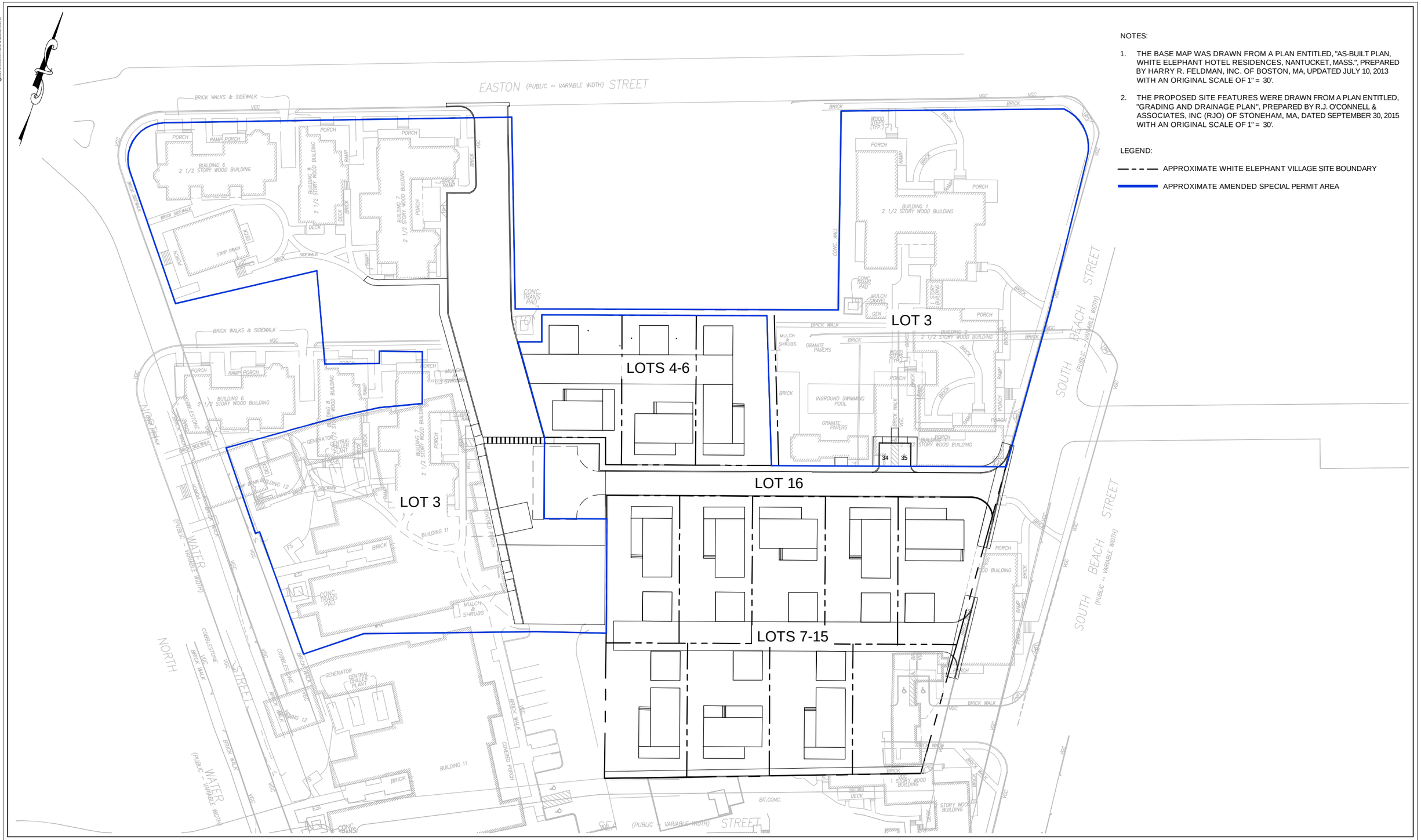
TABLES

	Total Area	Pavement & Roof	Brick or Gravel	Lawn & Shrubs
Total Site Area (sq-ft)	111771	44708	16766	50297
Total Site Area (acres)	2.57	1.03	0.38	1.15
CN Numbers		98	76	49

	Total Area	Pavement & Roof	Brick or Gravel	Lawn & Shrubs
Total Site Area (sq-ft)	111,771			
Total Site Area (acres)	2.57			
CN Numbers		98	76	49
Subcatchment Number				
C1	13,706	6,768	1,583	5,355
C2	6,456	3,885	891	1,680
C3	10,568	4,221	765	5,582
C4	13,356	10,571	1,066	1,719
C5	13,898	10,863	772	2,263
C6	22,419	8,050	8,477	5,892
Pool	900	Pool area excluded from model		
C7	4,433	4,433	0	0
C8	13,361	113	1,762	11,486
C9	12,674	Infiltrated area excluded from model		
Total Modeled Area (sq-ft)	98,197	48,904	15,316	33,977
Total Modeled Area (acres)	2.25	1.12	0.35	0.78

FIGURES



NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "AS-BUILT PLAN, WHITE ELEPHANT HOTEL RESIDENCES, NANTUCKET, MASS.", PREPARED BY HARRY R. FELDMAN, INC. OF BOSTON, MA, UPDATED JULY 10, 2013 WITH AN ORIGINAL SCALE OF 1" = 30'.
2. THE PROPOSED SITE FEATURES WERE DRAWN FROM A PLAN ENTITLED, "GRADING AND DRAINAGE PLAN", PREPARED BY R.J. O'CONNELL & ASSOCIATES, INC (RJO) OF STONEHAM, MA, DATED SEPTEMBER 30, 2015 WITH AN ORIGINAL SCALE OF 1" = 30'.

LEGEND:

APPROXIMATE WHITE ELEPHANT VILLAGE SITE BOUNDARY

APPROXIMATE AMENDED SPECIAL PERMIT AREA

SANBORN HEAD

GRAPHICAL SCALE

30' 15' 0' 30' 60'

NO.	DATE	DESCRIPTION	BY

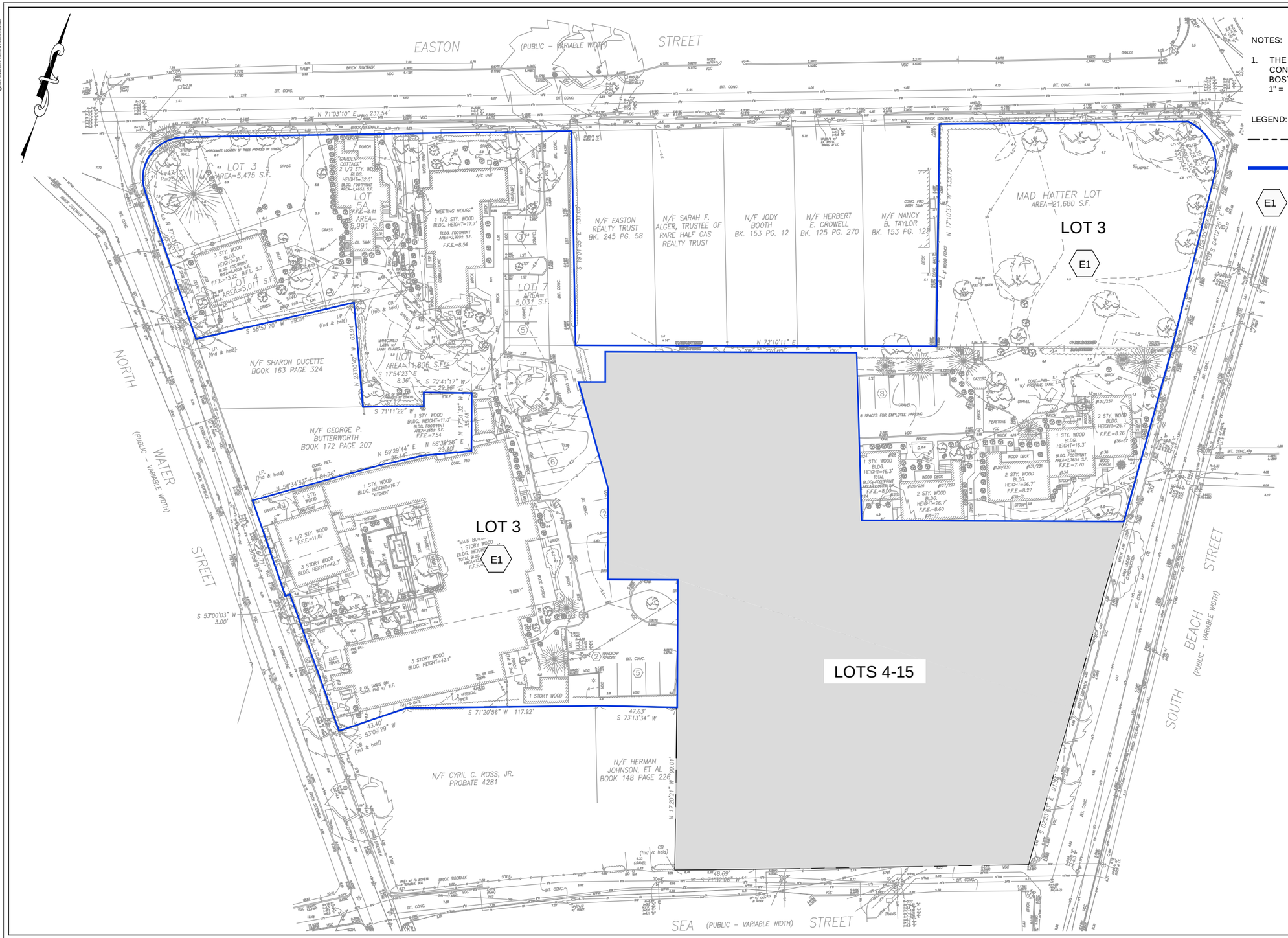
DRAWN BY: C.GREEN
DESIGNED BY: A.SANTAMARIA
REVIEWED BY: V.KOKOSA
PROJECT MGR: L.NORTON
PIC: D.WOOD
DATE: JUNE 2016

STORMWATER MANAGEMENT REPORT
WHITE ELEPHANT VILLAGE
NANTUCKET, MASSACHUSETTS

SITE PLAN

PROJECT NUMBER: 2495.04

SHEET NUMBER: 1



NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "EXISTING CONDITIONS PLAN", PREPARED BY FELDMAN LAND SURVEYORS OF BOSTON, MA, DATED NOVEMBER 1, 2005 WITH AN ORIGINAL SCALE OF 1" = 30'.

LEGEND:

- APPROXIMATE WHITE ELEPHANT VILLAGE SITE BOUNDARY
- APPROXIMATE AMENDED SPECIAL PERMIT AREA
- E1 — APPROXIMATE AMENDED SPECIAL PERMIT AREA SUBCATCHMENT AREA

SANBORN HEAD

GRAPHICAL SCALE
30' 15' 0' 30' 60'

NO.	DATE	DESCRIPTION	BY

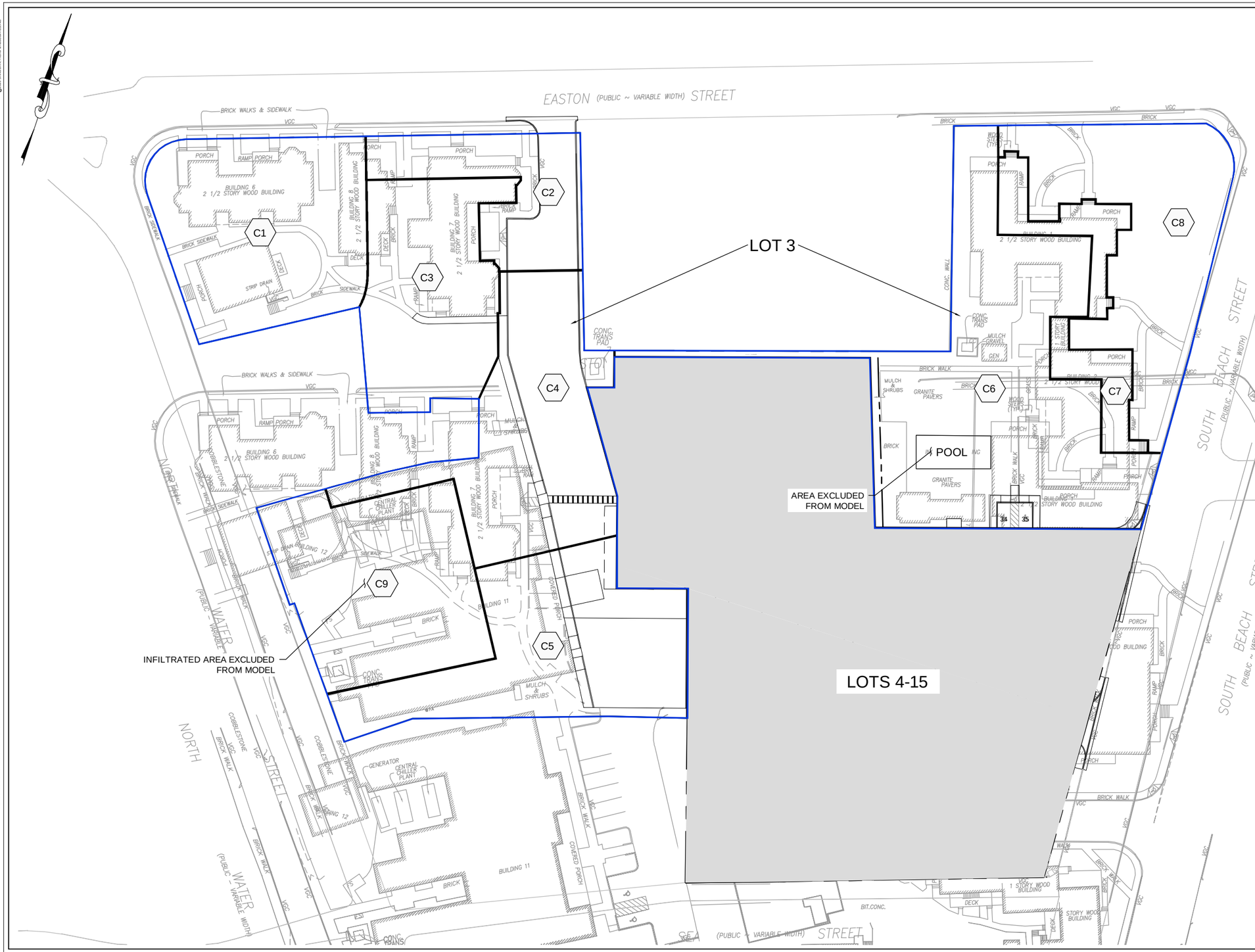
DRAWN BY: C.GREEN
DESIGNED BY: A.SANTAMARIA
REVIEWED BY: V.KOKOSA
PROJECT MGR: L.NORTON
PIC: D.WOOD
DATE: JUNE 2016

STORMWATER MANAGEMENT REPORT
WHITE ELEPHANT VILLAGE
NANTUCKET, MASSACHUSETTS

EXISTING CONDITIONS PLAN

PROJECT NUMBER: 2495.04

SHEET NUMBER: 2



NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "AS-BUILT PLAN, WHITE ELEPHANT HOTEL RESIDENCES, NANTUCKET, MASS.", PREPARED BY HARRY R. FELDMAN, INC. OF BOSTON, MA, UPDATED JULY 10, 2013 WITH AN ORIGINAL SCALE OF 1" = 30'.
2. THE PROPOSED SITE FEATURES WERE DRAWN FROM A PLAN ENTITLED, "GRADING AND DRAINAGE PLAN", PREPARED BY R.J. O'CONNELL & ASSOCIATES, INC (RJO) OF STONEHAM, MA, DATED SEPTEMBER 30, 2015 WITH AN ORIGINAL SCALE OF 1" = 30'.

LEGEND:

- APPROXIMATE WHITE ELEPHANT VILLAGE SITE BOUNDARY
- APPROXIMATE AMENDED SPECIAL PERMIT AREA
- C1 — APPROXIMATE AMENDED SPECIAL PERMIT AREA SUBCATCHMENT AREA

SANBORN HEAD

GRAPHICAL SCALE
30' 15' 0' 30' 60'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: A.SANTAMARIA
REVIEWED BY: V.KOKOSA
PROJECT MGR: L.NORTON
PIC: D.WOOD
DATE: JUNE 2016

STORMWATER MANAGEMENT REPORT
WHITE ELEPHANT VILLAGE
NANTUCKET, MASSACHUSETTS

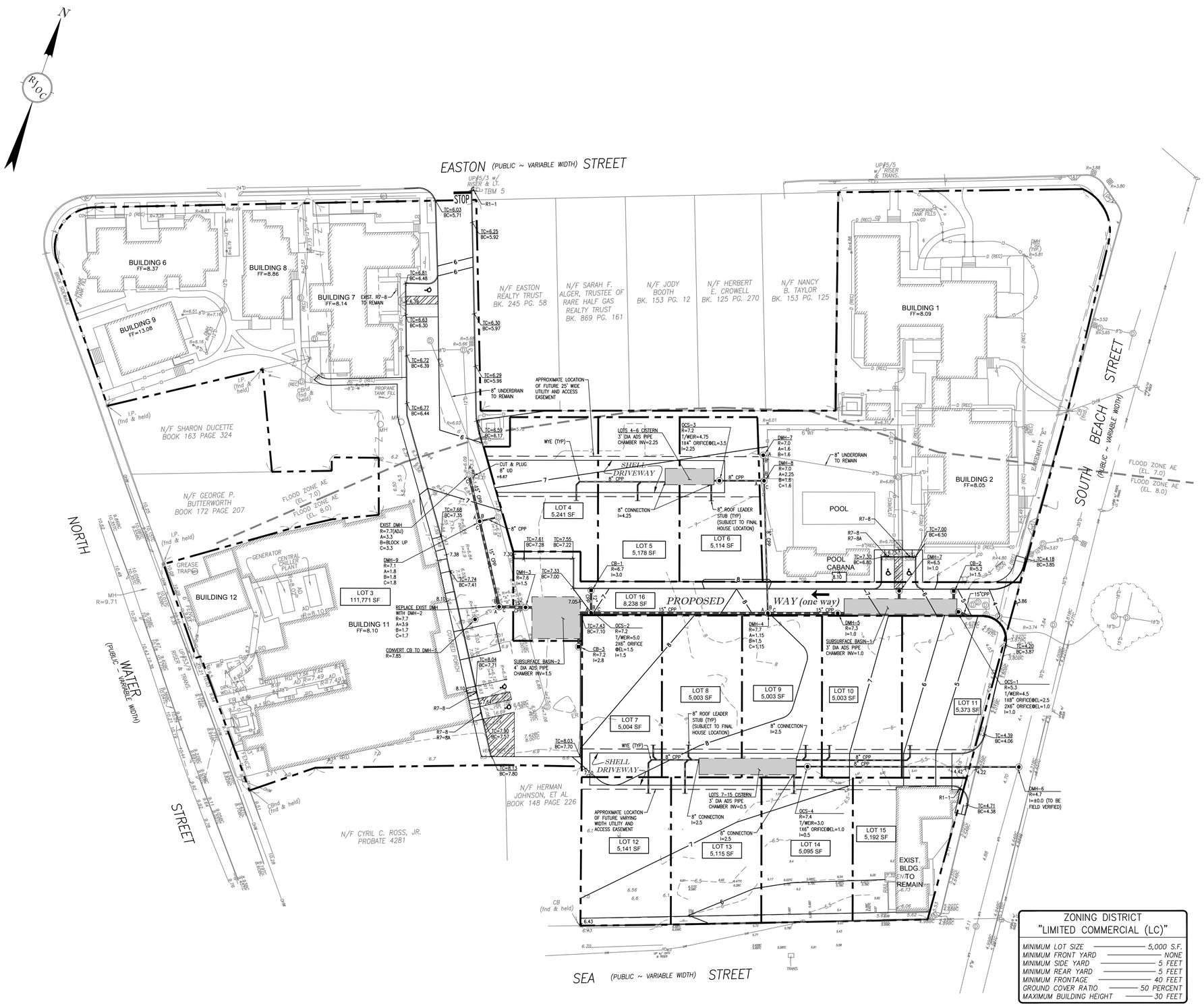
PROPOSED CONDITIONS PLAN

PROJECT NUMBER: 2495.04

SHEET NUMBER: 3

APPENDIX A

COPY OF C-2, GRADING & DRAINAGE PLAN, AND C-7, DRAINAGE DETAILS – 2, PREPARED BY RJ O'CONNELL



LEGEND

EXISTING		PROPOSED
dhCB	CONCRETE BOUND WITH DRILLHOLE FOUND	
dh	DRILLHOLE IN CURB FOUND	
I-PIPE	IRON PIPE FOUND	
R+C	REBAR AND CAP FOUND	
	CATCHBASIN	
	DRAIN MANHOLE	
—D—	DRAINAGE LINE	
SRF	SPLIT RAIL FENCE	
PF	PICKET FENCE	
	STONEWALL	
VGC	VERTICAL GRANITE CURB	
TC=8.1	TOP OF CURB ELEVATION	TC=6.25 BC=5.75
BC=7.9	BOTTOM OF CURB ELEVATION	
B.W.	BAY WINDOW	
x5.6	GRADE SPOT ELEVATION	5.60
5	GRADE CONTOUR LINE	7
	HYDRANT	
	WATER VALVE	
	WATER METER	
	WATER SHUTOFF	
—W—	WATER LINE	
—S—	SEWER LINE	
	SEWER MANHOLE	
EHH	ELECTRIC HANDHOLE	
TEL	TELEPHONE PEDESTAL	
	UTILITY POLE	
OHW	OVERHEAD WIRES	
	SIGN	

ZONING COMPLIANCE

(A) LOTS 3 THROUGH 16 ARE SUBJECT IN PART TO PROTECTION UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT, BUT CONTAIN SUFFICIENT LOT AREA, AS DEFINED IN THE NANTUCKET ZONING BYLAW, TO COMPLY WITH APPLICABLE ZONING REQUIREMENTS. A NOTICE OF INTENT MAY BE REQUIRED TO BE FILED WITH THE NANTUCKET CONSERVATION COMMISSION WITH REGARD TO PROPOSED CONSTRUCTION OF SUCH LOTS.

ZONING DISTRICT "LIMITED COMMERCIAL (LC)"

MINIMUM LOT SIZE	5,000 S.F.
MINIMUM FRONT YARD	NONE
MINIMUM SIDE YARD	5 FEET
MINIMUM REAR YARD	5 FEET
MINIMUM FRONTAGE	40 FEET
GROUND COVER RATIO	50 PERCENT
MAXIMUM BUILDING HEIGHT	30 FEET

HEIGHT LIMITATION: SEC. 139-17A DEFINED AS 30 FT.

OWNER OF RECORD: NANTUCKET ISLAND RESORTS LLC
ENGINEER OF RECORD: R.J. O'CONNELL & ASSOCIATES, INC.
SURVEYOR OF RECORD: FELDMAN LAND SURVEYORS

30 0 15 30 60
GRAPHIC SCALE IN FEET

Nantucket Planning Board

APPROVAL UNDER THE SUBDIVISION CONTROL LAW REQUIRED

Barry Rector, Chairman

Linda Williams, Vice Chairman

Joseph Marcklinger

John McLaughlin

Nathaniel Lowell

DATE APPROVED: _____

DATE ENDORSED: _____

PLANNING BD. FILE NO.: _____

No.	Revision	Date
1.	REVISED PER PEER REVIEW COMMENTS	11/25/2015
2.	DEFINITIVE SUBDIVISION PLAN SUBMISSION	10/08/2015

Location
19 NORTH WATER STREET
NANTUCKET, MA

ASSESSORS MAPS:
42.4.2 1, PARCEL 29
42.4.2 3, PARCEL 19
42.4.1 32, PARCEL 72

Seal:

Designed by:	JTA
Drawn by:	MCR
Checked by:	JTA
Scale:	1"=30'
Date:	10/08/2015

Prepared for:
NANTUCKET ISLAND RESORTS
10 AMELIA DRIVE
NANTUCKET, MA 02554
508-325-1000

Prepared by:
RJO'CONNELL & ASSOCIATES, INC.
CIVIL ENGINEERS, SURVEYORS & LAND PLANNERS
80 MONTVALE AVE
STONEHAM, MA 02180
781-279-0180
FAX: 781-279-0173

Project Name:
DEFINITIVE PLAN FOR THE SUBDIVISION OF LAND
WHITE ELEPHANT VILLAGE
PROPOSED WAY
NANTUCKET, MA

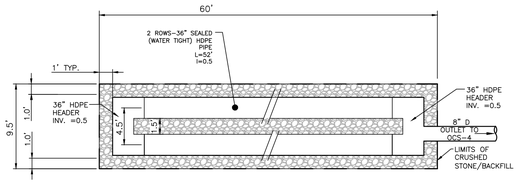
Drawing Name:
GRADING AND DRAINAGE PLAN

Drawing No.:
C-2

Project No.: 13052

Copyright © 2015 by R.J. O'Connell & Associates, Inc.

Drawing name: G:\MA\Nantucket\NED\White Elephant Phase III\Main\Definitive Subdivision\13052_C-2 GRADING & DRAINAGE.dwg
Nov 24, 2015 - 16:28pm

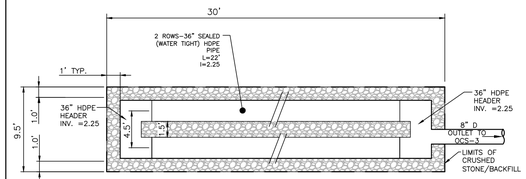


NOTE:

1. PROPOSED HOUSE ROOF DOWNSPOUTS FROM LOTS 7-15 TO BE CONNECTED TO CISTERN.

7 LOTS 7-15 CISTERN LAYOUT

SCALE: N.T.S.

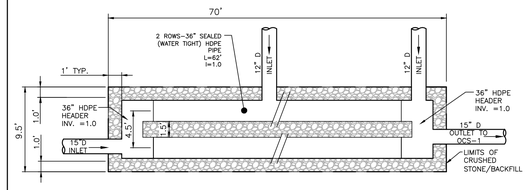


NOTE:

1. PROPOSED HOUSE ROOF DOWNSPOUTS FROM LOTS 4-6 TO BE CONNECTED TO CISTERN.

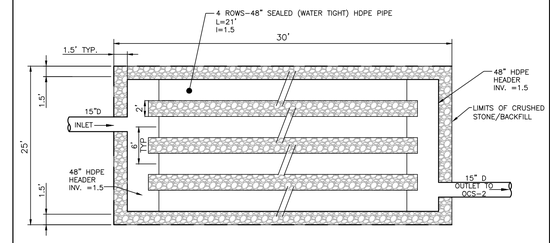
7 LOTS 4-6 CISTERN LAYOUT

SCALE: N.T.S.



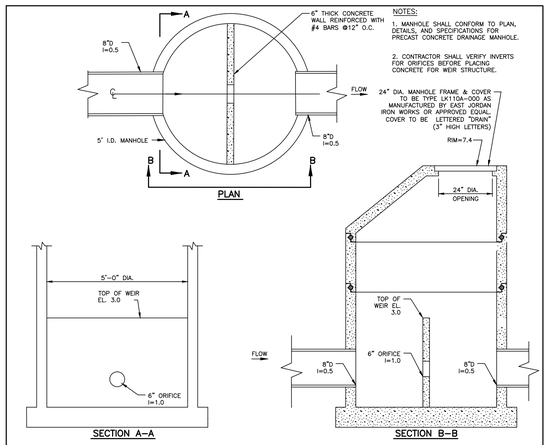
4 SUBSURFACE DETENTION BASIN #1 LAYOUT

SCALE: N.T.S.



1 SUBSURFACE DETENTION BASIN #2 LAYOUT

SCALE: N.T.S.



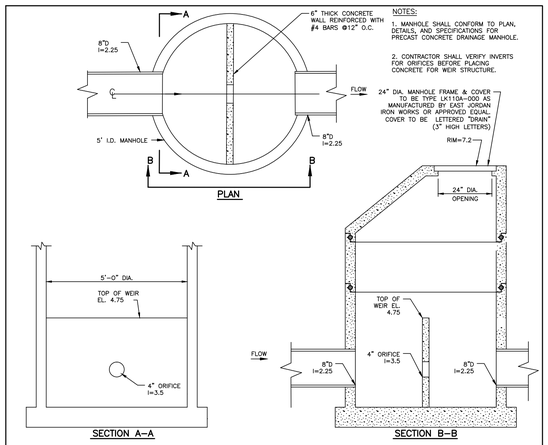
NOTES:

1. MANHOLE SHALL CONFORM TO PLAN, DETAILS, AND SPECIFICATIONS FOR PRECAST CONCRETE DRAINAGE MANHOLE.

2. CONTRACTOR SHALL VERIFY INVERTS FOR ORIFICES BEFORE PLACING CONCRETE FOR WEIR STRUCTURE.

8 OUTLET CONTROL MANHOLE (OCS-4) FOR LOTS 7-15 CISTERN

SCALE: N.T.S.



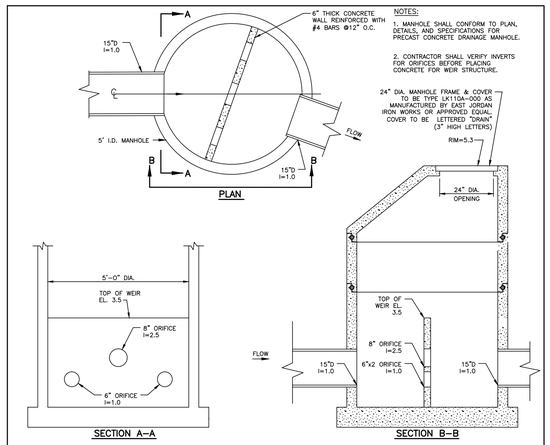
NOTES:

1. MANHOLE SHALL CONFORM TO PLAN, DETAILS, AND SPECIFICATIONS FOR PRECAST CONCRETE DRAINAGE MANHOLE.

2. CONTRACTOR SHALL VERIFY INVERTS FOR ORIFICES BEFORE PLACING CONCRETE FOR WEIR STRUCTURE.

8 OUTLET CONTROL MANHOLE (OCS-3) FOR LOTS 4-6 CISTERN

SCALE: N.T.S.



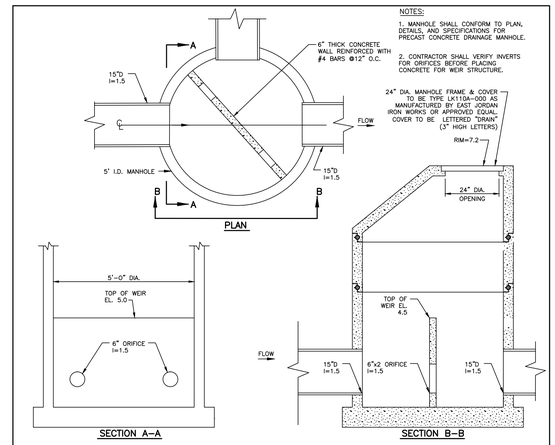
NOTES:

1. MANHOLE SHALL CONFORM TO PLAN, DETAILS, AND SPECIFICATIONS FOR PRECAST CONCRETE DRAINAGE MANHOLE.

2. CONTRACTOR SHALL VERIFY INVERTS FOR ORIFICES BEFORE PLACING CONCRETE FOR WEIR STRUCTURE.

5 OUTLET CONTROL MANHOLE (OCS-1) FOR SUBSURFACE DETENTION BASIN #1

SCALE: N.T.S.



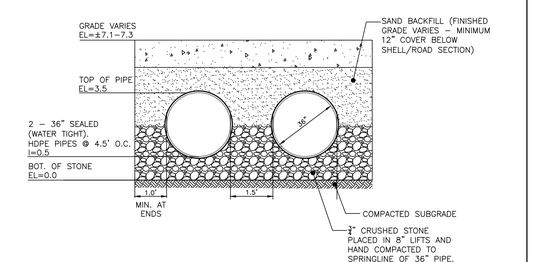
NOTES:

1. MANHOLE SHALL CONFORM TO PLAN, DETAILS, AND SPECIFICATIONS FOR PRECAST CONCRETE DRAINAGE MANHOLE.

2. CONTRACTOR SHALL VERIFY INVERTS FOR ORIFICES BEFORE PLACING CONCRETE FOR WEIR STRUCTURE.

2 OUTLET CONTROL MANHOLE (OCS-2) FOR SUBSURFACE DETENTION BASIN #2

SCALE: N.T.S.

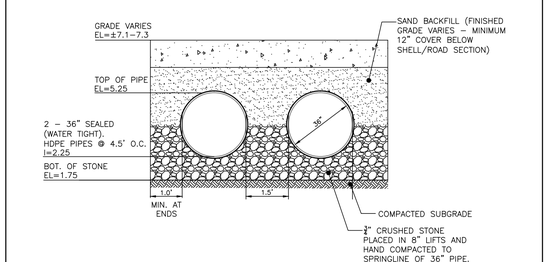


NOTE:

1. CISTERN TO BE CONNECTED TO INDIVIDUAL DESIGN/BUILD IRRIGATION SYSTEMS FOR LOTS 7-15.

9 TYPICAL BACKFILL SECTION - LOTS 7-15 CISTERN

SCALE: N.T.S.

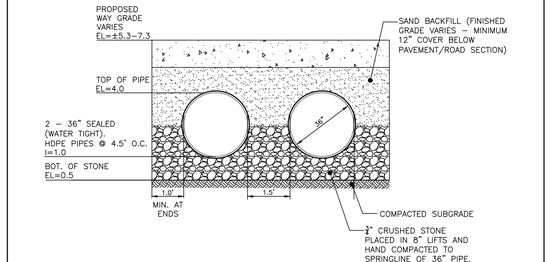


NOTE:

1. CISTERN TO BE CONNECTED TO INDIVIDUAL DESIGN/BUILD IRRIGATION SYSTEMS FOR LOTS 4-6.

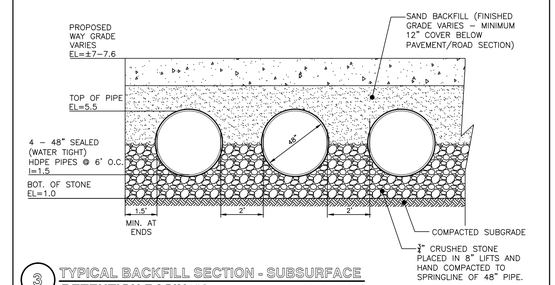
9 TYPICAL BACKFILL SECTION - LOTS 4-6 CISTERN

SCALE: N.T.S.



6 TYPICAL BACKFILL SECTION - SUBSURFACE DETENTION BASIN #1

SCALE: N.T.S.



3 TYPICAL BACKFILL SECTION - SUBSURFACE DETENTION BASIN #2

SCALE: N.T.S.

NOTES:

1. THE UNDERGROUND STORAGE AREA SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.

2. WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER.

3. MINIMUM BEDDING THICKNESS SHALL BE 6-INCHES.

4. FOR LOCATION OF SUBSURFACE DETENTION AND CISTERN AREAS, SEE DWG. C-2.

5. PIPES AND MANIFOLDS SHALL BE HDPE (HIGH DENSITY POLYETHYLENE PIPE) N-12 HC WITH WT JOINTS PER ASTM D-3212 AS MANUFACTURED BY ADS.

Nantucket Planning Board

APPROVAL UNDER THE SUBDIVISION CONTROL LAW REQUIRED

Barry Rector, Chairman

Linda Williams, Vice Chairman

Joseph Marcklinger

John McLaughlin

Nathaniel Lowell

DATE APPROVED: _____

DATE ENDORSED: _____

PLANNING BD. FILE NO.: _____

No.	Revision	Date
1.	DEFINITIVE SUBDIVISION PLAN SUBMISSION	10/08/2015

Location
19 NORTH WATER STREET
NANTUCKET, MA

ASSESSORS MAPS:
42.4.2 1, PARCEL 29
42.4.2 3, PARCEL 19
42.4.1 32, PARCEL 72

Seal:

Designed by:	JTA
Drawn by:	MCR
Checked by:	JTA
Scale:	N.T.S.
Date:	10/08/2015

Prepared for:
NANTUCKET ISLAND RESORTS
10 AMELIA DRIVE
NANTUCKET, MA 02554
508-325-1000

Prepared by:
RJO'CONNELL & ASSOCIATES, INC.
CIVIL ENGINEERS, SURVEYORS & LAND PLANNERS
80 MONTVALE AVE
STONEHAM, MA 02180
781-279-0180
FAX: 781-279-0173

Project Name:
DEFINITIVE PLAN FOR THE SUBDIVISION OF LAND
WHITE ELEPHANT VILLAGE
PROPOSED WAY
NANTUCKET, MA

Drawing Name:
DRAINAGE DETAILS - 2

Drawing No.:
C-7

Project No.: 13052

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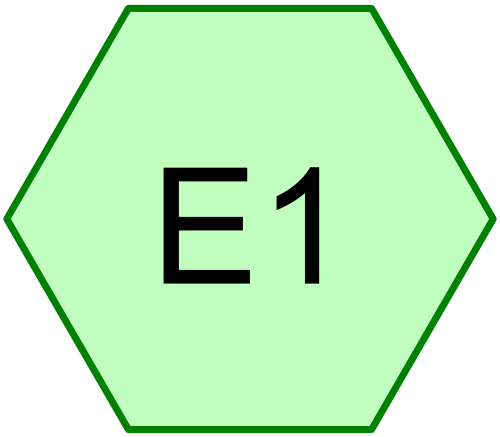
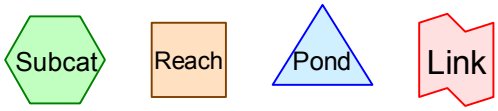
Drawing name: G:\MA\Nantucket\WED\White Elephant Phase III\Main\Definitive Subdivision\13052_C-7 DRAINAGE DETAILS-2.dwg
Oct 09, 2015 - 10:49am

APPENDIX B

EXISTING CONDITIONS MODEL
HYDROCAD OUTPUT



Special Permit Area



Routing Diagram for 20151003 Special Permit Existing
Prepared by Sanborn, Head & Associates, Inc.
HydroCAD® 10.00-13 s/n 00705 © 2014 HydroCAD Software Solutions LLC

Summary for Subcatchment E1: Special Permit Area

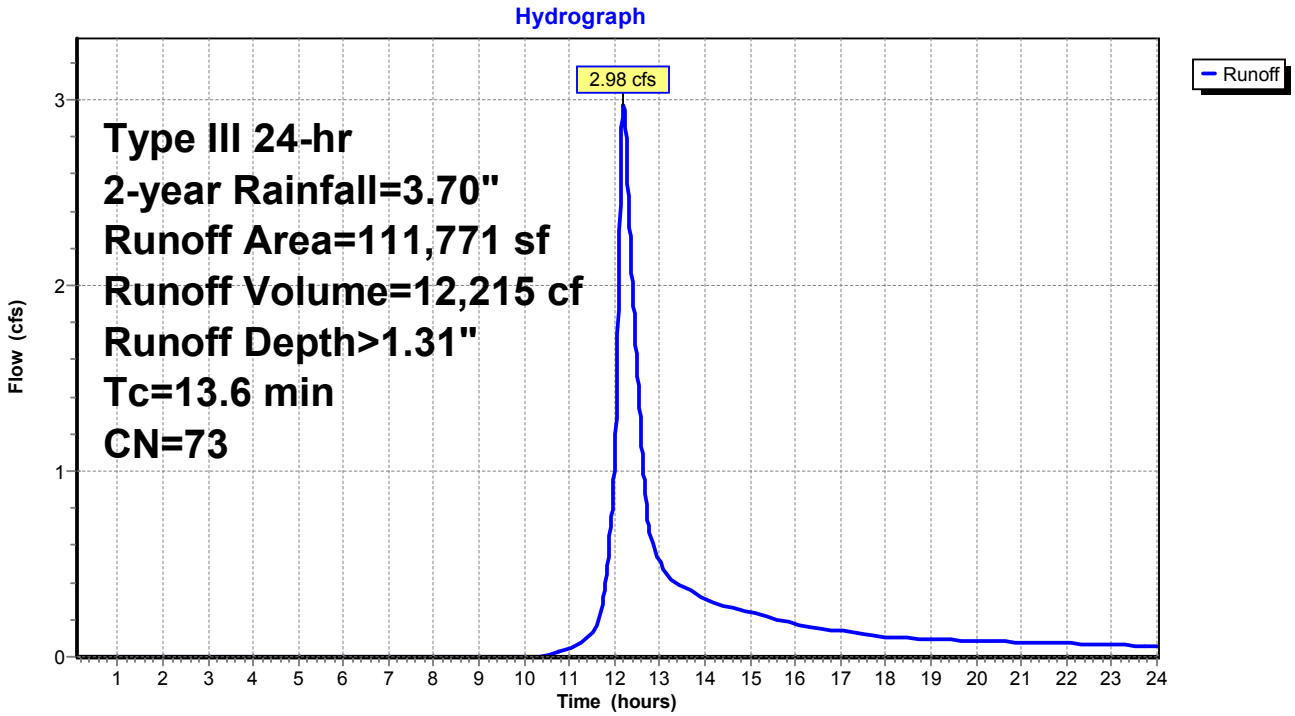
Runoff = 2.98 cfs @ 12.20 hrs, Volume= 12,215 cf, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.70"

	Area (sf)	CN	Description
*	44,708	98	Pavement & Roofs
*	16,766	76	Gravel & Bricks
*	50,297	49	Lawns & Shrubs
	111,771	73	Weighted Average
	67,063		60.00% Pervious Area
	44,708		40.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6					**Direct Entry,**

Subcatchment E1: Special Permit Area



Summary for Subcatchment E1: Special Permit Area

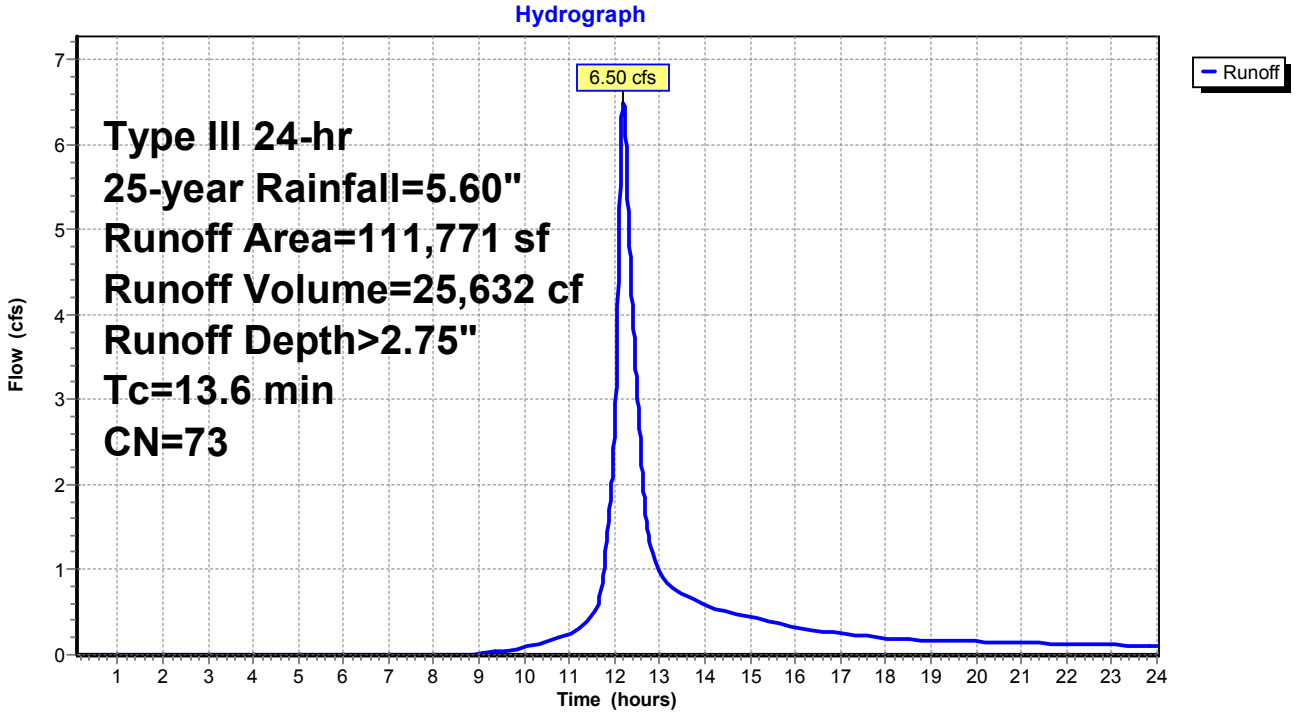
Runoff = 6.50 cfs @ 12.19 hrs, Volume= 25,632 cf, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.60"

	Area (sf)	CN	Description
*	44,708	98	Pavement & Roofs
*	16,766	76	Gravel & Bricks
*	50,297	49	Lawns & Shrubs
	111,771	73	Weighted Average
	67,063		60.00% Pervious Area
	44,708		40.00% Impervious Area

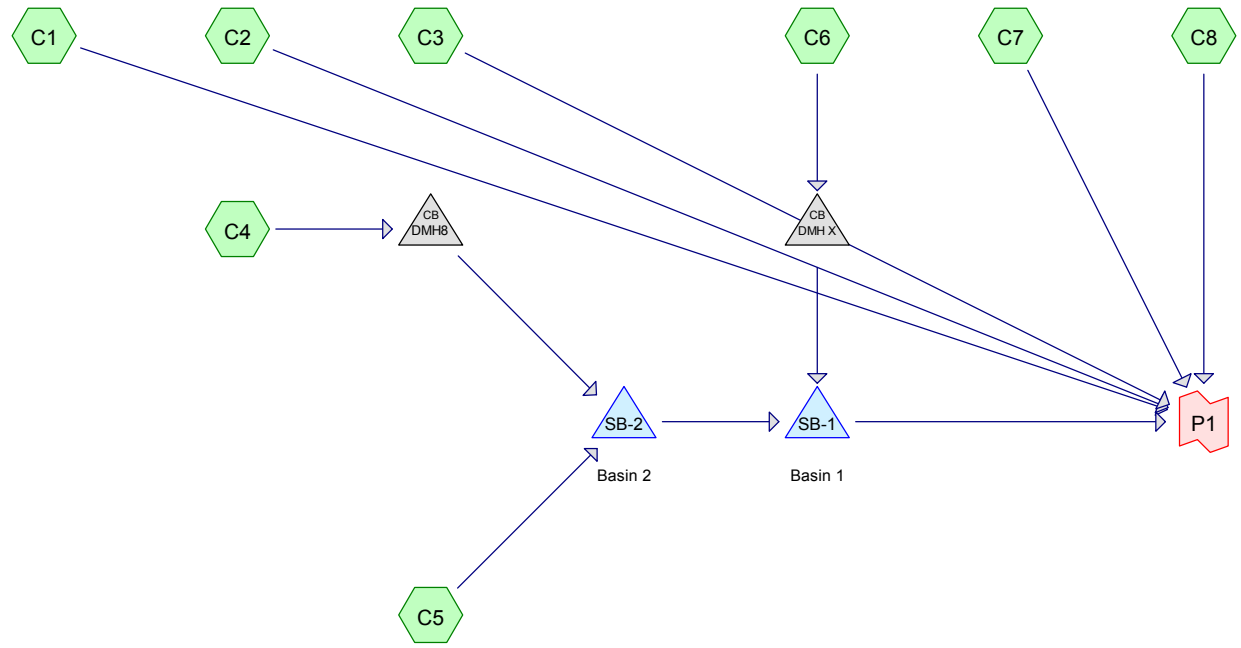
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6					**Direct Entry,**

