
- Use biodegradable soaps only;
- Use hose nozzles that automatically turn off when unattended.

Routine Inspection and Maintenance of Storm Water BMPs

- Previously addressed.

Spill Prevention and Response Plans

- Spill control practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP).

Maintenance of Lawns, Gardens and Other Landscaped Areas:

- Grass shall not be cut shorter than two (2) to three (3) inches and mulch clipping should be left on lawns as a natural fertilizer;
- Use low volume water approaches for irrigation such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems;
- Mulch shall be used wherever practicable. Mulch helps retain water and prevents erosion.

Storage and Use of Fertilizers, Herbicides and Pesticides:

- Fertilizers shall be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit exposure to storm water. Storage will be in covered areas only. Contents of partially used bags shall be transferred into sealable plastic containers to avoid spills;
- Do not fertilize before or during rain events;
- Consider the use of organic fertilizers;
- Pesticides shall be applied only when necessary and only in the minimum amounts recommended by the manufacturer.

Pet Waste Management

- Scoop up and seal pet waste in plastic bags. Dispose of in garbage.

Solid Waste Management

- All solid waste shall be disposed of or recycled in accordance with all federal, state and local regulations.

List of Emergency Contacts for Plan Implementation

To be determined by Owner.

POST-CONSTRUCTION
OPERATION AND MAINTENANCE LOG

Inspector's Name: _____ Date: _____

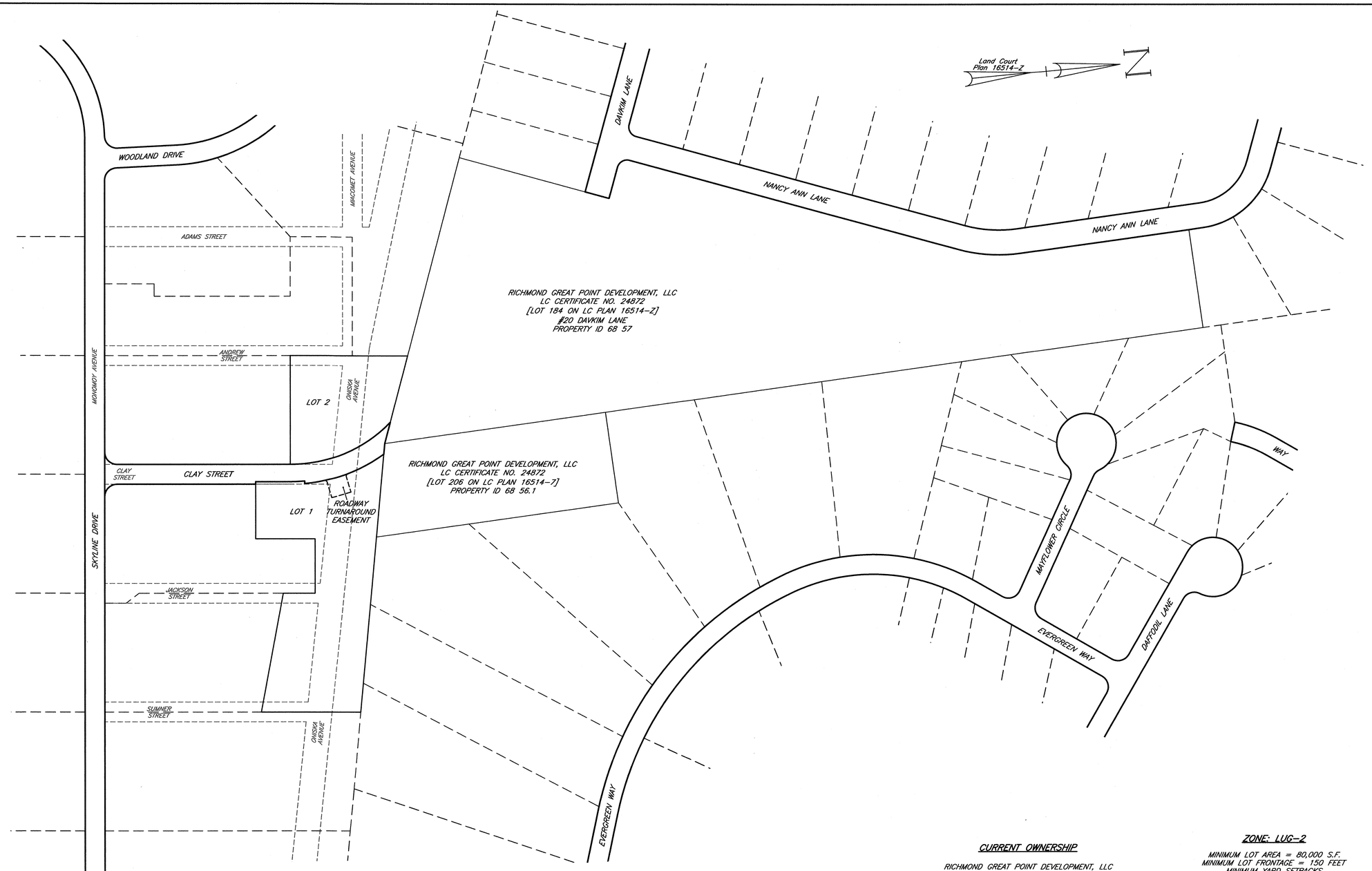
Qualifications: _____

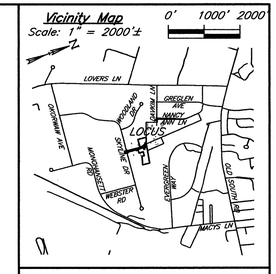
_____

Inspection Type: ☐ Routine ☐ Spill ☐ Other: _____

☐ Post-Rainfall (Precipitation in Inches: _____)

BMP	Frequency	Date Last Performed	Comments
Litter and Debris Removal	After Significant Rain Events		
Deep Sump and Hooded Catch Basins	Inspect four (4) times per year Maintenance as necessary		
Sub-Surface Infiltration System	Inspect two (2) times per year		
Vegetated Areas	Inspect as necessary for erosion		





I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

HAYES ENGINEERING, INC.