Subcatchment E1: Special Permit Area



APPENDIX C

PROPOSED CONDITIONS MODEL
HYDROCAD OUTPUT



Subcat Reach Pond Link

Routing Diagram for 20151005 Special Permit Proposed
Prepared by Sanborn, Head & Associates, Inc.
HydroCAD® 10.00-13 s/n 00705 © 2014 HydroCAD Software Solutions LLC

Summary for Subcatchment C1:

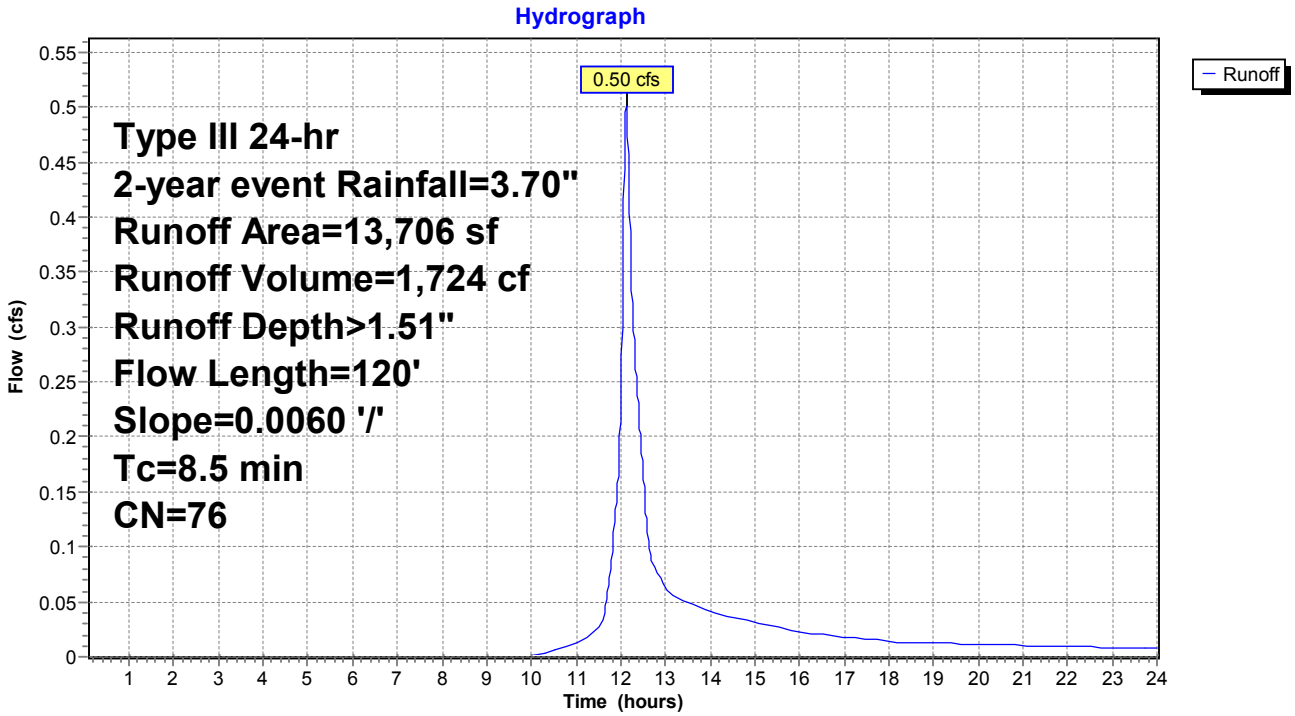
Runoff = 0.50 cfs @ 12.12 hrs, Volume= 1,724 cf, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	6,768	98	Pavement & Roof
*	1,583	76	Gravel & Brick
*	5,355	49	Landscaping
	13,706	76	Weighted Average
	6,938		50.62% Pervious Area
	6,768		49.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	120	0.0060	0.24		**Lag/CN Method,**

Subcatchment C1:



Summary for Subcatchment C2:

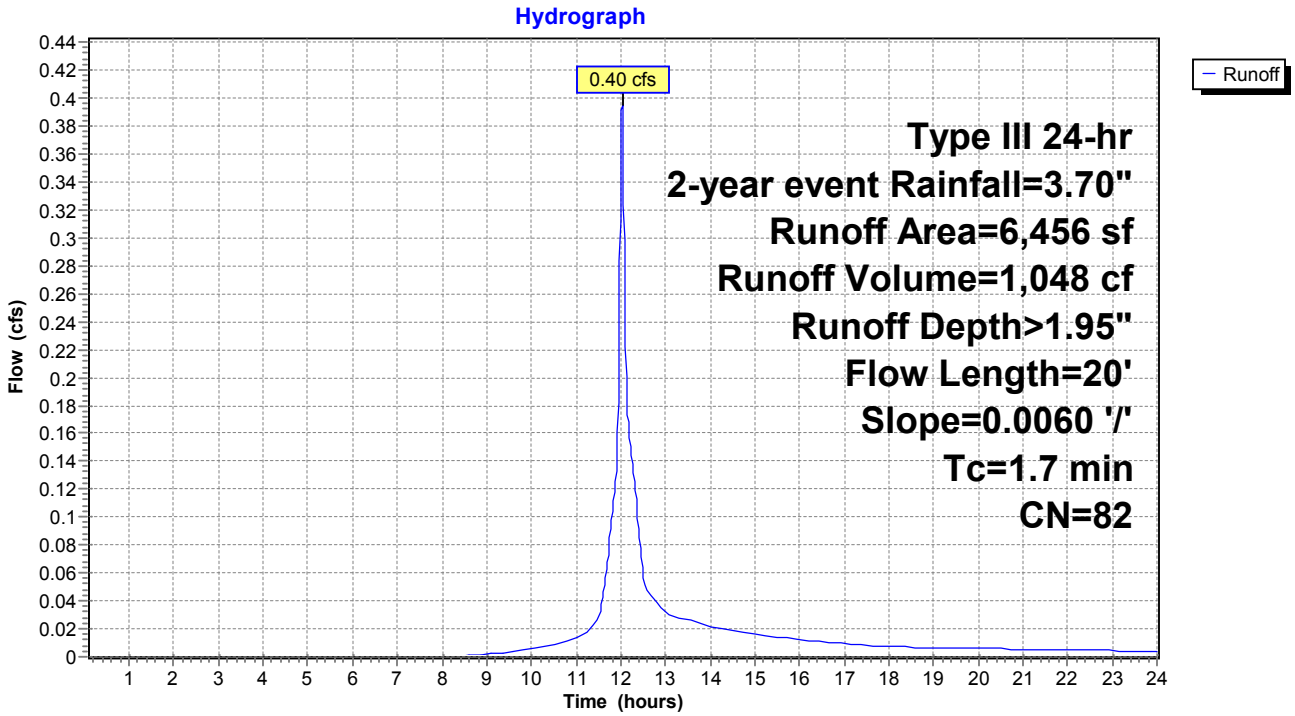
Runoff = 0.40 cfs @ 12.03 hrs, Volume= 1,048 cf, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	3,885	98	Pavement & Roof
*	891	76	Gravel & Brick
*	1,680	49	Landscaping
	6,456	82	Weighted Average
	2,571		39.82% Pervious Area
	3,885		60.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0060	0.20		**Lag/CN Method,**

Subcatchment C2:



Summary for Subcatchment C3:

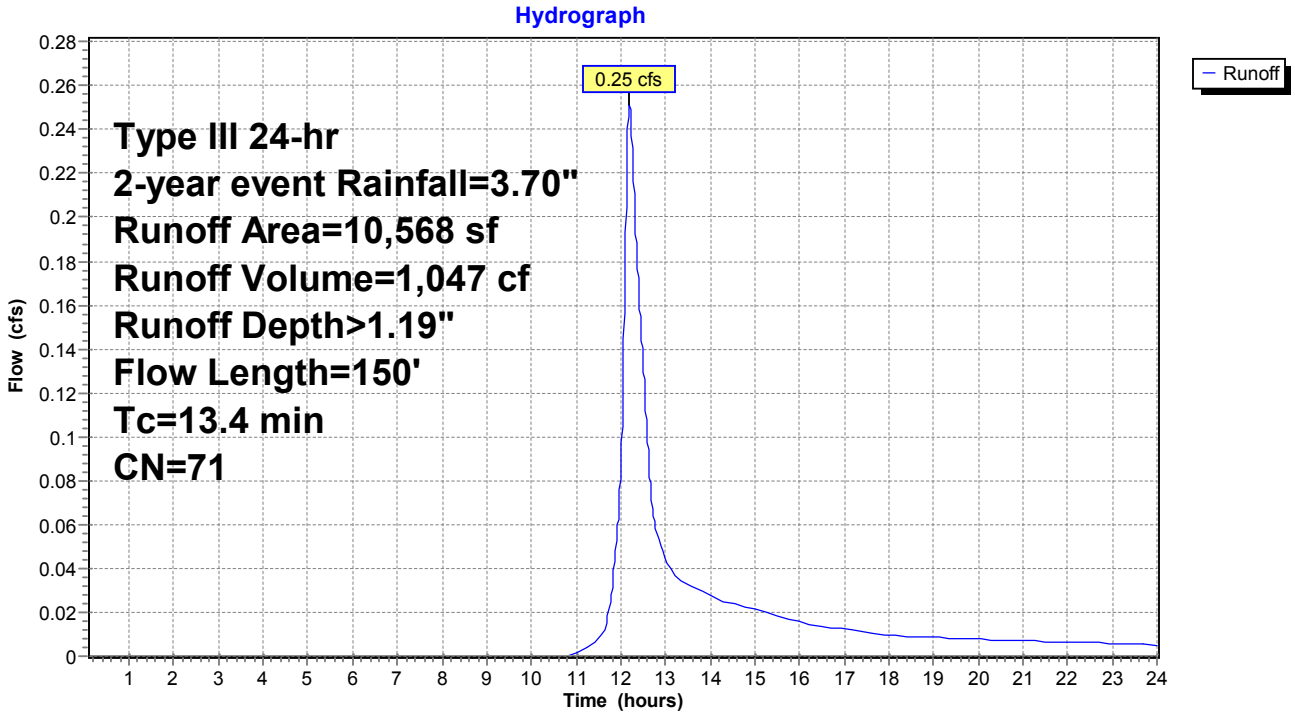
Runoff = 0.25 cfs @ 12.20 hrs, Volume= 1,047 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	4,221	98	Pavement & Roof
*	765	76	Gravel & Brick
*	5,582	49	Landscaping
	10,568	71	Weighted Average
	6,347		60.06% Pervious Area
	4,221		39.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0010	1.55	1.22	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
12.3	50	0.0060	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.70"
13.4	150	Total			

Subcatchment C3:



Summary for Subcatchment C4:

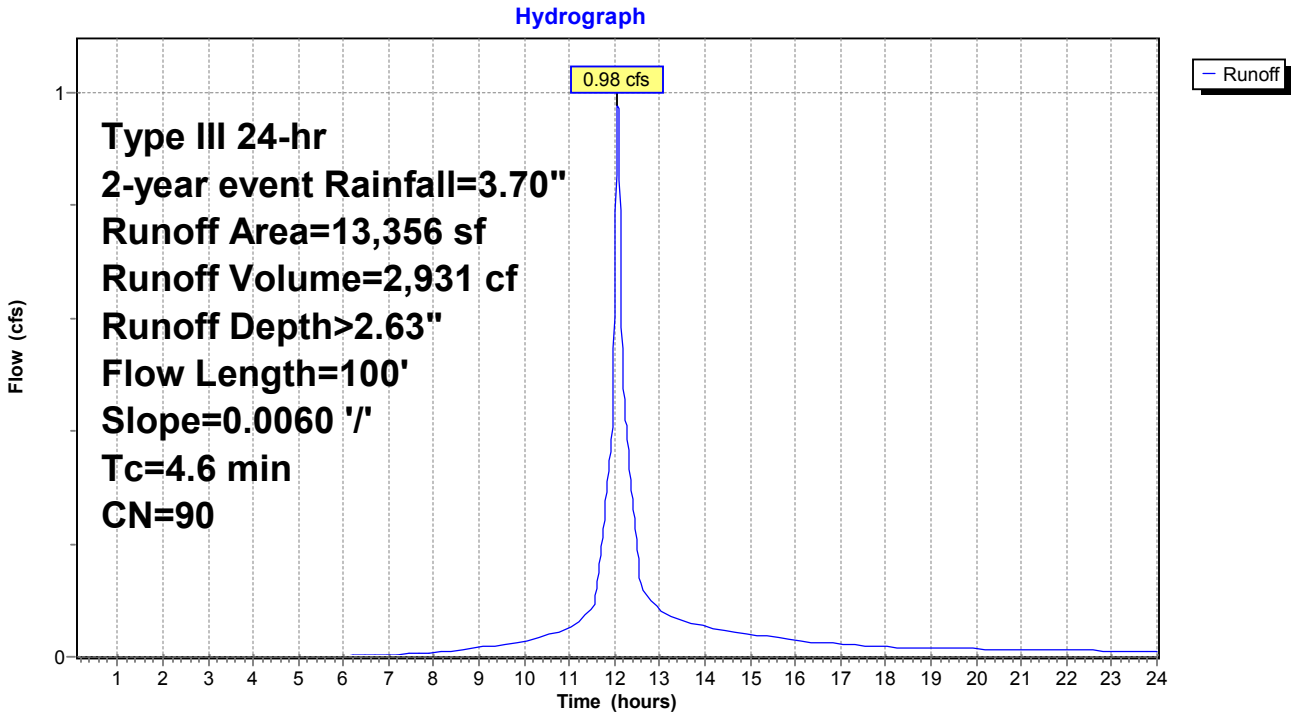
Runoff = 0.98 cfs @ 12.07 hrs, Volume= 2,931 cf, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	10,571	98	Pavement & Roof
*	1,066	76	Gravel & Brick
*	1,719	49	Landscaping
	13,356	90	Weighted Average
	2,785		20.85% Pervious Area
	10,571		79.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.0060	0.37		**Lag/CN Method,**

Subcatchment C4:



Summary for Subcatchment C5:

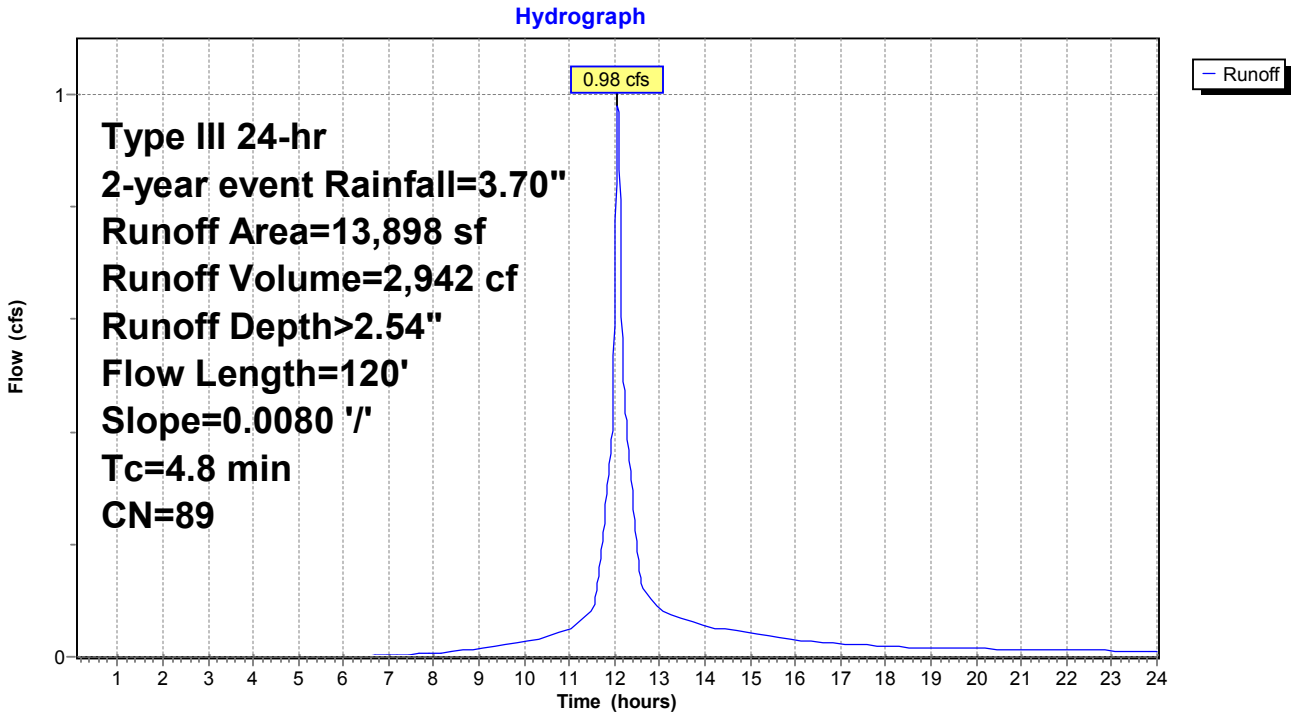
Runoff = 0.98 cfs @ 12.07 hrs, Volume= 2,942 cf, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	10,863	98	Pavement & Roof
*	772	76	Gravel & Brick
*	2,263	49	Landscaping
	13,898	89	Weighted Average
	3,035		21.84% Pervious Area
	10,863		78.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	120	0.0080	0.42		**Lag/CN Method,**

Subcatchment C5:



Summary for Subcatchment C6:

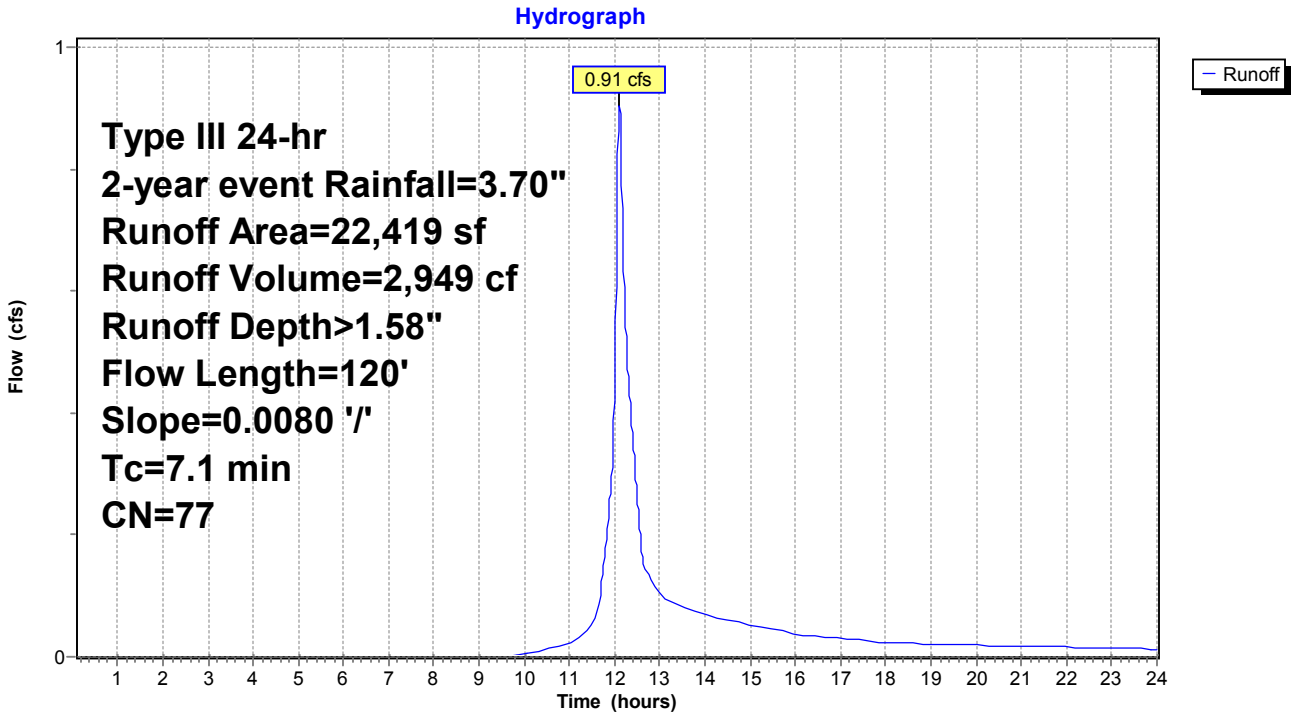
Runoff = 0.91 cfs @ 12.11 hrs, Volume= 2,949 cf, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	8,050	98	Pavement & Roof
*	8,477	76	Gravel & Brick
*	5,892	49	Landscaping
	22,419	77	Weighted Average
	14,369		64.09% Pervious Area
	8,050		35.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	120	0.0080	0.28		**Lag/CN Method,**

Subcatchment C6:



Summary for Subcatchment C7:

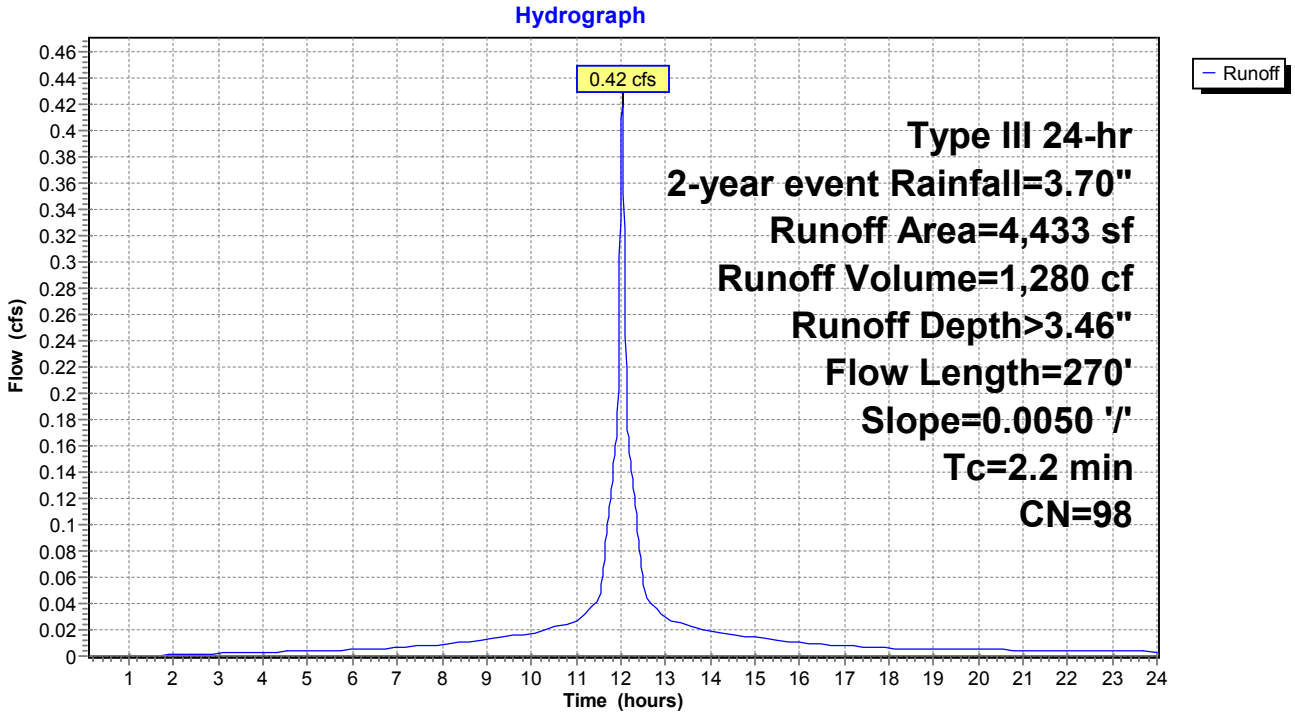
Runoff = 0.42 cfs @ 12.03 hrs, Volume= 1,280 cf, Depth> 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	4,433	98	Pavement & Roof
*	0	76	Gravel & Brick
*	0	49	Landscaping
	4,433	98	Weighted Average
	4,433		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	270	0.0050	2.02	0.40	**Pipe Channel,** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

Subcatchment C7:



Summary for Subcatchment C8:

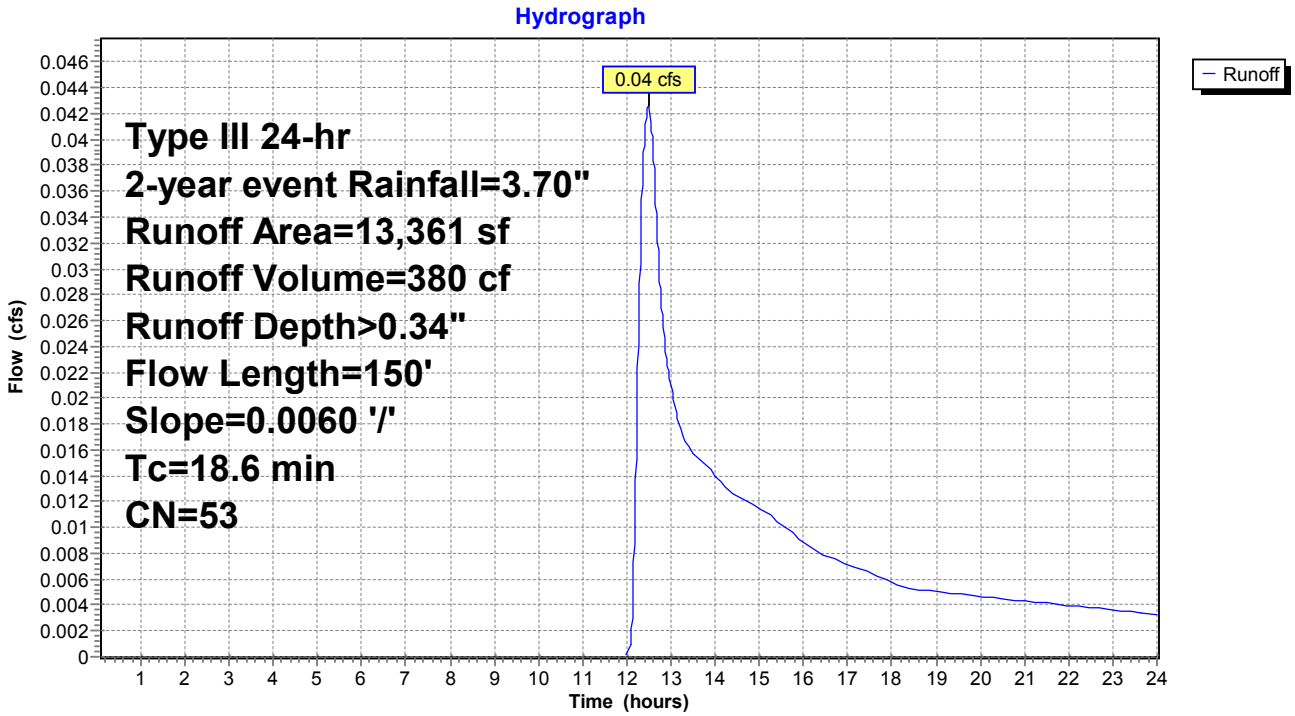
Runoff = 0.04 cfs @ 12.50 hrs, Volume= 380 cf, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year event Rainfall=3.70"

	Area (sf)	CN	Description
*	113	98	Pavement & Roof
*	1,762	76	Gravel & Brick
*	11,486	49	Landscaping
	13,361	53	Weighted Average
	13,248		99.15% Pervious Area
	113		0.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.6	150	0.0060	0.13		**Lag/CN Method,**

Subcatchment C8:



Summary for Pond DMH X:

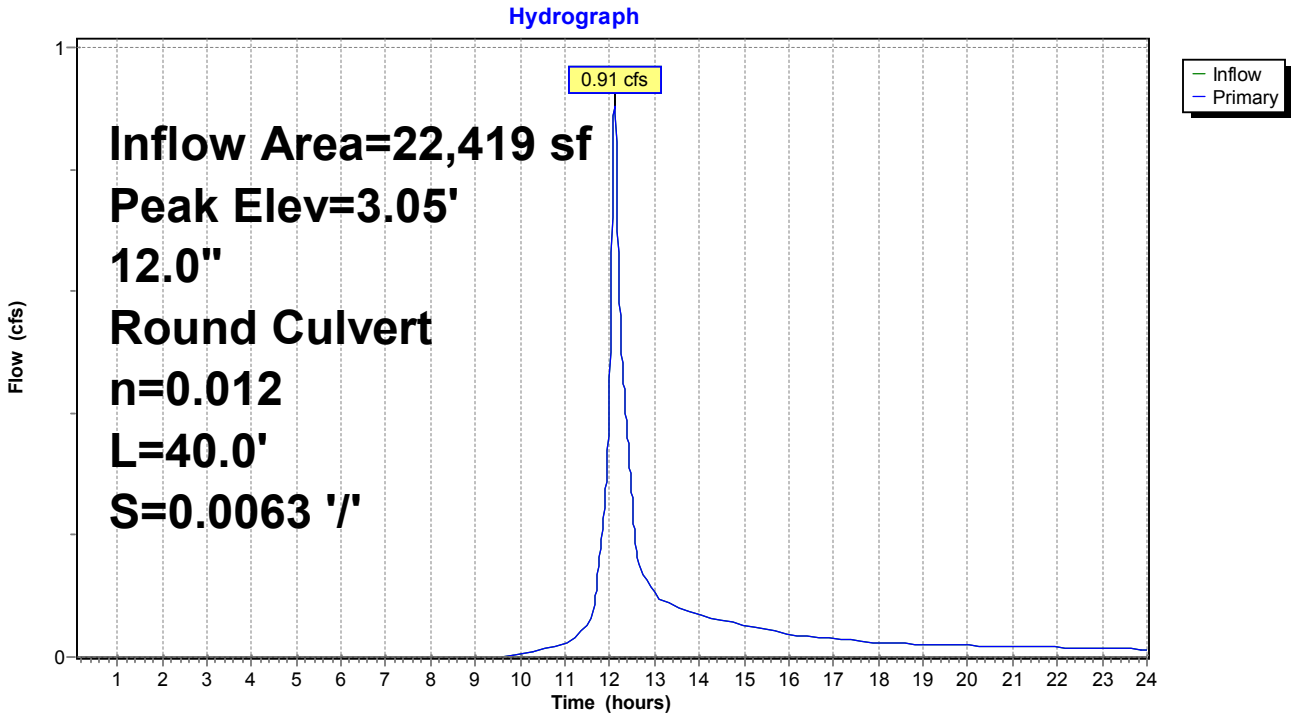
Inflow Area = 22,419 sf, 35.91% Impervious, Inflow Depth > 1.58" for 2-year event event
Inflow = 0.91 cfs @ 12.11 hrs, Volume= 2,949 cf
Outflow = 0.91 cfs @ 12.11 hrs, Volume= 2,949 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.11 hrs, Volume= 2,949 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.05' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert** L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.50' / 2.25' S= 0.0063 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.11 hrs HW=3.05' TW=2.09' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.90 cfs @ 2.99 fps)

Pond DMH X:



Summary for Pond DMH8:

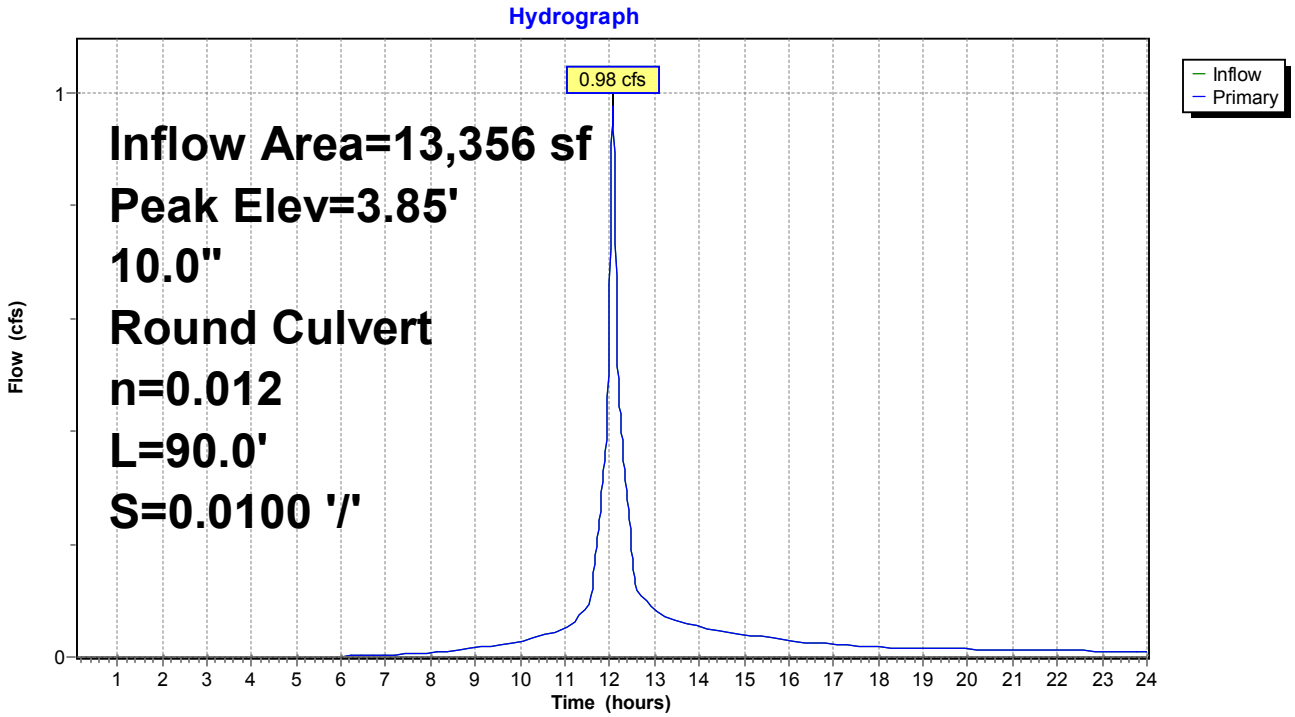
Inflow Area = 13,356 sf, 79.15% Impervious, Inflow Depth > 2.63" for 2-year event event
Inflow = 0.98 cfs @ 12.07 hrs, Volume= 2,931 cf
Outflow = 0.98 cfs @ 12.07 hrs, Volume= 2,931 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.07 hrs, Volume= 2,931 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.85' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.30'	**10.0" Round Culvert** L= 90.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.30' / 2.40' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf

Primary OutFlow Max=0.98 cfs @ 12.07 hrs HW=3.85' TW=2.23' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.98 cfs @ 2.53 fps)

Pond DMH8:



Summary for Pond SB-1: Basin 1

Inflow Area = 49,673 sf, 59.36% Impervious, Inflow Depth > 2.12" for 2-year event event
Inflow = 2.15 cfs @ 12.10 hrs, Volume= 8,764 cf
Outflow = 1.88 cfs @ 12.17 hrs, Volume= 8,735 cf, Atten= 13%, Lag= 4.0 min
Primary = 1.88 cfs @ 12.17 hrs, Volume= 8,735 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.24' @ 12.17 hrs Surf.Area= 0 sf Storage= 412 cf

Plug-Flow detention time= 6.2 min calculated for 8,735 cf (100% of inflow)
Center-of-Mass det. time= 4.2 min (827.2 - 823.1)

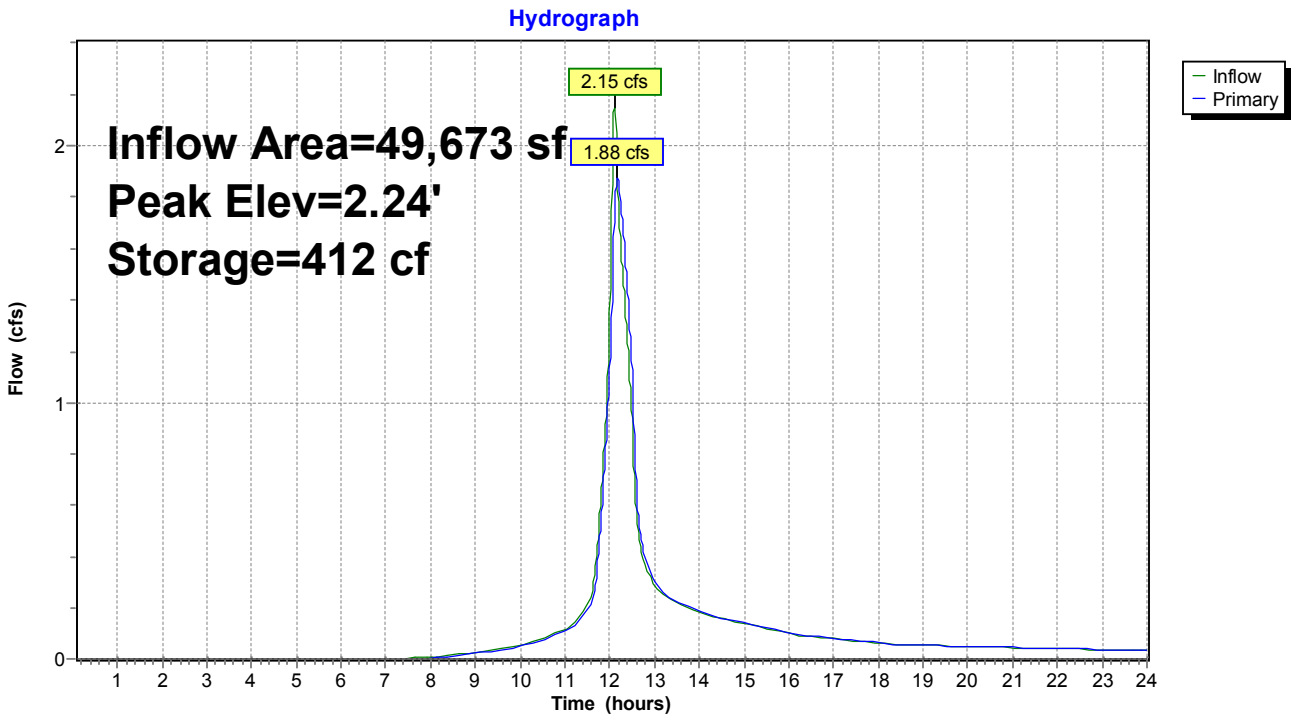
Volume	Invert	Avail.Storage	Storage Description
#1	1.00'	1,000 cf	**3' dia Pipes** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1.00	0
4.00	1,000

Device	Routing	Invert	Outlet Devices
#1	Primary	1.00'	**15.0" Round Culvert** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1.00' / 0.91' S= 0.0090 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	1.00'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	2.50'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	3.50'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.88 cfs @ 12.17 hrs HW=2.24' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.88 cfs of 3.87 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.88 cfs @ 4.78 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-1: Basin 1



Summary for Pond SB-2: Basin 2

Inflow Area = 27,254 sf, 78.65% Impervious, Inflow Depth > 2.59" for 2-year event event
Inflow = 1.96 cfs @ 12.07 hrs, Volume= 5,874 cf
Outflow = 1.25 cfs @ 12.10 hrs, Volume= 5,816 cf, Atten= 36%, Lag= 2.0 min
Primary = 1.25 cfs @ 12.10 hrs, Volume= 5,816 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.60' @ 12.16 hrs Surf.Area= 0 sf Storage= 600 cf

Plug-Flow detention time= 16.6 min calculated for 5,813 cf (99% of inflow)
Center-of-Mass det. time= 10.5 min (812.2 - 801.7)

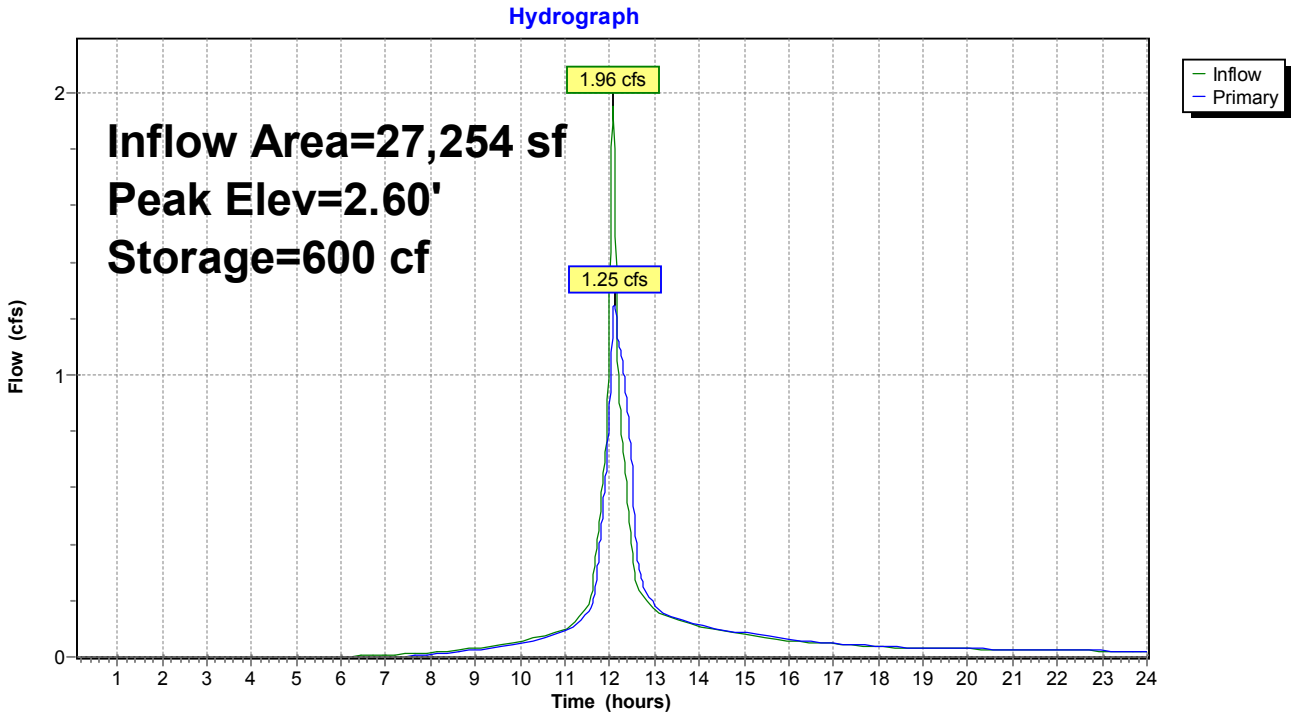
Volume	Invert	Avail.Storage	Storage Description
#1	1.00'	1,500 cf	**3' dia Pipes** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1.00	0
5.00	1,500

Device	Routing	Invert	Outlet Devices
#1	Primary	1.00'	**15.0" Round Culvert** L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 1.00' / 1.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1.00'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	4.50'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.17 cfs @ 12.10 hrs HW=2.45' TW=2.06' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.17 cfs of 2.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.17 cfs @ 2.99 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-2: Basin 2

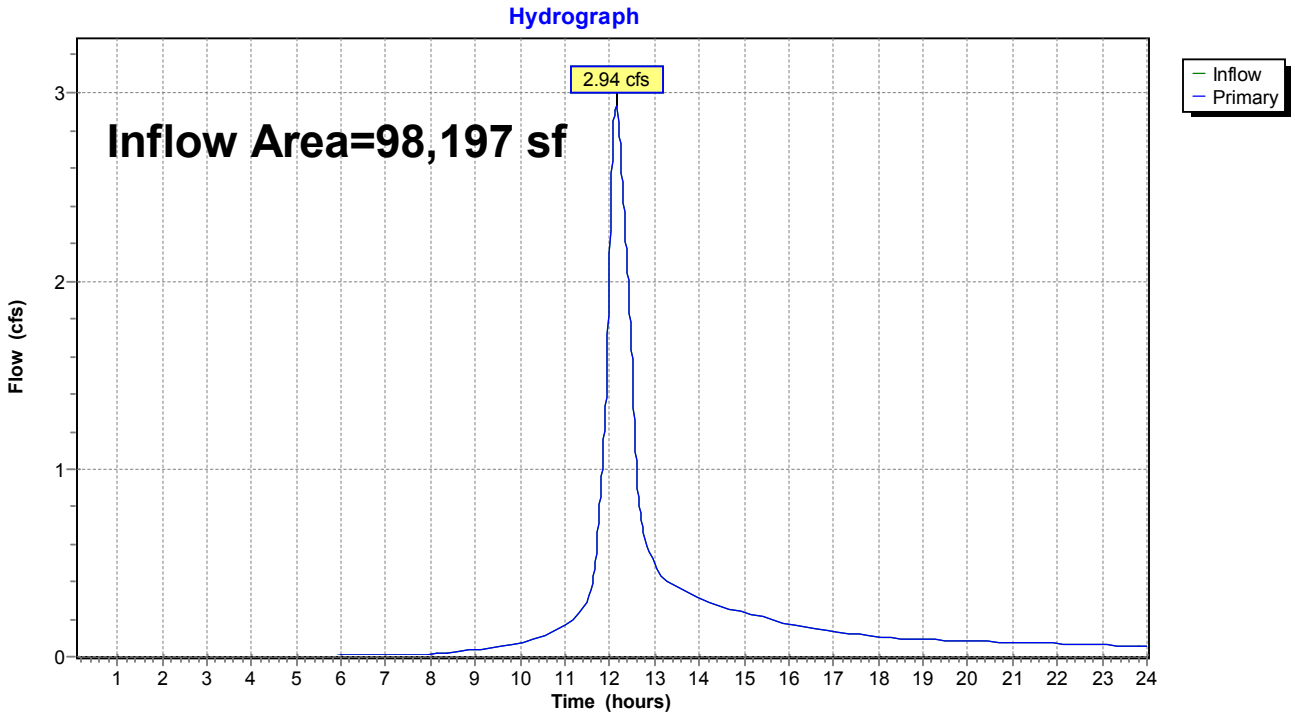


Summary for Link P1:

Inflow Area = 98,197 sf, 49.80% Impervious, Inflow Depth > 1.74" for 2-year event event
Inflow = 2.94 cfs @ 12.15 hrs, Volume= 14,214 cf
Primary = 2.94 cfs @ 12.15 hrs, Volume= 14,214 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs

Link P1:



Summary for Subcatchment C1:

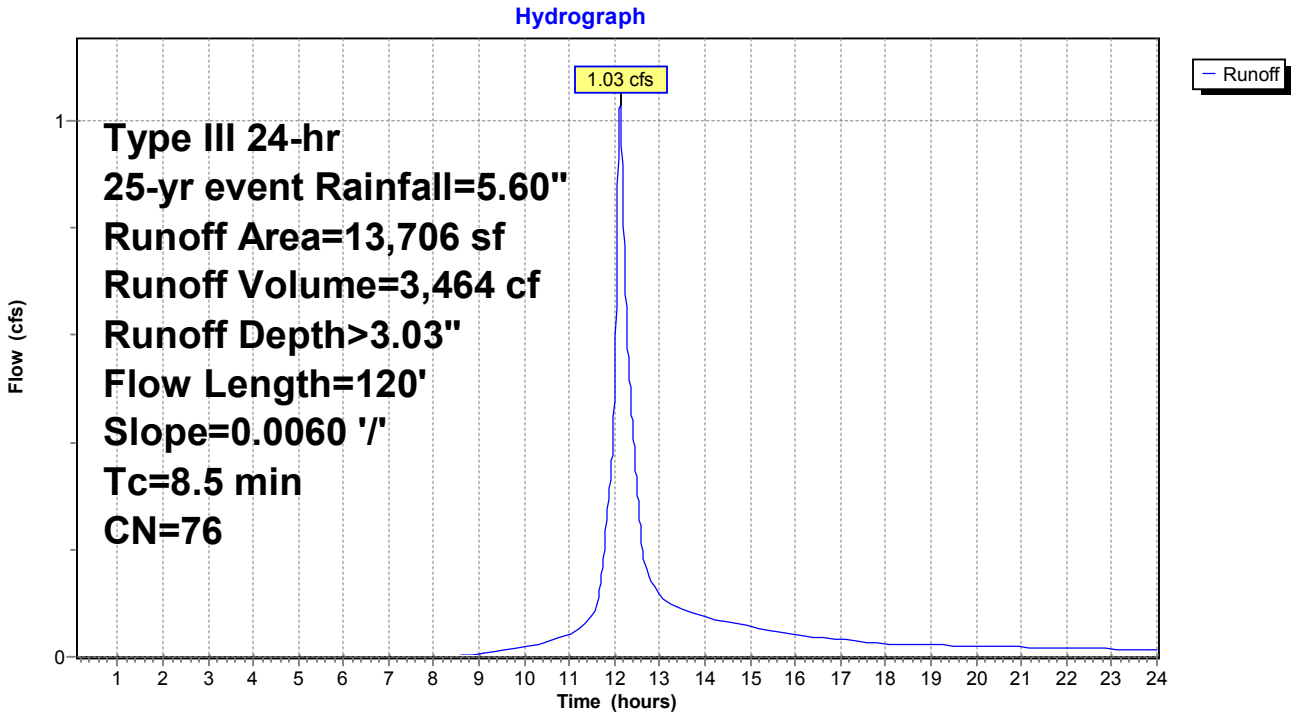
Runoff = 1.03 cfs @ 12.12 hrs, Volume= 3,464 cf, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	6,768	98	Pavement & Roof
*	1,583	76	Gravel & Brick
*	5,355	49	Landscaping
	13,706	76	Weighted Average
	6,938		50.62% Pervious Area
	6,768		49.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	120	0.0060	0.24		**Lag/CN Method,**

Subcatchment C1:



Summary for Subcatchment C2:

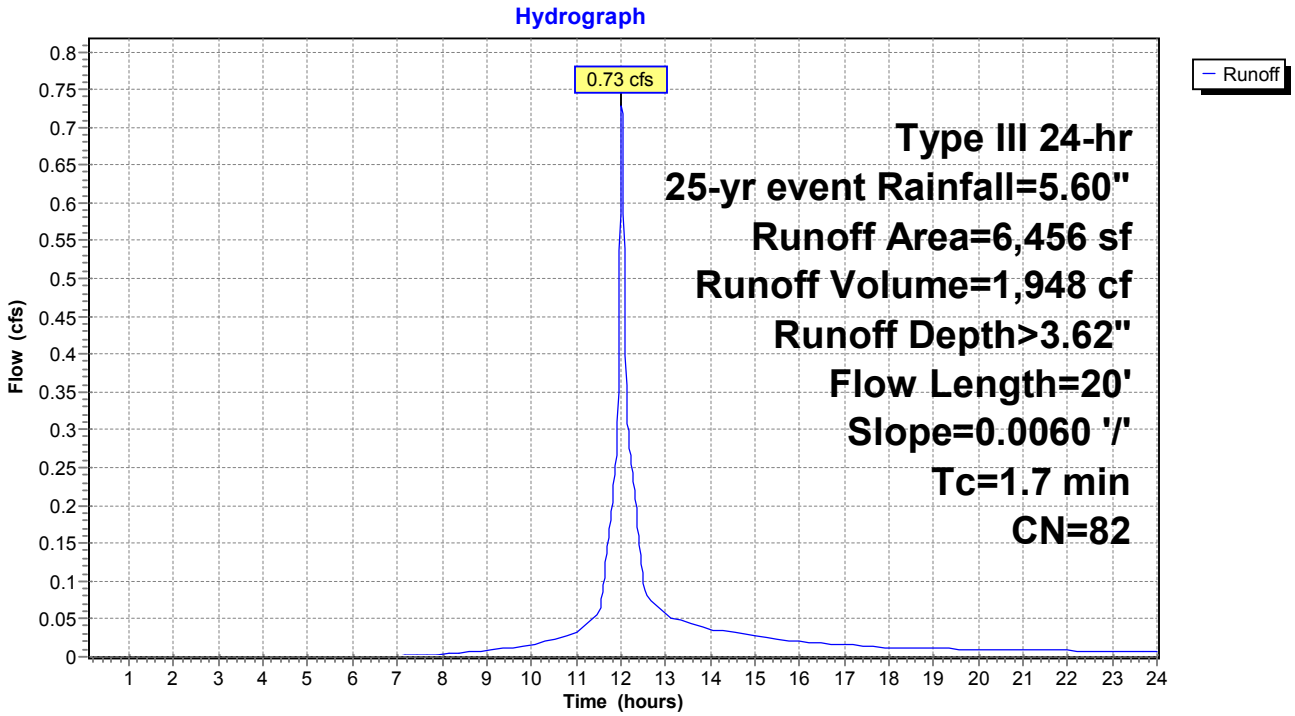
Runoff = 0.73 cfs @ 12.03 hrs, Volume= 1,948 cf, Depth> 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	3,885	98	Pavement & Roof
*	891	76	Gravel & Brick
*	1,680	49	Landscaping
	6,456	82	Weighted Average
	2,571		39.82% Pervious Area
	3,885		60.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0060	0.20		**Lag/CN Method,**

Subcatchment C2:



Summary for Subcatchment C3:

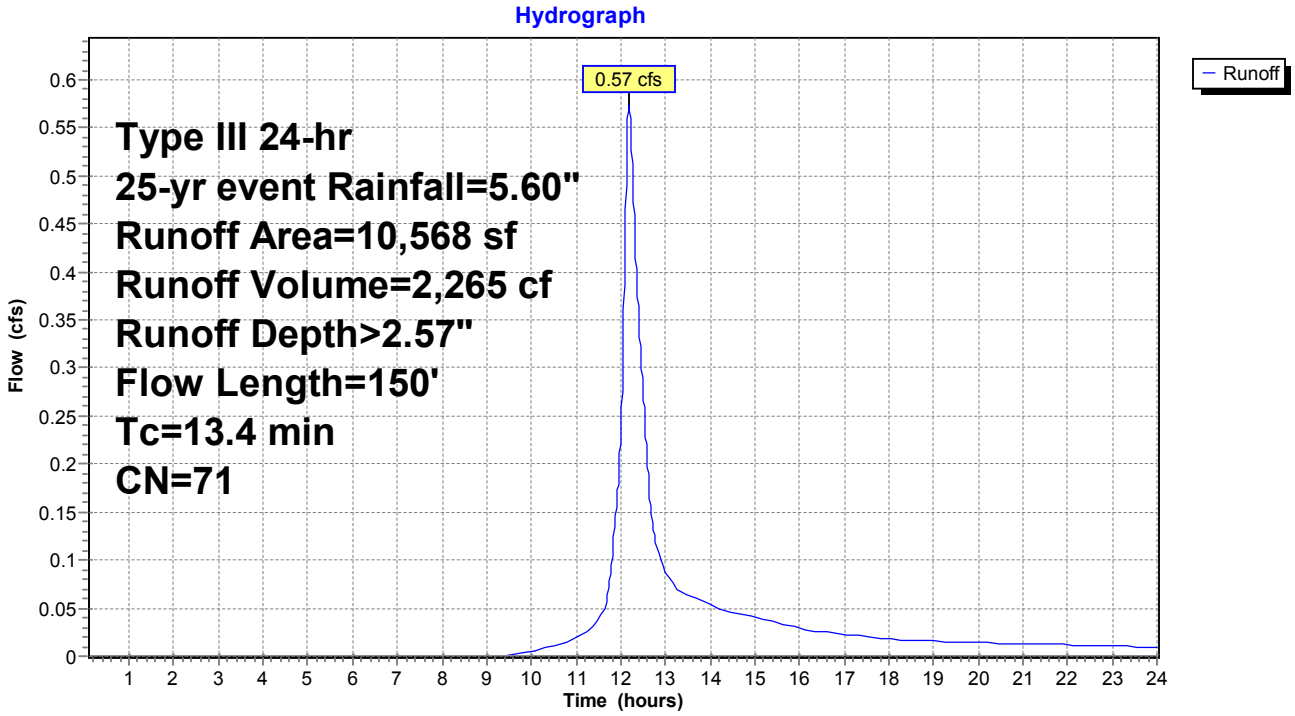
Runoff = 0.57 cfs @ 12.19 hrs, Volume= 2,265 cf, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	4,221	98	Pavement & Roof
*	765	76	Gravel & Brick
*	5,582	49	Landscaping
	10,568	71	Weighted Average
	6,347		60.06% Pervious Area
	4,221		39.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0010	1.55	1.22	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
12.3	50	0.0060	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.70"
13.4	150	Total			

Subcatchment C3:



Summary for Subcatchment C4:

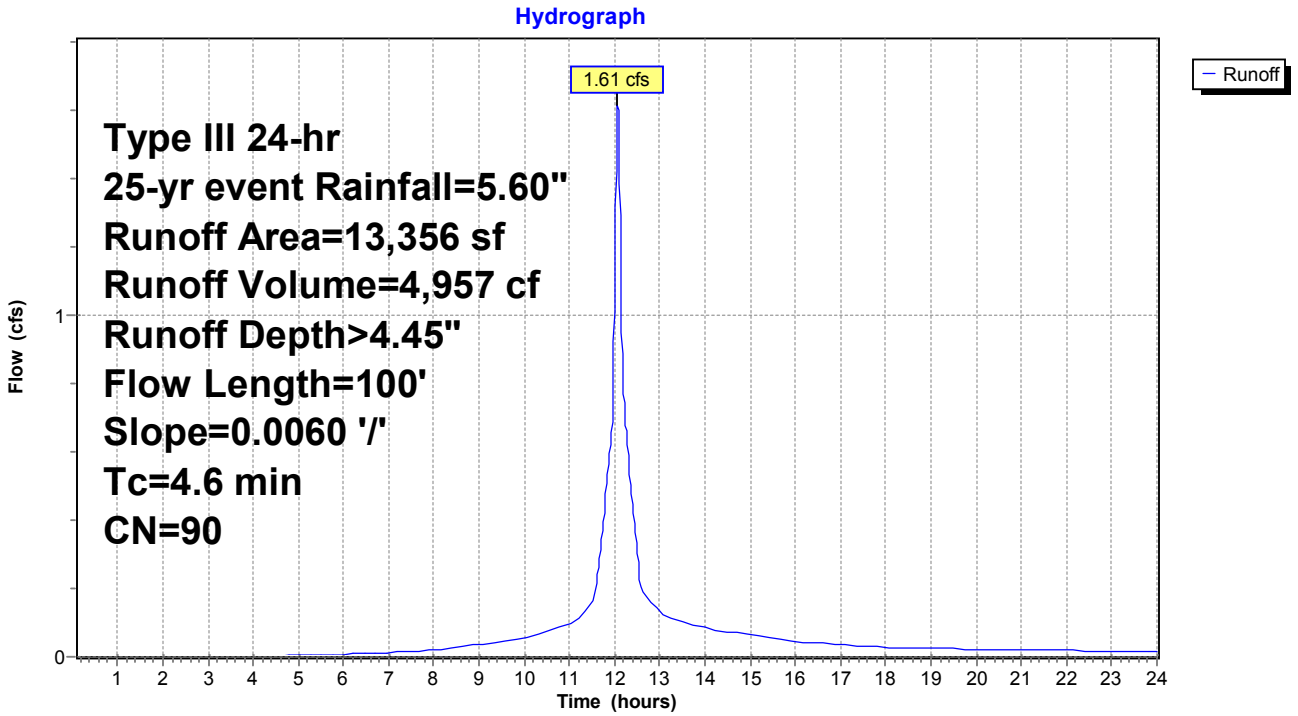
Runoff = 1.61 cfs @ 12.07 hrs, Volume= 4,957 cf, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	10,571	98	Pavement & Roof
*	1,066	76	Gravel & Brick
*	1,719	49	Landscaping
	13,356	90	Weighted Average
	2,785		20.85% Pervious Area
	10,571		79.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.0060	0.37		**Lag/CN Method,**

Subcatchment C4:



Summary for Subcatchment C5:

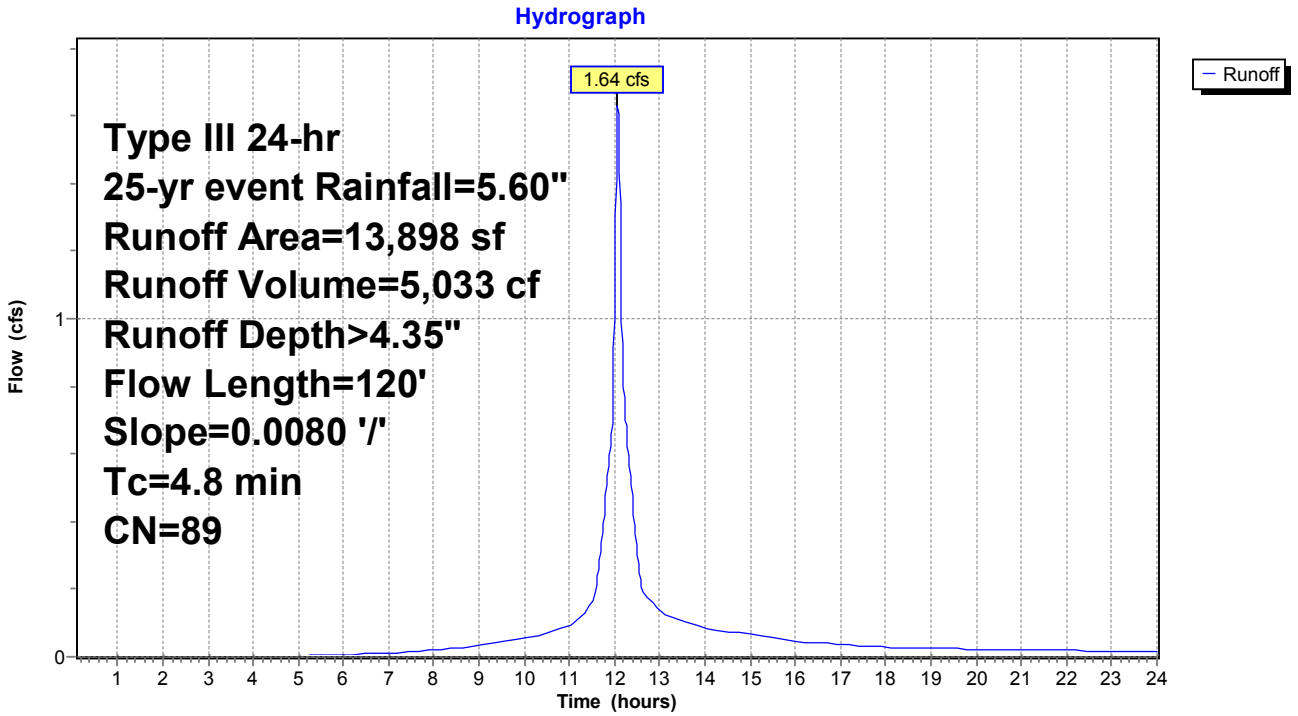
Runoff = 1.64 cfs @ 12.07 hrs, Volume= 5,033 cf, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	10,863	98	Pavement & Roof
*	772	76	Gravel & Brick
*	2,263	49	Landscaping
	13,898	89	Weighted Average
	3,035		21.84% Pervious Area
	10,863		78.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	120	0.0080	0.42		**Lag/CN Method,**

Subcatchment C5:



Summary for Subcatchment C6:

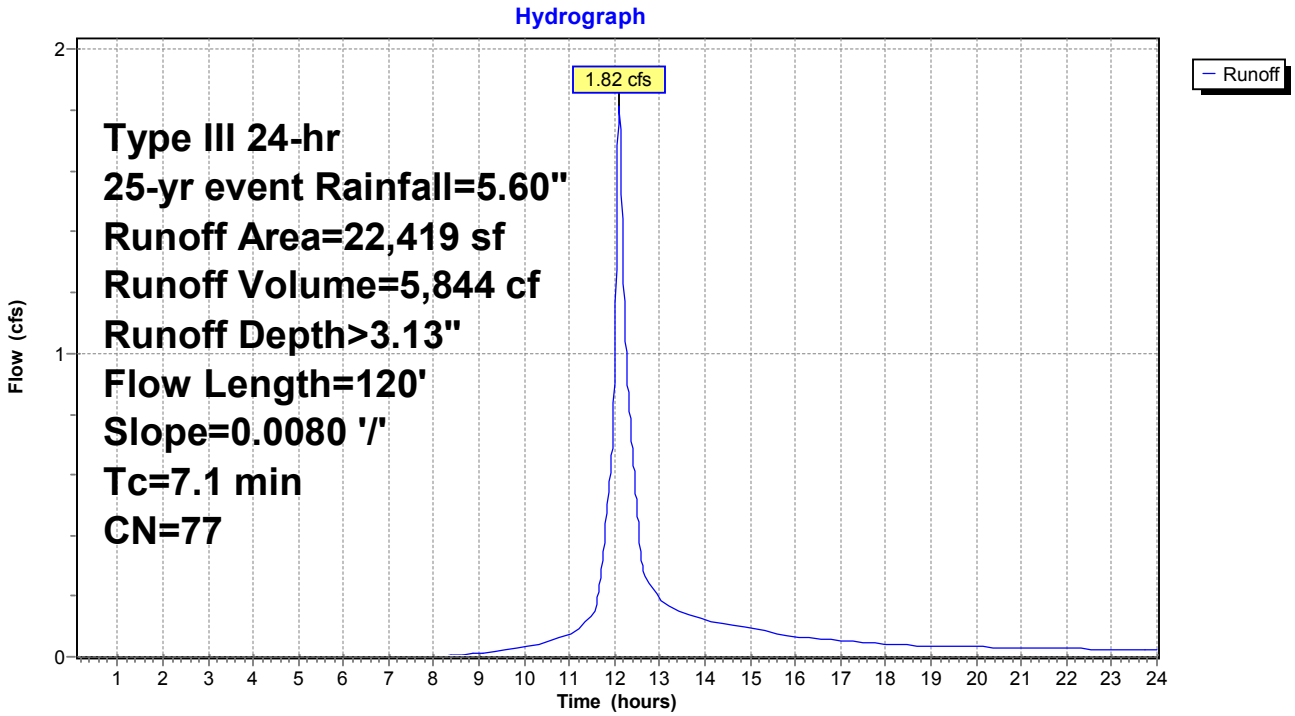
Runoff = 1.82 cfs @ 12.10 hrs, Volume= 5,844 cf, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	8,050	98	Pavement & Roof
*	8,477	76	Gravel & Brick
*	5,892	49	Landscaping
	22,419	77	Weighted Average
	14,369		64.09% Pervious Area
	8,050		35.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	120	0.0080	0.28		**Lag/CN Method,**

Subcatchment C6:



Summary for Subcatchment C7:

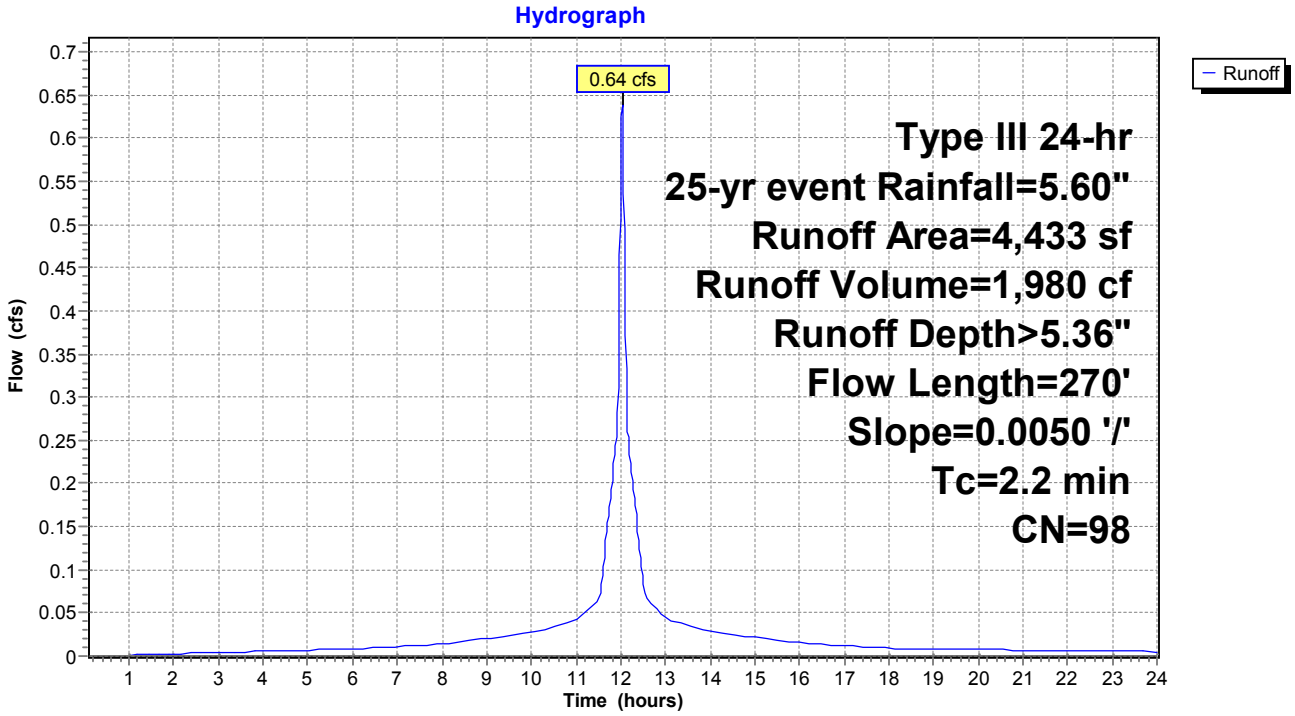
Runoff = 0.64 cfs @ 12.03 hrs, Volume= 1,980 cf, Depth> 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	4,433	98	Pavement & Roof
*	0	76	Gravel & Brick
*	0	49	Landscaping
	4,433	98	Weighted Average
	4,433		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	270	0.0050	2.02	0.40	**Pipe Channel,** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

Subcatchment C7:



Summary for Subcatchment C8:

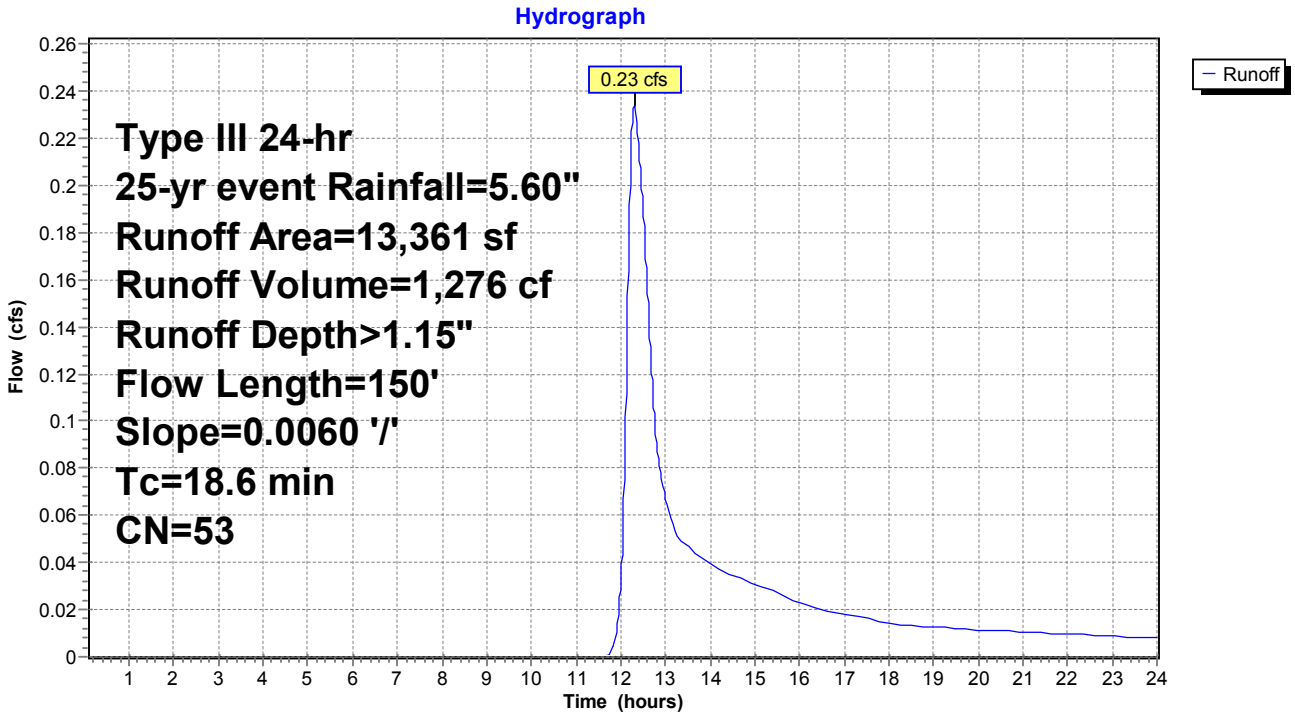
Runoff = 0.23 cfs @ 12.30 hrs, Volume= 1,276 cf, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr event Rainfall=5.60"

	Area (sf)	CN	Description
*	113	98	Pavement & Roof
*	1,762	76	Gravel & Brick
*	11,486	49	Landscaping
	13,361	53	Weighted Average
	13,248		99.15% Pervious Area
	113		0.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.6	150	0.0060	0.13		**Lag/CN Method,**

Subcatchment C8:



Summary for Pond DMH X:

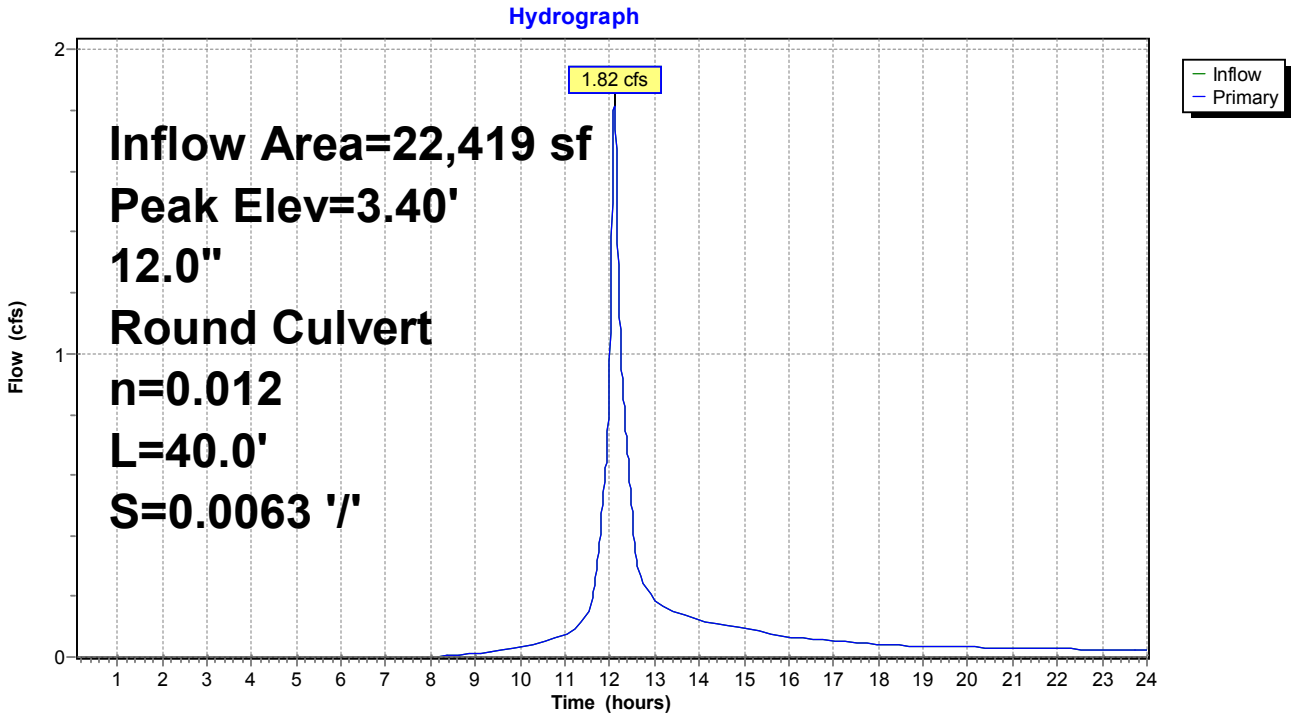
Inflow Area = 22,419 sf, 35.91% Impervious, Inflow Depth > 3.13" for 25-yr event event
Inflow = 1.82 cfs @ 12.10 hrs, Volume= 5,844 cf
Outflow = 1.82 cfs @ 12.10 hrs, Volume= 5,844 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.82 cfs @ 12.10 hrs, Volume= 5,844 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.40' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert** L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.50' / 2.25' S= 0.0063 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.68 cfs @ 12.10 hrs HW=3.35' TW=2.96' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.68 cfs @ 3.20 fps)

Pond DMH X:



Summary for Pond DMH8:

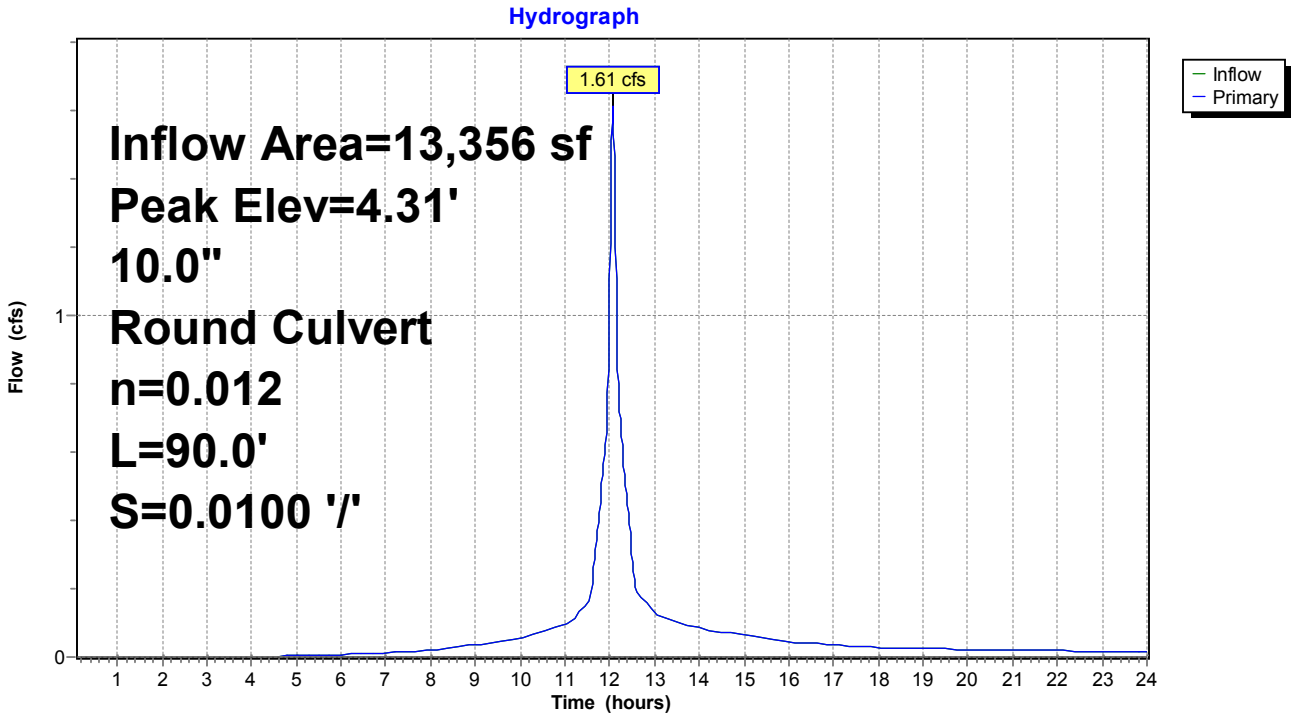
Inflow Area = 13,356 sf, 79.15% Impervious, Inflow Depth > 4.45" for 25-yr event event
Inflow = 1.61 cfs @ 12.07 hrs, Volume= 4,957 cf
Outflow = 1.61 cfs @ 12.07 hrs, Volume= 4,957 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.07 hrs, Volume= 4,957 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 4.31' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.30'	**10.0" Round Culvert** L= 90.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.30' / 2.40' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf

Primary OutFlow Max=1.50 cfs @ 12.07 hrs HW=4.10' TW=3.31' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.50 cfs @ 3.59 fps)

Pond DMH8:



Summary for Pond SB-1: Basin 1

Inflow Area = 49,673 sf, 59.36% Impervious, Inflow Depth > 3.81" for 25-yr event event
Inflow = 3.64 cfs @ 12.11 hrs, Volume= 15,765 cf
Outflow = 3.46 cfs @ 12.16 hrs, Volume= 15,728 cf, Atten= 5%, Lag= 2.4 min
Primary = 3.46 cfs @ 12.16 hrs, Volume= 15,728 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.11' @ 12.16 hrs Surf.Area= 0 sf Storage= 702 cf

Plug-Flow detention time= 5.2 min calculated for 15,722 cf (100% of inflow)
Center-of-Mass det. time= 3.8 min (811.0 - 807.2)

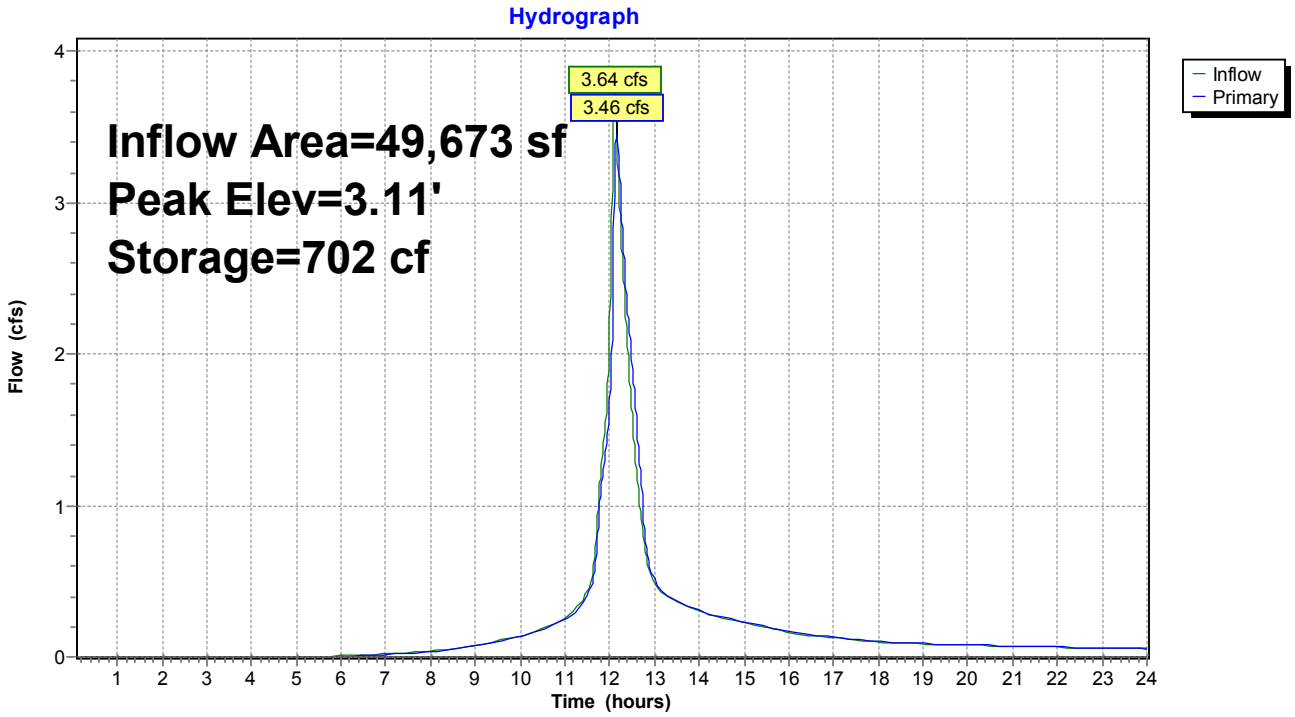
Volume	Invert	Avail.Storage	Storage Description
#1	1.00'	1,000 cf	**3' dia Pipes** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1.00	0
4.00	1,000

Device	Routing	Invert	Outlet Devices
#1	Primary	1.00'	**15.0" Round Culvert** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1.00' / 0.91' S= 0.0090 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	1.00'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	2.50'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	3.50'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=3.46 cfs @ 12.16 hrs HW=3.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.46 cfs of 7.19 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.58 cfs @ 6.56 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.88 cfs @ 2.65 fps)
  └─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-1: Basin 1



Summary for Pond SB-2: Basin 2

Inflow Area = 27,254 sf, 78.65% Impervious, Inflow Depth > 4.40" for 25-yr event event
Inflow = 3.25 cfs @ 12.07 hrs, Volume= 9,990 cf
Outflow = 1.90 cfs @ 12.16 hrs, Volume= 9,921 cf, Atten= 42%, Lag= 5.6 min
Primary = 1.90 cfs @ 12.16 hrs, Volume= 9,921 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs
Peak Elev= 4.11' @ 12.16 hrs Surf.Area= 0 sf Storage= 1,168 cf

Plug-Flow detention time= 14.2 min calculated for 9,917 cf (99% of inflow)
Center-of-Mass det. time= 9.8 min (796.8 - 787.1)

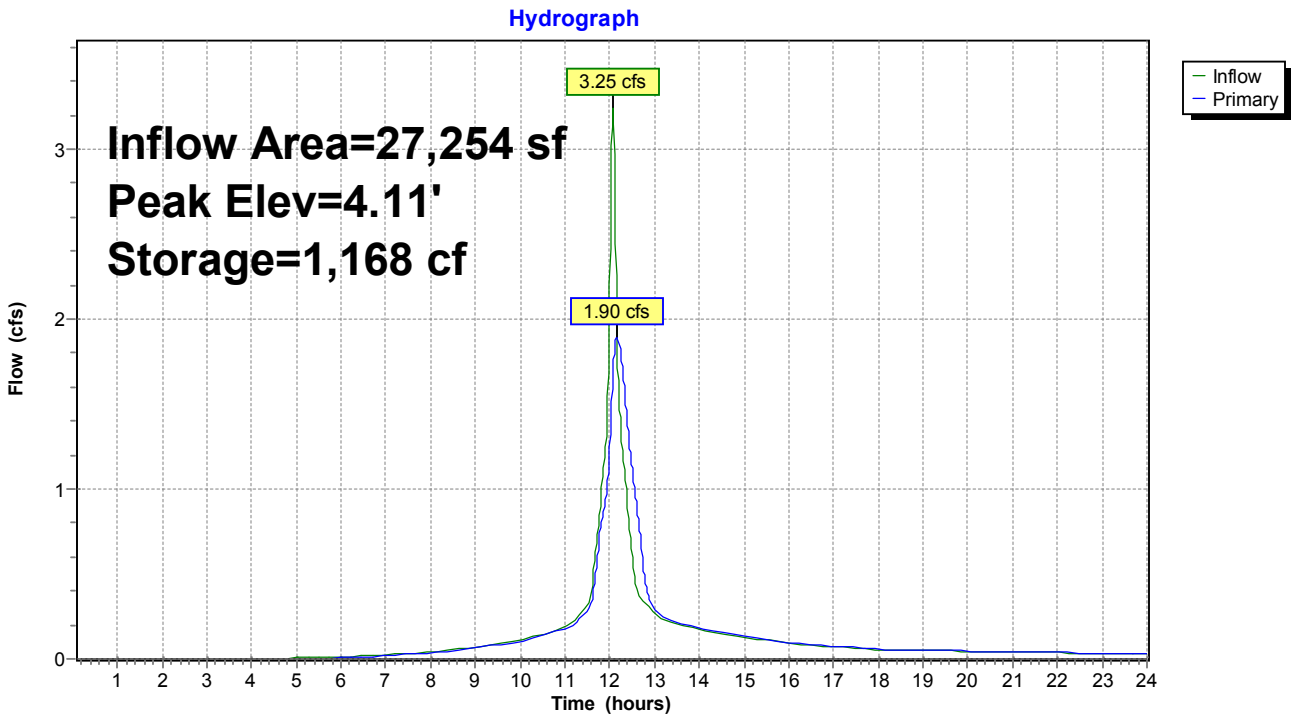
Volume	Invert	Avail.Storage	Storage Description
#1	1.00'	1,500 cf	**3' dia Pipes** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1.00	0
5.00	1,500

Device	Routing	Invert	Outlet Devices
#1	Primary	1.00'	**15.0" Round Culvert** L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 1.00' / 1.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1.00'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	4.50'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.90 cfs @ 12.16 hrs HW=4.11' TW=3.10' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.90 cfs of 4.67 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.90 cfs @ 4.84 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-2: Basin 2

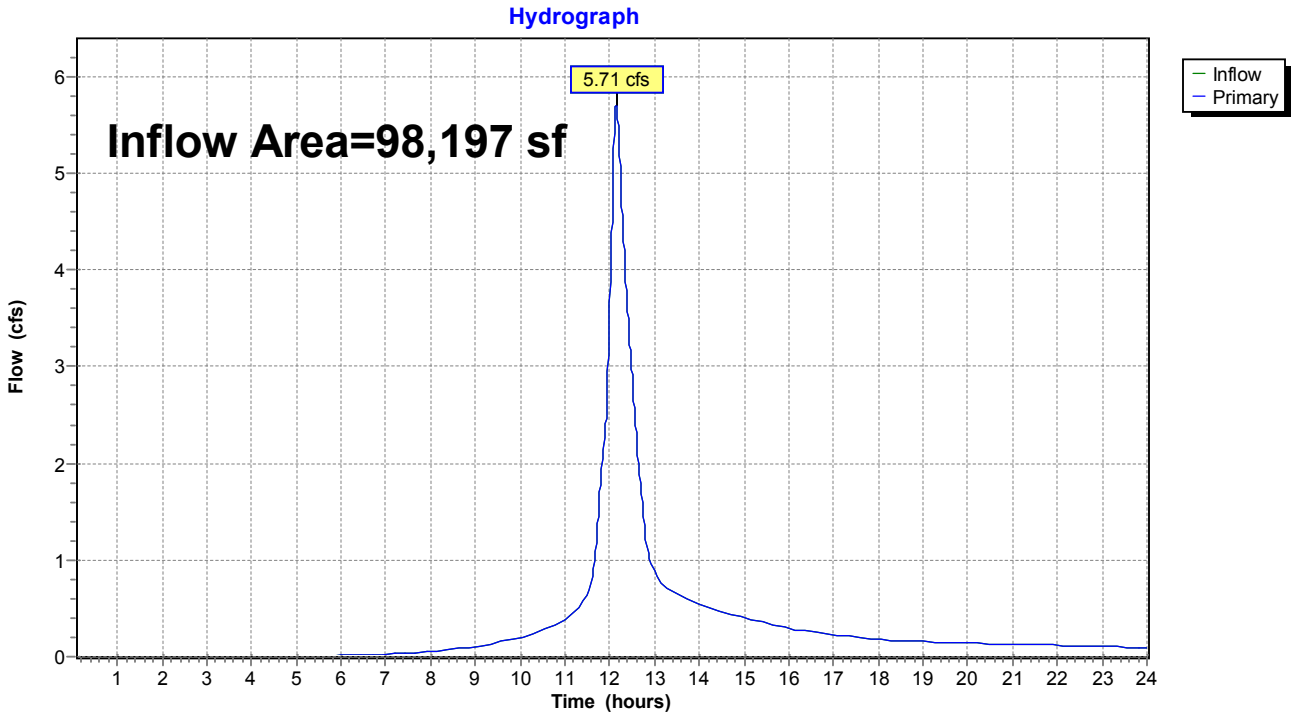


Summary for Link P1:

Inflow Area = 98,197 sf, 49.80% Impervious, Inflow Depth > 3.26" for 25-yr event event
Inflow = 5.71 cfs @ 12.15 hrs, Volume= 26,661 cf
Primary = 5.71 cfs @ 12.15 hrs, Volume= 26,661 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-24.00 hrs, dt= 0.01 hrs

Link P1:



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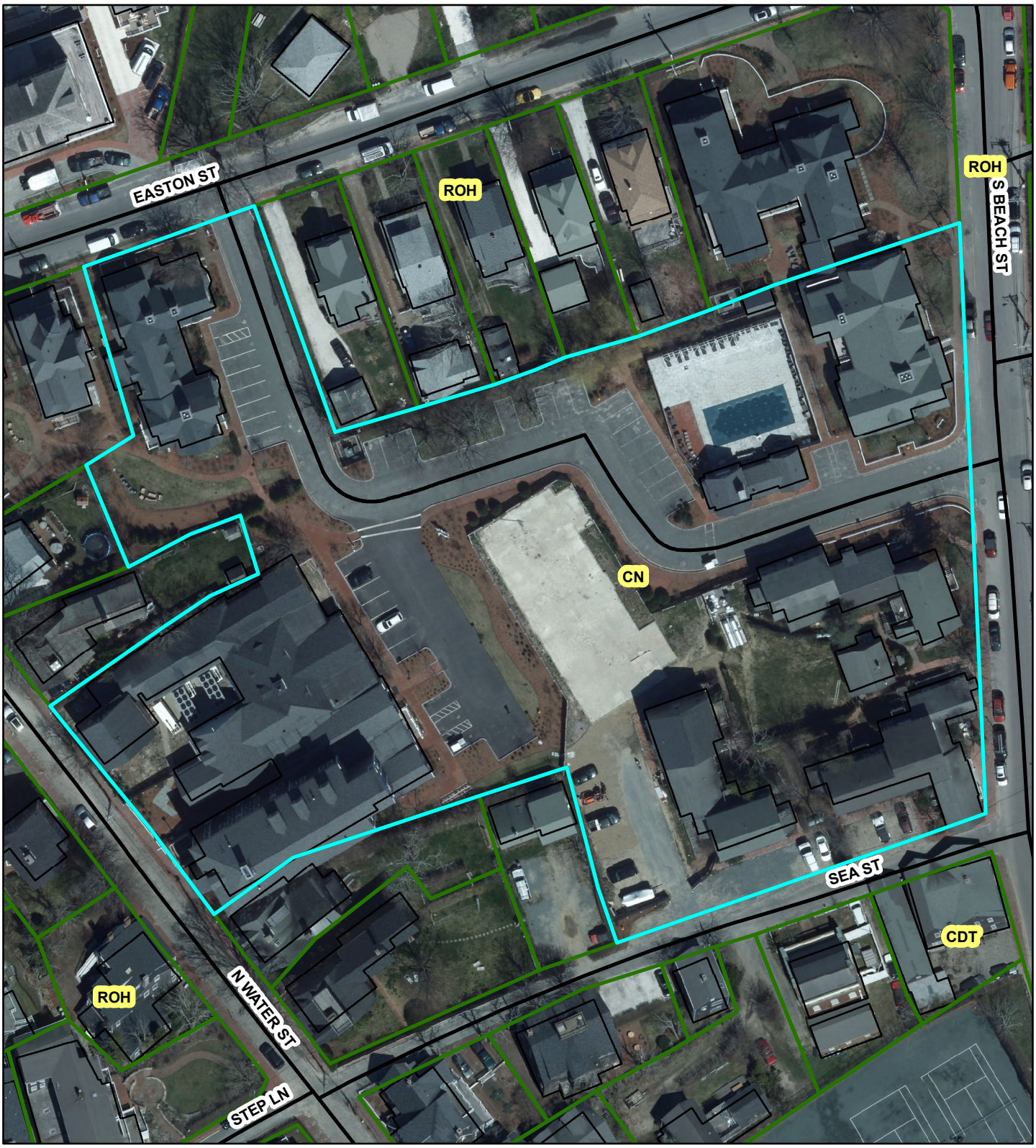
#42-16 White Elephant Village
19 South Beach Street (Townhouse 5)
Map 42.4.2 Parcel 3
Special Permit: Uses



PLANNING BOARD

FILE # 42-16

VAUGHAN, DALE, HUNTER AND BEAUDETTE
PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
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RICHARD P. BEAUDETTE

LORI D'ELIA
BRYAN J. SWAIN

WILLIAM F. HUNTER
OF COUNSEL

Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

June 15, 2016

JUN 15 2016

RECEIVED
JUN 15 2016
By CH #105546

BY HAND DELIVERY

Mr. Barry Rector, Chairman
Nantucket Planning Board
2 Fairgrounds Road
Nantucket, MA 02554

Re: Special Permit Application —
19 South Beach Street (a/k/a Townhouse 5, White Elephant Village)

Dear Chairman Rector:

On behalf of Nantucket Island Resorts LLC (the "Applicant"), and in accordance with the Town of Nantucket Zoning Bylaws, enclosed are the following application materials submitted in support of an application for a Special Permit to authorize offices, retail, personal services, convenience store, and art gallery uses (the "Proposed Uses") at 19 South Beach Street, a/k/a Townhouse 5 of the White Elephant Village (the "Site"):

1. Special Permit Application Form (a copy of which is being filed simultaneously with the Town Clerk);
2. Applicant's Addendum summarizing the Proposed Uses;
3. Site Plan entitled, "SP-1, Lot 15 Site Plan, White Elephant Village, Nantucket, MA," dated June 10, 2016, prepared by RJ O'Connell & Associates, Inc.;
4. Certified Abutters List;
5. Abutter mailing labels (4 sets);
6. A check in the amount of $488.80 (80 x $6.11), made payable to Pitney Bowes Reserve Funds, in satisfaction of the abutter notification fee; and
7. A check in the amount of $250.00, made payable to the Town of Nantucket, in satisfaction of the special permit filing fee.