Coordinate System

N 92,823.98
E 1,761,414.97
Massachusetts State Plane Coordinates, Island Zone in US Survey feet based upon Nantucket Primary Airport Control Station designation ACK ARP (PID – AB3245) NAD 83(2011) position.

LEGEND

CBDH – CONCRETE BOUND WITH DRILL HOLE

(FD) – FOUND

LC – LAND COURT

rf – REGULARITY FACTOR

▣ – PROPOSED CONCRETE BOUND WITH DRILL HOLE TO BE SET BY OWNER UNLESS OTHERWISE NOTED

SHEET INDEX:

SHEET 1 of 5:	DEFINITIVE INDEX SHEET
SHEET 2 of 5:	DEFINITIVE PLAN
SHEET 3 of 5:	DEFINITIVE TOPOGRAPHIC PLAN
SHEET 4 of 5:	DEFINITIVE PLAN & PROFILE SHEET
SHEET 5 of 5:	DETAIL SHEET

NOTES:

1. LOTS SHOWN HEREON COMPLY WITH THE LOT AREA REQUIREMENTS AS PROVIDED IN THE NANTUCKET ZONING BYLAW, CHAPTER 139 ss 2A AND 16A.
2. THE PLANNING BOARD DETERMINES THAT LOTS 1 & 2 DO NOT CONTAIN AREAS SUBJECT TO PROTECTION UNDER THE MASSACHUSETTS PROTECTION ACT WHICH ARE REQUIRED TO BE EXCLUDED FROM LOT AREA UNDER THE NANTUCKET ZONING BY-LAW, BUT STILL MAY BE SUBJECT TO PROTECTION UNDER STATE AND LOCAL WETLAND BYLAWS. DETERMINATION MAY BE OBTAINED THROUGH APPLICATION TO THE CONSERVATION COMMISSION.
3. LOT 2 IS NOT TO BE CONSIDERED A SEPARATE BUILDING LOT BUT IS TO BE HELD IN COMMON OWNERSHIP WITH ADJOINING LAND OF RICHMOND GREAT POINT DEVELOPMENT, LLC.

CURRENT OWNERSHIP

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1397 PAGE 312
[LOT 42B ON PLAN NO. 2013-69]
#42 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 44.1
(LOTS ON THIS PLAN: LOT 2, PORTION OF LOT 1 & ROAD)

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1443 PAGE 213
[LOT 48B ON PLAN NO. 2013-69]
#48 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 45.1
(LOTS ON THIS PLAN: PORTION OF LOT 1 & ROAD)

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1454 PAGE 75, BOOK 1514 PAGE 343 & BOOK 1515 PAGE 1
[LOT 54B ON PLAN NO. 2015-95]
#54 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 46 PART
(LOT ON THIS PLAN: PORTION OF LOT 1)

ZONE: LUG-2

MINIMUM LOT AREA = 80,000 S.F.
MINIMUM LOT FRONTAGE = 150 FEET
MINIMUM YARD SETBACKS
FRONT = 35 FEET
SIDE = 15 FEET
REAR = 15 FEET
ALLOWABLE GROUND COVER % = 4%

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK

Seal: COMMONWEALTH OF MASSACHUSETTS — THOMAS F. WINSLOW #30320 — PROFESSIONAL LAND SURVEYOR — (6-7-2016)

Hayes
0' 50' 100' 200' 300'

DEFINITIVE INDEX SHEET
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887

Engineer
Hayes Engineering, Inc.
603 Salem Street
Wakefield, Mass. 01880
www.hayeseng.com

Scale: 1"= 100'

December 11, 2015

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2	Reduced scope of subdivision plan	5/31/2016
1	Ownership & abutter references	2/29/2016

NANTUCKET PLANNING BOARD

Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

INDEX SHEET

SHEET 1 OF 5

N:\MAN66\Dsk\yline-davkim_R3.dwg, 6/1/2016 4:16:04 PM, TFW

Land Court Plan 16514–Z

N

SKYLINE DRIVE (40 FEET WIDE) (PLAN FILE 11–A)

JOYCE SAVOCA
BOOK 488 PAGE 247
[LOT 41 ON PLAN FILE 11–A]
#37 SKYLINE DRIVE
PROPERTY ID 79 100

GRAHAM M. W. KILVERT REVOCABLE TRUST &
CLAUDIA M. KILVERT REVOCABLE TRUST
BOOK 1471 PAGE 200
[LOT 43 ON PLAN FILE 11–A]
#47 SKYLINE DRIVE
PROPERTY ID 79 101

FRANCIS BALESTER & SUSAN M. BALESTER
BOOK 522 PAGE 327
[LOT A ON PLAN FILE 47–Z]
#36 SKYLINE DRIVE
PROPERTY ID 79 39

WALTER J. GLOWACKI
BOOK 283 PAGE 108
[PORTION OF LOT 52 ON PLAN FILE 11–A]
#13 WOODLAND DRIVE
PROPERTY ID 79 208

RICHMOND GREAT POINT DEVELOPMENT, LLC
LC CERTIFICATE NO. 24872
[LOT 184 ON LC PLAN 16514–Z]
#20 DAVIKIM LANE
PROPERTY ID 68 57

RICHMOND GREAT POINT DEVELOPMENT, LLC
LC CERTIFICATE NO. 24872
[LOT 206 ON LC PLAN 16514–7]
PROPERTY ID 68 56.1

EDWIN A. LEMBERG & MARIE E. LEMBERG
BOOK 1428 PAGE 324
[LOT 42A ON PLAN NO: 2013–69]
#42A SKYLINE DRIVE
PROPERTY ID 79 44 PART