As addressed in the enclosed materials, the Site is currently part of the White Elephant Village, a resort governed by a Major Commercial Development Special Permit issued by the Planning Board on January 23, 2006, as amended (the "Resort Special Permit"), and is the subject of a definitive subdivision plan approved by the Planning Board on December 14, 2015. Certain of the lots governed by the Resort Special Permit, including Townhouse 5 (Lot 15), will be released from the Resort Special Permit upon the recordation of the subdivision plan and the commencement of construction of the improvements contemplated by such plan. The purpose of this application is to allow the Site to be utilized for the Proposed Uses once it is released from the Resort Special Permit.

Kindly acknowledge receipt of the enclosed submission by signing the duplicate copy of this letter. Do not hesitate to contact me if you require any further documentation or information regarding this submission.

Sincerely,

Richard P. Beaudette

cc: John E. Twohig, Esq.

ACKNOWLEDGED:

TOWN OF NANTUCKET:

By:_____
Name:
Title:
Duly authorized

Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

JUN 15 2016

Nantucket Planning Board

RECEIVED
JUN 15 2016
By

Application for a Special Permit

Date: June 13, 2016 File #: 42-16

Name of development: 19 South Beach Street (a/k/a Townhouse 5 of the White Elephant Village)

Owner(s) name(s): White Elephant Hotel Residences LLC

Mailing address: c/o New England Development, 75 Park Plaza, Boston, MA 02116
Phone number: _____ Fax number: _____ E-mail: _____

Applicant's name: White Elephant Hotel Residences LLC

Mailing address: Applicant's Attorney: Richard P. Beaudette, Esq., Vaughan, Dale, Hunter and Beaudette PC, PO Box 659, Nantucket, MA 02554
Phone number: (508) 228-4455 Fax number: (508) 228-3070 E-mail: rick@vdhlaw.com

Engineer / surveyor's name: R.J. O'Connell & Associates, Inc.

Mailing address: 80 Montvale Avenue, Stoneham, MA 02180
Phone number: (781) 279-0180 Fax number: (781) 279-0173 E-mail: _____

Location of lot(s):
☐Street address 19 South Beach Street (representing a portion of the lot having an address of 19 North Water Street)

☐Tax Assessors Map 42.4.2 Parcel 3

☐Nantucket Registry of Deed: Plan Book _____ and Page _____ **OR**

Plan File # _____ **OR** Land Court Plan # 36477-A at Certificate # 22853

Size of parcel: 5,192 sq. ft. Zoning District: Limited Commercial (LC)

Special Permit sought: (check one)

- ❍ Cluster subdivision
- ❍ Commercial WECS
- ❍ Driveway Access/Curb Cut Special Permit
- ❍ Harbor Overlay District (HOD)
- ❍ Major Commercial Development (MCD)

- ○ Multi-family Special Permit
- ○ Moorlands Management District Subdivision or Construction (MMD)
- ○ NEHOD (Neighborhood Employee Housing Overlay District)
- ○ MRD (Major Residential Development)
- ○ MIPOD (Mid-Island Planned Overlay District)
- ☒ Other Uses Requiring a Special Permit (specify all uses and *Nantucket Code* sections)

Section	Description
139-7A, 139-30	Offices, Personal Services, Art Gallery, Convenience Store

Specify all associated Zoning Code relief sought:

Section	Description
139-7A, 139-30	Offices, Personal Services, Art Gallery, Convenience Store
139-18	Off-Street Parking Requirements

Only the zoning relief expressly requested above will be considered as part of this application.

If applying for a Major Commercial Development, specify how the application will comply with Section 139-11 (J) of the *Zoning Code of the Town of Nantucket*, also known as the Town's Affordable Housing Effort:

_____

_____

Planning Board filing fee due: $_____

Engineering Inspection Escrow Deposit due: $_____

I/ we hereby certify that the applicant(s) cited above have been authorized by me/ us to file a Special Permit application with the Planning Board on property that I/ we own.

White Elephant Hotel Residences LLC
By: NED Manager LLC, its Manager

By: _____, its Manager

_____
Owner(s)' Signature(s)
White Elephant Hotel Residences LLC, by their attorney, Richard P. Beaudette, Esq.

_____
Applicant's Signature

I/we White Elephant Hotel Residences LLC, the undersigned, hereby authorize Richard P. Beaudette, Esq. to act as agent(s) on my/our behalf and to make any necessary revisions on this filed application as they may be requested by the Board to meet its governing rules and guidelines.

White Elephant Hotel Residences LLC
By: NED Manager LLC, its Manager

By: _____, its Manager
Owner(s)' signature(s)

Check List:

- ❑ Planning Board Special Permit abutters list – to be obtained at the Tax Assessor's office
- ❑ Completed application form entitled "Application to the Planning Board for a Special Permit"
- ❑ Application fee of $250.00 payable to Town of Nantucket
- ❑ Abutters fee of $6.11 per abutters payable to Pitney Bowes Reserved Funds
- ❑ Four (4) sets of mailing labels with each abutter's name and address
  - 1" x 2 5/8" size, typed labels, are preferred
  - duplicate labels are not necessary if the same owner is listed for more than one abutting property
- ❑ Completed application form
- ❑ Town Clerk's stamped application (provide 2 copies-one for Town Clerk and one for Planning Board)

ADDENDUM

Application for Special Permit
19 South Beach Street
Nantucket, MA

For the reasons stated below, and for such other reasons as may subsequently be brought to the Board's attention, Nantucket Island Resorts LLC (the "Applicant"), the operator of the White Elephant Village resort (the "Resort"), respectfully requests that the Board issue a special permit for 19 South Beach Street, Nantucket, Massachusetts (the "Site"). The Site is currently part of the Resort and is governed by a Major Commercial Development Special Permit issued for the Resort on January 23, 2006, most recently amended on December 9, 2013 (the "Resort Special Permit").

Concurrently with this application, the Applicant has submitted a companion application petitioning the Planning Board to release uncompleted portions of the Resort, including the Site, from the Resort Special Permit to enable their future development independently of the Resort. Specifically, Lots 4-16 (the "Subdivision Lots") as shown on a definitive subdivision plan entitled, "Definitive Plan for the Subdivision of Land, Proposed Way, White Elephant Village, Nantucket, MA," dated October 8, 2015, approved by the Planning Board in accordance with the Subdivision Control Law (M.G.L. c. 41, §§ 81K-81GG) on December 14, 2015 (the "Subdivision Plan"), will be released from the Resort Special Permit. The companion application requests that the Subdivision Lots (including the Site) remain governed by the Resort Special Permit until the recordation of the Subdivision Plan and the commencement of construction of the improvements contemplated by such plan.

The Site is currently occupied by an office tenant and ancillary Resort amenities and support facilities. In addition to maintaining the current uses, this application requests a special permit to allow art gallery, personal services, convenience store uses, and customary accessory uses (collectively, the "Proposed Uses"), which would enliven the Site and complement currently permitted uses for the Site (including offices, retail stores, and uses accessory and ancillary to the Resort). The expansion of the allowed uses for the Site would also allow the Applicant to respond to present and anticipated leasing demands. This proposal relates solely to use and does not involve any additions or alterations to the Site.

Site

The Site consists of an approximately 5,192 square foot lot bounded by South Beach Street to the east and Sea Street to the south, identified as Lot 15 on the Subdivision Plan, and shown on a plan entitled, "SP-1, Lot 15 Site Plan, White Elephant Village, Nantucket, MA," dated June 10, 2016, prepared by RJ O'Connell & Associates, Inc., a copy of which is enclosed with this application. The Site consists of a portion of Lot 3 on Assessor's Map 42.4.2. The Site is improved with a building currently occupied by an office tenant on the ground floor and also used for ancillary Resort amenities and support services (the "Building").

As shown on the map entitled, "Town of Nantucket, Nantucket Island Zones," including cumulative zoning updates through the April 2016 Annual Town Meeting (the "Zoning Map"),

the Site is currently located in the Commercial Neighborhood District by virtue of a Zoning Map amendment approved at the April 2015 Annual Town Meeting. At the time the Subdivision Plan was filed, the Site was located in the Limited Commercial District. Pursuant to M.G.L. c. 40A, § 6, the Site is presently governed by the use and dimensional controls for the Limited Commercial District, the controls in effect at the time the Subdivision Plan was filed.

Proposal

This application requests the approval of the Proposed Uses, intended to enliven the Site and allow the Applicant to respond to present and anticipated leasing demands. As described in greater detail below, this proposal relates solely to the approval of additional uses for the Site, all of which are allowed by right in the Site's current zoning district. The Proposal does not involve any additions or alterations to the Building, nor does it seek any relief needed to effectuate the release of the Subdivision Lots (including the Site) from the Resort Special Permit.

Relief Requested

The Applicant proposes to utilize all (or any portion of) the Site for offices, retail stores, art gallery use, personal services, convenience store, and customary accessory uses. All of the Proposed Uses are allowed by right in the Site's current zoning district, the Commercial Neighborhood District. However, because the Site was located in the Limited Commercial District at the time the Subdivision Plan was filed, the Site is subject to the use and dimensional controls of the Limited Commercial District. Offices and retail stores are allowed by right in the Limited Commercial District, but the remaining Proposed Uses (art gallery, personal services, and convenience store) require a special permit in the Limited Commercial District. The Proposed Uses are considered Business Commercial Uses under the Zoning Bylaw; therefore, in accordance with Section 139-30A of the Zoning Bylaw, the Planning Board is the special permit granting authority for the Proposed Uses.

In addition, due to the non-automobile-focused nature of travel in this area of Nantucket, and in light of the fact that the Building cannot be reconfigured in a way that would allow the Site to conform to the Zoning Bylaw's off-street parking requirements, this application requests relief from the minimum off-street parking requirements, as allowed by Section 139-18D of the Zoning Bylaw.

This application requests relief from the use and off-street parking requirements only. No dimensional relief is required—the Site satisfies all of the dimensional and intensity controls applicable to properties the Limited Commercial District, including minimum lot size (5,000 square feet), minimum side and rear yard setbacks (5 feet), minimum frontage (40 feet), and maximum ground cover (50%).

Standards for Grant of Relief

Use

In accordance with M.G.L. c. 40A, § 9 and Section 139-30A(1) of the Zoning Bylaw, the Planning Board shall grant the requested special permit if it finds that the Proposed Uses are in

harmony with the general purpose and intent of the Zoning Bylaw. As established in Section 139-1 of the Zoning Bylaw, these purposes include promoting the health, safety, convenience, morals and general welfare of the Town of Nantucket and lessening the danger from fire and congestion.

This application simply seeks to authorize uses currently allowed by right in the Site's current zoning district but which, through a technicality of the Subdivision Control Law, require a special permit from the Board. No exterior changes to the Building or related infrastructure are proposed. That all of the Proposed Uses are allowed by right in the Site's current zoning district reflects the Town's determination—the result of a recent comprehensive planning and zoning process—that the Site is an appropriate and desirable location for the Proposed Uses. Had the Subdivision Plan not served to "freeze" zoning for the Site, the requested special permit would not be required.

Further, the Site has long housed offices and commercial uses without incident and is located in the vicinity of numerous such uses. The Proposed Uses are consistent with uses prevailing in the Site's immediate vicinity, will complement the surrounding neighborhood, and will be operated in such a manner as not to interfere with the use or enjoyment, or injure the physical condition, of adjacent land. Accordingly, the Proposed Uses are in harmony with the general purpose and intent of the Zoning Bylaw.

Off-Street Parking

The Building is presently occupied by an office tenant on the ground floor and is also used for ancillary Resort amenities and support services. The proposal calls for use of the Building for offices, retail stores, art gallery use, personal services, convenience store, and customary accessory uses. In accordance with Section 139-18 of the Zoning Bylaw, the parking requirements for the Proposed Uses are 1 space for every 200 square feet of gross floor area, the same as for the existing office use, except that retail stores and services also require 1 parking space for every 3 employees on peak shift. Under the Resort Special Permit, approximately 1,800 square feet of the Building may be occupied by offices and retail stores, requiring approximately nine (9) parking spaces (based on a rate of 1 per 200 square feet), plus additional parking for retail/service employees. Due to physical constraints and Site challenges, the Site cannot physically accommodate required parking spaces. Accordingly, the Applicant requests that the Board grant relief from the required parking requirements, as allowed by Section 139-18D of the Zoning Bylaw.

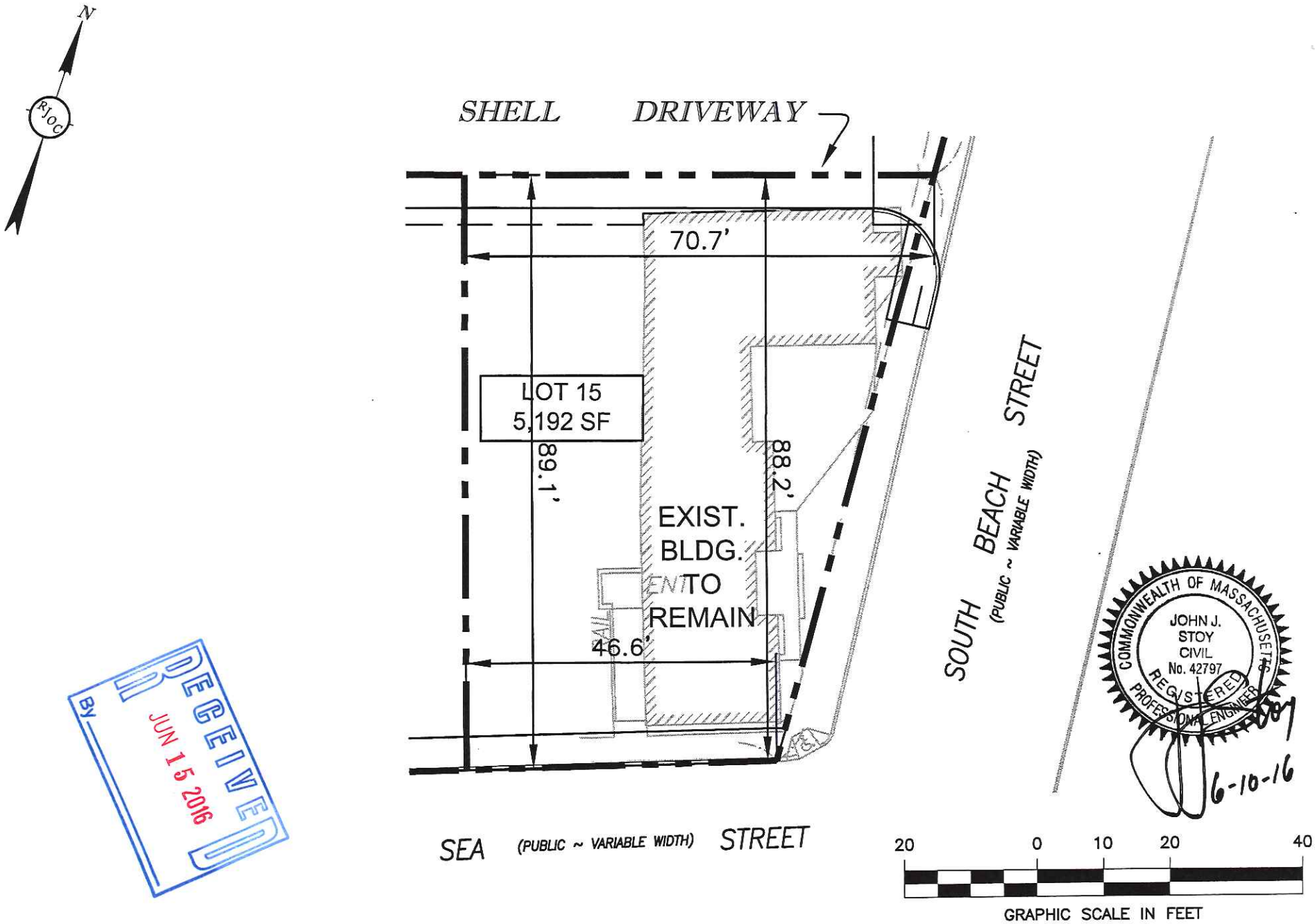
The Board may grant the requested parking relief if it finds that (a) the granting of such relief is in harmony with the general purpose and intent of the Zoning Bylaw; (b) full compliance is physically impossible for the applicant to provide, or, if physically possible, would have a significant adverse effect upon the scenic or historic integrity of the neighborhood; and (c) the granting of relief would not be contrary to sound traffic, parking or safety considerations.

Due to the Building's age and configuration, it is physically impossible to construct the required parking spaces at the Site. Further, the Site is located in an area of the Town in which automobile travel is discouraged. In fact, the Site abuts the Commercial Downtown District to the south and east, within which off-street parking is not required. Even if the Site could be

reconfigured to accommodate the required parking (which it cannot), providing the additional parking required by the Zoning Bylaw would encourage vehicular travel in an area of Town highly traveled by pedestrians, contrary to sound traffic, parking and safety considerations. Accordingly, the Applicant respectfully submits that the proposal satisfies the standards for relief from the applicable off-street parking requirements.

Conclusions

For the reasons stated above, and for such other reasons as may subsequently be brought to the Board's attention, the Applicant respectfully requests that the Board (i) issue a special permit allowing the Proposed Uses (offices, retail stores, art gallery use, personal services, convenience store, and customary accessory uses), and (ii) grant relief from the minimum off-street parking requirements in accordance with Section 139-18D of the Zoning Bylaw.



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No.	REVISION	DATE	No.	REVISION	DATE

Seal:

Designed by:	SPG
Drawn by:	RJK
Checked by:	SPG
Scale:	1"=20'
Date:	06/10/2016

Prepared for:
NANTUCKET™ ISLAND RESORTS
10 AMELIA DRIVE
NANTUCKET, MA 02554
508-228-1000

Prepared by:
RJO'CONNELL & ASSOCIATES, INC.
CIVIL ENGINEERS, SURVEYORS & LAND PLANNERS
80 MONTVALE AVE
STONEHAM, MA 02180
781-279-9166 FAX: 781-279-8193

Project Name:
WHITE ELEPHANT VILLAGE
NANTUCKET, MA

Drawing Name:
LOT 15 SITE PLAN

Drawing No.:
SP-1

Project No.: 13052

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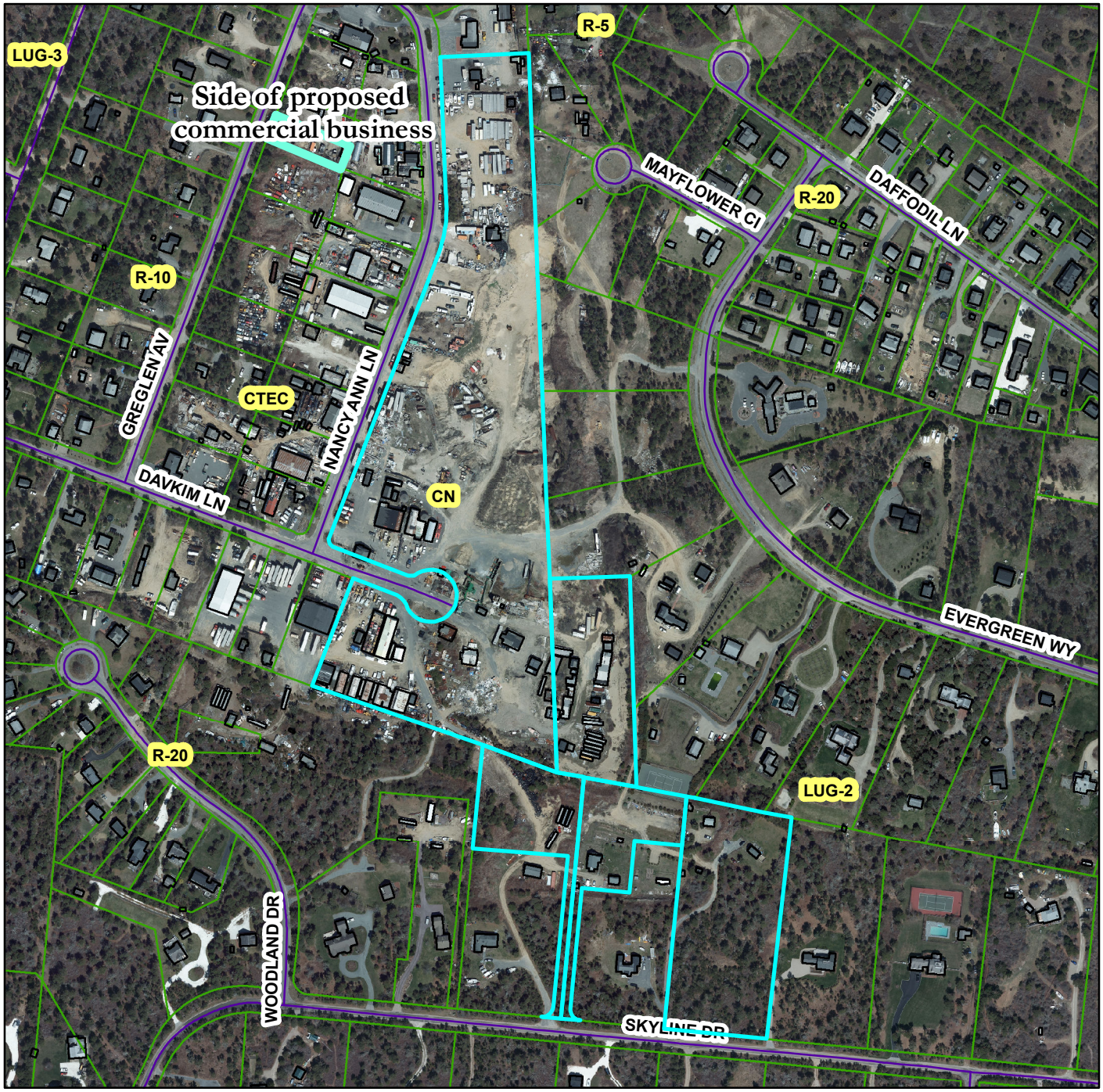
Drawing name: G:\MA\Nantucket\NED\White Elephant Phase III\Main\Definitive Subdivision\13052_SP-1 Site Plan.dwg
Jun 14, 2016 - 12:54pm

#7918 Richmond Great Point Development, LLC
Definitive Subdivision
42B, 48R, 54R Skyline Drive & 20 Davkim Lane
Map 79 Parcels 44.1, 45.1, 46
Map 68 Parcels 56.1, 57



PESCE ENGINEERING & ASSOCIATES, INC.
451 Raymond Road
Plymouth, MA 02360
Phone: 508-743-9206 Cell: 508-333-7630
epesce@comcast.net

July 1, 2016

Nantucket Planning Board
Attn: Ms. Leslie Snell, AICP, LEED ® AP
Deputy Director, Planning & Land Use Services
2 Fairgrounds Road
Nantucket, MA 02554

RE: UPDATED Engineering Review of the Proposed **Clay Street Definitive Subdivision (off Skyline Drive)**

Dear Mrs. Snell & Members of the Board:

Pesce Engineering & Associates, Inc. is pleased to provide you this updated engineering review of the proposed Clay Street Definitive Subdivision, located off Skyline Drive, Nantucket, MA. As before, we have evaluated the plans for consistency with the Town's Zoning Bylaw, the Nantucket Rules and Regulations Governing the Subdivision of Land (SR&R), and general conformance with the Massachusetts Stormwater Management Regulations.

We have reviewed the following new information to prepare this letter report:

- Letter from The Richmond Company to the Town of Nantucket Planning Board, Subject: Submittal of a Modified Plans and Revised Technical Materials, "Form B" Application for Approval of a Definitive Plan, 42 (Rear) 48 (Rear) and 54 (Rear) Skyline Drive Properties and 20 Davkim Lane Property (Planning Board File #7918, with list of requested waivers, dated June 3, 2016.

- Site Development Plans; Definitive Plan, Clay Street, Nantucket, MA, 5 sheets, prepared by Hayes Engineering, Inc., dated December 11, 2015, and revised May 31, 2016.

- Revised Storm Water Management Report, Definitive Subdivision, Clay Street, Nantucket, MA, prepared by Hayes Engineering, Inc., dated December 11, 2015, and revised May 31, 2016.

The applicant has revised the design plans to now show a dead end layout and rural road (gravel), with an "L" turning area. It no longer connects to Nancy Ann Lane. The total subdivision road layout is 40 ft. wide X approximately 580 ft. long. The proposed gravel road is 12 ft. wide (transitioning to 17.5 ft. wide at the 375 ft. point) X approximately 538 ft. long. The total area for this subdivision (including the roadway

area) has been reduced to approximately 3.54 acres. No new municipal water or sewer utilities are proposed for this subdivision.

The following are our updated review comments:

Definitive Plans, Utilities, and Site Layout

1. We recommend that the applicant discuss with the Board the justification and explanation for the waivers requested. From our review of these waivers, we find they do not present any major additional engineering issues or concerns, with the exception of the comments below regarding the gravel road width, and the proposed 8-ich diameter drainage pipe.

2. The proposed roadway width of 12 ft. may be too narrow to be acceptable by the Nantucket Fire Dept. We recommend that the applicant review this plan with the Fire dept., and provide the Board with their written acceptance, if approved.

3. The proposed subdivision road transitions from 40 ft. wide to 35 ft. in the vicinity of the existing dwelling shown on Lot 1. Sheet 2 further states "*Existing House to be Razed or incorporated into Adjacent Lot.*" We recommend that the Board consider a Condition, that if the dwelling is actually razed (and no longer encroaching near the road), that the subdivision roadway shall be widened to 40 ft., consistent with the rest of the road layout.

4. We recommend that "Clay Street" be designated as a separate lot, to be deeded to the subdivision Homeowner's Association, as per the Planning Board requirements.

5. We have the following comments regarding the proposed intersection of Clay Street at Skyline Drive:

    a. Sheet 4 shows a paved or Belgian block apron, which terminates at the Skyline Road layout line. We recommend that this apron be extended into the Clay Street layout for a length of 10 ft. from the Skyline Drive layout line.

    b. We recommend that the proposed apron radii be added to the plans.

6. We recommend that some additional signage be added to the plans as follows:

    a. A street sign at the intersection of Clay Street and Skyline Drive.

    b. A "Stop" sign (with painted stop line) at the intersection at Skyline Drive.

7. As before, the plans show several lines representing “paper” streets running through the new lot lines (Oniska Avenue, Andrew St., Jackson St. & Sumner St.). We recommend that the applicant clarify the disposition (street abandonment or legal discontinuance?), or relevance of these paper streets.

8. We recommend that proposed driveway apron be shown on the plans (in the conceptual location). The “Driveway Culvert Detail” shown on Sheet 5 should also show the proposed radii, and the length of the driveway should be shown extending 10 ft. into the lot.

9. We recommend that that length, width and radii dimensions be added for the proposed turning area located in the roadway turnaround easement off Clay Street.

10. Since the proposed turning area located in the roadway turnaround easement is also a connection to an existing driveway, we recommend that the engineer consider adding a driveway culvert for this location.

Stormwater Management

This project proposes to mitigate post-development runoff for the new subdivision roadway by collecting runoff flow into a 2 ft. wide grass swale on the east side of Clay Street, which flows to an area drain, which then discharges to a subsurface infiltration area. This stormwater management system will remove some of the Total Suspended Solids (TSS) in the stormwater, and recharge the stormwater to the aquifer. The proposed design also reduces the peak rate of runoff as compared to the existing conditions, and is additionally designed for the 100-yr. storm.

We have the following stormwater management comments:

1. The proposed Nyloplast area drain basin should be designed to provide a 4 ft. sediment sump, and outlet tee or elbow, in accordance with Stormwater Best Management Practices.

2. The sediment accumulation from a gravel road is likely to be higher than that from a paved road surface. As such, we recommend that the piping from the area drain to the cultic chambers be 12-inch diameter minimum, in order to function with some accumulated sediment during use.

3. The proposed rim elevation of the area drain is 26.50 ft., and the invert of the outlet pipe is 25.00 ft. This provides only 10 inches of cover over the proposed 8-inch pipe. We recommend that at least 12 inches of cover is provided over the HPDE pipe.

4. As before, no soil test pit data was provided to evaluate the separation distance from the bottom of the Cultec chambers from the estimated seasonal high groundwater elevation. As requested in the list of waivers, we recommend that the requirement to provide test pit data be added as a condition of the Decision, requiring this soil test pit data to be provided to the Board prior to the construction start.

5. The calculations in the Stormwater Report indicate a peak storm elevation which exceeds the area drain inlet rim elevation of 26.50 ft. for the 10, 25, 50 & 100-yr. storms (all these storms have a calculated peak elevation over elevation 27.50 ft.). Additionally this peak storm elevation is at the Cultec chamber and area drain location, which will likely discharge onto Skyline Drive. We recommend that the area drain and Cultec chambers be re-located further away from the intersection with Skyline Drive, and that the system be enlarged to better accommodate storm events.

6. The proposed roadside stormwater swale is proposed as only a 2-ft. wide swale with 1.5:1 side slopes. We recommend that this swale be widened to accommodate a more constructible and less steep 2:1 side slope, and be at least 2 ft. deep.

Thank you again for this opportunity to assist the Planning Board in their review of this project. As always, please call if you have any questions or comments.

Sincerely,

PESCE ENGINEERING & ASSOCIATES, INC.

Edward L. Pesce

Edward L. Pesce., P.E., LEED ® AP
Principal

David Armanetti, The Richmond Co.
P. John Ogren, P.E., Hayes Engineering, Inc.

Holly Backus

From: Holly Backus
Sent: Wednesday, June 08, 2016 1:53 PM
To: 'David Armanetti'; Catherine Ancero; Ed P
Cc: Patricia Roggeveen; Andrew Burek; Arthur Reade; Andrew Vorce; Leslie Snell
Subject: RE: Richmond Nantucket - Submittal of Modifications to "Clay Street" Definitive Subdivision

Thank you Dave for the email and corresponding documents.
We will provide to the Board for their review and discussion on June 13th.

Please let me know if you have any questions or if I can be of further assistance.
Take care,

Holly E. Backus
Land Use Specialist
Town of Nantucket

From: David Armanetti [mailto:darmanetti@richmondco.com]
Sent: Monday, June 06, 2016 4:46 PM
To: Catherine Ancero; Holly Backus; Ed P
Cc: Patricia Roggeveen; Andrew Burek; Arthur Reade; Andrew Vorce; Leslie Snell
Subject: Richmond Nantucket - Submittal of Modifications to "Clay Street" Definitive Subdivision

Catherine, Holly, and Ed –

Following up on my meeting with Catherine this morning, where I formally submitted original, full size, hard copies, attached, please find PDFs of our submittal of the modified plans and supporting technical materials for the "Clay Street" Definitive Subdivision that we had previously submitted on January 6, 2016 and was originally discussed at the public hearing that was held by the Town Planning Board at its March 3, 2016, which was then continued, at our request, to be resubmitted, with proposed modifications, which we have now designed and proposed. Subject to your determination of the completeness of the plans and materials, we are requesting that the public hearing / deliberations on this application be re-initiated at the June 13, 2016 meeting of the Planning Board.

Our submittal of the modified plan and materials includes the following:

1 – PDF of the cover letter, describing the context and summarizing the modifications that we have made to the proposed subdivision and which have been incorporated in the (revised) plans and technical materials.

2 – PDF of the revised subdivision plans, including details (5 sheets)

3 – PDF of the revised list of waivers from the subdivision rules and regulations that are being requested to accommodate the proposed (revised) plan – you will note that many of the requests are necessary to meet the request that the road serving the 48R / 54R Skyline Drive property be improved to the minimum possible level (as a "rural road") to provide safe and sufficient access to a single residential lot; this is being done partly to accommodate concerns of the immediate abutters and abutters in the Skyline Drive and Surfside areas, to minimize the likelihood that this road will be used as a "cut through" to our larger housing development area, located further to the north, within the 20 Davkim Lane property and properties located further to the north and east.

4 – PDF of the revised Storm Water Management Plan, reflecting the substantial reduction in the scope of the subdivision and the prospective runoff to be generated by the development, thereby requiring a much more limited scope of accompanying drainage improvements.

As you know, the application was stamped in as received by the Town Clerk and by you, on behalf of the PLUS office this morning.

Please advise of any additional requirements to complete this filing.

We realize that it may take Mr. Pesce more than a few days to initiate and conduct his review of the modifications, which may not be completed prior to the June 13, 2016 meeting of the Planning Board and that the generation of his review comments and recommendations may not be issued until after that date. Nonetheless, we believe it will be productive for the staff and Planning Board to discuss the modified plans and solicit abutter and public input at this meeting.

We look forward to the Planning Board's further consideration of this application at its June 13, 2016 meeting.

Regards,
Dave

David J. Armanetti
Director of Real Estate Development
The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887

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THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
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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

603 Salem Street
Wakefield, MA 01880
Tel: (781) 246-2800
Fax: (781) 246-7596

Nantucket, MA 02554
Tel: (508) 228-7909

Refer to File No. **NAN-0107M**

Storm Water Management Report

Definitive Subdivision
Clay Street
Nantucket, Massachusetts

December 11, 2015

REVISED: May 31, 2016

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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.

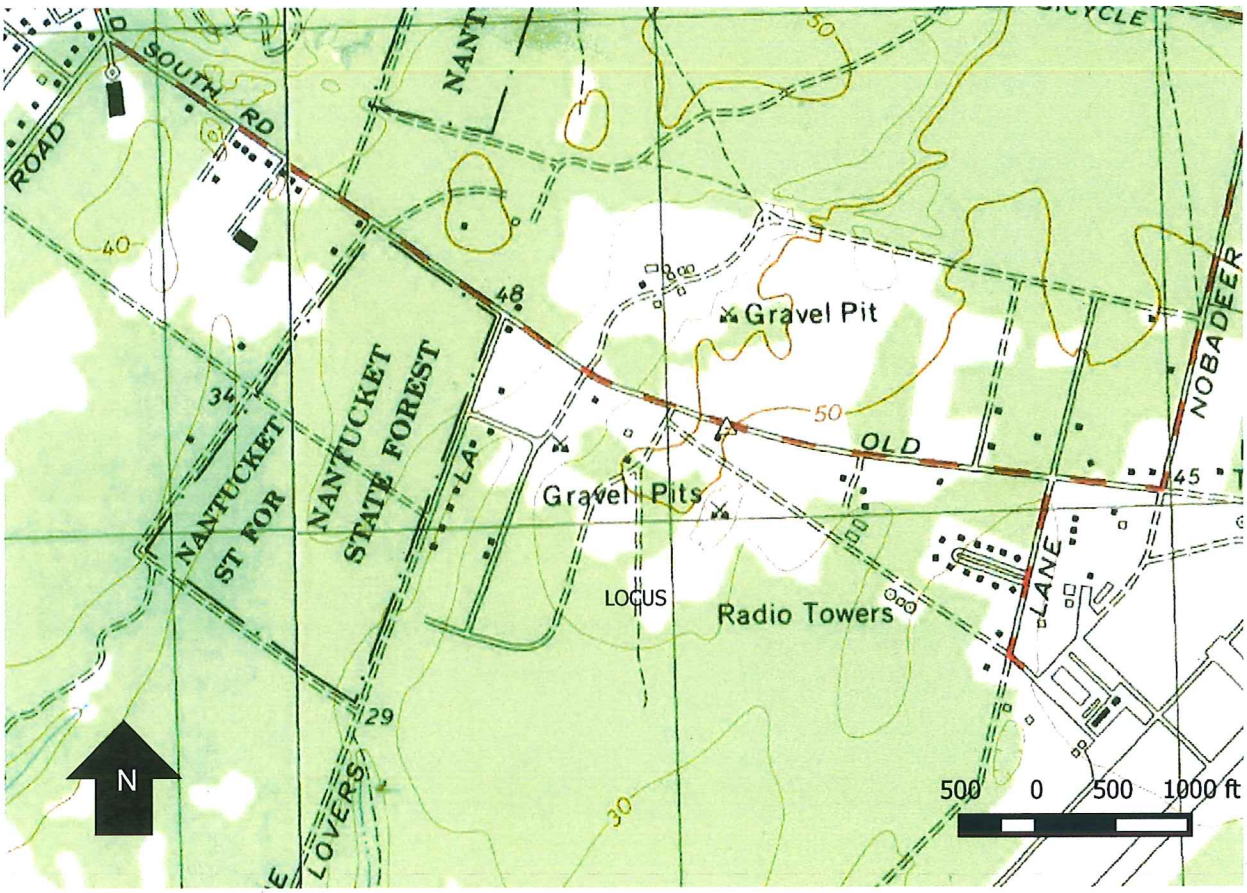


Figure 1- USGS Vicinity Map

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

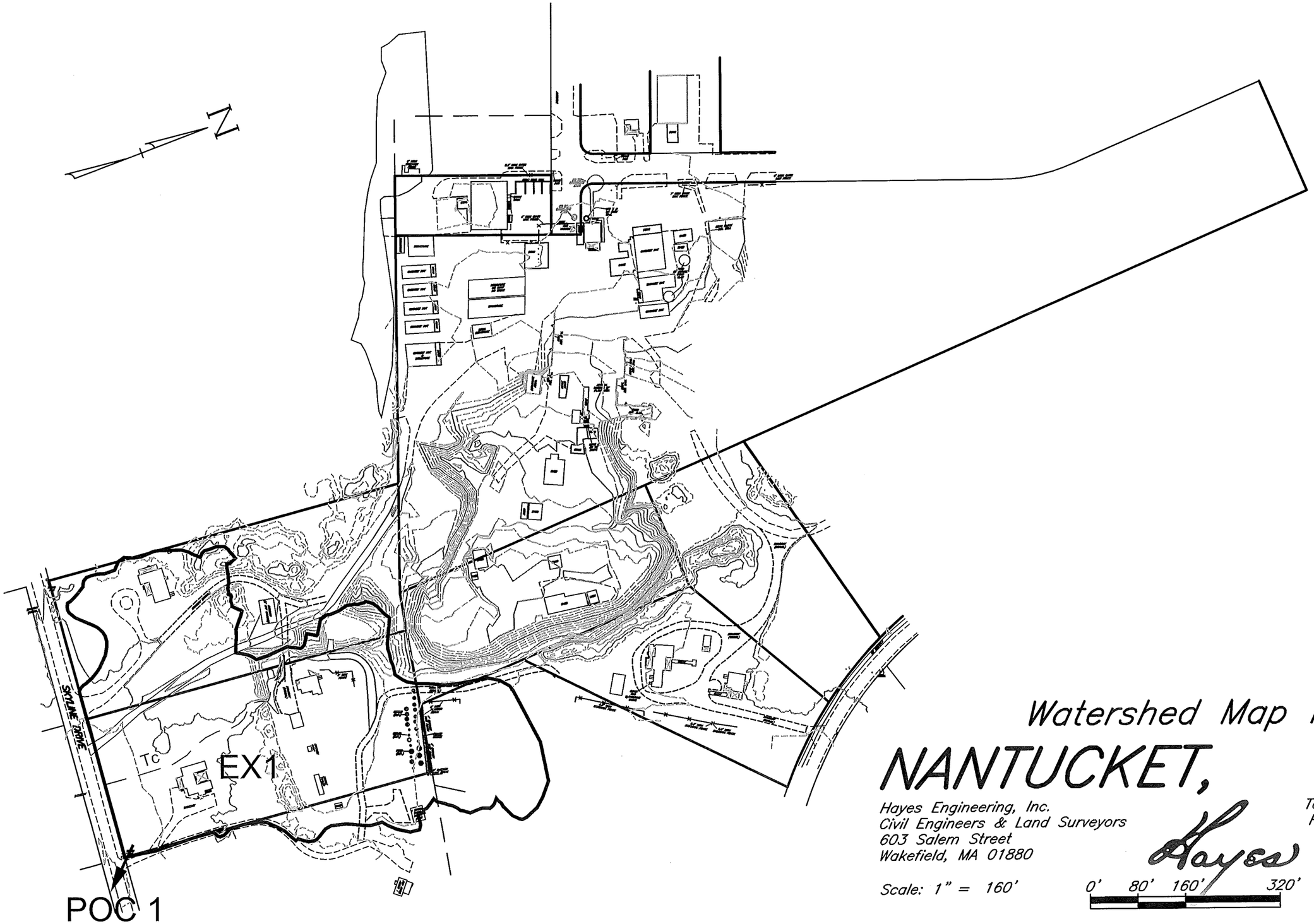
Under existing conditions, the site is divided into one (1) sub-catchment area. (See Figure 2 – Pre-Development Watershed Map).

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.

Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

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

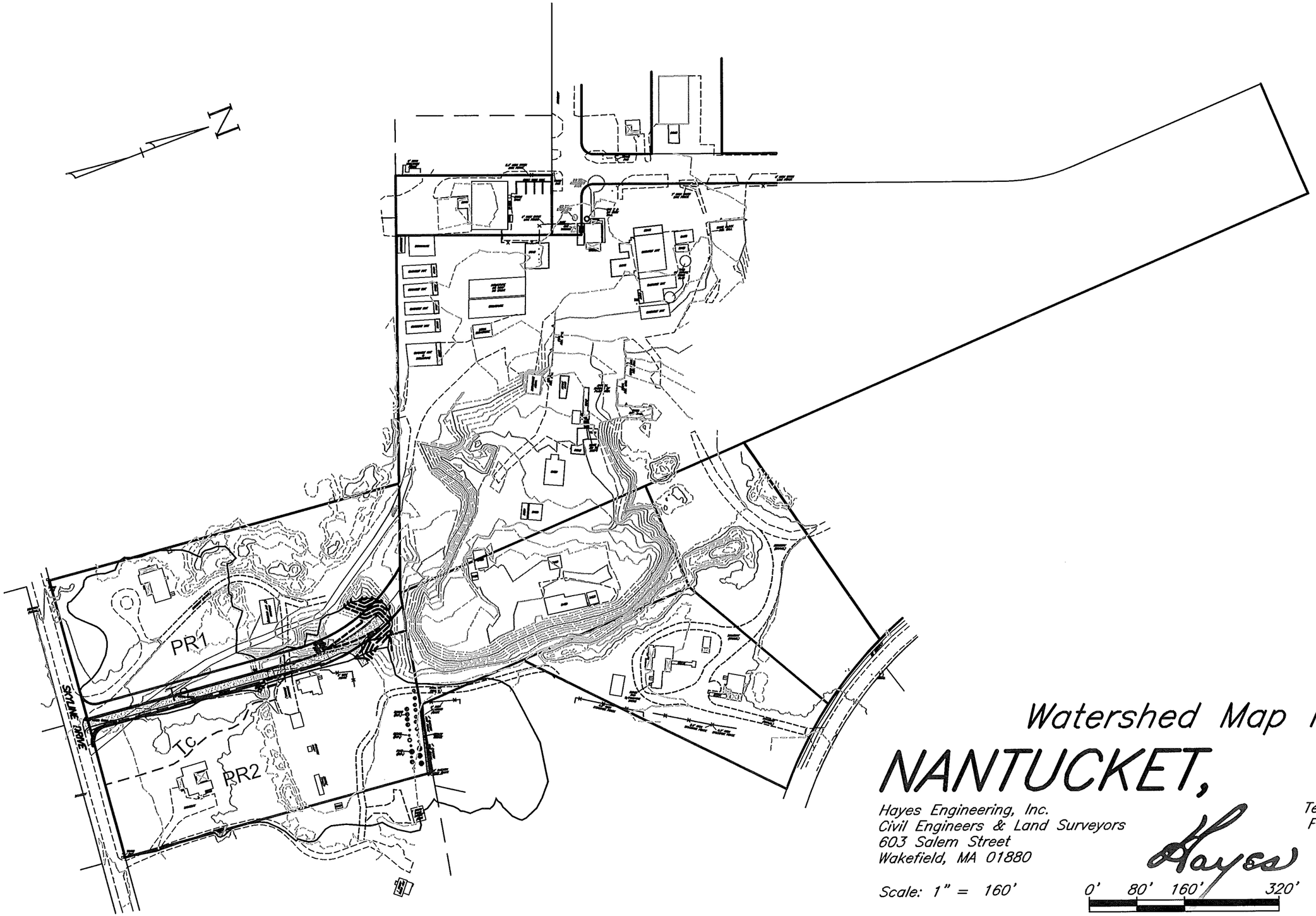
2.2 Post-Development Conditions

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



Watershed Map in NANTUCKET, MASS.

Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

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Scale: 1" = 160'

0' 80' 160' 320'

December 11, 2015
Rev. May 31, 2016

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.

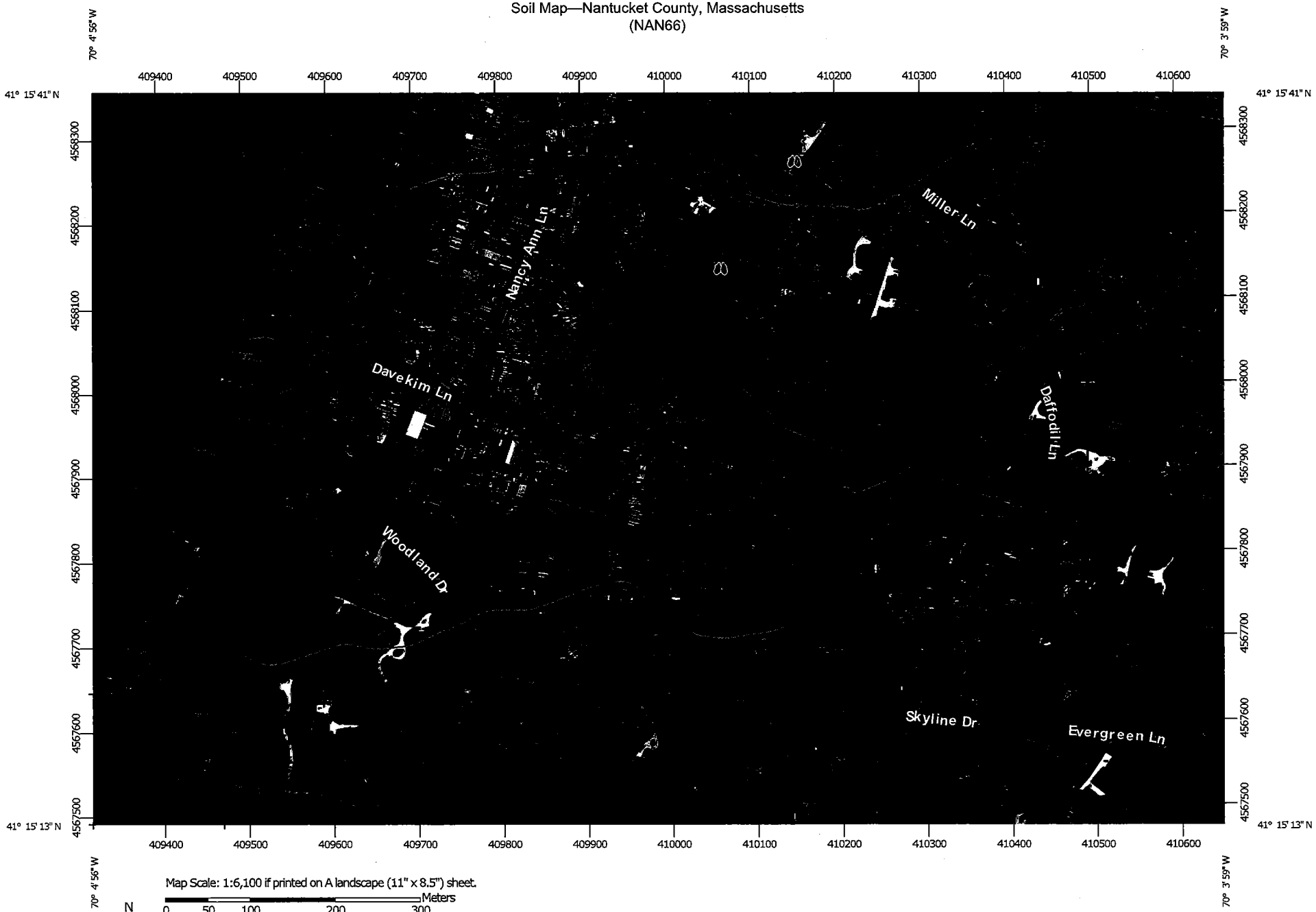
4.0 Conclusion

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	—	—

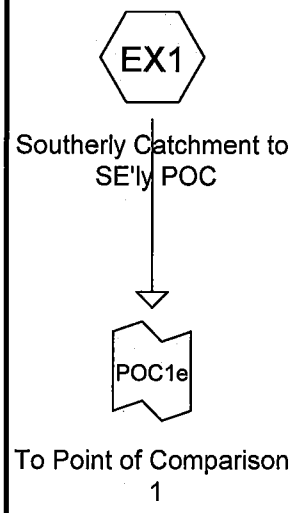
Data Source Information

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

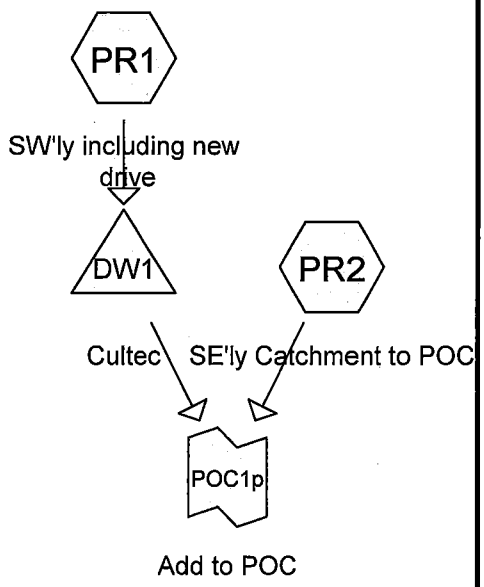
APPENDIX B:

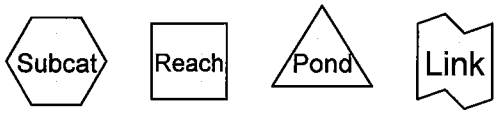
HydroCAD® Calculations

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
HydroCAD® 10.00-16 s/n 03206 © 2015 HydroCAD Software Solutions LLC

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

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

PE 6/2/18

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: _____

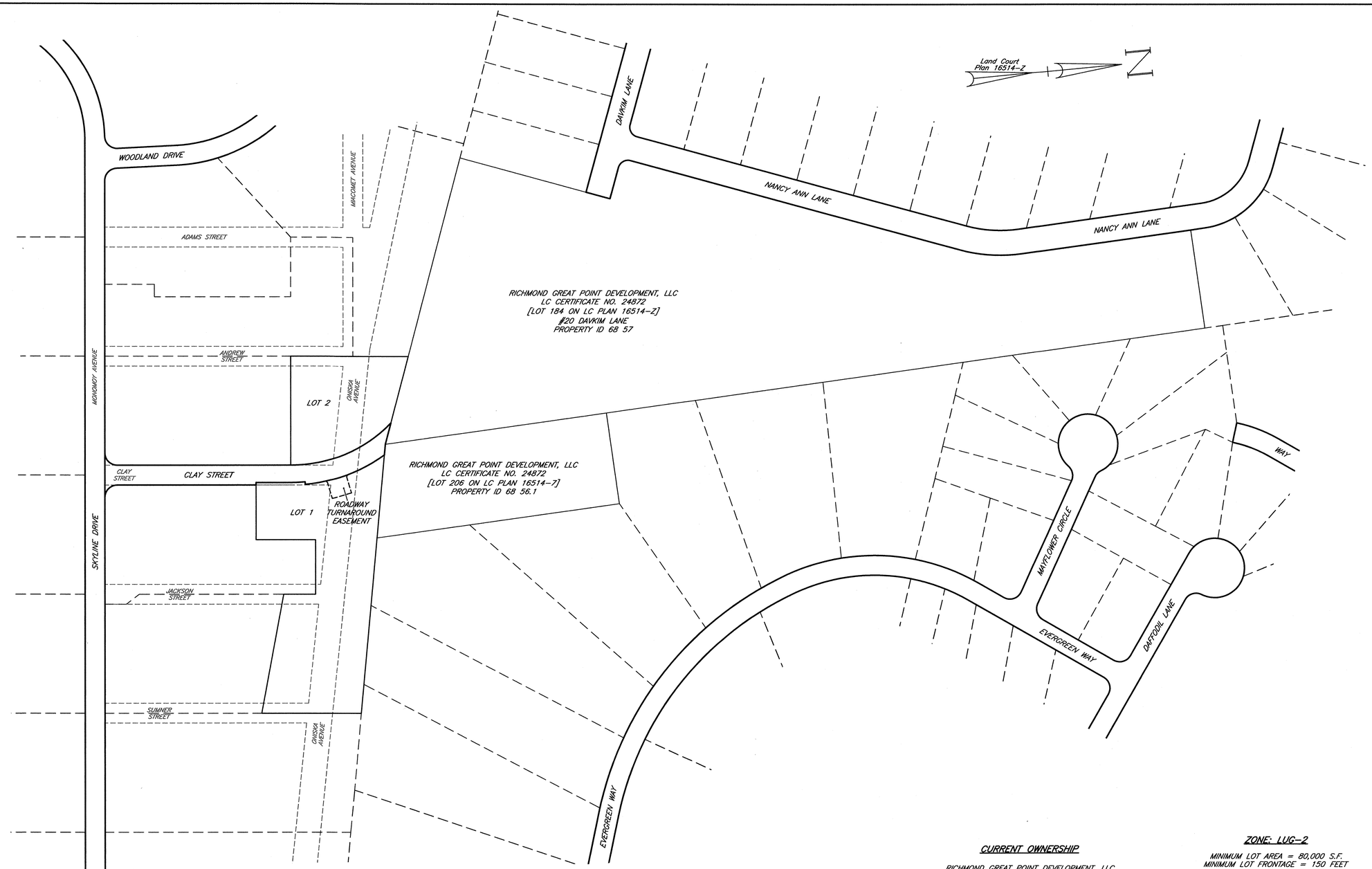
Qualifications: _____

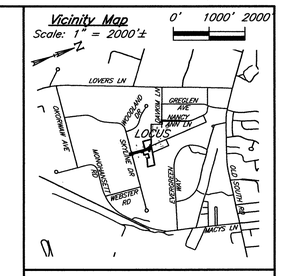
_____

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		





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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

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

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

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

NANTUCKET PLANNING BOARD

_____
_____
_____
_____
_____

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

INDEX SHEET

SHEET 1 OF 5

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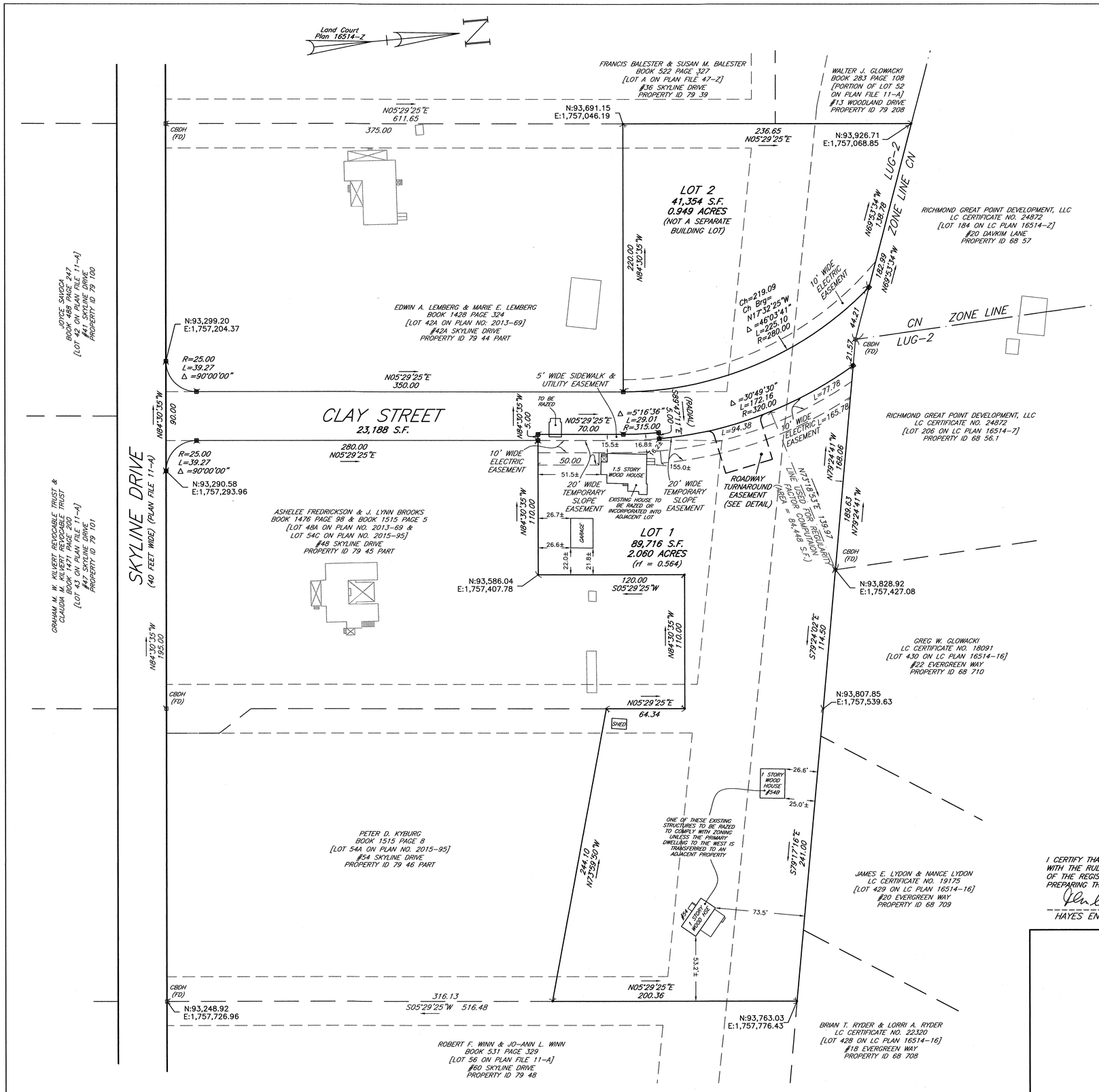

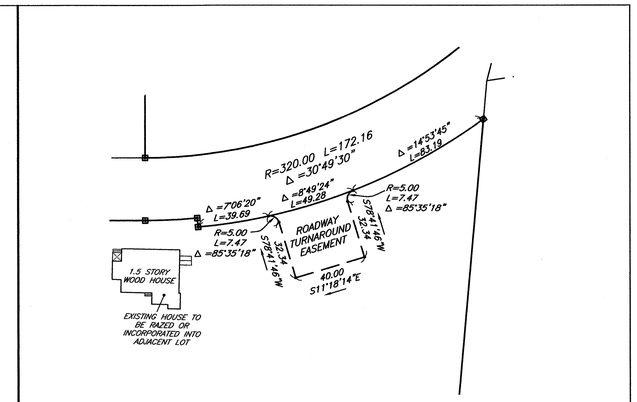

ROADWAY TURNAROUND DETAIL
SCALE: 1" = 40'

NOTES:

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TOWN CLERK

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LEGEND

CBDH – CONCRETE BOUND WITH DRILL HOLE

(FD) – FOUND

LC – LAND COURT

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

Coordinate System

N 92,823.98
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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.

ZONE: LUG-2

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

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

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.

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

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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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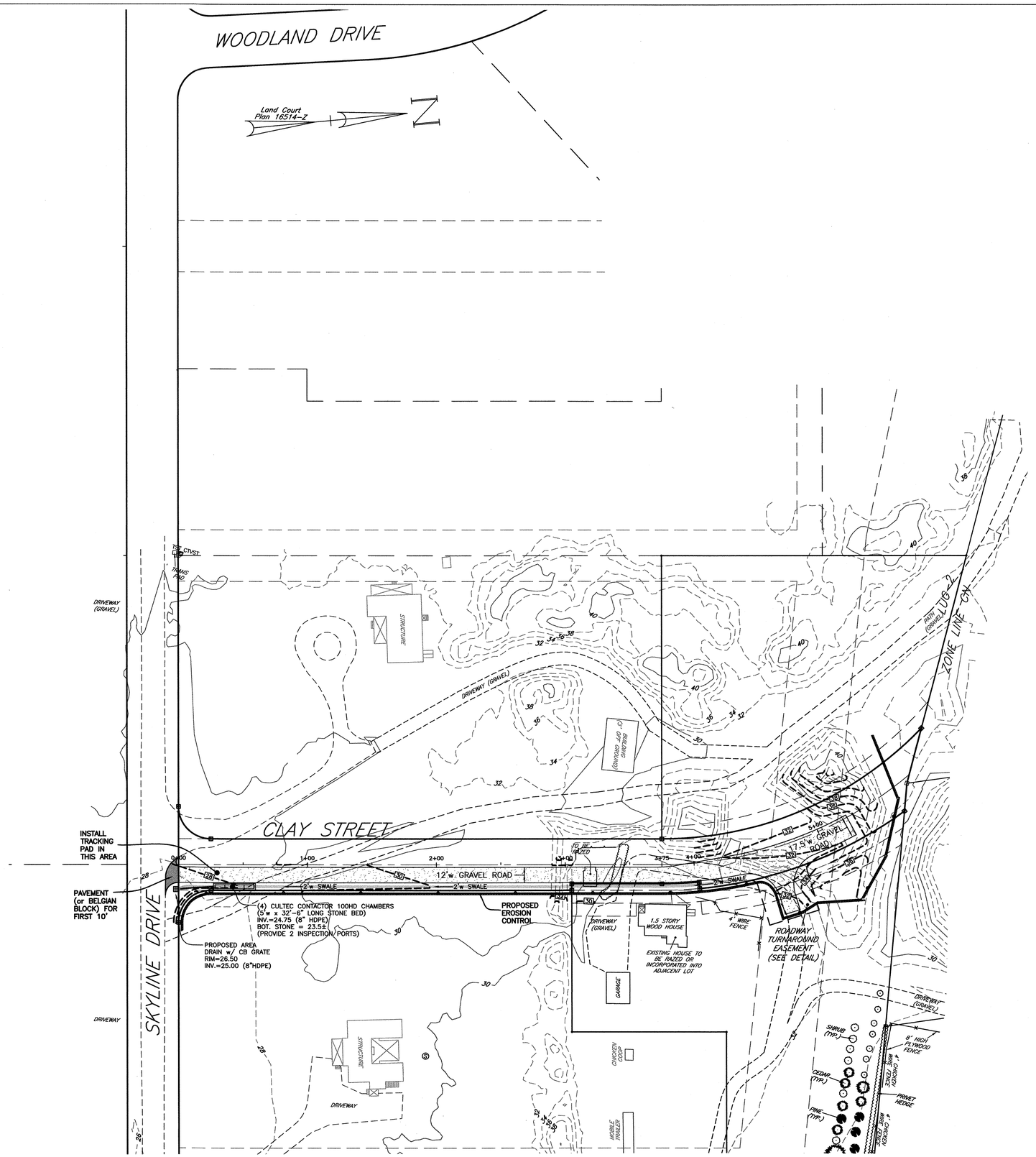

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_____
HAYES ENGINEERING, INC.

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: _____

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_____
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.
VGC – 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

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PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

Seal: COMMONWEALTH OF MASSACHUSETTS — PETER J. OGREN — CIVIL — No. 27145 — REGISTERED PROFESSIONAL ENGINEER — 6/27/16

Hayes — 0' 20' 40' 80' 120'

DEFINITIVE TOPOGRAPHIC PLAN
CLAY STREET
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1	Reduced scope of subdivision plan	5/31/2016

NANTUCKET PLANNING BOARD

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TOPOGRAPHIC SHEET

SHEET 3 OF 5

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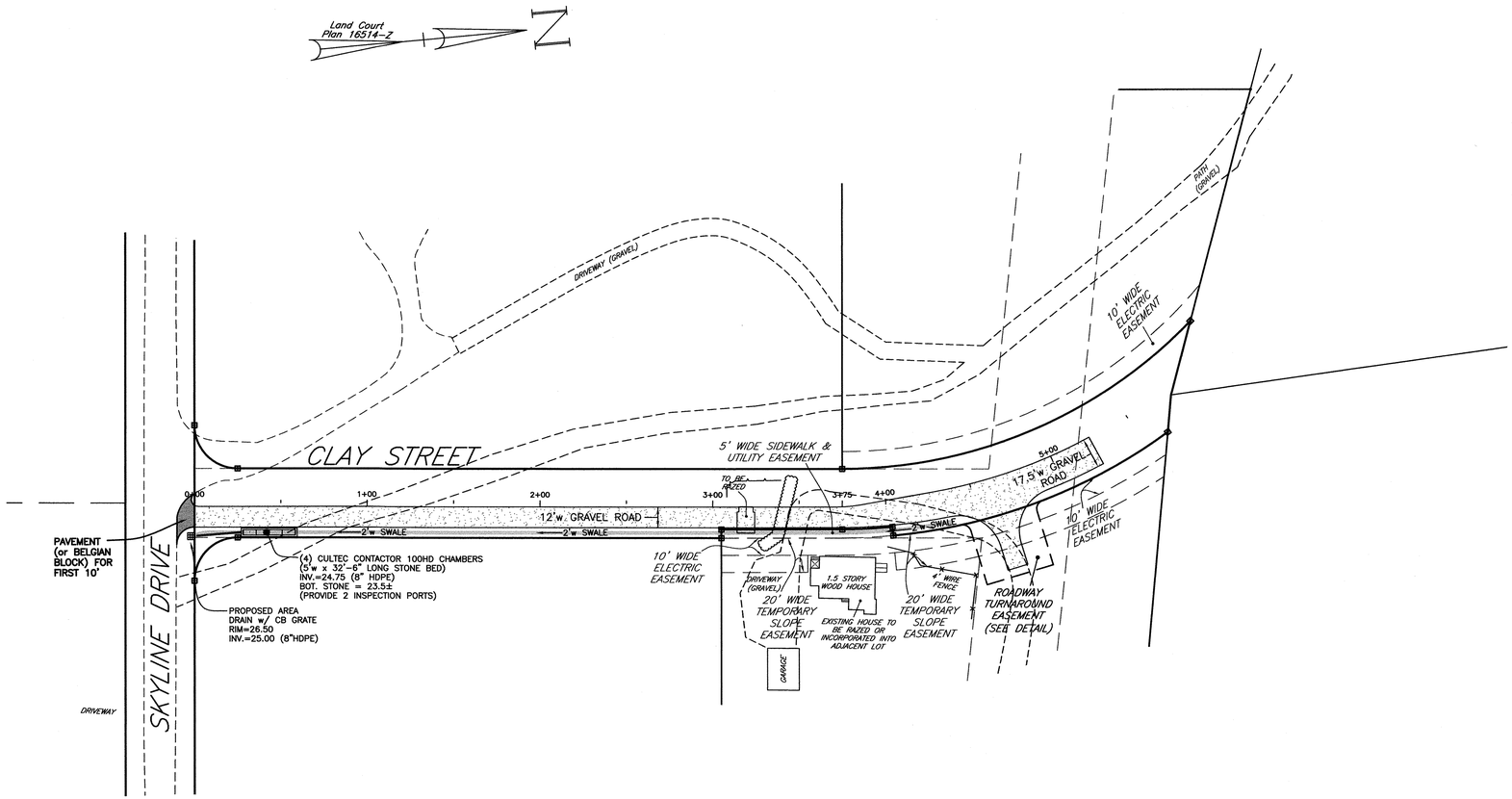

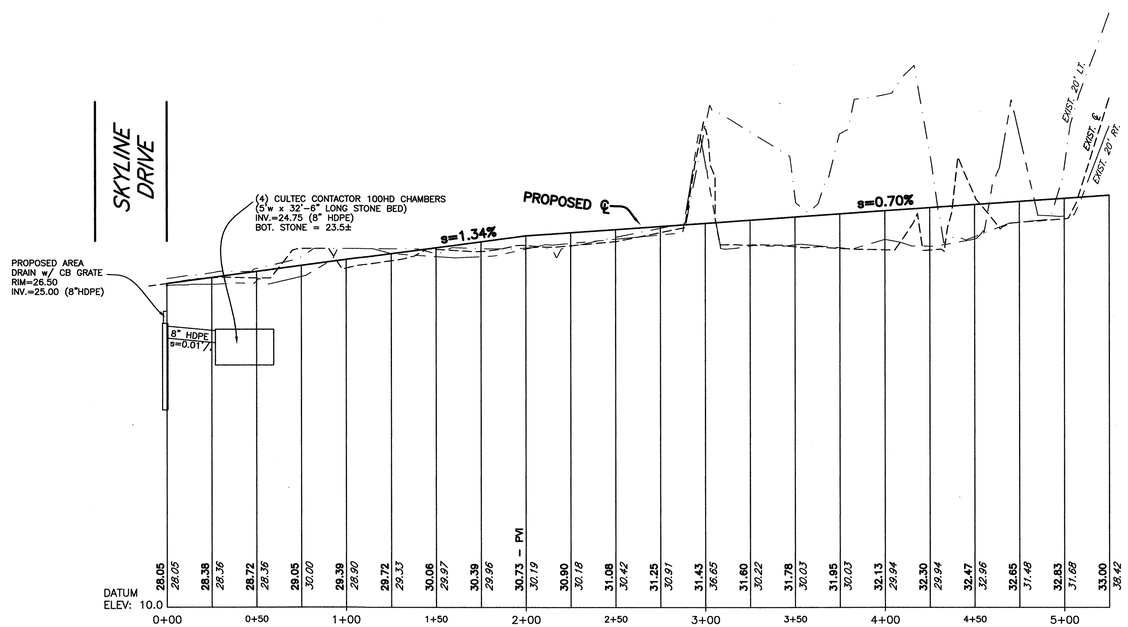

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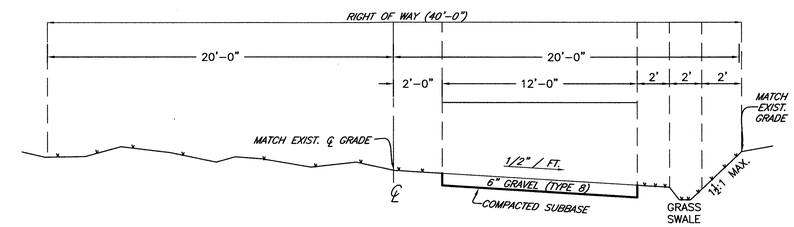

TYPE B: 6-inch stabilized and compacted fill consisting of 35% dense-graded crushed stone and 65% crushed stone fines and silts. (See Appendix A and Plate No. 6)

TYPICAL SECTION
MODIFIED STABILIZED GRAVEL ROAD
NOT TO SCALE

ZONE: CN

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0' 20' 40' 80' 120'

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Scale: 1"=40'(HOR.) & 4'(VER.)

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NANTUCKET PLANNING BOARD

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Plan Signed: _____

PROFILE SHEET

SHEET 4 OF 5

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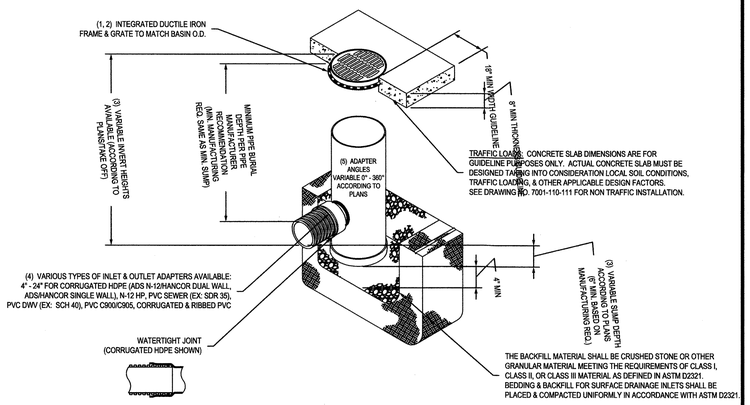
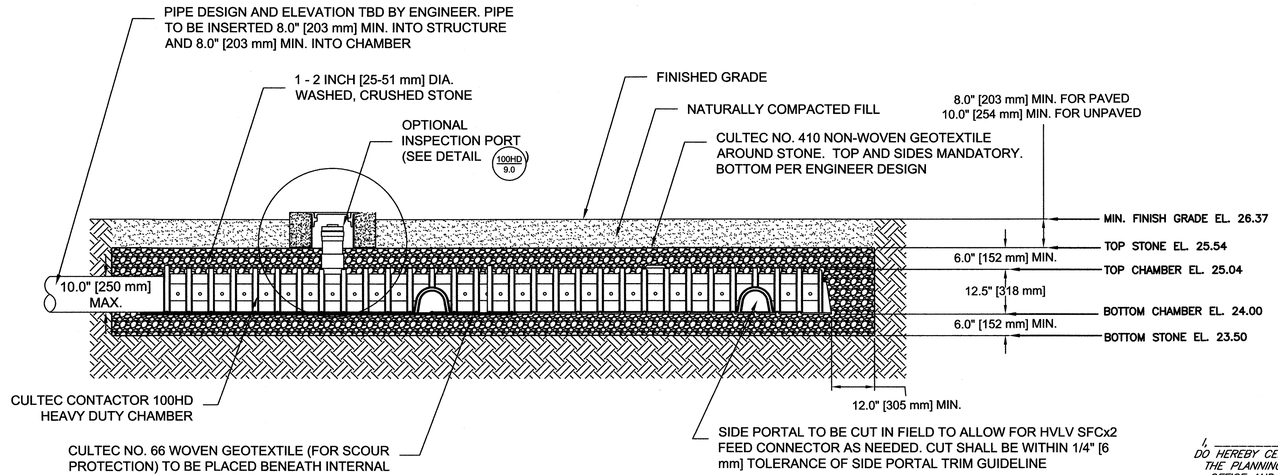
NYLOPLAST 24" DRAIN BASIN: 2824AG _ _X



1 - GRATES/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.

THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, TRANSFER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM, FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN, EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST.

DRAWN BY EBC	MATERIAL	Nyloplast	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE 04-03-05			
REVISED BY NMH	PROJECT NO./NAME	TITLE 24 IN DRAIN BASIN QUICK SPEC INSTALLATION DETAIL	
DATE 03-14-16			
DWG SIZE A	SCALE 1:40 SHEET 1 OF 1	DWG NO. 7001-110-192	REV E



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HAYES ENGINEERING, INC.

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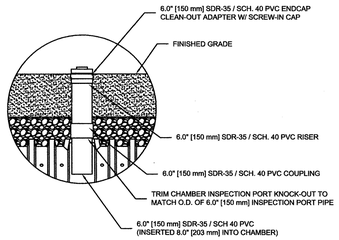
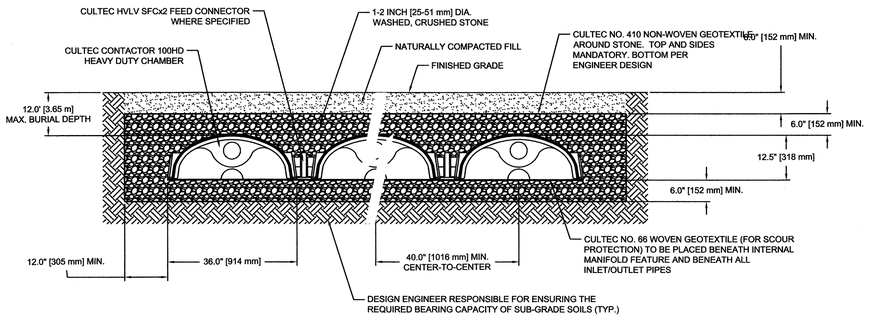




GENERAL NOTES

CONTACTOR 100HD BY CULTEC, INC. OF BROOKFIELD, CT.
STORAGE PROVIDED = 3.84 CF/FT [0.82 M³/3] 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.

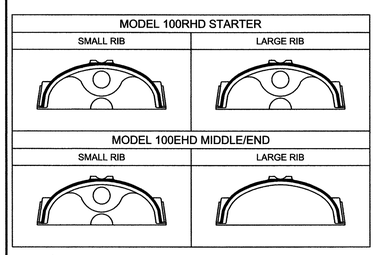
EROSION CONTROL NOTES:

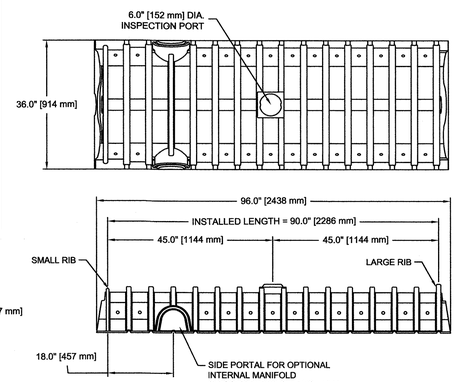
1) EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED IN ACCORDANCE WITH, AS UPDATED FROM TIME TO TIME, THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, A GUIDE FOR PLANNERS, DESIGNERS AND MUNICIPAL OFFICIALS", PREPARED FOR FRANKLIN, HAPDEN, HAMPSHIRE CONSERVATION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

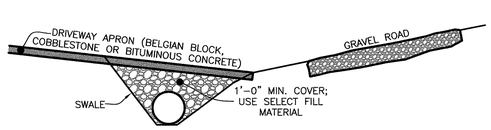
3) DURING CONSTRUCTION ON DRY AND WINDY DAYS WHEN POTENTIAL DUST CONDITIONS MAY BE OF CONCERN, EXPOSED SOIL TO BE SPRAYED WITH WATER TO CONTROL DUST.

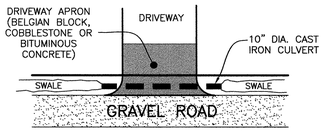
4) DURING CONSTRUCTION SKYLINE DRIVE AND DAVKIM LANE TO BE MONITORED FOR SEDIMENT AND SHOULD BE SWEPT AS NECESSARY.





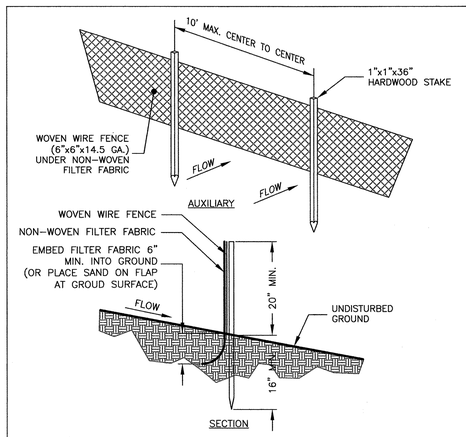
CULTEC CONTACTOR 100HD CHAMBER STORAGE = 1.866 CF/FT [0.173 m³/m]
INSTALLED LENGTH ADJUSTMENT = 0.5' [0.15 m]
ALL CONTACTOR 100HD HEAVY DUTY UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.





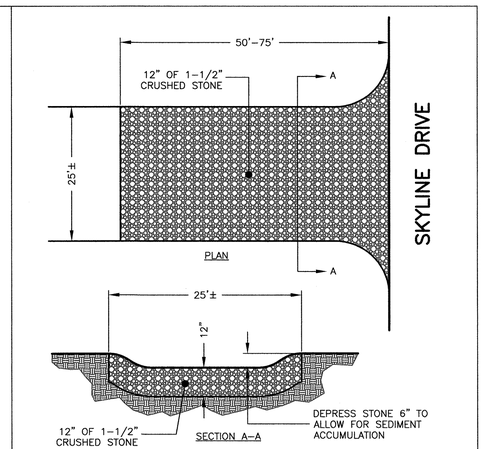
DRIVEWAY CULVERT DETAIL
NOT TO SCALE

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

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

N:\NAN66\Dsky/ine-davkim_R3.dwg, 6/1/2016 4:18:17 PM, TRW

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

January 6, 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 Application for Approval of a Definitive Subdivision Plan
42 (Rear) 48 (Rear) and 54 (Rear) Skyline Drive Properties and 20 Davkim Lane Property

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 completed application (Form B) and associated materials (plans, storm water management report, deeds, etc.) comprising 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 primary intent of the subdivision is to consolidate the +/-1 acre (rear) portions of both of the 48 Skyline Drive property and the 54 Skyline Drive property, which have been previously subdivided out from the front portions of these properties, by way of approval not required plans that were previously endorsed by the Town of Nantucket Planning Board, into a single +/- 2 acre conforming / buildable lot. This lot will take access from and derive its frontage off a new roadway, also comprising part of this subdivision, whose layout matches the layout of the previously laid out "paper street" known as Clay Street. This road will intersect with Skyline Drive, at the south, will run north, past the 42 (Front) and 48 (Front) Skyline Drive properties and past the (new) 48 (Rear) / 54 (Rear) Skyline Drive property, and will then turn northwest, running through the southern edge of the 20 Davkim Lane property, and intersecting with the existing portion of Davkim Lane, due east of its existing intersection with Nancy Ann Lane.

The entirety of the 48 (Rear), and 54 (Rear) Skyline Drive properties, which will be consolidated to create the buildable lot upon approval of this subdivision (show as Lot # 1 on the plan), are designated within the Limited Use General 2 (LUG-2) zoning district. The buildable lot resulting from the proposed action will meet or exceed the relevant dimensional criteria and related requirements for such as established in the local zoning bylaw for the above-referenced district, including but not limited to the following:

- Minimum Lot Area (Not Less than 80,000 Square Feet) – Proposed 89,219 Square Feet
- Minimum Lot Frontage (Not Less than 150 Linear Feet – Proposed 302.48 Linear Feet
- Minimum Lot Regularity Factor (Not Less than 0.55) – Proposed 0.568

It is further noted that the land area comprising the entirety of the 48 (Rear), and 54 (Rear) Skyline Drive properties, which will be consolidated to create the buildable lot upon approval of this subdivision (shown as Lot # 1 on the plan), is subject to a covenant in favor of the Nantucket Land Council, Inc. (NLC), dated as of January 15, 1982, recorded at Book 481, Page 314 in the Nantucket County Registry of Deeds. This covenant provides that certain land in this area, including the subject properties, "*shall not be resubdivided, or combined and resubdivided, in such a manner as to create or leave any lot containing less than 80,000 square feet of land*". As described herein and as a review of the proposed subdivision plan will confirm, the current proposal, which resubdivides portions of two lots and consolidates them into a single lot, which is comprised of 89,219 square feet of land area, exceeds and complies with the (applicable) restriction in this covenant.

With respect to access and vehicular circulation, as part of this application, we are respectfully requesting that the Planning Board allow for a "phased" improvement of the new roadway, based on the anticipated progression of development of the (new) 48 (rear) / 54 (Rear) Skyline Drive property, and the other surrounding properties. To this end, our intent is to sell and to provide for the development of the (new) 48 (rear) / 54 (Rear) Skyline Drive property immediately. Our proposal is to initially improve the first +/- 450 linear feet of this roadway to driveway standards, including all required drainage, terminating at a "turnaround", but not to improve it to full roadway standards and not to improve the remaining +/- 800 linear foot long segment running further north which intersects into the existing portion of Davkim Lane until such time as is necessary, based on the future development and improvement of the adjacent (20 Davkim Lane) property. The rationale and underlying basis for this "phasing" request is as follows.

As you are aware and as the Planning Board is aware, the 20 Davkim Lane property, which is +/- 15 acres in size, was recently the subject of zoning warrant articles which were approved at the Nantucket Special Town Meeting which was held on November 9, 2015, which is ultimately expected to result in the development of this property as a multi-family rental apartment residential community. We are currently in the initial phases of the site planning specific to this property, which will take several months to work through and will then be subject to substantial review / approval by the Planning Board, including a special permit, major site plan review, and a subsequent definitive subdivision. Because the precise path and layout of the roadway that will be expected to run through this property is still subject to this planning and permitting process, we would respectfully request the phasing and improvement flexibility described herein relative to the roadway that will serve the current subdivision, in order to improve the segment which is required to allow for the release and development of the 48 (Rear) and 54 (Rear) Skyline Drive properties as a single residential lot as a driveway immediately, while deferring the improvement of the remaining segment of the roadway until such time as the specific development plan for the (much larger) surrounding property is finalized, and reviewed / approved by the Planning Board.

In addition to the completed (Form B) application, we have submitted the following plans and technical materials that are required to be submitted to provide for the processing and approval of the proposed subdivision, including: (1) the *Definitive Plan, Clay Street, Nantucket, Mass* as prepared by Hayes Engineering, Inc., dated December 11, 2015, depicting the subdivision of the lots along with the applicable / customary notes and details (totaling 9 sheets), (2) the *Storm Water Management Report*, as prepared by Hayes Engineering, Inc., dated December 11, 2015, (3) the *Site Analysis Report*, as prepared by Hayes Engineering, Inc., dated December 2015, (4) the *Street Network Plan*, as prepared by Hayes Engineering, Inc., dated December 11, 2015, and (5) the *Requested Waivers*, as prepared by Hayes Engineering, Inc., dated December 2015.

We have also attached Attachment # 1 to the Form B application form, detailing the derivation of the title to the land comprising the proposed subdivision, given that the land includes multiple parcels, and that title to several of the parcels has been derived from different sellers / grantors.

We trust that this submittal conforms to the applicable requirements for such a Definitive Subdivision Plan (AR) and we look forward to the completion of your review and the subsequent review and approval of the plan by the Town of Nantucket Planning Board.

If you any immediate questions with respect to either the application 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.

JAN 11 2016 PM1:19
Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

Nantucket Planning Board

RECEIVED JAN 11 2016 By

Form B
Application for Approval of a Definitive Subdivision Plan (AR)

File one completed form with the Planning Board and one copy with the Town Clerk.

Date: JANUARY 6, 2016

To the Planning Board of Nantucket:

The undersigned, being the applicant as defined under Chapter 41, Section 81-L, for approval of a proposed subdivision shown on a plan entitled SUBDIVISION PLAN OF LAND IN NANTUCKET, MASS designed by HAYES ENGINEERING, INC. dated _____, and described as follows: located on 42B/48R/54R SKYLINE DRIVE AND 20 DAVKIM LANE, number of lots proposed THREE (3) total acreage of tract 17.044 ACRES, hereby submits said plan as a **definitive** plan in accordance with the *Rules and Regulations Governing the Subdivision of Land* of the Nantucket Planning Board and makes application to the Board for approval of said plan.

SEE ATTACHMENT #1 FOR DETAILS

The undersigned's title to said land is derived from _____ by deed dated _____ and recorded in the Nantucket Registry of Deeds Book _____, Page _____, registered in the Nantucket Registry District of the Land Court, Certificate of Title # _____ and shown on Nantucket Assessor's Map # _____, Parcel _____, and said land is free of encumbrances except for the following: CUSTOMARY UTILITY EASEMENTS AND ONE COVENANT IN FAVOR OF NANTUCKET LAND COUNCIL (ATTACHED)

Said plan ○ has ☒ has not evolved from a preliminary plan submitted to the Board on N/A (date) and ○ approved ○ disapproved on N/A (date).

The undersigned hereby applies for the approval of said **definitive** plan by the Board, in belief that the plan conforms to the Board's *Rules and Regulations*.

Name(s) and address(es) of the Applicant(s):
(to include all the names and addresses of the principals of the owner entity such as principal officers of the corporation, trustees of a trust or partners of a partnership)

RICHMOND GREAT POINT DEVELOPMENT LLC
PHILIP PASTAN, ITS MANAGER

Contact Phone #: (978) 988-3900 x16 Fax #: (978) 988-3950 E-mail: ppastan@richmondco.com

Name of owner(s): RICHMOND GREAT POINT DEVELOPMENT LLC

Address of owner(s): 23 CONCORD ST., WILMINGTON MA 01887

I hereby certify that the applicant(s) listed above have been authorized by me to file a subdivision plan with the Planning Board on property that I own.

Owner's signature PHILIP PASTAN, ITS MANAGER 12/14/15

Received by Town Clerk:

Date: Jan. 11, 2016

Time: 1:19 p.m.

Received by Board of Health:

Date: 1-11-2016 AB

Time: 1:15 pm

Planning Board File #_____

Attachment 1 to Form B / Application for Approval of a Definitive Subdivision Plan (AR)

Additional Space Needed to Provide Derivation of Title to Land

"Definitive Plan, Clay Street, Nantucket Mass"
42 (Rear), 48 (Rear), and 54 (Rear) Skyline Drive and 20 Davkim Lane

The title to the land included in the Application for Approval of a Definitive Subdivision Plan is derived as follows:

As to the Owner of One Hundred Percent (100%) of the 42 (Rear) Skyline Drive Property
RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel Seventy" on Page 14 of the "*Deed*").

As to the Owner of One Hundred Percent (100%) of the 48 (Rear) Skyline Drive Property
RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated July 25, 2014, recorded at the Nantucket County Registry of Deeds, in Book # 1443, Page # 213, recorded on July 25, 2014.

As to the Owner of the One Hundred Percent (100%) of the 54 (Rear) Skyline Drive Property
RICHMOND GREAT POINT DEVELOPMENT LLC

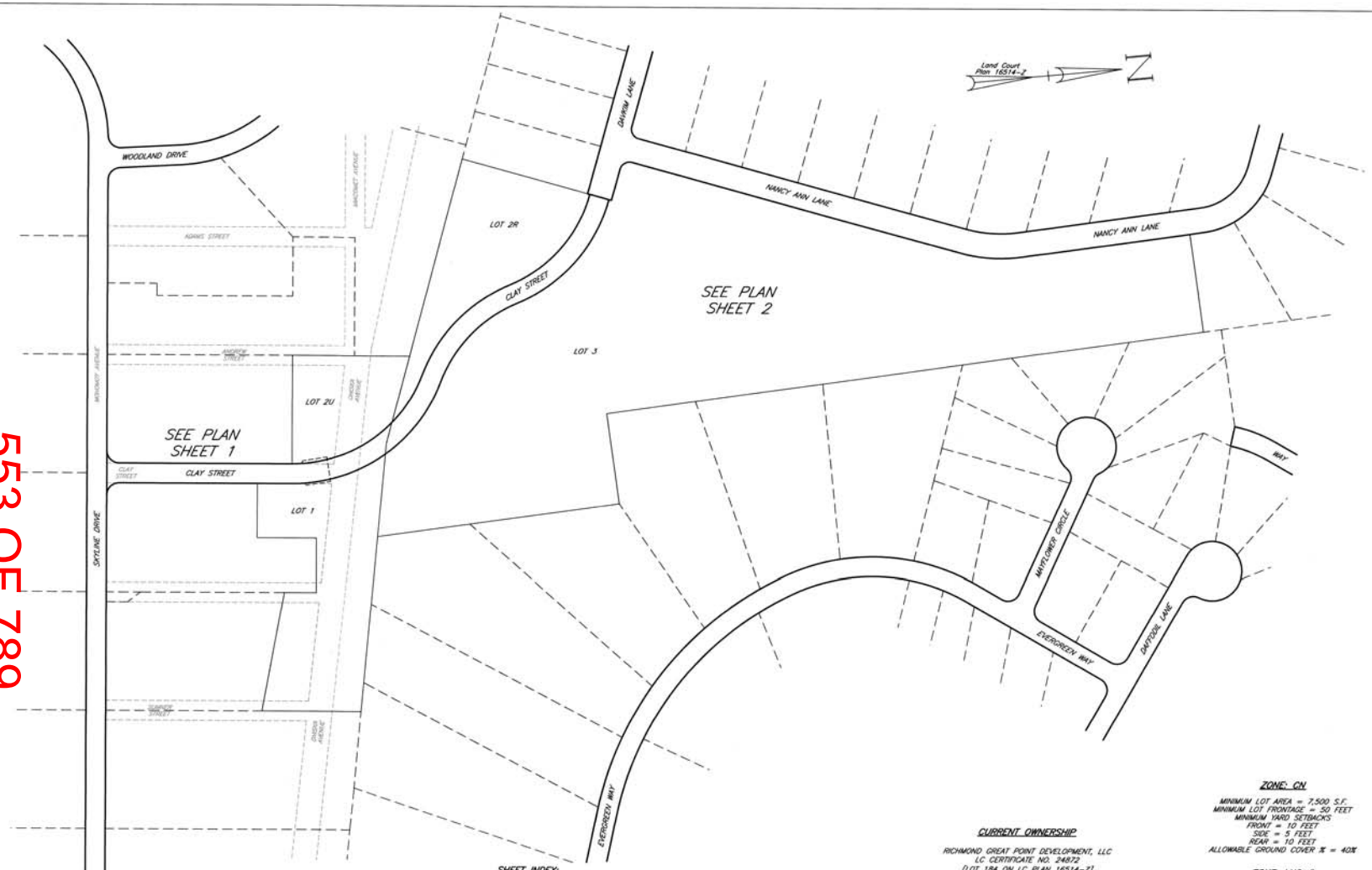
"Quitclaim Deed" recorded as Document # 00002834, recorded on October 10, 2014 at the Nantucket Registry of Deeds (as to a 25% interest in the property).