ASHELEE FREDRICKSON & J. LYNN BROOKS
BOOK 1476 PAGE 98 & BOOK 1515 PAGE 5
[LOT 48A ON PLAN NO. 2013–69 &
LOT 54C ON PLAN NO. 2015–95]
#48 SKYLINE DRIVE
PROPERTY ID 79 45 PART

PETER D. KYBURG
BOOK 1515 PAGE 8
[LOT 54A ON PLAN NO. 2015–95]
#54 SKYLINE DRIVE
PROPERTY ID 79 46 PART

GREG W. GLOWACKI
LC CERTIFICATE NO. 18091
[LOT 430 ON LC PLAN 16514–16]
#22 EVERGREEN WAY
PROPERTY ID 68 710

JAMES E. LYDON & NANCE LYDON
LC CERTIFICATE NO. 19175
[LOT 429 ON LC PLAN 16514–16]
#20 EVERGREEN WAY
PROPERTY ID 68 709

BRIAN T. RYDER & LORRI A. RYDER
LC CERTIFICATE NO. 22320
[LOT 428 ON LC PLAN 16514–16]
#18 EVERGREEN WAY
PROPERTY ID 68 708

ROBERT F. WINN & JO–ANN L. WINN
BOOK 531 PAGE 329
[LOT 56 ON PLAN FILE 11–A]
#60 SKYLINE DRIVE
PROPERTY ID 79 48

CLAY STREET
23,188 S.F.

LOT 2
41,354 S.F.
0.949 ACRES
(NOT A SEPARATE BUILDING LOT)

LOT 1
89,716 S.F.
2.060 ACRES
(rf = 0.564)

N:93,691.15
E:1,757,046.19

N:93,926.71
E:1,757,068.85

N:93,299.20
E:1,757,204.37

N:93,290.58
E:1,757,293.96

N:93,586.04
E:1,757,407.78

N:93,828.92
E:1,757,427.08

N:93,807.85
E:1,757,539.63

N:93,248.92
E:1,757,726.96

N:93,763.03
E:1,757,776.43

N05°29'25"E 611.65
375.00
236.65 N05°29'25"E
N05°29'25"E 350.00
N05°29'25"E 70.00
280.00 N05°29'25"E
N05°29'25"E 64.34
120.00 S05°29'25"W
316.13 S05°29'25"W 516.48
N05°29'25"E 200.36

N84°30'35"W 90.00
N84°30'35"W 135.00
N84°30'35"W 110.00
N84°30'35"W 5.00
220.00 N84°30'35"W

R=25.00 L=39.27 Δ=90°00'00"
R=25.00 L=39.27 Δ=90°00'00"

Ch=219.09 Ch Brg=N17°32'25"W Δ=46°03'41" L=225.10 R=280.00

Δ=5°16'36" L=29.01 R=315.00

Δ=30°49'30" L=172.16 R=320.00

L=94.38
L=77.78
L=165.78

N69°53'34"W 1.86.78
182.89 N69°53'34"W
N79°24'41"W 188.06
189.63 N79°24'41"W
S79°24'02"E 114.50
S79°17'16"E 241.00
244.10 N13°59'50"W

N73°18'53"E 139.97 LINE USED FOR REGULARITY FACTOR COMPUTATION (AREA = 84,448 S.F.)

ZONE LINE CN
LUG–2
ZONE LINE CN
LUG–2

10' WIDE ELECTRIC EASEMENT
10' WIDE ELECTRIC EASEMENT
10' WIDE ELECTRIC EASEMENT

5' WIDE SIDEWALK & UTILITY EASEMENT

ROADWAY TURNAROUND EASEMENT (SEE DETAIL)

20' WIDE TEMPORARY SLOPE EASEMENT
20' WIDE TEMPORARY SLOPE EASEMENT

TO BE RAZED

1.5 STORY WOOD HOUSE
EXISTING HOUSE TO BE RAZED OR INCORPORATED INTO ADJACENT LOT

GARAGE
SHED

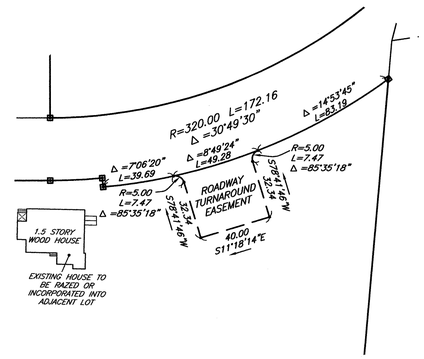
1 STORY WOOD HOUSE #54B

ONE OF THESE EXISTING STRUCTURES TO BE RAZED TO COMPLY WITH ZONING UNLESS THE PRIMARY DWELLING TO THE WEST IS TRANSFERRED TO AN ADJACENT PROPERTY

1 STORY WOOD HOUSE #54A

CBDH (FD)

15.5± 16.8± 155.0± 50.00 51.5± 26.7± 26.6± 22.0± 21.8± 26.6' 25.0'± 53.2± 73.5'



ROADWAY TURNAROUND DETAIL
SCALE: 1" = 40'

NOTES:
1. LOTS SHOWN HEREON COMPLY WITH THE LOT AREA REQUIREMENTS AS PROVIDED IN THE NANTUCKET ZONING BYLAW, CHAPTER 139 ss 2A AND 16A.
2. THE PLANNING BOARD DETERMINES THAT LOTS 1 & 2 DO NOT CONTAIN AREAS SUBJECT TO PROTECTION UNDER THE MASSACHUSETTS PROTECTION ACT WHICH ARE REQUIRED TO BE EXCLUDED FROM LOT AREA UNDER THE NANTUCKET ZONING BY–LAW, BUT STILL MAY BE SUBJECT TO PROTECTION UNDER STATE AND LOCAL WETLAND BYLAWS. DETERMINATION MAY BE OBTAINED THROUGH APPLICATION TO THE CONSERVATION COMMISSION.
3. LOT 2 IS NOT TO BE CONSIDERED A SEPARATE BUILDING LOT BUT IS TO BE HELD IN COMMON OWNERSHIP WITH ADJOINING LAND OF RICHMOND GREAT POINT DEVELOPMENT, LLC.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK