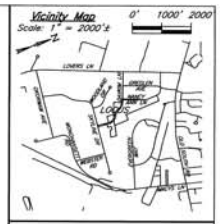
"*Deed*" dated December 11, 2015, recorded at the Nantucket County Registry of Deeds, in Book # 1515, Page # 1, recorded on December 14, 2015 (as to a 50% interest in the property).

"*Deed*" dated November 30, 2015, recorded at the Nantucket County Registry of Deeds, in Book # 1514, Page # 343, recorded on December 14, 2015 (as to a 25% interest in the property).

As to the Owner of One Hundred Percent (100%) of the 20 Davkim Lane Property
RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry District, as Certificate # 24872, recorded on August 8, 2013 (referred to as "Registered Land – Parcel Thirty-Two" on Page 7 of the "*Deed*").





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 9:	DEFINITIVE INDEX SHEET
SHEET 2 of 9:	DEFINITIVE PLAN 1 of 2
SHEET 3 of 9:	DEFINITIVE PLAN 2 of 2
SHEET 4 of 9:	DEFINITIVE TOPOGRAPHIC PLAN
SHEET 5 of 9:	DEFINITIVE PLAN & PROFILE SHEET 1 of 2
SHEET 6 of 9:	DEFINITIVE PLAN & PROFILE SHEET 2 of 2
SHEET 7 of 9:	INTERIM DRIVEWAY PLAN & PROFILE
SHEET 8 of 8:	DETAIL SHEET
SHEET 9 of 9:	EROSION CONTROL PLAN

NOTES:

1. LOTS SHOWN HEREON COMPLY WITH THE LOT AREA REQUIREMENTS AS PROVIDED IN THE NANTUCKET ZONING BYLAW, CHAPTER 139 §§ 2A AND 16A.
2. THE PLANNING BOARD DETERMINES THAT LOTS 1, 2U, 2R & 3 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 2U IS NOT TO BE CONSIDERED A SEPARATE BUILDING LOT BUT IS TO BE HELD IN COMMON OWNERSHIP WITH ADJOINING LOT 2R TO FORM ONE BUILDING LOT. (TOTAL PARCEL AREA = 112,466 S.F., OR 2.581 ACRES)

CURRENT OWNERSHIP

RICHMOND GREAT POINT DEVELOPMENT, LLC
LC CERTIFICATE NO. 24872
[LOT 184 ON LC PLAN 16514-2]
#20 DAVIKIN 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

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1397 PAGE 312
[LOT 428 ON PLAN NO. 2013-69]
#42 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 44.1

RICHMOND GREAT POINT DEVELOPMENT, LLC
BOOK 1443 PAGE 213
[LOT 488 ON PLAN NO. 2013-69]
#48 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 45.1

RICHMOND 54 SKYLINE REALTY TRUST
BOOK 1442 PAGE 111 & BOOK 1442 PAGE 114
[LOT 55 ON PLAN FILE 11-4]
#54 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 46 PART

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.

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

No.	Revision	Date
10		
9		
8		
7		
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5		
4		
3		
2		
1		

Seal: THOMAS R. WINSLOW #30320 — 12-14-2015

Hayes
0' 50' 100' 200' 300'

DEFINITIVE INDEX SHEET
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
23 CONCORD STREET
WILMINGTON, MA 01887

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

Scale: 1"=100'

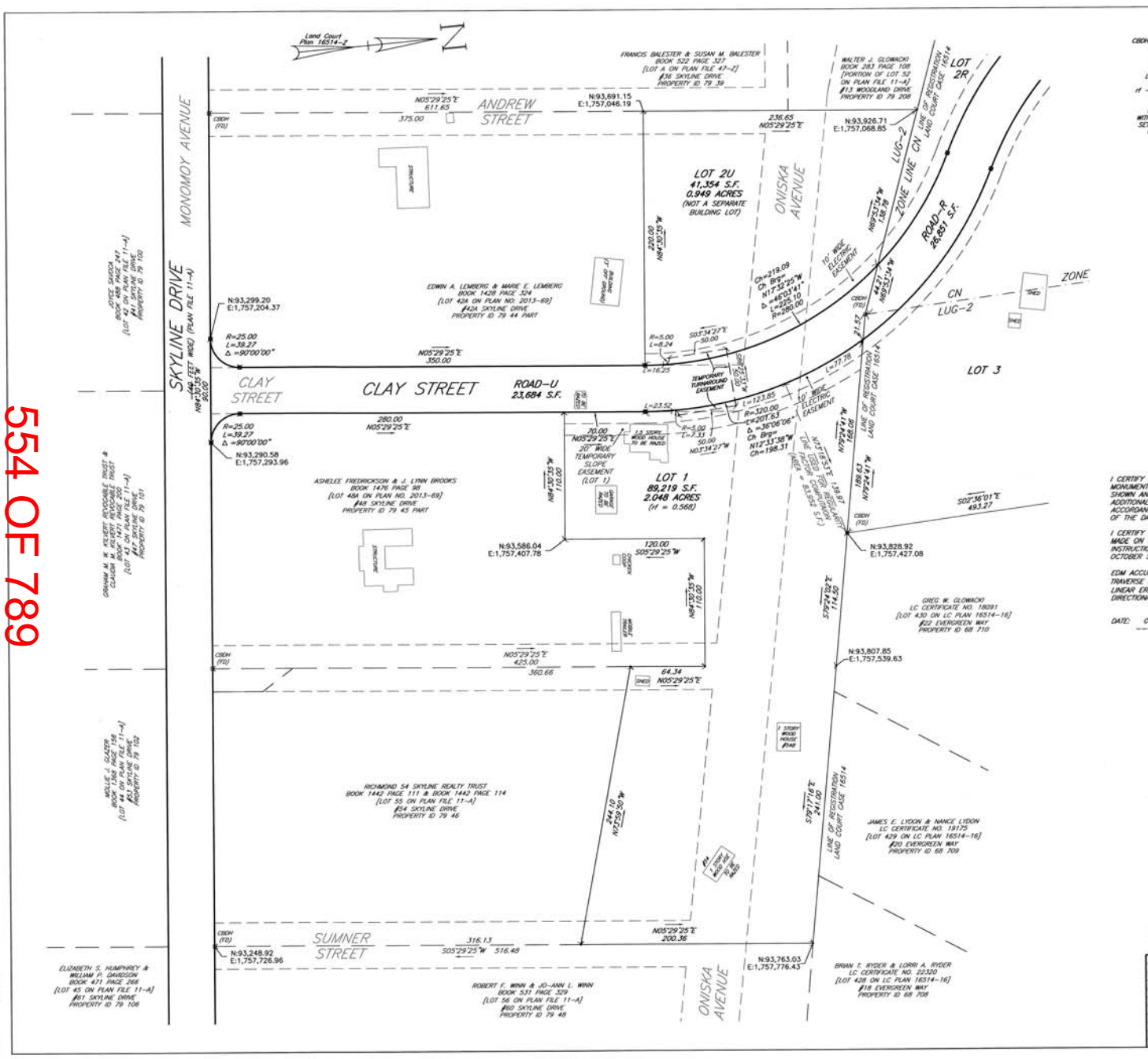
December 11, 2015

NANTUCKET PLANNING BOARD

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

INDEX SHEET

SHEET 1 OF 9



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.

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.

NOTES:

1. LOTS SHOWN HEREON COMPLY WITH THE LOT AREA REQUIREMENTS AS PROVIDED IN THE NANTUCKET ZONING BYLAW, CHAPTER 139 ss 2A AND 16A.
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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

I CERTIFY THAT AS OF THE DATE OF THIS SURVEY, THE MONUMENTS CONTROLLING PRIOR PLANS ARE IN THE GROUND AS SHOWN AND DESCRIBED HEREON. I FURTHER CERTIFY THAT ANY ADDITIONAL MONUMENTS SHOWN HEREON HAVE BEEN SET IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 AS OF THE DATE OF THIS SURVEY.

I CERTIFY THAT THIS PLAN WAS DRAWN FROM AN ACTUAL SURVEY MADE ON THE GROUND IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 BETWEEN NOVEMBER 20, 2012 AND OCTOBER 5, 2015.

EDM ACCURACY ±(2 MM + 2 PPM)
TRAVERSE PRECISION (RAW) = 1:52,714
LINEAR ERROR OF CLOSURE (RAW) = 0.16 FEET
DIRECTIONAL ERROR OF CLOSURE = 53.3"E

DATE: OCTOBER 5, 2015

_____
PROFESSIONAL LAND SURVEYOR

CURRENT OWNERSHIP

RICHMOND GREAT POINT DEVELOPMENT, LLC
LC CERTIFICATE NO. 24872
[LOT 184 ON LC PLAN 16514-Z]
#20 OAKIM 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

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

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

RICHMOND 54 SKYLINE REALTY TRUST
BOOK 1442 PAGE 111 & BOOK 1442 PAGE 114
[LOT 55 ON PLAN FILE 11-A]
#54 SKYLINE DRIVE, NANTUCKET, MA
PROPERTY ID 79 46 PART

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: THOMAS E. WINSLOW #30320 (12-14-2015)

Hayes

0' 20' 40' 80' 120'

DEFINITIVE PLAN
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
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
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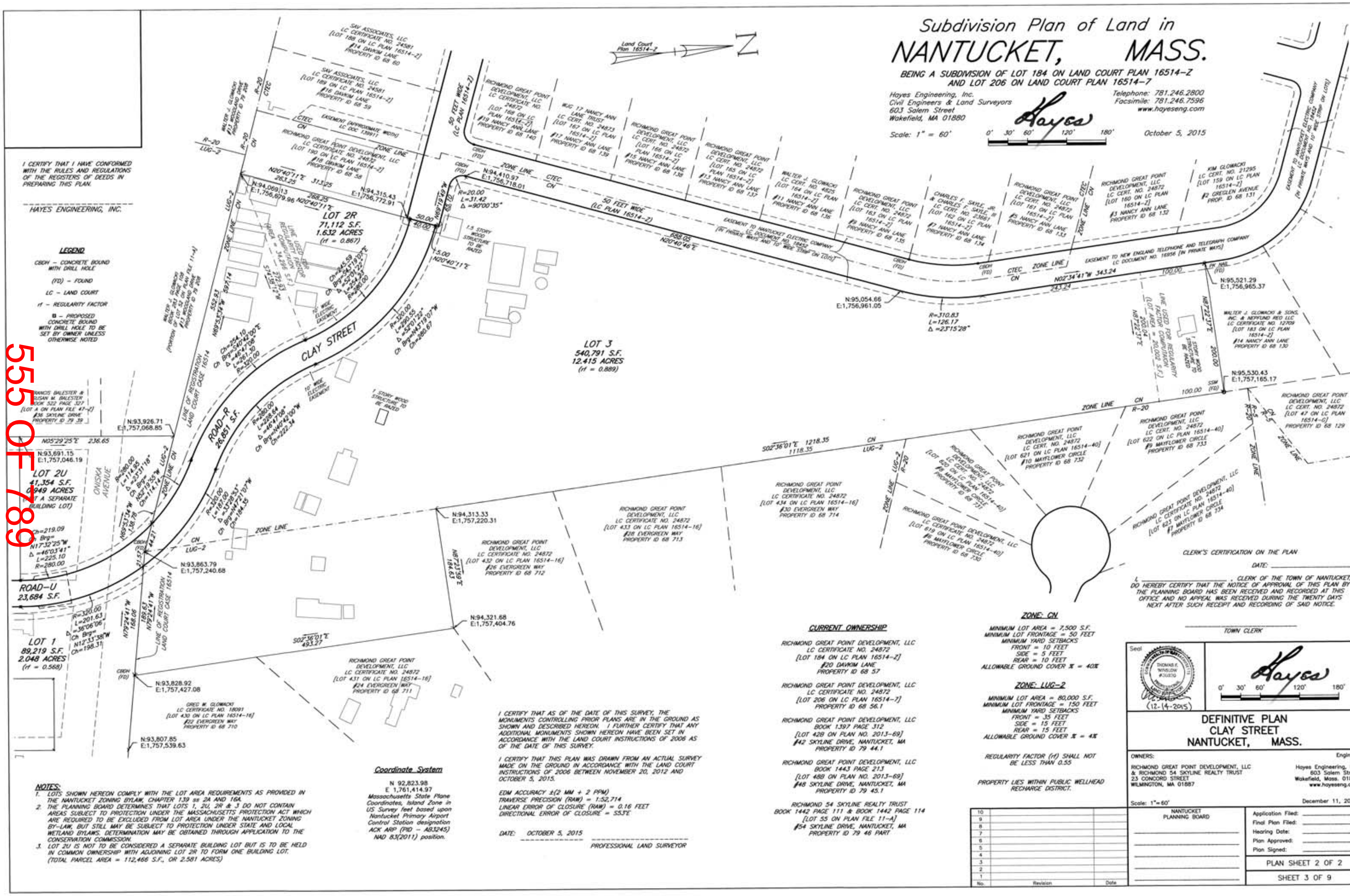
NANTUCKET PLANNING BOARD

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

PLAN SHEET 1 OF 2

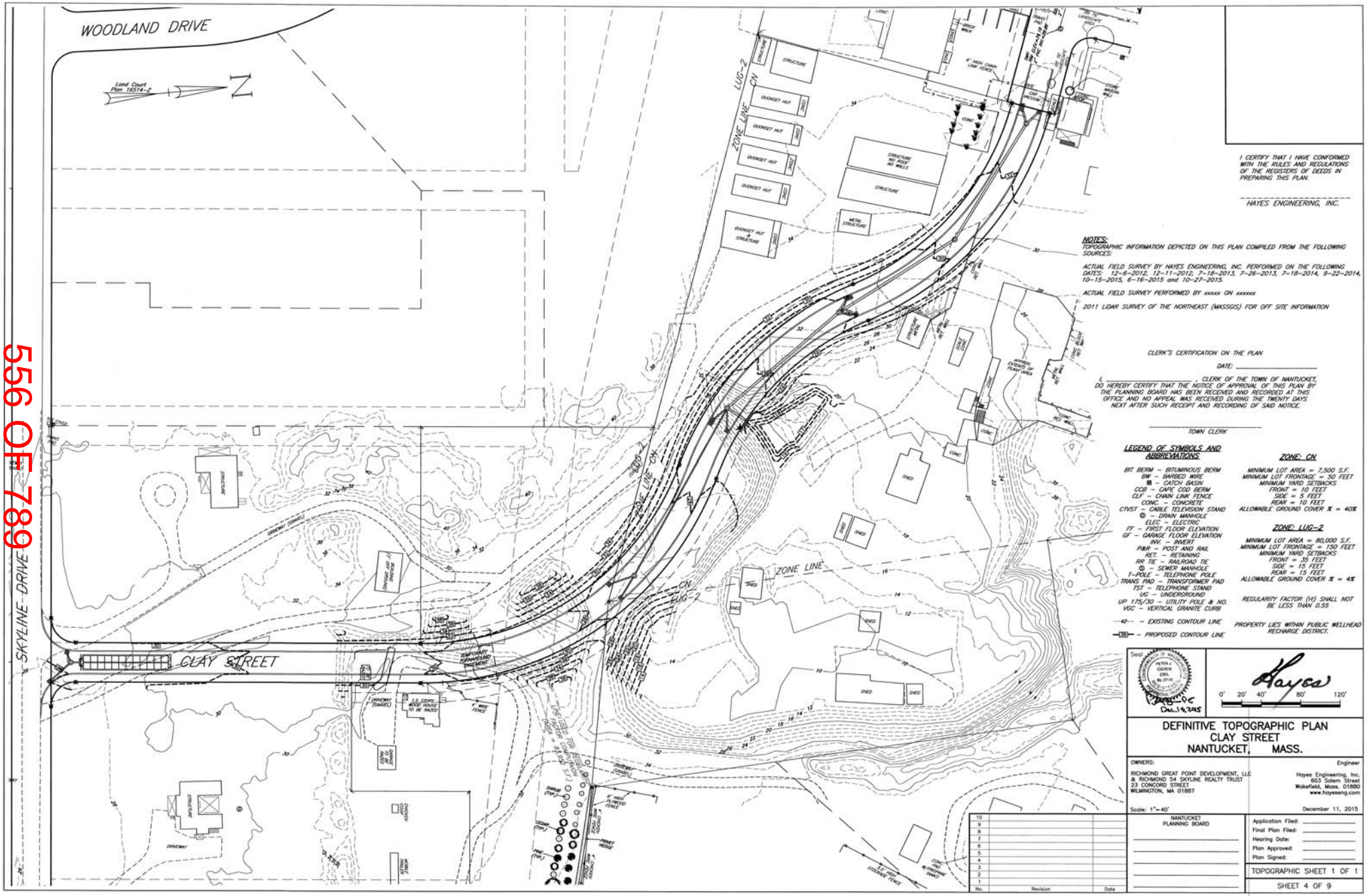
SHEET 2 OF 9



555 OF 789

10 of 25

556 OF 789



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.

ACTUAL FIELD SURVEY PERFORMED BY xxxxx ON xxxxxx

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.
VGC – 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. COOKEN CIVIL No. 37140 REGISTERED PROFESSIONAL ENGINEER
Dec. 14, 2015

Hayes
0' 20' 40' 80' 120'

DEFINITIVE TOPOGRAPHIC PLAN
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
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

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NANTUCKET PLANNING BOARD

Application Filed: _____
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Plan Signed: _____

TOPOGRAPHIC SHEET 1 OF 1

SHEET 4 OF 9

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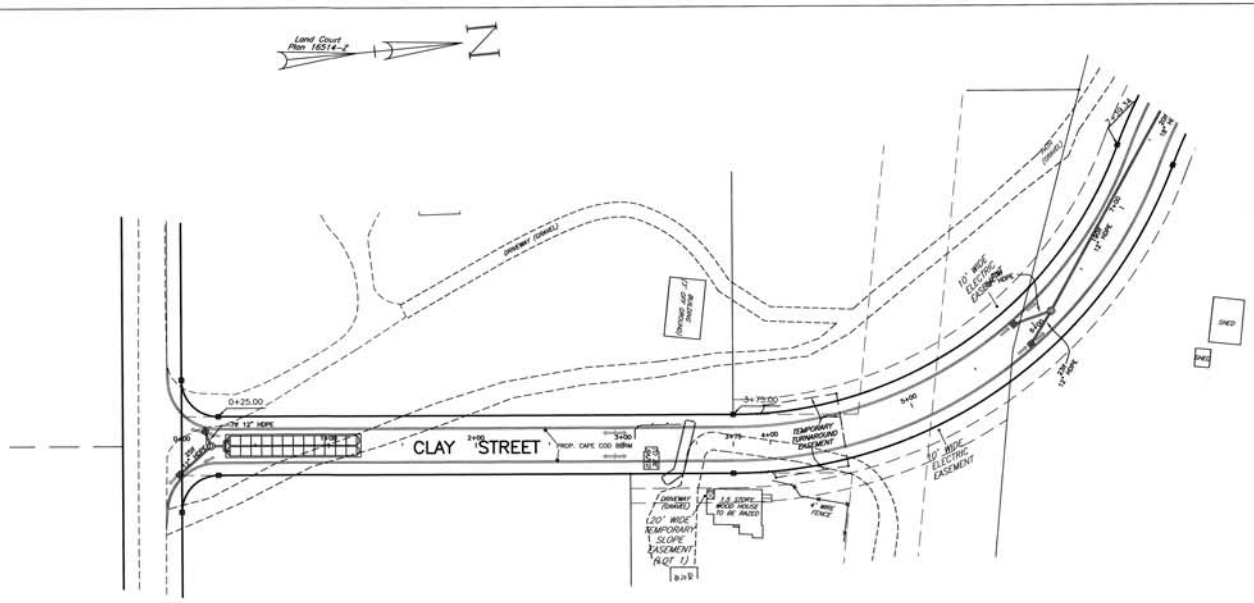


LEGEND

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.

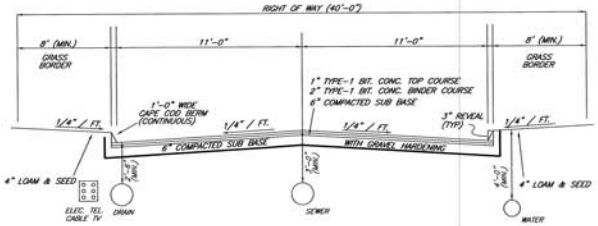
HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

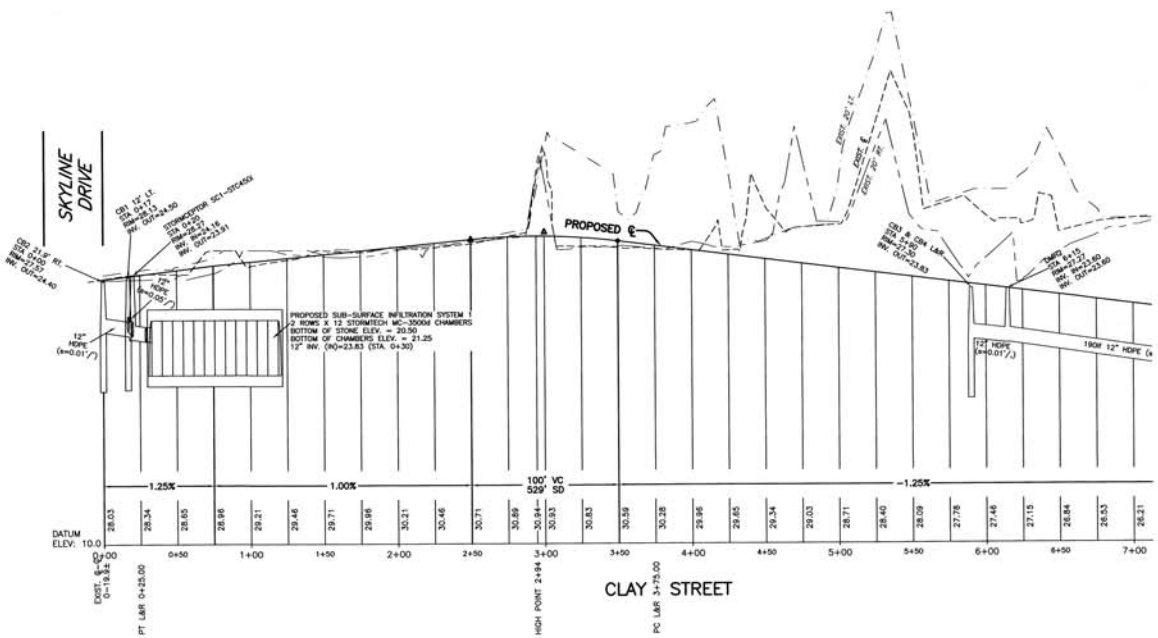
I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK



TYPICAL ROADWAY CROSS SECTION

NOT TO SCALE



ZONE: ON

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

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MINIMUM YARD SETBACKS
FRONT = 35 FEET
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REAR = 15 FEET
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REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55

PROPERTY LIES WITHIN PUBLIC WELLHEAD RECHARGE DISTRICT.

Seal: COMMONWEALTH OF MASSACHUSETTS — PETER A. GOFFIN, CIVIL, No. 37110, REGISTERED PROFESSIONAL ENGINEER — DATE: 12.14.2015

Hayes

0' 20' 40' 80' 120'

DEFINITIVE PLAN & PROFILE
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
23 CONCORD STREET
WILMINGTON, MA 01887

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

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December 11, 2015

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NANTUCKET PLANNING BOARD

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PROFILE SHEET 1 OF 2

SHEET 5 OF 9

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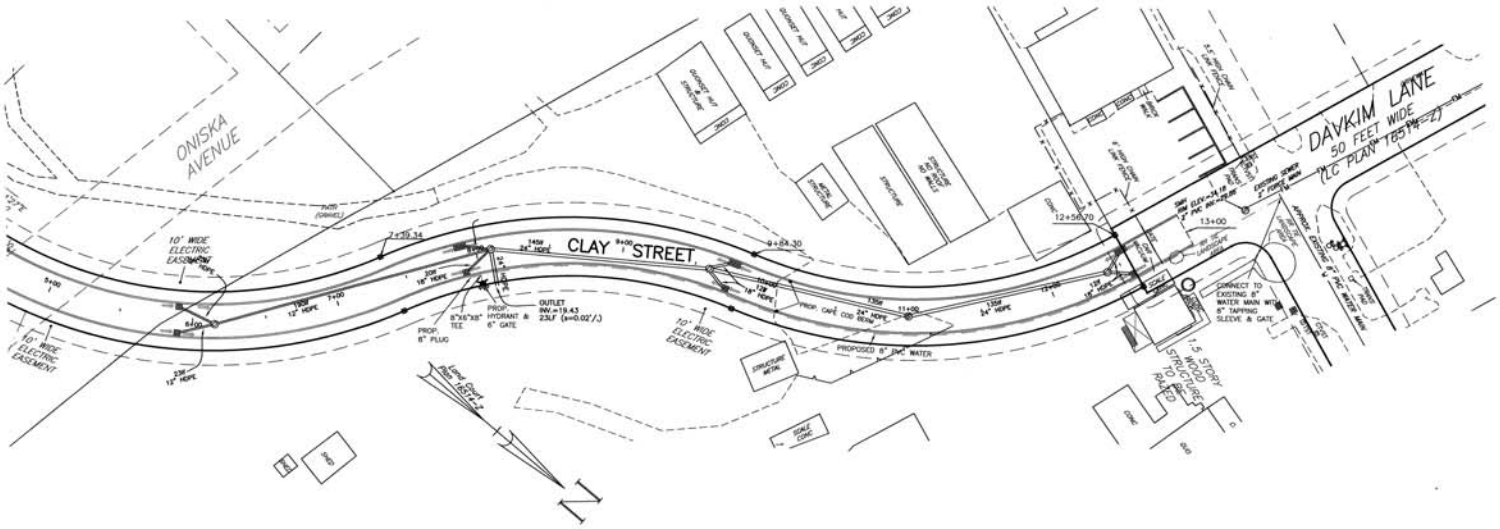

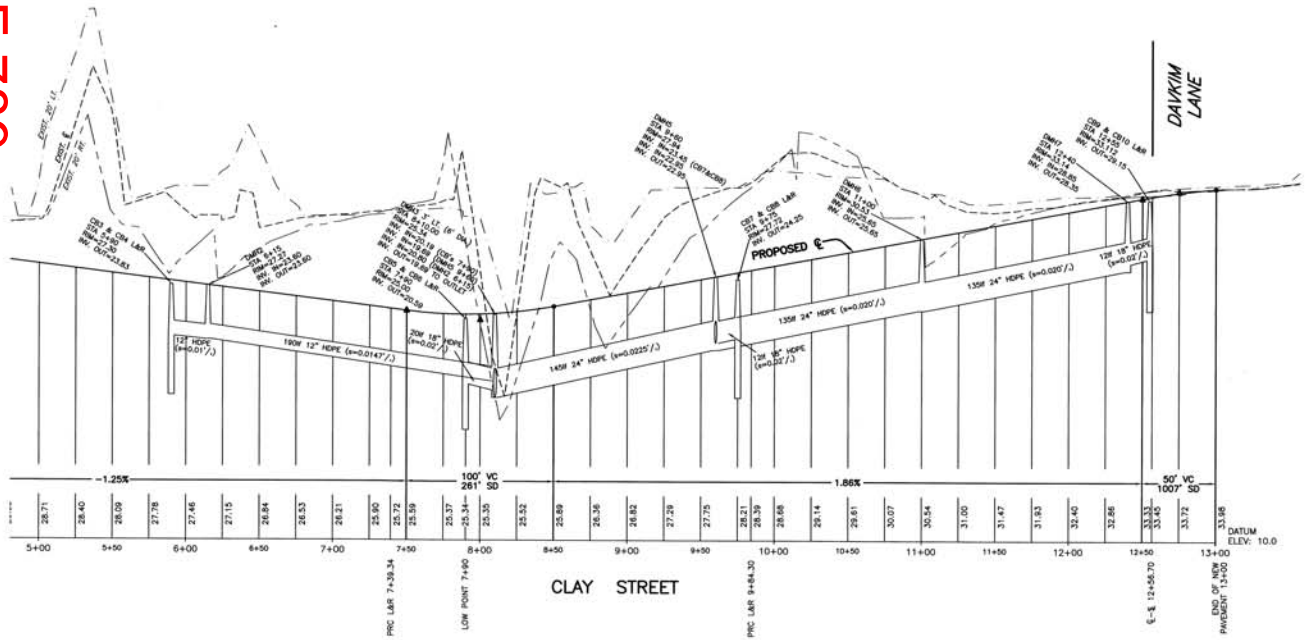

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HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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_____
TOWN CLERK

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

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ZONE: LUG-2

MINIMUM LOT AREA = 80,000 S.F.
MINIMUM LOT FRONTAGE = 150 FEET
MINIMUM YARD SETBACKS
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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. COFFEN CIVIL No. 37140 REGISTERED PROFESSIONAL ENGINEER DEC 14, 2015

Hayes 0' 20' 40' 80' 120'

DEFINITIVE PLAN & PROFILE
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
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

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NANTUCKET PLANNING BOARD

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PROFILE SHEET 2 OF 2

SHEET 6 OF 9

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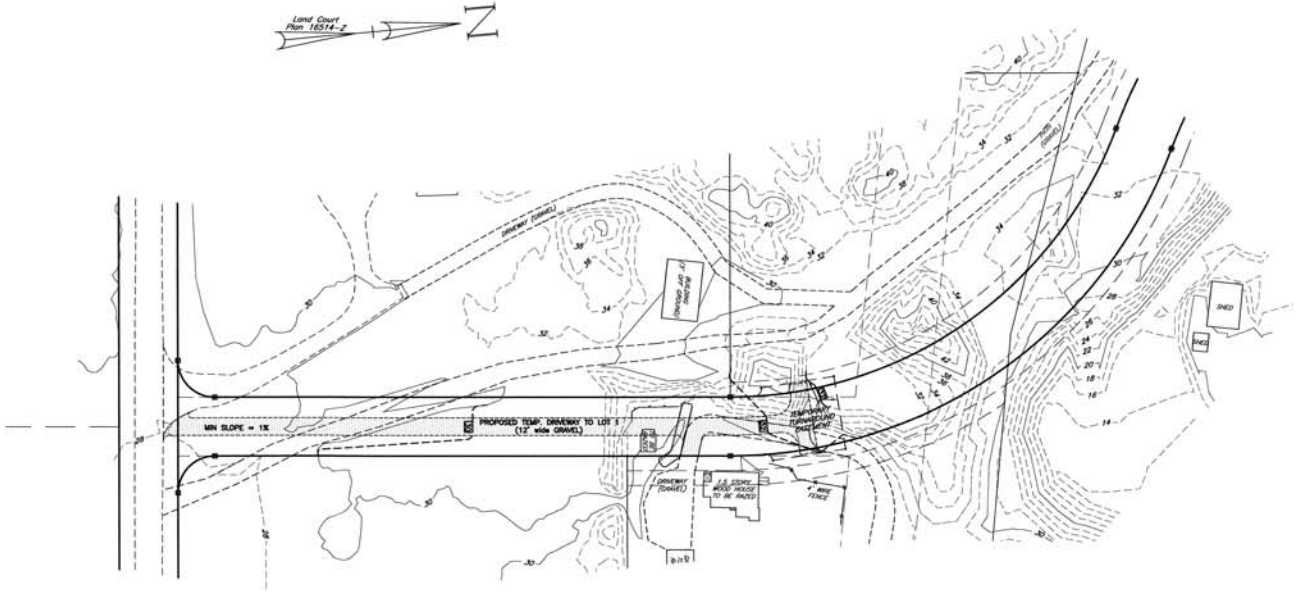

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HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

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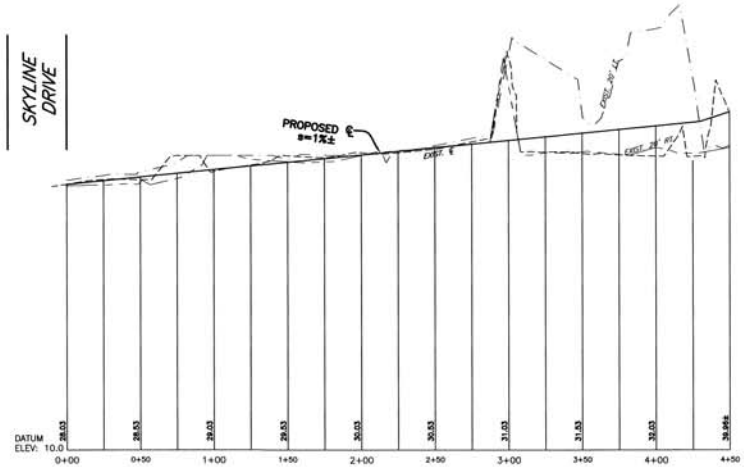
_____
TOWN CLERK



TEMPORARY ACCESS DRIVE

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. 31140
REGISTERED PROFESSIONAL ENGINEER
OCT 19, 2015

Hayes
0' 20' 40' 80' 120'

INTERIM DRIVEWAY PLAN & PROFILE
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
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.)

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NANTUCKET PLANNING BOARD

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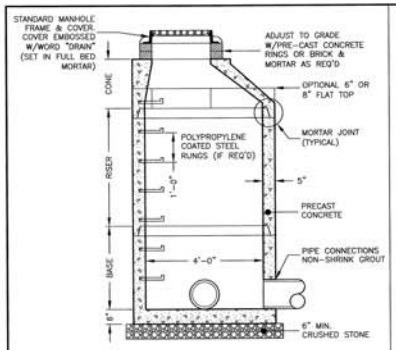
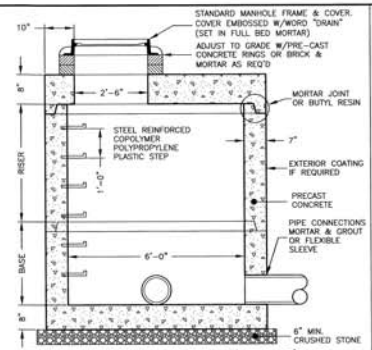
PLAN SHEET 1 OF 1

SHEET 7 OF 9



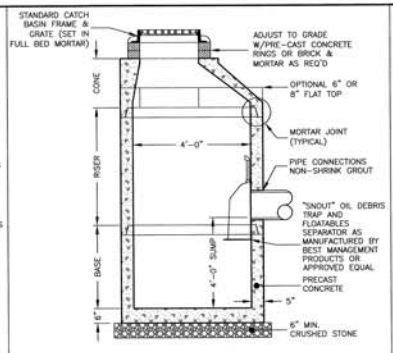
PRE-CAST DRAIN MANHOLE
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



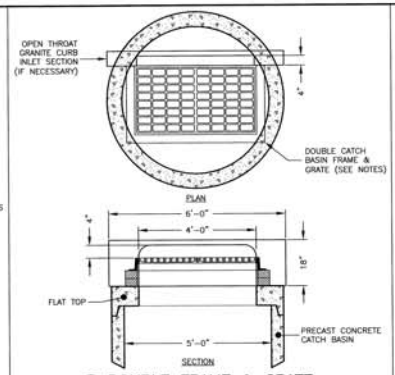
PRE-CAST DRAIN MANHOLE 6' I.D.
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.18 SQ. IN./LINEAL FT. AND 0.18 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
4. BUTYL RESIN SECTION JOINT CONFORMS TO LATEST ASTM C443 SPEC.



PRE-CAST CATCH BASIN
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



DOUBLE FRAME & GRATE
NOT TO SCALE

NOTES:
1. ON SLOPES USE LEBARON LV2448-2-000 FRAME W/LEBARON LK1200-300 3 FLANGE CASCADE GRATE OR APPROVED EQUAL.
2. AT LOW POINTS USE LEBARON LV2448-2-000 FRAME W/LEBARON LF248-2-000 3 FLANGE GRATE OR APPROVED EQUAL.

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

HAYES ENGINEERING, INC.

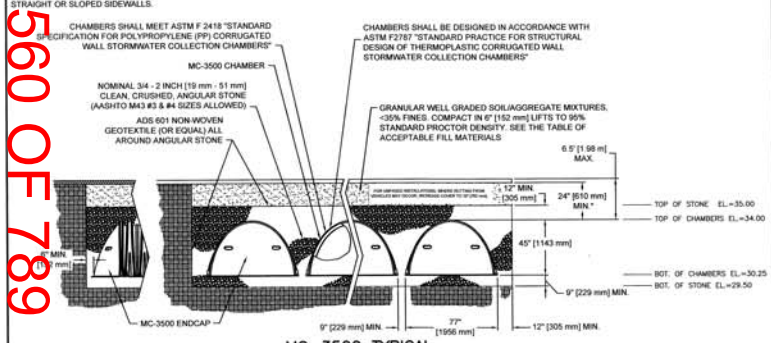
CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

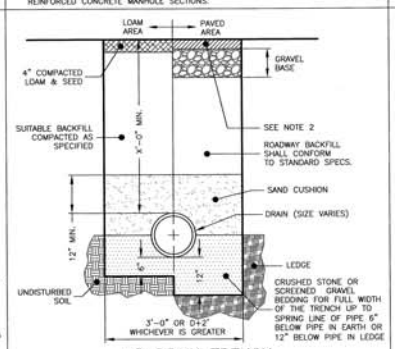
I, _____, CLERK OF THE TOWN OF NANTUCKET, DO HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____
TOWN CLERK

PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.



MC-3500 TYPICAL CROSS-SECTION
NOT TO SCALE

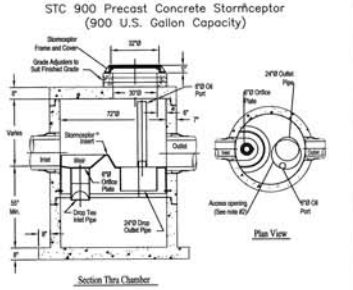


DRAIN TRENCH
NOT TO SCALE

NOTES:
1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF DEPARTMENT OF PUBLIC WORKS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.

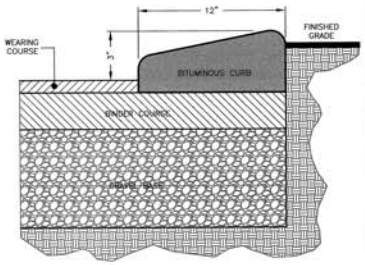
Rinker MATERIALS

STC 900 Precast Concrete Stormceptor (900 U.S. Gallon Capacity)

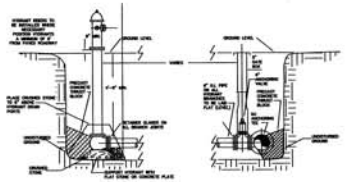


Notes:
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
2. The Cover Should Be Positioned Over The Outlet Drop Pipe and The Oil Port.
3. The Stormceptor System is protected by one or more of the following U.S. Patents: 6498348, 6598333, 6722760, 6723113, 6849181, 8086782, 8577606.
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

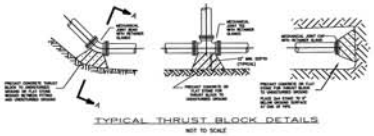
STORMCEPTOR STC 900
NOT TO SCALE



CAPE COD CURB
NOT TO SCALE

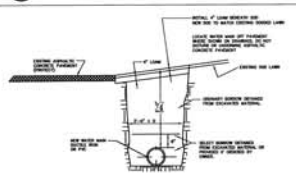


TYPICAL HYDRANT ASSEMBLY INSTALLATION
NOT TO SCALE

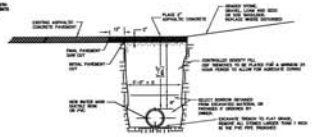


TYPICAL THRUST BLOCK DETAILS
NOT TO SCALE

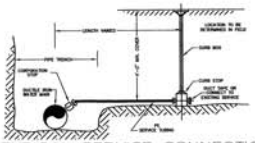
PIPE DIAMETER	DEPTH				TEE
	1.0	0.5	1.0	1.5	
6	1	1	1	1	1.5
8	1	1	1	1	2.0
10	1	1	1.5	2.0	3



TYPICAL TRENCH IN SHOULDER (SOD)
(SHOWN RIGHT SIDE INSTALLATION LEFT SIDE SIMILAR)
NOT TO SCALE



TYPICAL CROSS TRENCH IN ROADWAY SURFACE
(SHOWN RIGHT SIDE INSTALLATION LEFT SIDE SIMILAR)
NOT TO SCALE



TYPICAL SERVICE CONNECTION
NOT TO SCALE

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. DORN CIVIL No. 41181 REGISTERED PROFESSIONAL ENGINEER Dec 19, 2015

Hayes 0' 20' 40' 80' 120'

DETAIL SHEET
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
23 CONCORD STREET
WILMINGTON, MA 01887

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

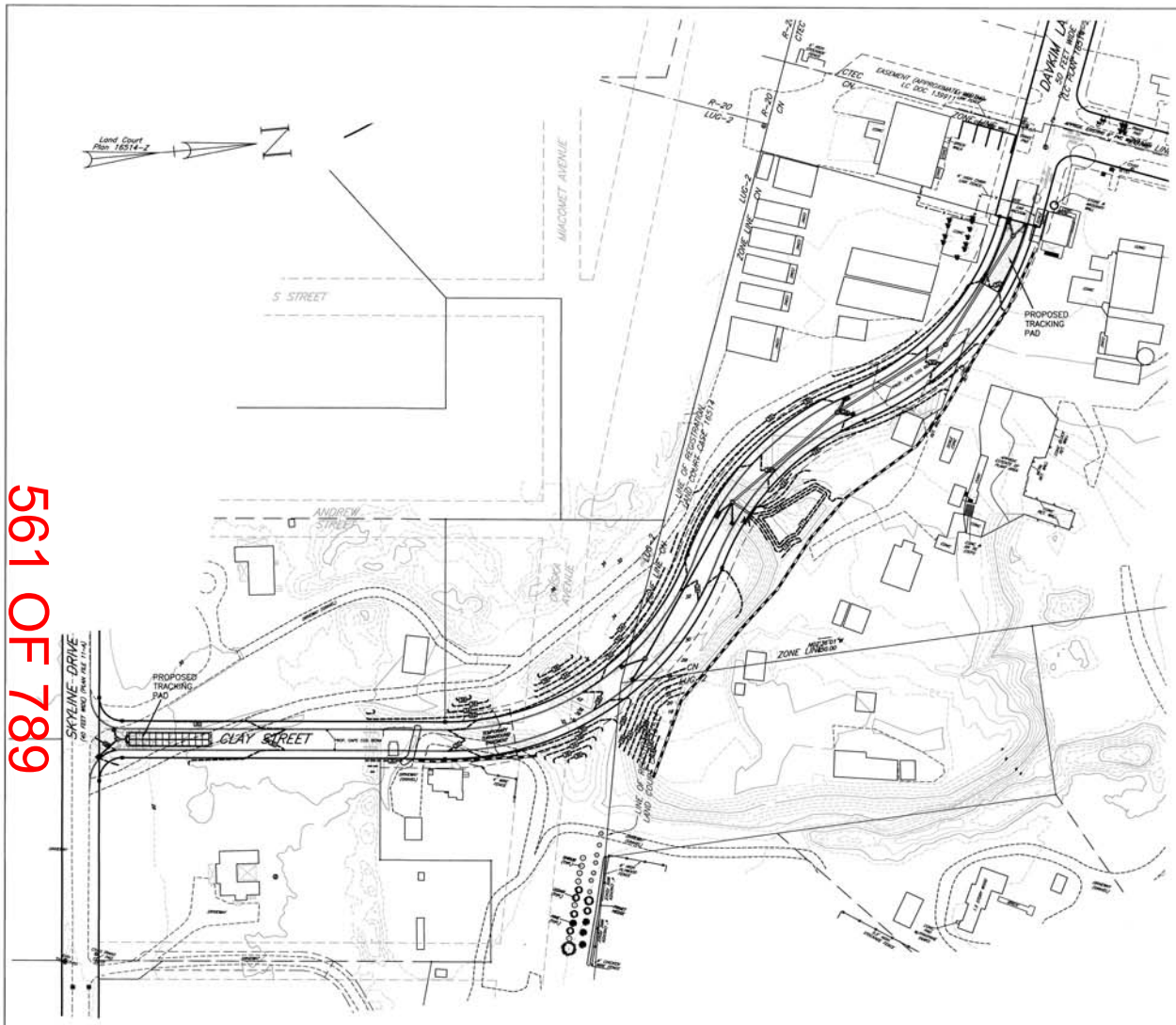
Scale: 1"=N.T.S.
December 11, 2015

NANTUCKET PLANNING BOARD
Application Filed: _____
Final Plan Filed: _____
Hearing Date: _____
Plan Approved: _____
Plan Signed: _____

DETAIL SHEET 1 OF 1
SHEET 8 OF 9

N:\NANMB\Dolphine-Sankim.dwg, 12/14/2015 10:43:34 AM, TC

560 OF 789



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

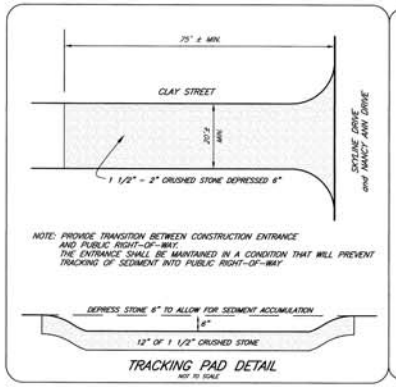
HAYES ENGINEERING, INC.

CLERK'S CERTIFICATION ON THE PLAN

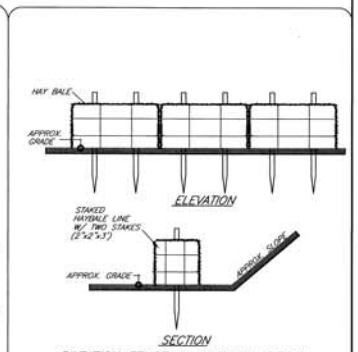
DATE: _____

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



TRACKING PAD DETAIL
NOT TO SCALE



SILTATION FENCE & HAYBALE DETAIL
NOT TO SCALE

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.

EROSION CONTROL LEGEND OF SYMBOLS & ABBREVIATIONS

STACKED HAYBALES

TRACKING PAD

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. OGREN CIVIL No. 37116 REGISTERED PROFESSIONAL ENGINEER 12-14-2015

Hayes

0' 30' 60' 120' 180'

EROSION CONTROL PLAN
CLAY STREET
NANTUCKET, MASS.