CURRENT OWNERSHIP

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1397 PAGE 312
[LOT 42B ON PLAN NO. 2013–69]
#42 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 44.1
(LOTS ON THIS PLAN: LOT 2, PORTION OF LOT 1 & ROAD)

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1443 PAGE 213
[LOT 48B ON PLAN NO. 2013–69]
#48 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 45.1
(LOTS ON THIS PLAN: PORTION OF LOT 1 & ROAD)

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1454 PAGE 75, BOOK 1514 PAGE 343 & BOOK 1515 PAGE 1
[LOT 54B ON PLAN NO. 2015–95]
#54 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 46 PART
(LOT ON THIS PLAN: PORTION OF LOT 1)

LEGEND

CBDH – CONCRETE BOUND WITH DRILL HOLE
(FD) – FOUND
LC – LAND COURT
rf – REGULARITY FACTOR
⊡ – PROPOSED CONCRETE BOUND WITH DRILL HOLE TO BE SET BY OWNER UNLESS OTHERWISE NOTED

Coordinate System

N 92,823.98
E 1,761,414.97
Massachusetts State Plane Coordinates, Island Zone in US Survey feet based upon Nantucket Primary Airport Control Station designation ACK ARP (PID – AB3245) NAD 83(2011) position.

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

_____ P.L.S.
HAYES ENGINEERING, INC.

ZONE: LUG–2

MINIMUM LOT AREA = 80,000 S.F.
MINIMUM LOT FRONTAGE = 150 FEET
MINIMUM YARD SETBACKS
FRONT = 35 FEET
SIDE = 15 FEET
REAR = 15 FEET
ALLOWABLE GROUND COVER % = 4%

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

Seal: COMMONWEALTH OF MASSACHUSETTS — THOMAS F. WINSLOW #30320 — PROFESSIONAL LAND SURVEYOR
(6-1-2016)

Hayes
0' 20' 40' 80' 120'

DEFINITIVE PLAN
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887

Engineer
Hayes Engineering, Inc.
603 Salem Street
Wakefield, Mass. 01880
www.hayeseng.com

Scale: 1"=40'
December 11, 2015

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2	Reduced scope of subdivision plan	5/31/2016
1	Ownership & abutter references	2/29/2016

NANTUCKET PLANNING BOARD

Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

PLAN SHEET

SHEET 2 OF 5

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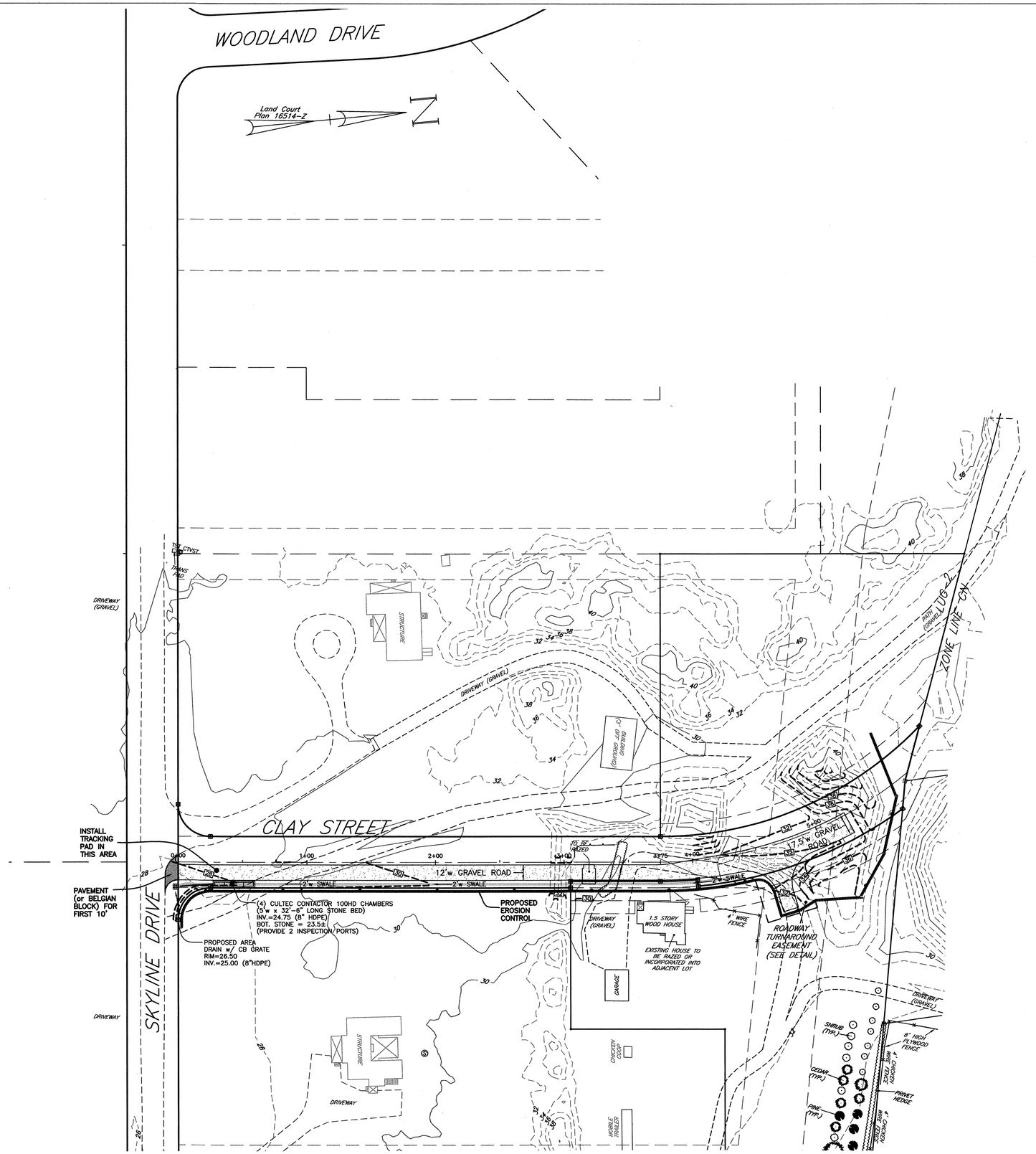