OWNERS:
RICHMOND GREAT POINT DEVELOPMENT, LLC
& RICHMOND 54 SKYLINE REALTY TRUST
23 CONCORD STREET
WILMINGTON, MA 01887

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

Scale: 1"=60'

December 11, 2015

No.	Revision	Date
10		
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NANTUCKET PLANNING BOARD

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

ECP SHEET 1 OF 1

SHEET 9 OF 9

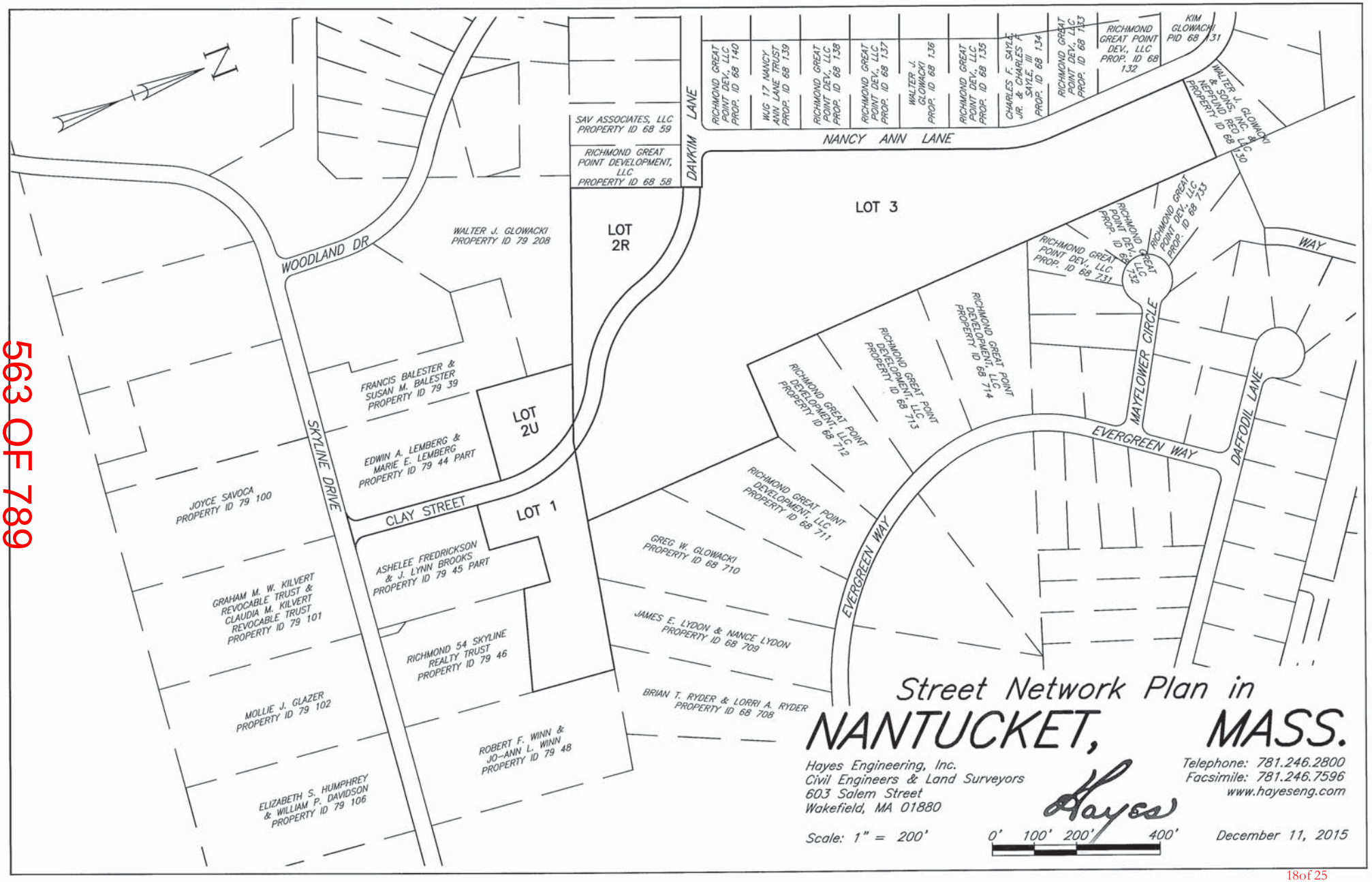
N:\DRAWINGS\Skyline-Sankin.dwg, 12/14/2015 10:43:55 AM, TC

REQUESTED WAIVERS
CLAY STREET
NANTUCKET, MASSACHUSETTS

December 2015

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)	Landscape Plan to be provided prior to Planning Board approval.
Section 2.06b(14)(b)	Existing trees to be saved will be decided during construction.
Section 4.06(b)(3)	Stormtech® MC-3500 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 4.16	Same as Section 2.06b(14)(a) & (b) above.
Section 4.18	No sidewalks are proposed along the sides of the proposed roadway Clay Street. There are no sidewalks on the adjacent streets, Skyline Drive and Davkim Lane.
Section 4.23	Soil tests will be provided prior to Planning Board approval.


N
WOODLAND DR
SKYLINE DRIVE
CLAY STREET
DAVKIM LANE
NANCY ANN LANE
EVERGREEN WAY
MAYFLOWER CIRCLE
DAFFODIL LANE
WAY
LOT 1
LOT 2R
LOT 2U
LOT 3
SAV ASSOCIATES, LLC PROPERTY ID 68 59
RICHMOND GREAT POINT DEVELOPMENT, LLC PROPERTY ID 68 58
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 140
WUG 17 NANCY ANN LANE TRUST PROP. ID 68 139
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 138
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 137
WALTER J. GLOWACKI PROP. ID 68 136
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 135
CHARLES F. SAYLE, JR. & CHARLES F. SAYLE, III PROP. ID 68 134
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 133
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 132
KIM GLOWACKI PID 68 131
WALTER J. GLOWACKI & SONS, INC. & REFOUND REO LLC PROPERT ID 68 130
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 731
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 732
RICHMOND GREAT POINT DEV., LLC PROP. ID 68 733
RICHMOND GREAT POINT DEVELOPMENT, LLC PROPERTY ID 68 714
RICHMOND GREAT POINT DEVELOPMENT, LLC PROPERTY ID 68 713
RICHMOND GREAT POINT DEVELOPMENT, LLC PROPERTY ID 68 712
RICHMOND GREAT POINT DEVELOPMENT, LLC PROPERTY ID 68 711
GREG W. GLOWACKI PROPERTY ID 68 710
JAMES E. LYDON & NANCE LYDON PROPERTY ID 68 709
BRIAN T. RYDER & LORRI A. RYDER PROPERTY ID 68 708
WALTER J. GLOWACKI PROPERTY ID 79 208
FRANCIS BALESTER & SUSAN M. BALESTER PROPERTY ID 79 39
EDWIN A. LEMBERG & MARIE E. LEMBERG PROPERTY ID 79 44 PART
ASHELEE FREDRICKSON & J. LYNN BROOKS PROPERTY ID 79 45 PART
RICHMOND 54 SKYLINE REALTY TRUST PROPERTY ID 79 46
ROBERT F. WINN & JO-ANN L. WINN PROPERTY ID 79 48
JOYCE SAVOCA PROPERTY ID 79 100
GRAHAM M. W. KILVERT REVOCABLE TRUST & CLAUDIA M. KILVERT REVOCABLE TRUST PROPERTY ID 79 101
MOLLIE J. GLAZER PROPERTY ID 79 102
ELIZABETH S. HUMPHREY & WILLIAM P. DAVIDSON PROPERTY ID 79 106
Street Network Plan in
NANTUCKET, MASS.
Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880
Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com
Hayes
Scale: 1" = 200'
0' 100' 200' 400'
December 11, 2015

PESCE ENGINEERING & ASSOCIATES, INC.
451 Raymond Road
Plymouth, MA 02360
Phone: 508-743-9206 Cell: 508-333-7630
epesce@comcast.net

February 4, 2016

Nantucket Planning Board
Attn: Ms. Leslie Snell, AICP, LEED ® AP
Deputy Director, Planning & Land Use Services
2 Fairgrounds Road
Nantucket, MA 02554

RE: Engineering Review of the Proposed **Clay Street (Rear of Skyline Drive) Definitive Subdivision**

Dear Mrs. Snell & Members of the Board:

Pesce Engineering & Associates, Inc. is pleased to provide you this engineering review of the proposed Clay Street Definitive Subdivision, located off Skyline Drive, Nantucket, MA. We have evaluated the plans for consistency with the Town's Zoning Bylaw, the Nantucket Rules and Regulations Governing the Subdivision of Land (SR&R), and general conformance with the Massachusetts Stormwater Management Regulations.

Along with a site visit conducted on January 15, 2016, we have reviewed the following information to prepare this letter report:

- Letter from The Richmond Company to the Town of Nantucket Planning Board, Subject: Submittal of a Definitive Plan of a Subdivision Plan, 42 (Rear) 48 (Rear) and 54 (Rear) Skyline Drive Properties and 20 Davkim Lane Property, with application package and enclosures including the Form B Application for Approval of a Definitive Subdivision Plan, dated January 6, 2016, and list of requested waivers.

- Site Development Plans; Definitive Plan, Clay Street, Nantucket, MA, 9 sheets, prepared by Hayes Engineering, Inc., dated December 11, 2015.

- Site Analysis Report, Clay Street, and Street Network Plan, prepared by Hayes Engineering, Inc., dated December 2015.

- Storm Water Management Report, Definitive Subdivision, Clay Street, Nantucket, MA, prepared by Hayes Engineering, Inc., dated December 11, 2015.

The proposed development is located on approximately 18.3 acres of land (comprising multiple parcels) situated between Skyline Drive (including potions of the rear of the lots for #42, 48 & 54 Skyline Drive), and the intersection of Nancy Ann Lane & Davkim Lane.

See the Street Network Plan for an overall view of this area. The site is located in both the Land Use General 2 (LUG-2) and Commercial Neighborhood (CN) Zoning Districts and the Public Wellhead Recharge Overlay District. No wetland areas are located on the subject parcels.

Several buildings exist on the property, which is the site of the former Glowacki commercial operations. The applicant proposes to develop this parcel by creating 4 new lots (Lots 1, 2U, 2R & 3) and a roadway lot (designated as 2 roadway lots; Road-U and Road-R). The proposed subdivision road is a 22-ft. wide paved surface, with 1 ft. Cape Cod berms, within a 40-ft. layout, and with 10 ft. wide electric easements on each side. The new subdivision road is approximately 1,300 feet long. Municipal water service is planned for only part of the subdivision (an extension of a water main for the northerly 500 ft. of the road) with the remainder serviced by private wells. Title 5 septic systems are planned to be installed for the new lots.

The following are our review comments:

Definitive Plans, Utilities, and Site Layout

1. We recommend that the applicant discuss with the Board the justification and explanation for the waivers requested. From our review of these waivers, we find they do not present any major additional engineering issues or concerns.

2. While we note that a waiver for submission of a Landscaping Plan (at this time) has been requested. We recommend that when it is submitted to the Board for review, that if street lighting is proposed, that this lighting be specified as “Dark Sky Compliant” with vertical cutoff shielding to mitigate impacts to abutters.

3. The applicant is requesting that the subdivision road be built in phases, and as such is proposing to build the first approximately 450 ft. of the new subdivision road, as a 12 ft. wide gravel driveway to allow access to Lot 1. If the Board chooses to approve this request, we recommend the following conditions:

    a. All proposed drainage piping/structures and utilities should be installed up to the proposed 450 ft. length of the driveway.

    b. A paved asphalt apron should be installed at the intersection with Skyline Drive.

    c. Discussion of the “triggering” event (or date) that will require the upgrade of this driveway to subdivision standards.

4. If it has not already been received, we recommend that the applicant receive approval from the Nantucket Fire Department on the proposed fire hydrant location, with a written report (or e-mail message) to the Planning Board. We also note that only one fire hydrant is proposed (near Station 8+00) along the entire new subdivision road. This may be insufficient for the future use of this property (for fire protection) if the property is further subdivided, and future residences are located more than 300 ft. from a fire hydrant.

5. We recommend that some additional signage be added to the plans as follows:

    a. Street signs at the intersections at each end of Clay Street.

    b. Stop signs (with pavement stop line) at the intersections at Skyline Drive and after the end of Clay Street, on Davkim Lane at the intersection with Nancy Ann Lane.

6. The proposed grading appears to cut through and affect the foundation of the metal structure near Station 10+25. We recommend that the grading at this location be modified or the structure removed/relocated.

7. We recommend that proposed driveway aprons (in conceptual locations), with appropriate driveway detail, be shown on the plans.

8. The roadway cross section detail on sheet 5 indicates *"6" Compacted Sub Base With Gravel Hardening."* We recommend that this roadway base material be specified with a design sieve specification (such as MA DOT M2.01.7, M1.03.0 or similar).

9. The plans show Lots 2U & 2R labeled as "Not a Separate Building Lot" with a "paper" street, Oniska Avenue, located between them. We recommend that the applicant clarify the intent for these lots, and the intended disposition (or relevance) of the apparent paper streets labeled as Summer Street, Andrew Street and Oniska Avenue.

Stormwater Management

This project proposes to mitigate post-development runoff for the new subdivision roadway by collecting runoff flow into a series of new catch basins and drain manholes, followed by discharge to 2 locations:

- A Stormceptor® treatment unit (at the intersection with Skyline Drive), which will discharge to a subsurface infiltration area in the subdivision road.

- A sediment forebay, which overflows to the existing gravel pit area east of the proposed subdivision road, which will act as a large infiltration area.

This stormwater management system will remove the Total Suspended Solids (TSS) in the stormwater, and recharge the stormwater to the aquifer. The proposed design also reduces the peak rate of runoff as compared to the existing conditions, and is additionally designed for the 100-yr. storm.

We have the following stormwater management comments:

1. The applicant proposes to use the existing gravel pit area as a big detention basin/infiltration area – designed for the volume up to the 20 ft. contour level. While this method will work well, it is not the conventional approach, since there are multiple sheds and structures in this area. For the proper use of stormwater management area, these structures should be removed to prevent the storage of materials/contaminants in the stormwater, or a re-design of this area (with no structures in the infiltration area) should be provided.

2. We recommend that the plans (sheets 4 & 8) show the gross length and width of the proposed infiltration bed with the MC-3500 StormTech™ chambers, for clarity during construction.

3. No soil test pit data was provided to evaluate the separation distance from the bottom of the StormTech™ chambers from the estimated seasonal high groundwater elevation. Subject to the approval of the Board, we recommend that the requirement to provide test pit data be added as a condition of the Decision; to conduct these test pits and provide this information to the Board prior to the construction start.

4. We recommend that inspection ports (2 minimum, per row of chambers), with covers brought to finish grade, be added to the plans.

5. The sediment forebay should have the following design features added to the plans:

    a. A flared end section with rip-rap apron for the inlet pipe.

    b. A rip-rap overflow spillway & apron at the 18.5 ft. elevation

    c. Construction Details for the above

6. The following comment pertains to the Stormwater Report:

a. Page63 of the report in Appendix B (HydroCAD® calculations): The elevations shown for the subsurface infiltration chambers are different from those shown in the "MC-3500 Typical Cross-Section" detail on sheet 8. Please clarify and revise accordingly.

b. Page 2 of the report in Appendix D "Checklist for Stormwater Report": The Checklist should be stamped, signed, and dated by the engineer.

Thank you again for this opportunity to assist the Planning Board in their review of this project. As always, please call if you have any questions or comments.

Sincerely,

PESCE ENGINEERING & ASSOCIATES, INC.

Edward L. Pesce., P.E., LEED ® AP
Principal

David Armanetti, The Richmond Co.
John Ogren, P.E., Hayes Engineering, Inc.

2/1/16

To The Nantucket Planning Board,

I am writing this letter in regards to the proposal put forth by Richmond Great Point Development, LLC (#7918) for the approval of a defining subdivision plan regarding 42, 46, 48, 54 Skyline Drive and 20 Davkim Lane. 48 and 54 Skyline Dr. already have access to Skyline Drive. 42 and 46 appear to be entitled to driveways on Skyline as long as they comply with existing zoning laws.

The proposed new road, Clay Street, would connect Davkim Lane to Skyline Dr.. Skyline is a private road that has constant repair issues. The proposed road would connect Skyline Dr. to a large commercial tract zoned RC2. 20 Davkim already has large amounts of frontage on Nancy Ann Lane and Davkim Lane. The proposed new road would only increase traffic and wear-and-tear on a private road and entirely change the nature of the Skyline neighborhood. Every property on Skyline is zoned LUG2. There is no access to any RC2 properties on Skyline, nor should there be. The proposed road only serves the commercial interests of Richmond Great Point Development, LLC and will burden the residents of not only Skyline Drive, but Webster Rd. and Woodland Dr. as well. The road will bring to Skyline Drive much commercial traffic, traffic that does not currently exist. It will also connect the other development of Richmond Great Point Development, LLC to Skyline Drive. Richmond Great Point Development, LLC has plenty of other options for their lot on 20 Davkim Lane.

I urge you to reject the proposed road, Clay St., and help maintain the quiet neighborly feel of Skyline Drive.

Sincerely,

William P. Davidson
(Resident of 61 Skyline Drive for 21 years)

NT MARINE
BOW STREET
MA 02554
88-6274

PLANNING BOARD

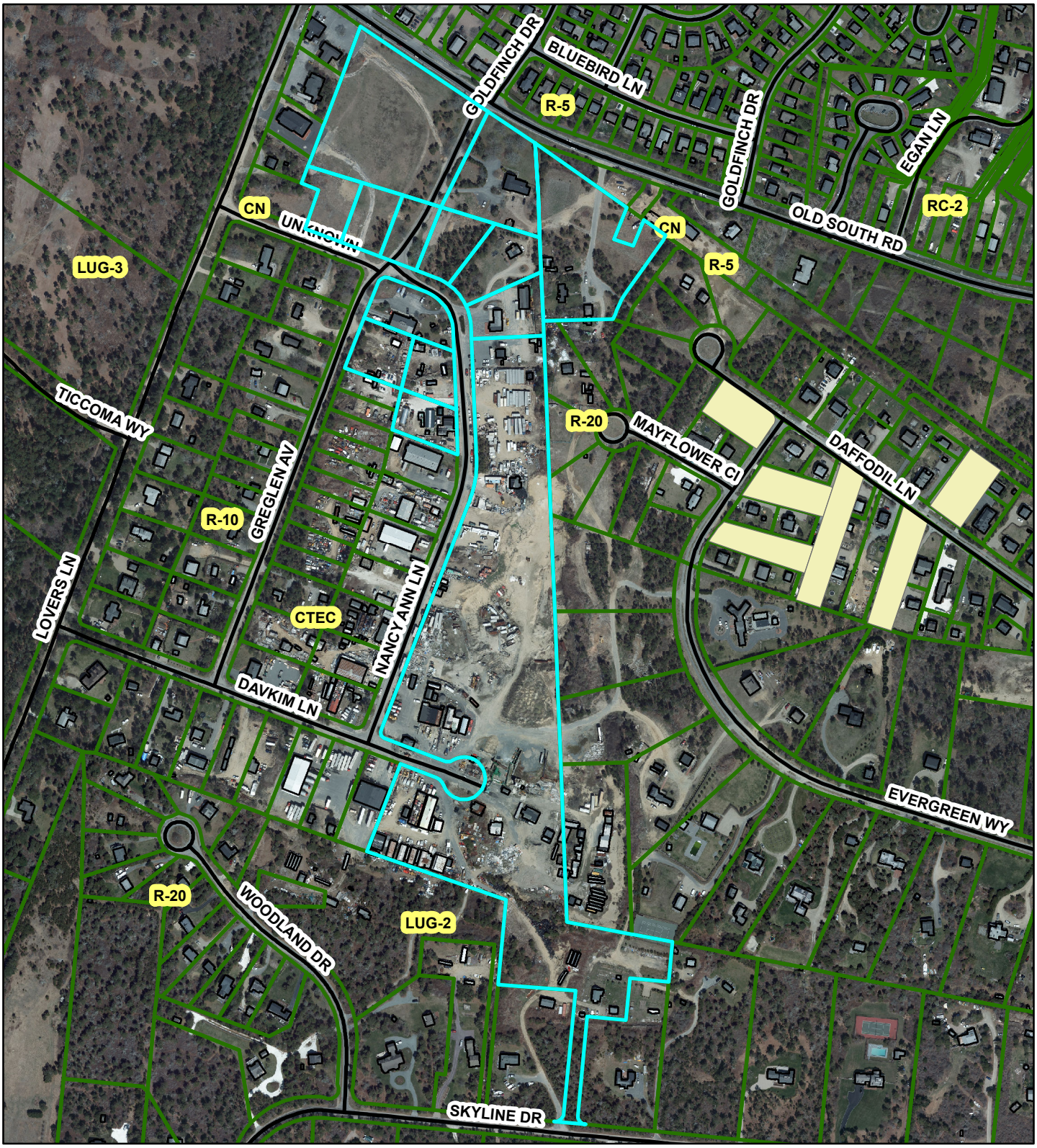
2751
ET MA

FOR MEETING ON 2/8/16

CASE # 2918

RECEIVED
FEB 01 2016
By

#7988 Richmond Great Point Development, LLC
Definitive Subdivision Plan
Nancy Ann Lane, Greglen Avenue, Davkim Lane & Old South Road
Map 68 Parcels 57, 129, 130, 131, 132 , 133, 157, 158, 176, 177, 204, 205, 206, 207, & 999.2



Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

JUN 1 5 2016

Nantucket Planning Board

Form B
Application for Approval of a Definitive Subdivision Plan
(AR)

"Old South Road Crossing" Definitive Subdivision

File one completed form with the Planning Board and one copy with the Town Clerk.

RECEIVED
JUN 1 5 2016
By

Date: _____ June 13, 2016 _____

To the Planning Board of Nantucket:

The undersigned, being the applicant as defined under Chapter 41, Section 81-L, for approval ~~of a proposed~~ Subdivision of Land in subdivision shown on a plan entitled Nantucket, Mass designed by _ Hayes Engineering, Inc. ___ dated ____ June 9, 2016 __, and described as follows: located on _ Multiple Lots on Nancy Ann Lane, Greglen ___ Avenue, Davkim Lane, and Old South Road (See "Attachment A" for List of Individual Parcels) _____, number of lots proposed _ Thirteen (13), total acreage of tract __ +/- 22.8 Acres _____, hereby submits said plan as a **definitive** plan in accordance with the *Rules and Regulations Governing the Subdivision of Land* of the Nantucket Planning Board and makes application to the Board for approval of said plan.

(See "Attachment B" for List of Individual Parcels)

The undersigned's title to said land is derived from _____ by deed dated _____ and recorded in the Nantucket Registry of Deeds Book _____, Page _____, registered in the Nantucket Registry District of the Land Court, Certificate of Title # _____ and shown on Nantucket Assessor's Map # _____, Parcel _____, and said land is free of encumbrances except for the following: (See "Attachment C" for List of Encumbrances)

Said plan ❍ has ❍ has not evolved from a preliminary plan submitted to the Board on _____(date) and ❍ approved ❍ disapproved on _____ (date).

The undersigned hereby applies for the approval of said **definitive** plan by the Board, in belief that the plan conforms to the Board's *Rules and Regulations.*

Name(s) and address(es) of the Applicant(s):
(to include all the names and addresses of the principals of the owner entity such as principal officers of the corporation, trustees of a trust or partners of a partnership)

Philip Pastan, (Sole) Manager of Richmond Great Point Development LLC

Contact Phone #: (978)988-3900 Fax #: (978)988-3950 E-mail: ppastan@richmondco.com

Name of owner(s): Richmond Great Point Development LLC

Address of owner(s): 23 Concord Street, Wilmington MA 01887

I hereby certify that the applicant(s) listed above have been authorized by me to file a subdivision plan with the Planning Board on property that I own.

Owner's signature Philip Pastan, as Manager of Richmond Great Point Development LLC

OK 6/13/16

Received by Town Clerk:

Date: _____

Time: _____

Received by Board of Health:

Date: _____

Time: _____

RECEIVED JUN 15 2016 BY: AB for BOH

Planning Board File # _____

"ATTACHMENT A"
LIST OF INDIVIDUAL PROPERTIES INCLUDED IN "FORM B" APPLICATION
"OLD SOUTH ROAD CROSSING" DEFINITIVE SUBDIVISION
RICHMOND GREAT POINT DEVELOPMENT LLC (OWNER / APPLICANT)

Index	Parcel Address	Assessor's Tax Map / Parcel ID		Land Court Plan Information	
		Map	Parcel	Plan Number	Lot
1	63 Old South Road	68	157	16514-103	872
2	67 Old South Road	68	158	16514-L	59
3	73 Old South Road	68	129	16514-97	853
4	75 (A) Old South Road	68	999.2	16514-100	858
5	3 Nancy Ann Lane	68	132	16514-Z	160
6	4 Nancy Ann Lane	68	204	16514-103	869
7	5 Nancy Ann Lane	68	133	16514-Z	161
8	6 Nancy Ann Lane	68	205	16514-Z	179
9	8 Nancy Ann Lane	68	206	16514-Z	180
10	10 Nancy Ann Lane	68	207	16514-Z	181
11	12 Nancy Ann Lane	68	176	16514-Z	182
12	14 Nancy Ann Lane	68	130	16514-Z	183
13	2 Greglen Avenue	68	131	16514-Z	159
14	4 Greglen Avenue	68	177	16514-Z	177
15	20 Davkim Lane	68	57	16514-Z	184

"ATTACHMENT B"
LIST OF INDIVIDUAL PROPERTIES FOR DERIVATION OF TITLE FOR DEFINITIVE SUBDIVISION
RICHMOND GREAT POINT DEVELOPMENT LLC
"OLD SOUTH ROAD CROSSING" DEFINITIVE SUBDIVISION

Index	Parcel Address		Deed Recording Reference (Date, Book, Page)			Internal Reference in Deed	
			Date	Book	Page	Parcel Number	Page
1	63 Old South Road		August 8, 2013	O1397	312	Thirty-Three	7
2	67 Old South Road		August 8, 2013	O1397	312	One	1
3	73 Old South Road		August 8, 2013	O1397	312	Forty-Three	9
4	75 (A) Old South Road		February 6, 2015	Document # 00147075		n/a	n/a
5	3 Nancy Ann Lane		August 8, 2013	O1397	312	Fourteen	4
6	4 Nancy Ann Lane		August 8, 2013	O1397	312	Twenty-Seven	6
7	5 Nancy Ann Lane		August 8, 2013	O1397	312	Fifteen	4
8	6 Nancy Ann Lane		August 8, 2013	O1397	312	Twenty-Eight	6
9	8 Nancy Ann Lane		August 8, 2013	O1397	312	Twenty-Nine	6
10	10 Nancy Ann Lane		August 8, 2013	O1397	312	Thirty	6
11	12 Nancy Ann Lane		August 8, 2013	O1397	312	Thirty-One	7
12	14 Nancy Ann Lane	20% Partial Interest	August 8, 2013	O1397	312	Fifty	10
		20% Partial Interest	July 14, 2014	Document # 145051		n/a	n/a
		20% Partial Interest	October 10, 2014	Document # 145942		n/a	n/a
		20% Partial Interest	October 10, 2014	Document # 145959		n/a	n/a
		20% Partial Interest	November 7, 2014	Document # 146249		n/a	n/a
13	2 Greglen Avenue		February 17, 2015	Document # 147131		n/a	n/a
14	4 Greglen Avenue		February 17, 2015	Document # 147135		n/a	n/a
15	20 Davkim Lane		August 8, 2013	O1397	312	Thirty-Two	7

THE
RICHMOND
COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 13, 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 Application for Definitive Subdivision
Richmond Great Point Development LLC (Owner / Developer)
"Old South Road Crossing" Definitive Subdivision

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 completed application (Form B) and associated materials (plans, storm water management report, deeds, etc.) comprising 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 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 completed application (Form B) and associated materials (plans, storm water management report, deeds, etc.) to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the approval of a definitive subdivision of land to allow for the reconfiguration of certain roadway segments and the reconfiguration of existing lots in this area comprising a series of thirteen (13) contiguous lots and +/- 1,270 linear feet (0.24 miles) of roadway segments, totaling +/- 24.3 acres of land, located along Old South Road, Nancy Ann Lane, Greglen Avenue, and 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 primary objective of the subdivision is to reconfigure, re-route, and improve the engineering design, safety, and condition of portions of the existing Nancy Ann Lane and Greglen Avenue roadways in the northern center of the Richmond Great Point Development LLC portfolio, which connect into Old South Road (to the north) and Lovers Lane (to the west), to "set the table" to accommodate the mixed-use development that is being proposed on adjacent properties owned by Richmond Great Point Development LLC, primarily comprised of the +/- 15,500 gross square feet series of retail "liner" buildings that are proposed to be developed along the frontage of Old South Road, the 225 unit 'Meadows II" workforce housing rental community that is proposed to be developed on the +/- 14.5 acre 20 and 20(R) Davkim Lane properties, and the 100 lot "Sandpiper Place" workforce homeownership housing community that is proposed to be developed on the +/- 17.2 acre combination of properties located off Old South Road, Daffodil Lane, Mayflower Circle, and Evergreen Way.

The first action proposed, which is the straightening, widening, and improvement to a "boulevard" type design of the segment of Nancy Ann Lane which is located in the northern half of the portfolio, is necessary in order to allow for the development of the retail "liner" buildings and, ultimately, to allow for the enhanced access and capacity that is necessary to allow for the development of the two housing initiatives described above.

In order to develop the two easternmost retail "liner" buildings, the existing stub of Greglen Avenue that currently runs from the northern edge of the existing 'Parcel Plus" property located at 2 Greglen Avenue and connects at a stop-sign controlled "T" intersection with Old South Road, offset slightly from the intersection of Goldfinch Drive, located on the northern side of Old South Road, will be abandoned. It is noted that this existing "stub" or "roadway segment" is actually not a right of way that was laid out or approved on any plan, and does not even have status as a legal road; it was simply constructed by a predecessor owner and has been continued to be utilized for this purpose for many years.

The current condition of this "stub" or "roadway segment" creates a quirky and unsafe "S" curve that has very steep radius curves, connecting from the northern end of Nancy Ann Lane, past the "Parcel Plus" property and connecting into Old South Road.

Upon its termination, this "stub" or "roadway segment" will be replaced by a straighter, wider, significantly improved reconfigured Nancy Ann Lane, which will run straight / directly into a (proposed) ninety degree, stop sign controlled "T" intersection with Old South Road, located approximately at the mid-point (roughly equidistant) between the existing Goldfinch Drive entrance and exit intersections to the existing Naushop residential community located on the north side of Old South Road, thereby eliminating the existing unsafe "S" curve with the restricted turning radius.

This new intersection will have a substantially more generous design width, including a center median and multiple dedicated turning lanes, to provide the additional capacity and design enhancements that will be necessary to accommodate the adjacent proposed development and all existing uses and businesses in the area, including the multiple existing trucking-intensive businesses located along the southern portion of Nancy Ann Lane and along Davkim Lane (including Cape Cod Express, Coca-Cola, Pepsi-Cola, Structures Unlimited, and Sayles Seafood).

As shown on the attached plan, a new roadway segment will then also be constructed along the southern boundary of the 4 Greglen Avenue property and the 5 Nancy Ann Lane property, running east to west and connecting Nancy Ann Lane and Greglen Avenue, in order to allow continued cross-access out to Lovers Lane and Old South Road, as a second means of vehicular access and circulation to the area.

The reconfiguration of the roadways, as described herein, will require the slight reconfiguration of the series of +/- fifteen (15) existing properties in the vicinity of the proposed roadway areas, primarily located along Nancy Ann Lane and the northern portion of Greglen Avenue. Most of these properties are vacant and will not be reconfigured until the roadway reconfiguration improvements are completed.

No buildings are proposed to be developed as part of the proposed subdivision; the subdivision is only comprised of the roadway reconfiguration, re-routing, and improvement and the (slight) reconfiguration of the lots surrounding the new roadway configuration.

The current zoning of the land / lots in the area is classified in three different zoning districts; portions are classified within the Commercial Neighborhood (CN) zoning district, portions are classified within the Commercial Trade, Entrepreneurship and Craft (CTEC) zoning district, and portions are classified within the Residential-5 (R-5) zoning district.

The specific dimensional characteristics of the thirteen (13) lots that are proposed to be reconfigured as a result of the proposed subdivision, and the length and area of the proposed roadway segments, will be as follows (following the proposed reconfigurations):

Lot Number on Plan And Street Address	Lot Area (Square Footage)	Lot Area (Square Footage)	Lot Frontage (Linear Feet)	Lot Regularity Factor (rf)
Lot # 1 – 4 Road "C"	38,388	0.88	96.55	0.701
Lot # 2 – 6 Road "C"	37,107	0.85	55.00	0.628
Lot # 3 – 8 Road "C"	52,581	1.21	84.86	0.794
Lot # 4 – 4 Road "A"	47,309	1.09	274.83	0.650
Lot # 5 – 6 Road "A"	28,161	0.65	105.00	0.776
Lot # 6 – 8 Road "A"	28,159	0.65	105.53	0.770
Lot # 7 – 4 Road "A"	36,606	0.84	178.89	0.995
Lot # 8 – 2 Greglen Avenue"	29,520	0.68	178.84	0.998
Lot # 9 – 4 Greglen Avenue	16,366	0.38	75.01	0.929
Lot # 10 – 6 Road "A"	20,145	0.46	80.16	0.913
Lot # 11 – 5 Nancy Ann Lane	22,250	0.51	201.78	0.929
Lot # 12 – 73 Old South Road	102,656	2.35	566.26	0.563
Lot # 13 – 20 Davkim Lane	534,267	12.26	1,331.13	0.552
Roadways ("A" and "B")	64,900	1.49	1,270 Linear Feet	n/a
Subtotal (Average)	**1,058,415**	**24.30**	**n/a**	**0.784**

As documented in the above-table and on the attached plans, the thirteen (13) lots resulting from the proposed subdivision will meet or exceed the relevant dimensional criteria and related requirements, as such are established in Section 139-16 (A) and (D) of the Town of Nantucket Zoning Bylaw for each of the applicable zoning districts.

In addition to the completed (Form B) application, attached hereto, we have submitted the following plans and technical materials that are required to be submitted to provide for the processing and approval of the proposed subdivision, including: (1) the *Definitive Plan, Old South Road Crossing, Nantucket, Mass* as prepared by Hayes Engineering, Inc., dated June 9, 2016, depicting the subdivision of the lots along with the applicable / customary notes and details (totaling 11 sheets), (2) the *Site Analysis Report*, as prepared by Hayes Engineering, Inc., dated June 10, 2016, (3) the *Street Network Plan*, as prepared by Hayes Engineering, Inc., dated June 9, 2016, and (4) the *Requested Waivers*, as prepared by Hayes Engineering, Inc., dated June 2016. Additional detail on the drainage improvements for the proposed roadways and a full *Stormwater Management Plan* will be submitted under separate cover, at a later date, once the additional design of this system has been refined.

We have also attached "Attachment A" and "Attachment B" to the Form B application form, detailing the specifics of the fifteen (15) existing parcels that comprise the proposed subdivision and the derivation of the title to the land comprising the proposed subdivision, given that the land includes multiple parcels, and that title to several of the parcels has been derived from different sellers / grantors.

We trust that this submittal conforms to the applicable requirements for such a Definitive Subdivision Plan (AR) and we look forward to the completion of your review and the subsequent review and approval of the plan by the Town of Nantucket Planning Board.

If you any immediate questions with respect to either the application 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.

THE
RICHMOND
COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 13, 2016

TOWN OF NANTUCKET
TOWN CLERK
16 Broad Street
Nantucket, Massachusetts 02554

Attention: Catherine Flanagan Stover, MMC, CMMC

Subject: Submittal of Application for Definitive Subdivision
Richmond Great Point Development LLC (Owner / Developer)
"Old South Road Crossing" Definitive Subdivision

Dear Mrs. Stover:

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 document submittal of the completed application to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the approval of a definitive subdivision of land to allow for the reconfiguration of certain roadway segments and the reconfiguration of lots in this area comprising a series of thirteen (13) contiguous lots and several proposed roadway segments, totaling +/- 24.3 acres of land, located along Old South Road, Nancy Ann Lane, Greglen Avenue, and Davkim Lane.

The Notice (and copy of the completed (Form B) application and accompanying plan) is being submitted to your office 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).

Upon your acknowledgment of receipt of this Notice (by way of time / date stamping the application), we intend to submit the original completed (Form B) application and accompanying plan to the Town of Nantucket Planning Board to obtain its review and subsequent approval.

Should you have any questions with respect to the application and submittal, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Andrew Burek, Esq., TRC
Arthur Reade, Jr., Esq., RGH

Hayes Engineering, Inc

603 Salem Street
Wakefield, MA 01880
Tel: (781) 246-2800
Fax: (781) 246-7596

Nantucket, MA 02554
Tel: (508) 228-7909

Refer to File No. **NAN-0107J**

SITE ANALYSIS REPORT
OLD SOUTH ROAD CROSSING
NANTUCKET, MASSACHUSETTS

June 10, 2016

This site analysis report was prepared as part of the submission requirements of a definitive subdivision plan in accordance with Section II, 2.06(a) (11) of the Rules and Regulations of the Planning Board for the Town of Nantucket, as amended. This subdivision plan proposes the creation of thirteen (13) lots, in conjunction with 1,268 linear feet of roadway, together with approximately 2,300 linear feet of improvements to Old South Road, Greglen Avenue and Nancy Ann Lane (Road C) as shown on the subdivision plans. The new roadways, known as Road A and Road B are proposed to be constructed as shown on the typical cross-sections illustrated on the profile plans, in order to provide frontage and adequate access to the lots within the parcel in a safe and convenient manner.

The site, being approximately 24.3 acres in extent, is located approximately 2.1 miles southeast of the town center, and is currently consists of undeveloped meadow, areas of interspersed scrub oak and pines (brush) and areas of developed residential and commercial lands, buildings and driveways. The topography of the site ranges from approximately 22 feet above the North American Vertical Datum of 1988 (NAVD88) to approximately elevation 43.

The area in which the project is proposed to be constructed is within the CN, R-5 and CTEC zoning districts. Zoning requirements for each district are summarized in the table below:

Criteria	CN Zoning District	R-5 Zoning District	CTEC Zoning District
Lot Area	7,500 sf.	5,000 sf.	10,000 sf.
Lot Frontage	50 feet	50 feet	50 feet
Front Yard	10 feet	10 feet	10 feet
Side Yard	5 feet	10 feet on one-side, 5 feet thereafter	5 feet
Rear Yard	10 feet	5 feet	10 feet
Ground Cover	40%	40%	40%

Lot areas of proposed lots vary from 16,000 sf. to 534,000 sf.

The property is comprised of Evesboro soils and were determined by using the Web Soil Survey from the National Cooperative Soil Survey for Nantucket County. The Evesboro sands consist of excessively-drained soil, generally found in smooth, irregular-shaped areas, as reported by the Soil Conservation Service. It is expected that the permeability of the soil is rapid in the surface layer and subsoil, and very rapid in the substratum.

Due to the granular nature and the grain size of the Evesboro soils coupled with the site topography and proposed drainage design leads us to believe that erosion is not expected to be a problem. Likewise, these soils are largely void of the small grain sizes, and do not produce excessively dusty conditions. Should dust control be required, it would be handled by wetting the surface of exposed areas during periods of activity of construction vehicles or in highly windy conditions. No other form of dust control is anticipated.

No surface water resources are present on the parcel being developed, nor are any portion of the site subject to the Wetlands Protection Act for Coastal Wetland Areas (M.G.L. Chapter 131, Section 40).

No areas of the site are represented as having severe limitations due to seasonal high water table. Similarly, no portion of the site is designated as being in a Zone A, B or V, as shown on the Flood Insurance Rate Map (FIRM), Community Panel #25019C0089G, effective date June 9, 2014.

The Evesboro sands typically provide poor potential for growth of vegetation.. The site is generally comprised of a sand and gravel pit with paved areas, numerous storage structures and gravel drives. There exists scattered clusters of vegetation on the southern end of the property of vegetation with the remained either pavement or devoid of vegetation. Any tree removal for the proposed roadways will be minimal as the majority of the area within the proposed roadway is currently gravel driveways or the sand and gravel pit.

An examination of the profile sheets submitted with the plan reveals that no major changes in watershed areas or directions are contemplated by construction of the subdivision proposed in this application. The general design approach for management of storm water is to collect the roadway drainage as well as runoff from portions of the site. This runoff is to be collected in deep sump catch basins, and then directed via a closed pipe system VortSentry treatment devices and discharge to proposed subsurface infiltration areas. The closed piping system shall be designed with sufficient capacity to accommodate the 25-year design storm and mitigation for the 100-year design storm. Stormwater entering the proposed subsurface infiltration area will provide for groundwater recharge in the proposed development. Also, the proposed deep sump catch basins and VortSentry devices will improve the water quality of the runoff from the proposed roadway.

The improvements which are contemplated for construction of the subdivision roadways include rights-of-ways with varying width as depicted on the plans. Existing roadways to be abandoned shall have pavement and infrastructure removed. Minimum pavement width for newly proposed roadways having two-way (bidirectional) traffic is 24-feet.

Sanitary sewer from the lots are proposed to be connected to municipal sanitary facilities available in Old South Road proximate to the intersection with Goldfinch Drive.

Potable water will be provided for domestic purposes by connecting to the Town water supply The proposed eight (8) inch water main through the project will be connected to an existing twelve (12) inch water main in Old South Road and existing eight (8) inch water main in Nancy Ann Lane.

The project roadways are provided to service future commercial and residential\multifamily developments within the project limits. The proposed roadway system will connect two existing roadways, Greglen Avenue and Nancy Ann Lane to Old South Road. These connection will provide for adequate site distances so as to enable vehicles to safely enter and exit the property, as well as providing adequate access for emergency vehicles.

The traffic generated by uses adjacent to the proposed roadway will add to the existing traffic volumes of the surrounding streets. Roadway improvements are proposed in Old South Road to mitigate new traffic generation. The geometry and construction of the proposed roadway system will provide for a safe and convenient alignment for vehicular traffic and access to the lots by emergency vehicles.

A sidewalk is being proposed along one side of the proposed Road A right-of-way.

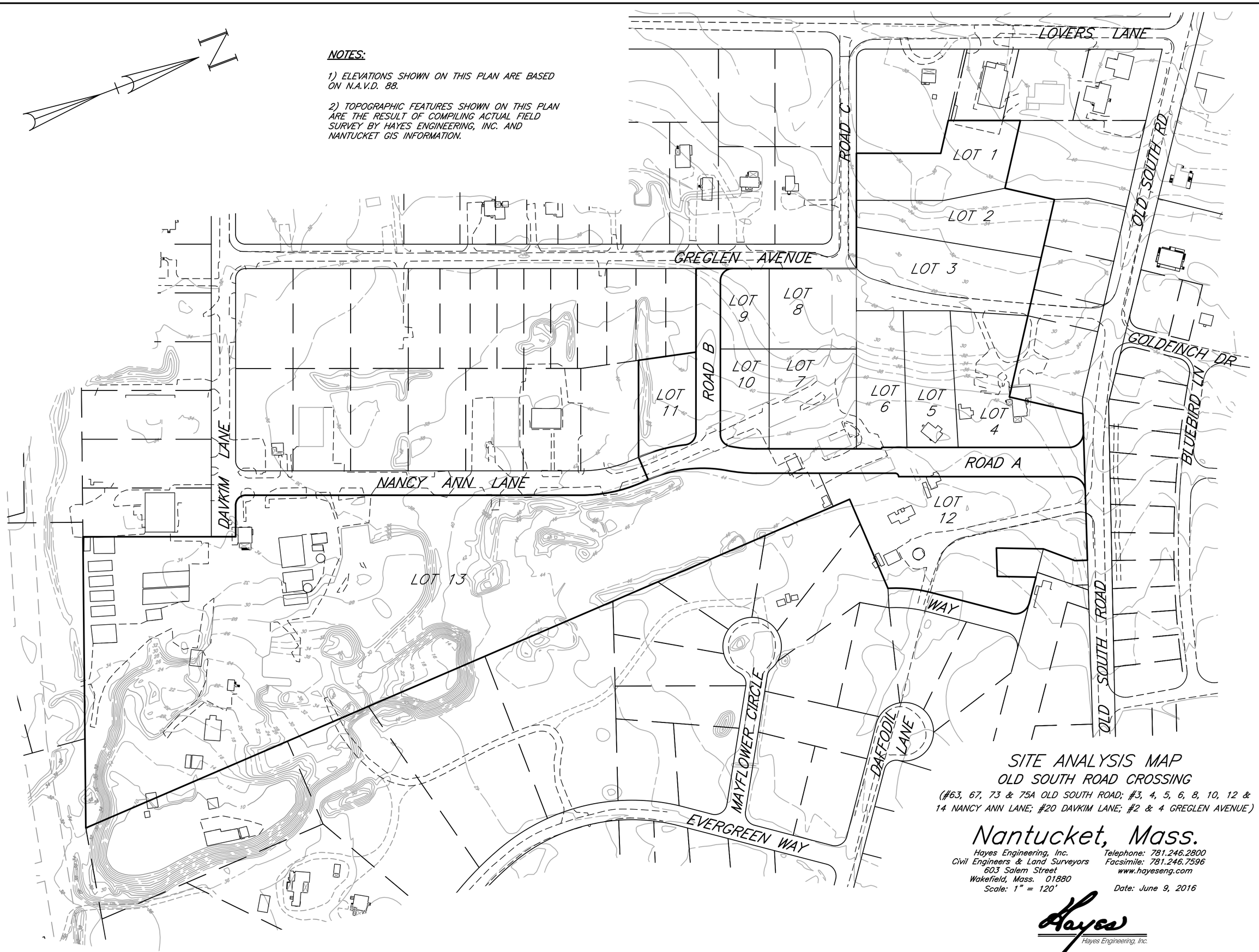
It is presently anticipated that all construction related to the physical roadway and infrastructure improvements would be completed within two (2) years following the receipt of all necessary approvals.

There are no proposed common open spaces associated with this development.

NOTES:

1) ELEVATIONS SHOWN ON THIS PLAN ARE BASED ON N.A.V.D. 88.

2) TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE THE RESULT OF COMPILING ACTUAL FIELD SURVEY BY HAYES ENGINEERING, INC. AND NANTUCKET GIS INFORMATION.



SITE ANALYSIS MAP

OLD SOUTH ROAD CROSSING

(#63, 67, 73 & 75A OLD SOUTH ROAD; #3, 4, 5, 6, 8, 10, 12 & 14 NANCY ANN LANE; #20 DAVKIM LANE; #2 & 4 GREGLEN AVENUE)

Nantucket, Mass.