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

_____
HAYES ENGINEERING, INC.

NOTES:

TOPOGRAPHIC INFORMATION DEPICTED ON THIS PLAN COMPILED FROM THE FOLLOWING SOURCES:

ACTUAL FIELD SURVEY BY HAYES ENGINEERING, INC. PERFORMED ON THE FOLLOWING DATES: 12-6-2012, 12-11-2012, 7-18-2013, 7-26-2013, 7-18-2014, 9-22-2014, 10-15-2015, 6-16-2015 and 10-27-2015.

2011 LiDAR SURVEY OF THE NORTHEAST (MASSGIS) FOR OFF SITE INFORMATION

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK

LEGEND OF SYMBOLS AND ABBREVIATIONS

BIT BERM – BITUMINOUS BERM
BW – BARBED WIRE
▦ – CATCH BASIN
CCB – CAPE COD BERM
CLF – CHAIN LINK FENCE
CONC. – CONCRETE
CTVST – CABLE TELEVISION STAND
Ⓓ – DRAIN MANHOLE
ELEC – ELECTRIC
FF – FIRST FLOOR ELEVATION
GF – GARAGE FLOOR ELEVATION
INV. – INVERT
P&R – POST AND RAIL
RET. – RETAINING
RR TIE – RAILROAD TIE
Ⓢ – SEWER MANHOLE
T-POLE – TELEPHONE POLE
TRANS PAD – TRANSFORMER PAD
TST – TELEPHONE STAND
UG – UNDERGROUND
UP 175/30 – UTILITY POLE & NO.
VCC – VERTICAL GRANITE CURB

--42-- – EXISTING CONTOUR LINE
—38— – PROPOSED CONTOUR LINE

ZONE: CN

MINIMUM LOT AREA = 7,500 S.F.
MINIMUM LOT FRONTAGE = 50 FEET
MINIMUM YARD SETBACKS
FRONT = 10 FEET
SIDE = 5 FEET
REAR = 10 FEET
ALLOWABLE GROUND COVER % = 40%

ZONE: LUG-2

MINIMUM LOT AREA = 80,000 S.F.
MINIMUM LOT FRONTAGE = 150 FEET
MINIMUM YARD SETBACKS
FRONT = 35 FEET
SIDE = 15 FEET
REAR = 15 FEET
ALLOWABLE GROUND COVER % = 4%

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

Seal

COMMONWEALTH OF MASSACHUSETTS
PETER J. OGREN
CIVIL
No. 27145
REGISTERED PROFESSIONAL ENGINEER

Hayes
0' 20' 40' 80' 120'

DEFINITIVE TOPOGRAPHIC PLAN
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887

Engineer
Hayes Engineering, Inc.
603 Salem Street
Wakefield, Mass. 01880
www.hayeseng.com

Scale: 1"= 40'

December 11, 2015

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1	Reduced scope of subdivision plan	5/31/2016

NANTUCKET
PLANNING BOARD

Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

TOPOGRAPHIC SHEET

SHEET 3 OF 5

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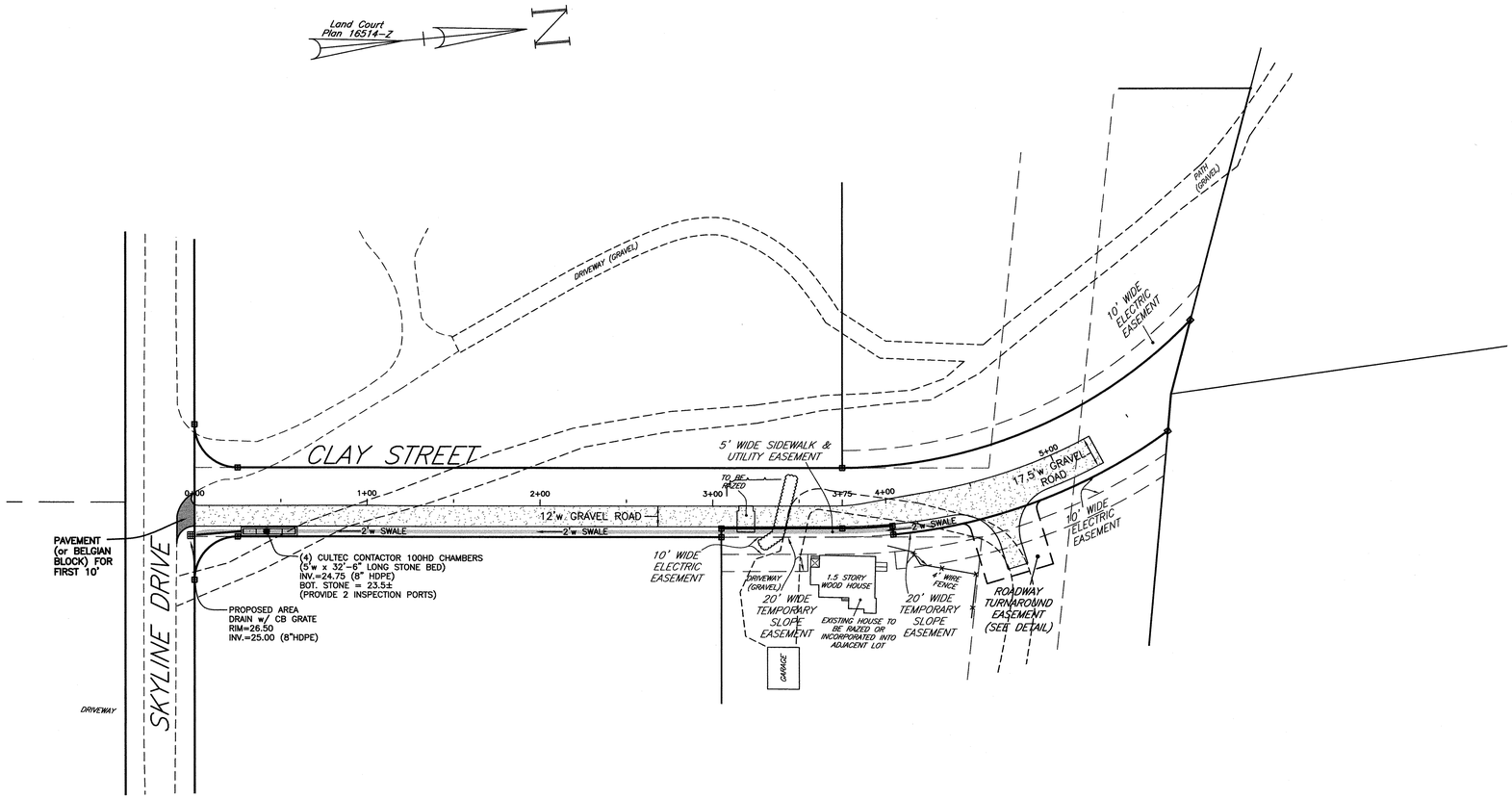

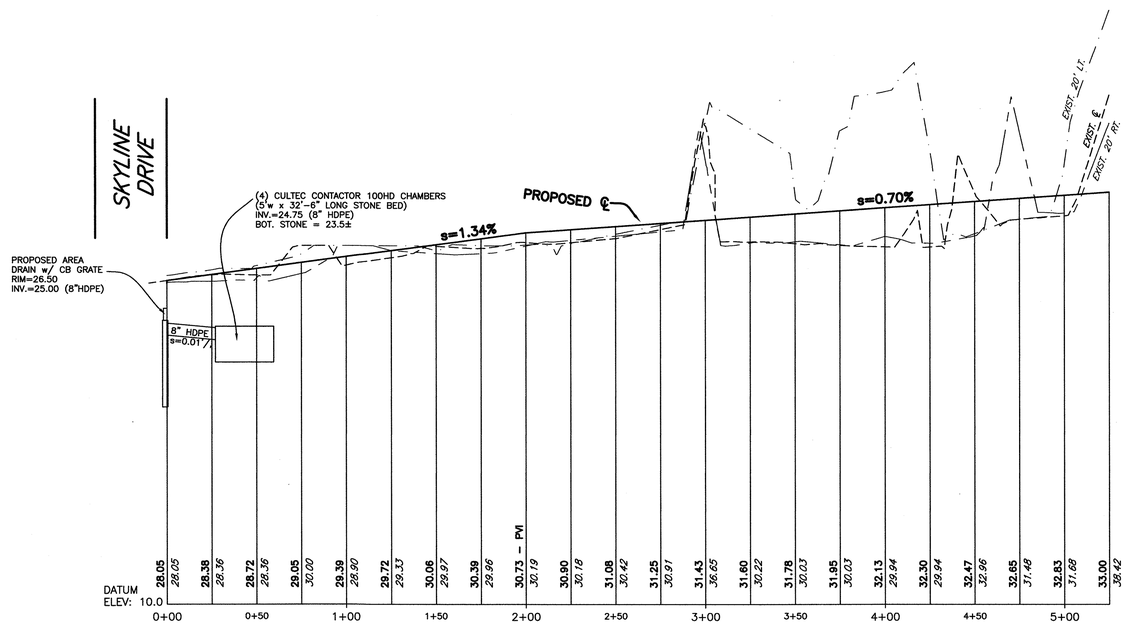

CLAY STREET

LEGEND

CBDH – CONCRETE BOUND WITH DRILL HOLE

(FD) – FOUND

LC – LAND COURT

rf – REGULARITY FACTOR

⊡ – PROPOSED CONCRETE BOUND WITH DRILL HOLE TO BE SET BY OWNER UNLESS OTHERWISE NOTED

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

_____
HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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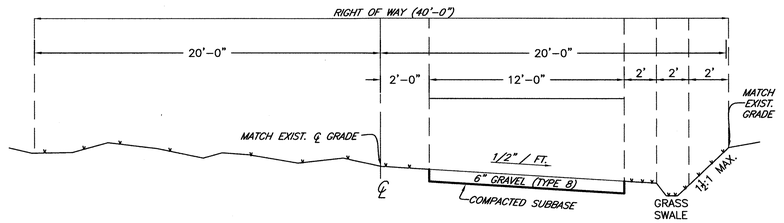
_____
TOWN CLERK



TYPE B: 6-inch stabilized and compacted fill consisting of 35% dense-graded crushed stone and 65% crushed stone fines and silts. (See Appendix A and Plate No. 6)

TYPICAL SECTION
MODIFIED STABILIZED GRAVEL ROAD
NOT TO SCALE

ZONE: CN

MINIMUM LOT AREA = 7,500 S.F.
MINIMUM LOT FRONTAGE = 50 FEET
MINIMUM YARD SETBACKS
FRONT = 10 FEET
SIDE = 5 FEET
REAR = 10 FEET
ALLOWABLE GROUND COVER % = 40%

ZONE: LUG-2

MINIMUM LOT AREA = 80,000 S.F.
MINIMUM LOT FRONTAGE = 150 FEET
MINIMUM YARD SETBACKS
FRONT = 35 FEET
SIDE = 15 FEET
REAR = 15 FEET
ALLOWABLE GROUND COVER % = 4%

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

Seal
COMMONWEALTH OF MASSACHUSETTS
PETER J OGREN
CIVIL
No. 27145
REGISTERED PROFESSIONAL ENGINEER

Hayes
0' 20' 40' 80' 120'

DEFINITIVE PLAN & PROFILE
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887

Engineer
Hayes Engineering, Inc.
603 Salem Street
Wakefield, Mass. 01880
www.hayeseng.com

Scale: 1"= 40'(HOR.) & 4'(VER.)
December 11, 2015

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1	Reduced scope of subdivision plan	5/31/2016

NANTUCKET
PLANNING BOARD

_____
_____
_____
_____
_____

Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

PROFILE SHEET

SHEET 4 OF 5

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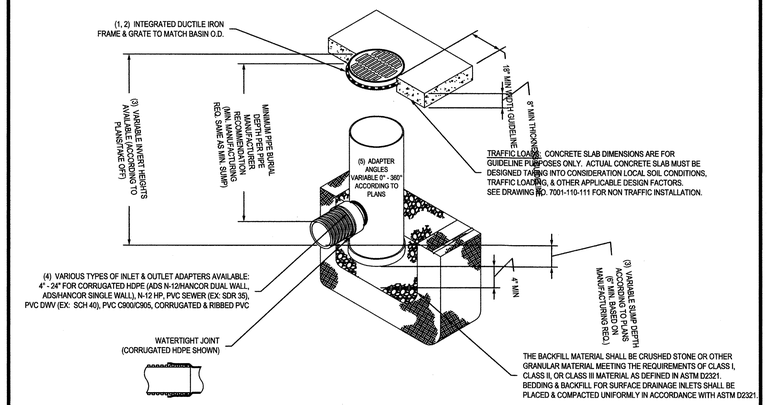
NYLOPLAST 24" DRAIN BASIN: 2824AG _ _X



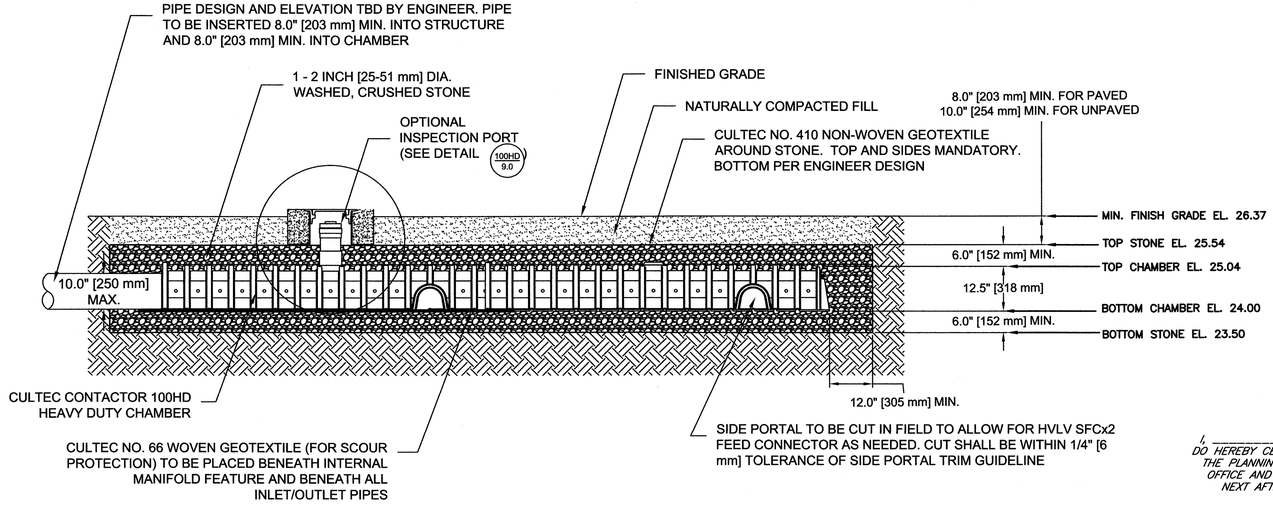
1 - GRATE/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP & PVC SEWER.
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

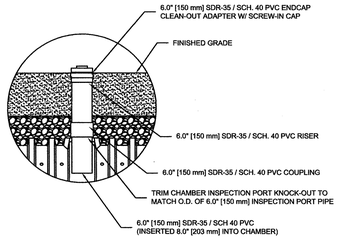
DRAWN BY	EBC	MATERIAL	
DATE	04-03-06		
REVISED BY	NMH	PROJECT NO./NAME	
DATE	03-14-16		
DWG SIZE	A	SCALE 1:40	SHEET 1 OF 1

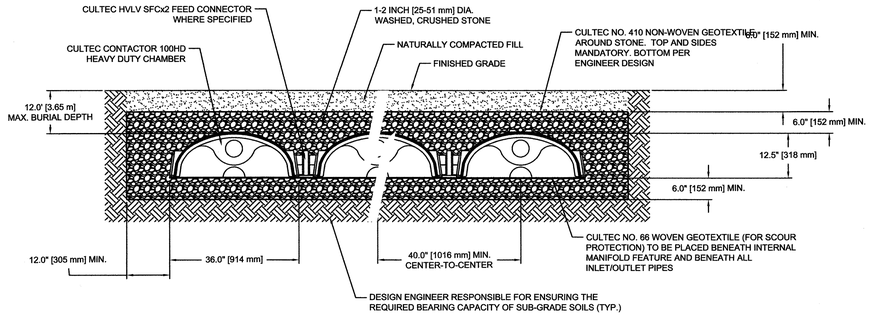
Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

TITLE
24 IN DRAIN BASIN QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-102 REV E





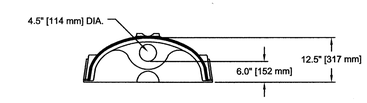


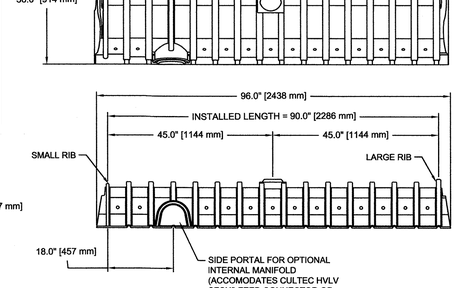
GENERAL NOTES

CONTACTOR 100HD BY CULTEC, INC. OF BROOKFIELD, CT.
STORAGE PROVIDED = 3.84 CF/FT [0.82 ㎥/3] PER DESIGN UNIT.
REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
MAXIMUM ALLOWED COVER ON TOP OF UNIT SHALL BE 12.0' [3.66 m]
THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS

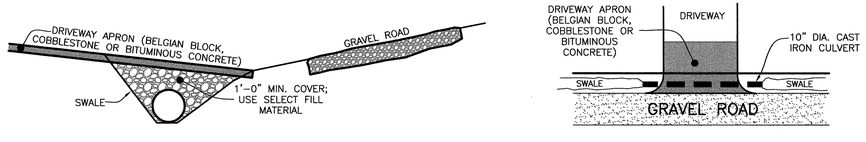
WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.ALL CONTACTOR 100HD HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER. ALL CONTACTOR 100 CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

MODEL 100RHD STARTER	
SMALL RIB	LARGE RIB
MODEL 100EHD MIDDLE/END	
SMALL RIB	LARGE RIB



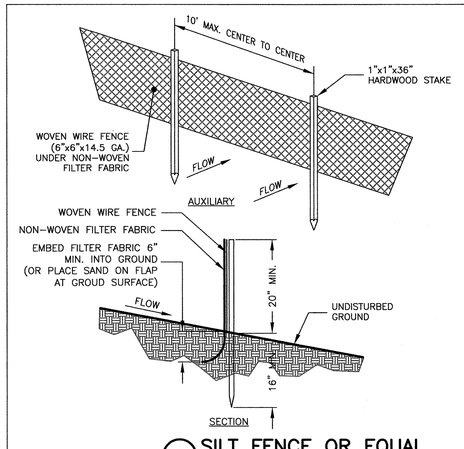


CULTEC CONTACTOR 100HD CHAMBER STORAGE = 1.866 CF/FT [0.173 ㎥/m]
INSTALLED LENGTH ADJUSTMENT = 0.5' [0.15 m]
ALL CONTACTOR 100HD HEAVY DUTY UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.



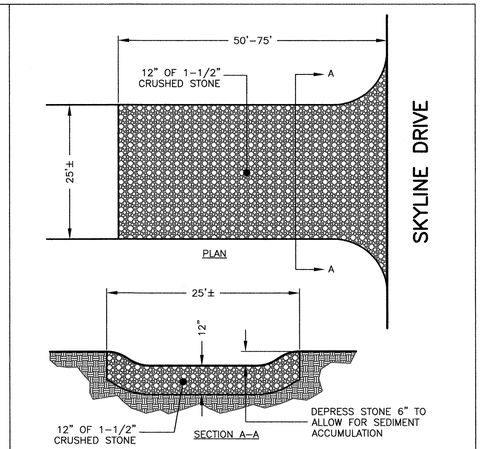
DRIVEWAY CULVERT DETAIL
NOT TO SCALE

NOTE:
USE AS NEEDED FOR EXISTING DRIVEWAYS CROSSING THE DRAINAGE SWALE



SILT FENCE OR EQUAL
NOT TO SCALE

NOTES:
1. WOVEN WIRE FENCE (6"X6"X14.5 GA.) UNDER NON-WOVEN FILTER FABRIC TO BE USED AT ALL WETLAND CROSSINGS AND ALL AREAS WITHIN 25' OF THE WETLAND LINE. ALL OTHER LOCATIONS THE FILTER FABRIC TO BE UV RESISTANT POLYPROPYLENE WITH A MINIMUM WEIGHT OF 2.5 OZ./SY.
2. USE MULTIPLE ROWS OF SILT FENCE FOR LONG STEEP SLOPES IF NECESSARY.



TIRE TRACKING PAD
NOT TO SCALE

NOTE:
PROVIDE TRANSITION BETWEEN CONSTRUCTION ENTRANCE AND PUBLIC RIGHT-OF-WAY. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OF SEDIMENT INTO PUBLIC RIGHT-OF-WAY

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

_____
HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK

EROSION CONTROL NOTES:

1) EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED IN ACCORDANCE WITH, AS UPDATED FROM TIME TO TIME, THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, A GUIDE FOR PLANNERS, DESIGNERS AND MUNICIPAL OFFICIALS", PREPARED FOR FRANKLIN, HAPDEN, HAMPSHIRE CONSERVATION DISTRICTS DATED MARCH 1997 REPRINTED MAY 2003.

2) A "SILT SACK", OR ITS APPROVED EQUIVALENT SHALL BE INSTALLED AND MAINTAINED AT NEW CATCH BASINS STRUCTURES DURING CONSTRUCTION.

3) DURING CONSTRUCTION ON DRY AND WINDY DAYS WHEN POTENTIAL DUST CONDITIONS MAY BE OF CONCERN, EXPOSED SOIL TO BE SPRAYED WITH WATER TO CONTROL DUST.

4) DURING CONSTRUCTION SKYLINE DRIVE AND DAVKIM LANE TO BE MONITORED FOR SEDIMENT AND SHOULD BE SWEPT AS NECESSARY.

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1	Reduced scope of subdivision plan	5/31/2016

Seal: COMMONWEALTH OF MASSACHUSETTS — PETER J. OGREN — CIVIL — No. 27145 — REGISTERED PROFESSIONAL ENGINEER

Hayes
0' 20' 40' 80' 120'

DETAIL SHEET
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887

Engineer
Hayes Engineering, Inc.
603 Salem Street
Wakefield, Mass. 01880
www.hayeseng.com

Scale: 1"=N.T.S.
December 11, 2015

NANTUCKET PLANNING BOARD

Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

DETAIL SHEET

SHEET 5 OF 5

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