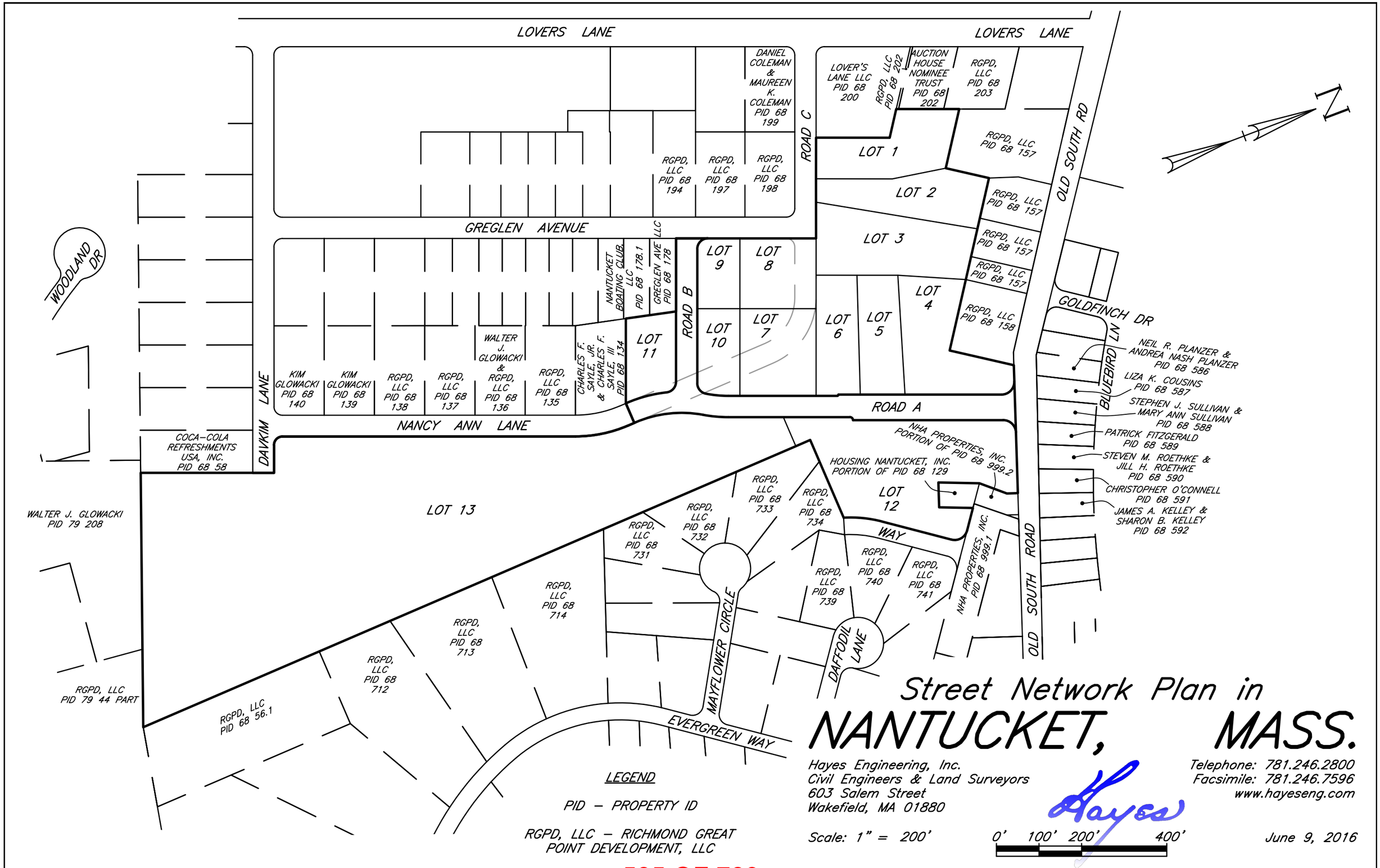
Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, Mass. 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

Scale: 1" = 120'

Date: June 9, 2016

Hayes Engineering, Inc.


LOVERS LANE
LOVERS LANE
DANIEL COLEMAN & MAUREEN K. COLEMAN PID 68 199
LOVER'S LANE LLC PID 68 200
RGPD, LLC PID 68 202
AUCTION HOUSE NOMINEE TRUST PID 68 202
RGPD, LLC PID 68 203
ROAD C
LOT 1
RGPD, LLC PID 68 157
OLD SOUTH RD
RGPD, LLC PID 68 194
RGPD, LLC PID 68 197
RGPD, LLC PID 68 198
LOT 2
GREGLEN AVENUE
LOT 3
RGPD, LLC PID 68 157
RGPD, LLC PID 68 157
RGPD, LLC PID 68 157
NANTUCKET BOATING CLUB, LLC PID 68 178.1
GREGLEN AVE LLC PID 68 178
LOT 9
LOT 8
ROAD B
LOT 4
RGPD, LLC PID 68 158
LOT 10
LOT 7
LOT 6
LOT 5
GOLDFINCH DR
WOODLAND DR
WALTER J. GLOWACKI & RGPD, LLC PID 68 136
CHARLES F. SAYLE, JR. & CHARLES F. SAYLE, III PID 68 134
LOT 11
KIM GLOWACKI PID 68 140
KIM GLOWACKI PID 68 139
RGPD, LLC PID 68 138
RGPD, LLC PID 68 137
RGPD, LLC PID 68 135
DAVKIM LANE
ROAD A
NANCY ANN LANE
BLUEBIRD LN
NEIL R. PLANZER & ANDREA NASH PLANZER PID 68 586
LIZA K. COUSINS PID 68 587
STEPHEN J. SULLIVAN & MARY ANN SULLIVAN PID 68 588
PATRICK FITZGERALD PID 68 589
STEVEN M. ROETHKE & JILL H. ROETHKE PID 68 590
CHRISTOPHER O'CONNELL PID 68 591
JAMES A. KELLEY & SHARON B. KELLEY PID 68 592
COCA-COLA REFRESHMENTS USA, INC. PID 68 58
NHA PROPERTIES, INC. PORTION OF PID 68 999.2
HOUSING NANTUCKET, INC. PORTION OF PID 68 129
LOT 12
WALTER J. GLOWACKI PID 79 208
LOT 13
RGPD, LLC PID 68 733
RGPD, LLC PID 68 734
RGPD, LLC PID 68 732
RGPD, LLC PID 68 731
WAY
RGPD, LLC PID 68 740
RGPD, LLC PID 68 741
NHA PROPERTIES, INC. PID 68 999.1
RGPD, LLC PID 68 739
RGPD, LLC PID 68 714
RGPD, LLC PID 68 713
RGPD, LLC PID 68 712
MAYFLOWER CIRCLE
DAFFODIL LANE
OLD SOUTH ROAD
RGPD, LLC PID 79 44 PART
RGPD, LLC PID 68 56.1
EVERGREEN WAY
N
LEGEND
PID – PROPERTY ID
RGPD, LLC – RICHMOND GREAT POINT DEVELOPMENT, LLC
Street Network Plan in
NANTUCKET, MASS.
Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880
Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com
Scale: 1" = 200'
0' 100' 200' 400'
June 9, 2016

Subdivision Plan of Land in NANTUCKET, MASS.

Being a Subdivision of Lot 59 on LC Plan 16514–L, Lots 159, 160, 161, 177, 179, 180, 181, 182, 183 & 184 on LC Plan 16514–Z, Lot 853 on LC Plan 16514–97, Lot 858 on LC Plan 16514–100, & Lots 869 & 872 on LC Plan 16514–103

Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

Scale: 1" = 100' 0' 50' 100' 200' 300' June 9, 2016

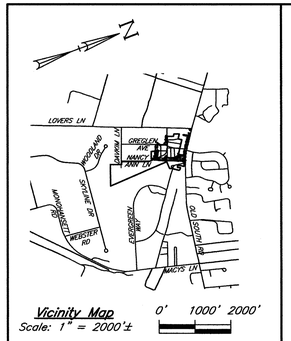
I CERTIFY THAT AS OF THE DATE OF THIS SURVEY, THE MONUMENTS CONTROLLING PRIOR PLANS ARE IN THE GROUND AS SHOWN AND DESCRIBED HEREON. I FURTHER CERTIFY THAT ANY ADDITIONAL MONUMENTS SHOWN HEREON HAVE BEEN SET IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 AS OF THE DATE OF THIS SURVEY.

I CERTIFY THAT THIS PLAN WAS DRAWN FROM AN ACTUAL SURVEY MADE ON THE GROUND IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 BETWEEN NOVEMBER 20, 2012 AND JUNE 3, 2016.

EDM ACCURACY ±(2 MM + 2 PPM)
TRAVERSE PRECISION (RAW) = 1:52,714
LINEAR ERROR OF CLOSURE (RAW) = 0.16 FEET
DIRECTIONAL ERROR OF CLOSURE = S53°E

DATE: JUNE 9, 2016

PROFESSIONAL LAND SURVEYOR



Vicinity Map
Scale: 1" = 2000'± 0' 1000' 2000'

CURRENT OWNERSHIP

RICHMOND GREAT POINT DEVELOPMENT, LLC

LAND COURT CERTIFICATE NO. 24872

[LOT 59 ON LC PLAN 16514–L]
#67 OLD SOUTH ROAD
PROPERTY ID 68 158

[LOT 160 ON LC PLAN 16514–Z]
#3 NANCY ANN LANE
PROPERTY ID 68 132

[LOT 161 ON LC PLAN 16514–Z]
#5 NANCY ANN LANE
PROPERTY ID 68 133

[LOT 179 ON LC PLAN 16514–Z]
#6 NANCY ANN LANE
PROPERTY ID 68 205

[LOT 180 ON LC PLAN 16514–Z]
#8 NANCY ANN LANE
PROPERTY ID 68 206

[LOT 181 ON LC PLAN 16514–Z]
#10 NANCY ANN LANE
PROPERTY ID 68 207

[LOT 182 ON LC PLAN 16514–Z]
#12 NANCY ANN LANE
PROPERTY ID 68 176

[LOT 184 ON LC PLAN 16514–Z]
#20 DAVKIM LANE
PROPERTY ID 68 57

[LOT 853 ON LC PLAN 16514–97]
#73 OLD SOUTH ROAD
PORTION OF PROPERTY ID 68 129

[LOT 869 ON LC PLAN 16514–103]
#4 NANCY ANN LANE
PROPERTY ID 68 204

[LOT 872 ON LC PLAN 16514–103]
#63 OLD SOUTH ROAD
PROPERTY ID 68 157

LC CERTIFICATE NOS. 12709 & 25430

[LOT 183 ON LC PLAN 16514–Z]
#14 NANCY ANN LANE
PROPERTY ID 68 130

LAND COURT CERTIFICATE NO. 25525

[LOT 858 ON LC PLAN 16514–100]
#75A OLD SOUTH ROAD
PROPERTY ID 68 999.2

LAND COURT CERTIFICATE NO. 25529

[LOT 159 ON LC PLAN 16514–Z]
#2 GREGLEN AVENUE
PROPERTY ID 68 131

LAND COURT CERTIFICATE NO. 25530

[LOT 177 ON LC PLAN 16514–Z]
#4 GREGLEN AVENUE
PROPERTY ID 68 177

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

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: R–5

MINIMUM LOT AREA = 5,000 S.F.
MINIMUM LOT FRONTAGE = 50 FEET

MINIMUM YARD SETBACKS
FRONT = 10 FEET
SIDE = 10 FEET ON ONE SIDE, 5 FEET THEREAFTER
REAR = 5 FEET

ALLOWABLE GROUND COVER % = 40%

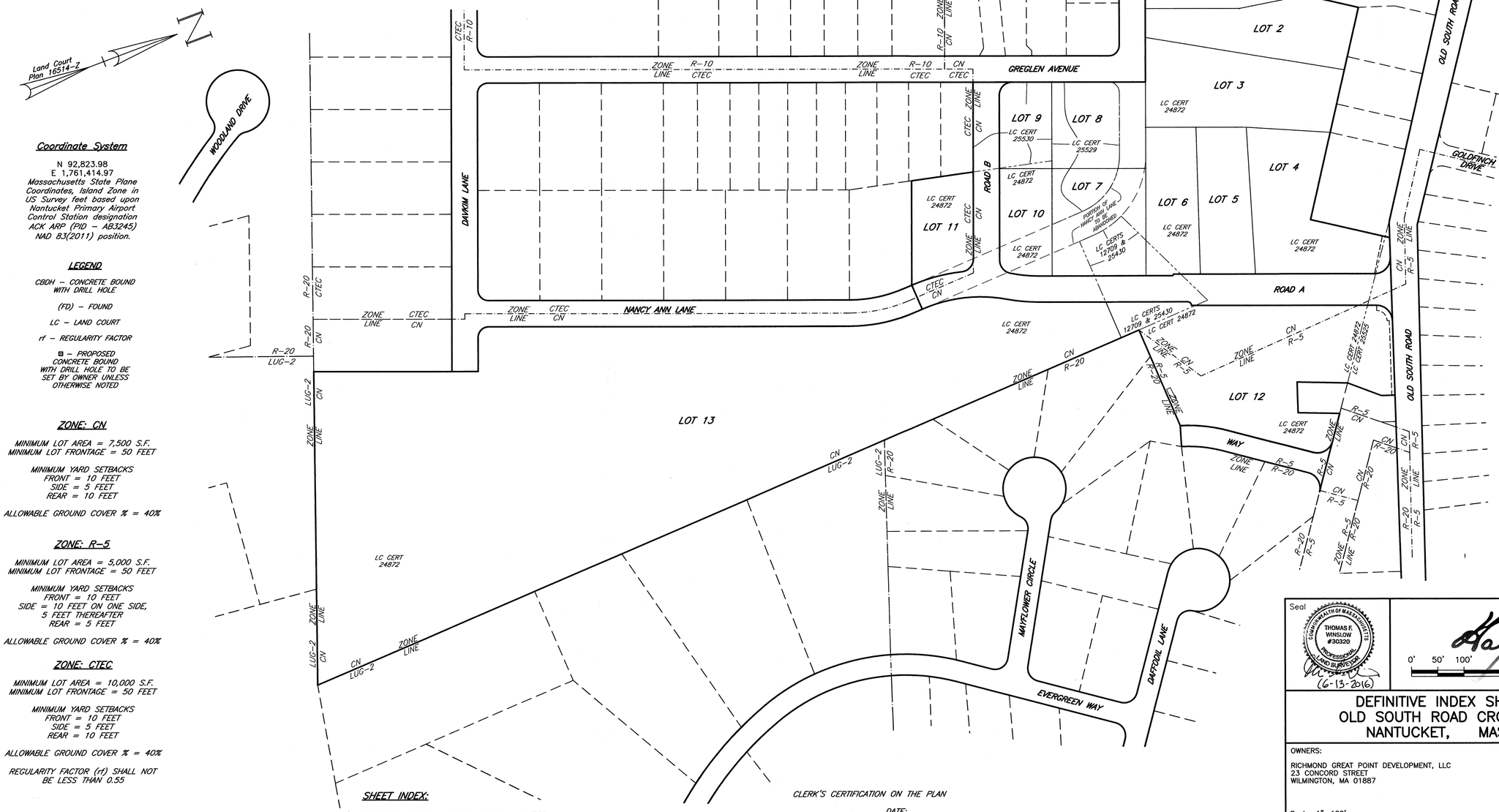
ZONE: CTEC

MINIMUM LOT AREA = 10,000 S.F.
MINIMUM LOT FRONTAGE = 50 FEET

MINIMUM YARD SETBACKS
FRONT = 10 FEET
SIDE = 5 FEET
REAR = 10 FEET

ALLOWABLE GROUND COVER % = 40%

REGULARITY FACTOR (rf) SHALL NOT BE LESS THAN 0.55



SHEET INDEX:

SHEET 1 of 11:	DEFINITIVE INDEX SHEET
SHEET 2 of 11:	DEFINITIVE PLAN SHEET 1 (LOTS 1–3)
SHEET 3 of 11:	DEFINITIVE PLAN SHEET 2 (LOTS 4–12)
SHEET 4 of 11:	DEFINITIVE PLAN SHEET 3 (LOT 13)
SHEET 5 of 11:	DEFINITIVE PLAN SHEET 4 (ABANDONMENT PLAN)
SHEET 6 of 11:	DEFINITIVE TOPOGRAPHIC PLAN SHEET 1
SHEET 7 of 11:	DEFINITIVE PLAN & PROFILE SHEET 1
SHEET 8 of 11:	DEFINITIVE PLAN & PROFILE SHEET 2
SHEET 9 of 11:	ROADWAY IMPROVEMENTS & SEWER SHEET 1
SHEET 10 of 11:	ROADWAY IMPROVEMENTS SHEET 2
SHEET 11 of 11:	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 THROUGH 13 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.

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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_____
TOWN CLERK

No.	Revision	Date
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Seal: COMMONWEALTH OF MASSACHUSETTS — THOMAS F. WINSLOW #30320 — PROFESSIONAL LAND SURVEYOR (6-13-2016)

0' 50' 100' 200' 300'

DEFINITIVE INDEX SHEET
OLD SOUTH ROAD CROSSING
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' June 9, 2016

NANTUCKET PLANNING BOARD

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

INDEX SHEET

SHEET 1 OF 11

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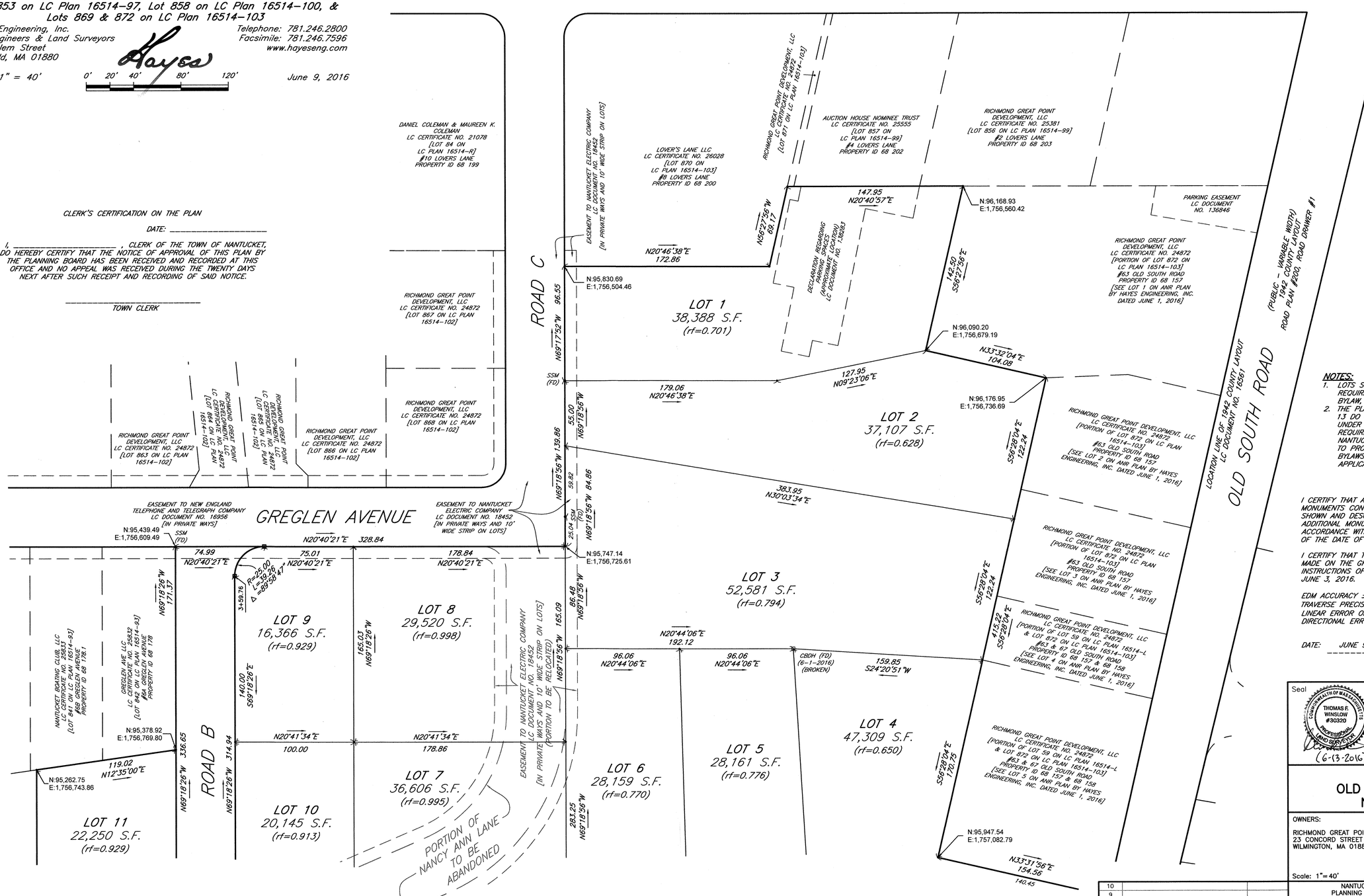
Subdivision Plan of Land in
NANTUCKET, MASS.

Being a Subdivision of Lot 59 on LC Plan 16514–L, Lots 159, 160, 161, 177, 179, 180, 181, 182, 183 & 184 on LC Plan 16514–Z, Lot 853 on LC Plan 16514–97, Lot 858 on LC Plan 16514–100, & Lots 869 & 872 on LC Plan 16514–103

Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

Scale: 1" = 40' 0' 20' 40' 80' 120' June 9, 2016



CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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_____
TOWN CLERK

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

NOTES:

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I CERTIFY THAT THIS PLAN WAS DRAWN FROM AN ACTUAL SURVEY MADE ON THE GROUND IN ACCORDANCE WITH THE LAND COURT INSTRUCTIONS OF 2006 BETWEEN NOVEMBER 20, 2012 AND JUNE 3, 2016.

EDM ACCURACY ±(2 MM + 2 PPM)
TRAVERSE PRECISION (RAW) = 1:52,714
LINEAR ERROR OF CLOSURE (RAW) = 0.16 FEET
DIRECTIONAL ERROR OF CLOSURE = S53°E

DATE: JUNE 9, 2016

PROFESSIONAL LAND SURVEYOR

Seal: COMMONWEALTH OF MASSACHUSETTS – THOMAS F. WINSLOW #30320 – PROFESSIONAL LAND SURVEYOR – (6-13-2016)

0' 20' 40' 80' 120'

DEFINITIVE PLAN
OLD SOUTH ROAD CROSSING
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' June 9, 2016

No.	Revision	Date
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NANTUCKET PLANNING BOARD

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

PLAN SHEET 1 OF 4

SHEET 2 OF 11

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Subdivision Plan of Land in NANTUCKET, MASS.

Being a Subdivision of Lot 59 on LC Plan 16514–L, Lots 159, 160, 161, 177, 179, 180, 181, 182, 183 & 184 on LC Plan 16514–Z, Lot 853 on LC Plan 16514–97, Lot 858 on LC Plan 16514–100, & Lots 869 & 872 on LC Plan 16514–103

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Wakefield, MA 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

Scale: 1" = 40'

June 9, 2016

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

CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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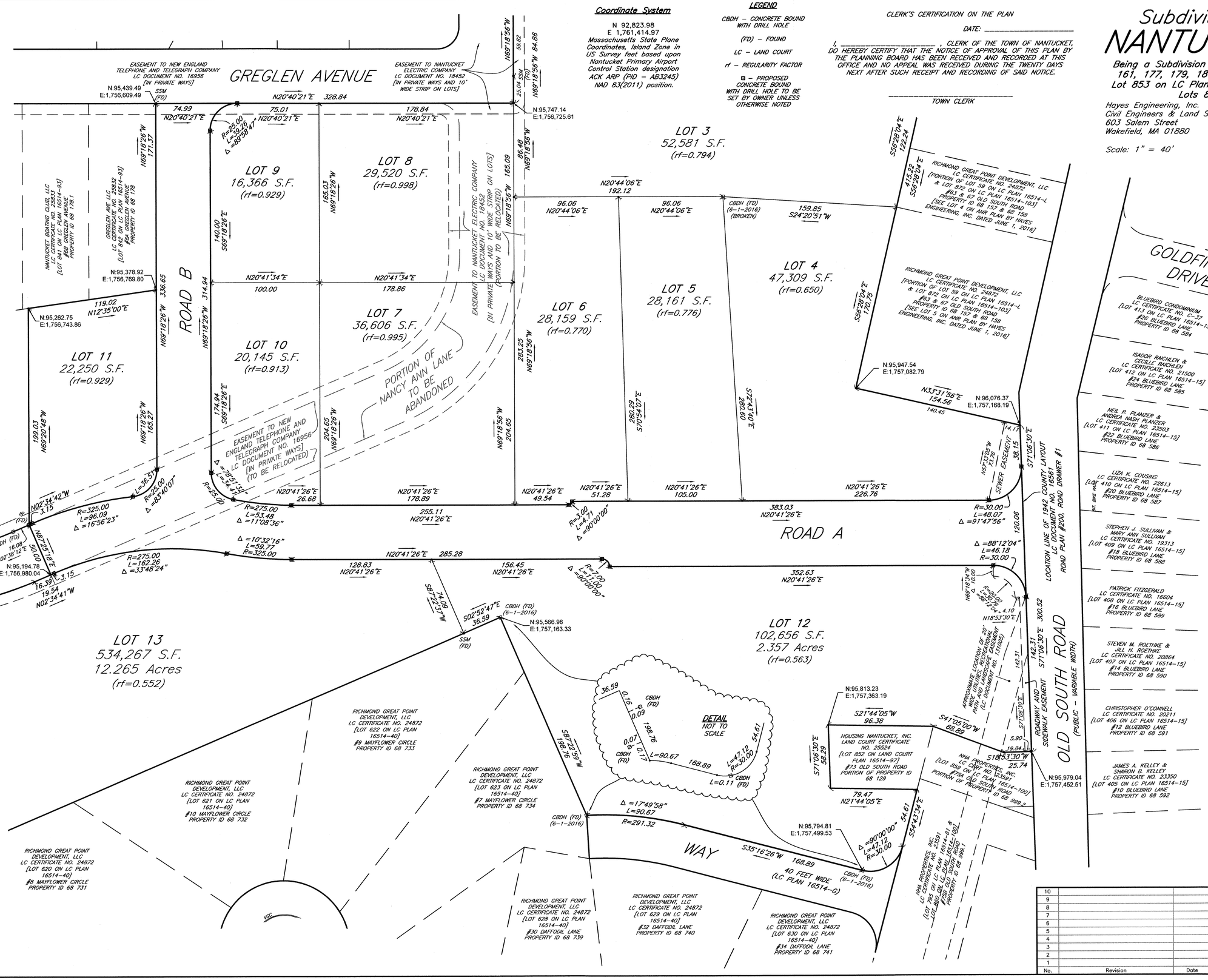
TOWN CLERK



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EDM ACCURACY ±(2 MM + 2 PPM)
TRAVERSE PRECISION (RAW) = 1:52,714
LINEAR ERROR OF CLOSURE (RAW) = 0.16 FEET
DIRECTIONAL ERROR OF CLOSURE = 5S3.3"E

DATE: JUNE 9, 2016

PROFESSIONAL LAND SURVEYOR

Seal: COMMONWEALTH OF MASSACHUSETTS THOMAS F. WINSLOW #30320 PROFESSIONAL LAND SURVEYOR (6-13-2016)

Hayes 0' 20' 40' 80' 120'

DEFINITIVE PLAN
OLD SOUTH ROAD CROSSING
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'

June 9, 2016

No.	Revision	Date
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NANTUCKET PLANNING BOARD

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

PLAN SHEET 2 OF 4

SHEET 3 OF 11

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Subdivision Plan of Land in NANTUCKET, MASS.

Being a Subdivision of Lot 59 on LC Plan 16514–L, Lots 159, 160, 161, 177, 179, 180, 181, 182, 183 & 184 on LC Plan 16514–Z, Lot 853 on LC Plan 16514–97, Lot 858 on LC Plan 16514–100, & Lots 869 & 872 on LC Plan 16514–103

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Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880

Telephone: 781.246.2800
Facsimile: 781.246.7596
www.hayeseng.com

Scale: 1" = 50' 0' 25' 50' 100' 150' June 9, 2016

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.

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(FD) – FOUND
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TOWN CLERK

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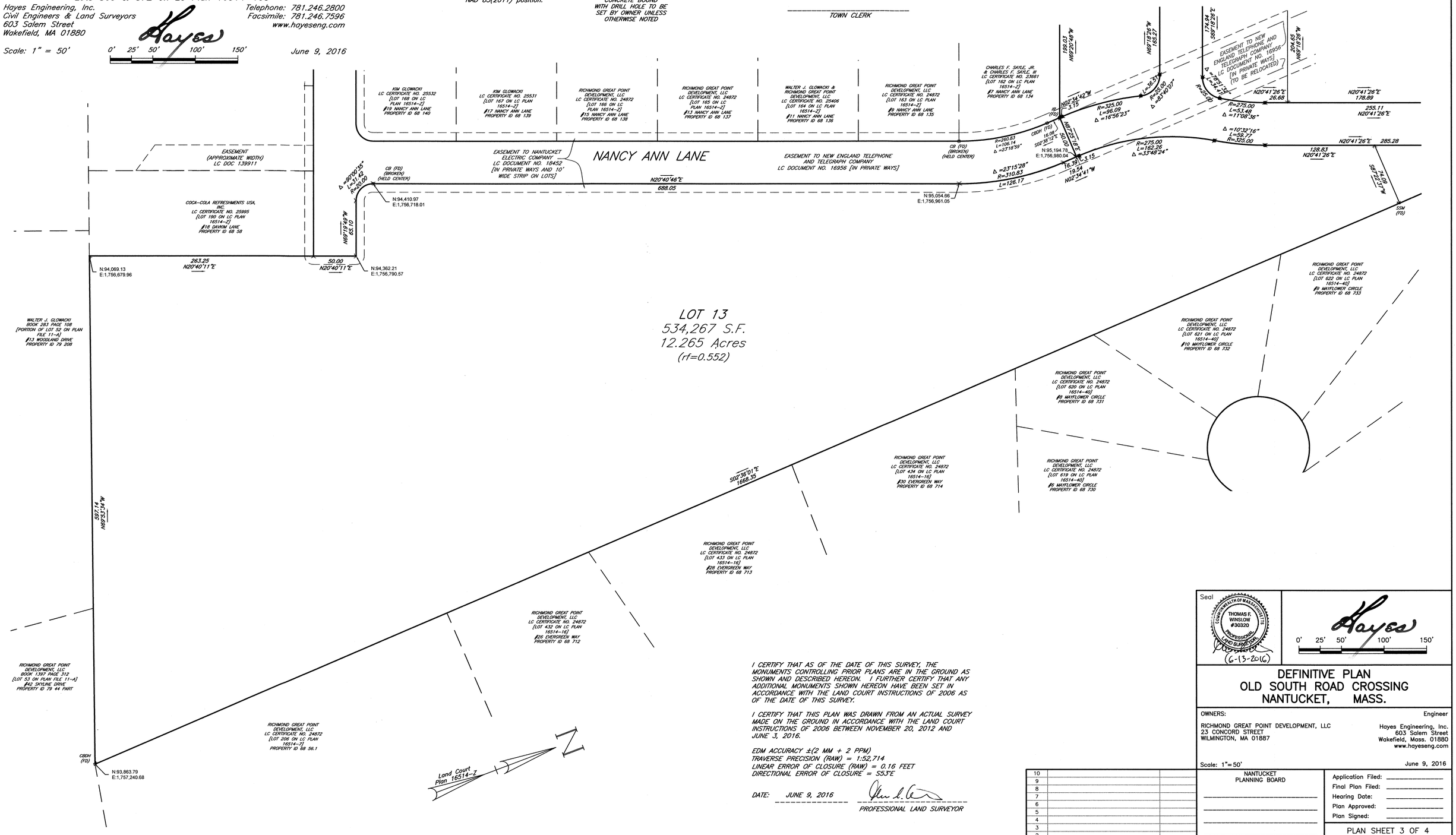

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NANTUCKET, MASS.

OWNERS:
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23 CONCORD STREET
WILMINGTON, MA 01887

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

Scale: 1"=50' June 9, 2016

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NANTUCKET PLANNING BOARD

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PLAN SHEET 3 OF 4

SHEET 4 OF 11

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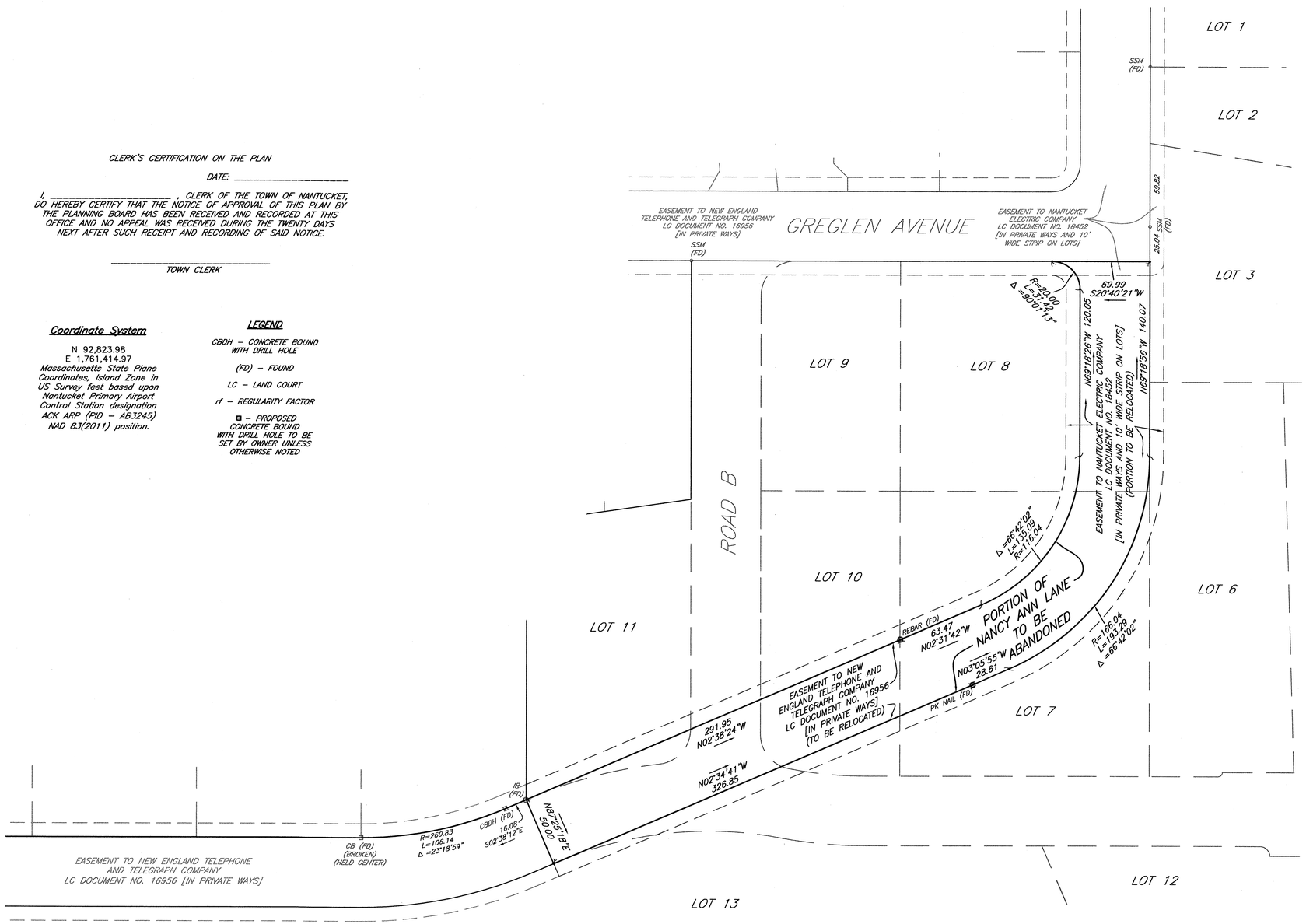

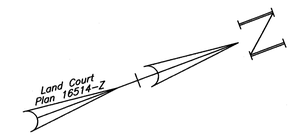

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LINEAR ERROR OF CLOSURE (RAW) = 0.16 FEET
DIRECTIONAL ERROR OF CLOSURE = S53°E

DATE: JUNE 9, 2016

PROFESSIONAL LAND SURVEYOR

Seal: COMMONWEALTH OF MASSACHUSETTS — THOMAS F. WINSLOW #30320 — PROFESSIONAL LAND SURVEYOR — (6-13-2016)

0' 20' 40' 80' 120'

DEFINITIVE PLAN
OLD SOUTH ROAD CROSSING
NANTUCKET, MASS.

OWNERS:
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23 CONCORD STREET
WILMINGTON, MA 01887

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

Scale: 1"= 40' June 9, 2016

No.	Revision	Date
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NANTUCKET PLANNING BOARD

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Application Filed: _____
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Plan Approved: _____
Plan Signed: _____

PLAN SHEET 4 OF 4

SHEET 5 OF 11

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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.

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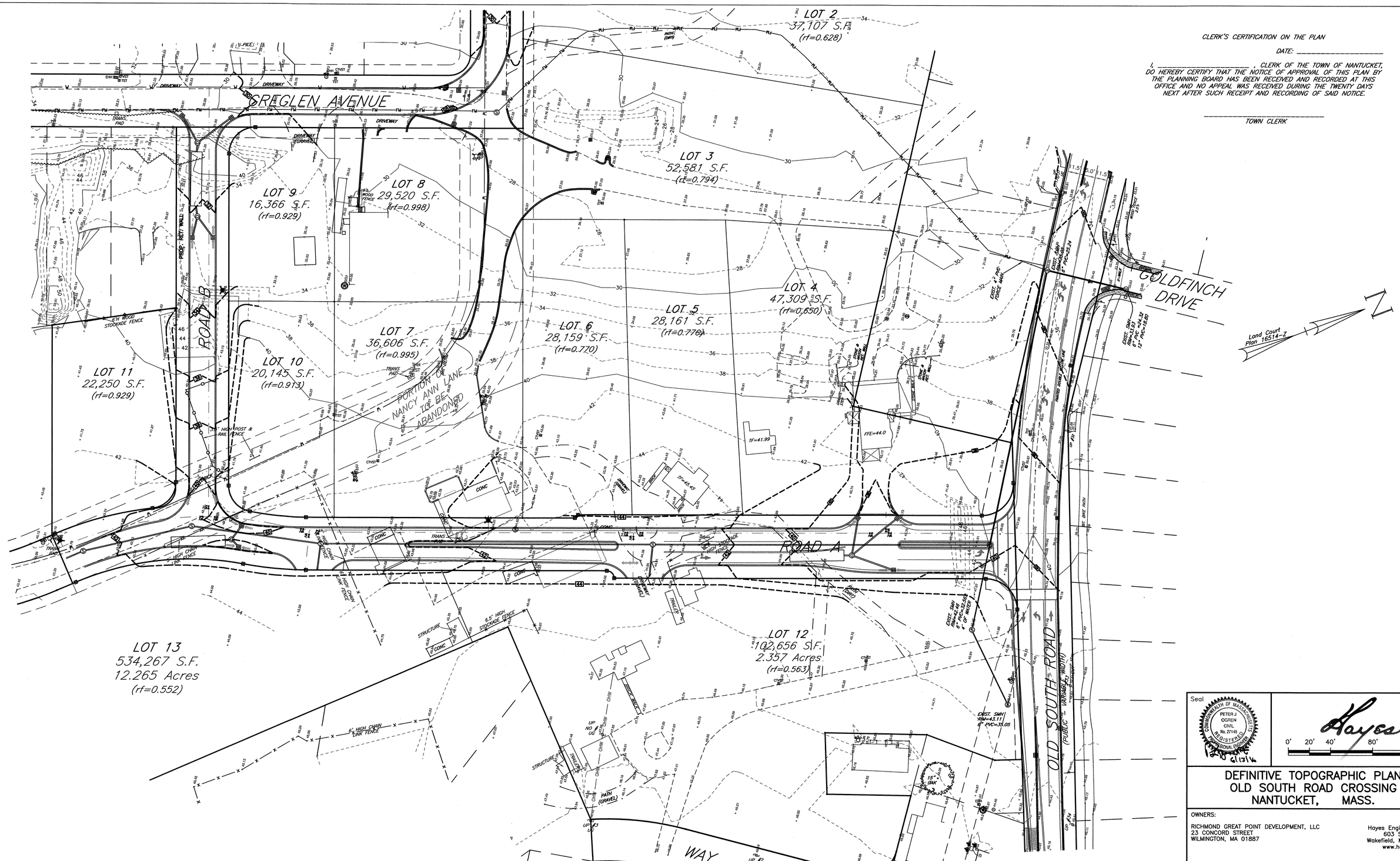

Seal

COMMONWEALTH OF MASSACHUSETTS
PETER J OGREN
CIVIL
No. 27145
REGISTERED PROFESSIONAL ENGINEER
6/13/16

Hayes

0' 20' 40' 80' 120'

DEFINITIVE TOPOGRAPHIC PLAN
OLD SOUTH ROAD CROSSING
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'

June 9, 2016

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NANTUCKET PLANNING BOARD

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SHEET 6 OF 11

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CLERK'S CERTIFICATION ON THE PLAN

DATE: _____

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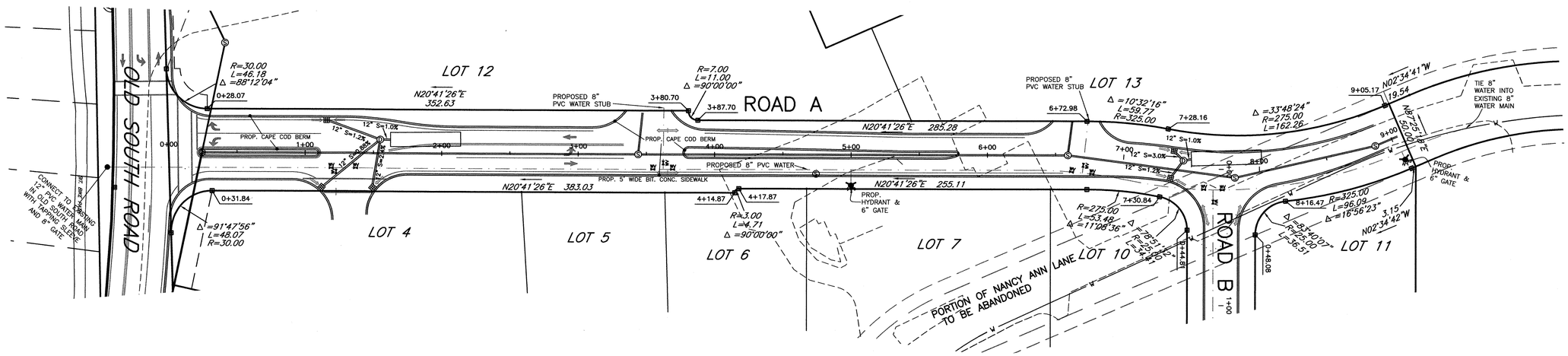
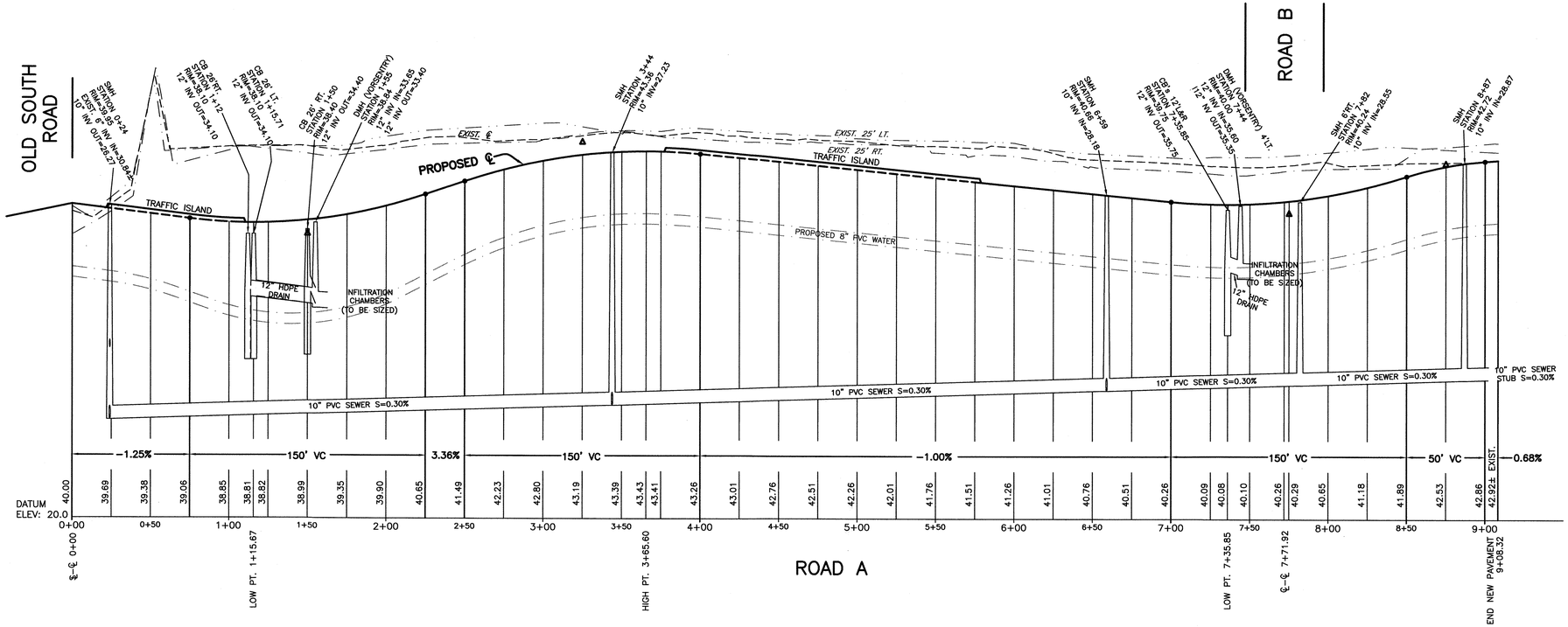


NOTE:
EXISTING UTILITIES AND PAVEMENT IN THE PORTION OF NANCY ANN LANE TO BE ABANDONED ARE TO BE REMOVED.



Seal

COMMONWEALTH OF MASSACHUSETTS PETER J. OGREN CIVIL No. 27145 REGISTERED PROFESSIONAL ENGINEER 6/13/16

Hayes 0' 20' 40' 80' 120'

DEFINITIVE PLAN & PROFILE
ROAD A
NANTUCKET, MASS.

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

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

Scale: 1"=40' (Hor.) & 4' (Ver.)
June 9, 2016

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NANTUCKET PLANNING BOARD

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PROFILE SHEET 1 OF 2

SHEET 7 OF 11

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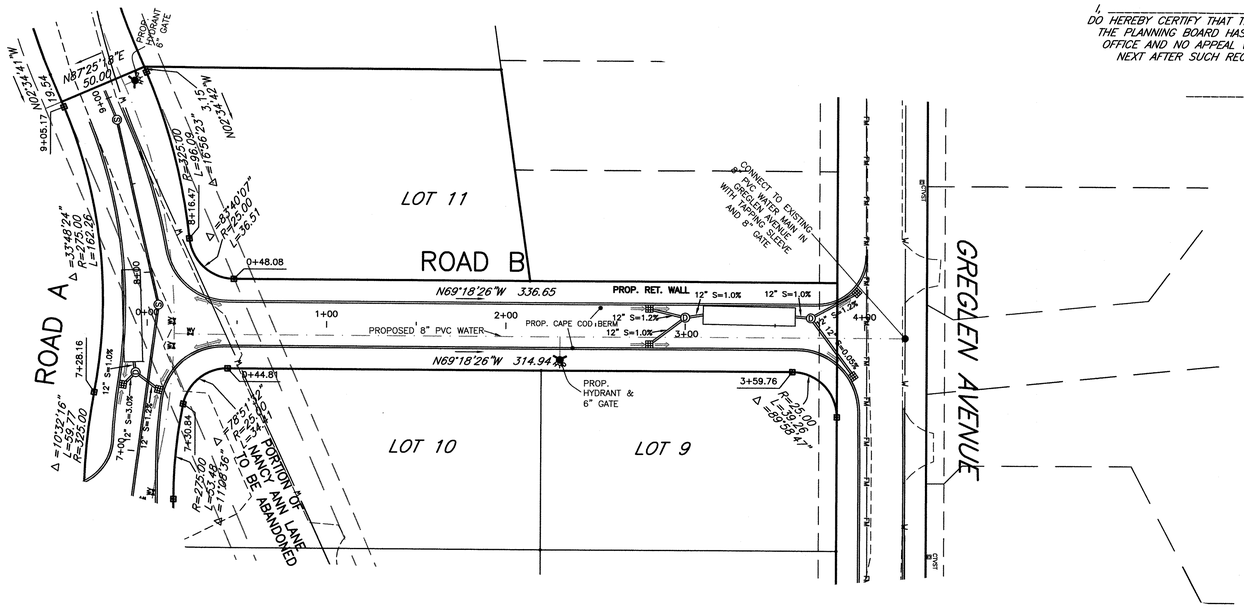

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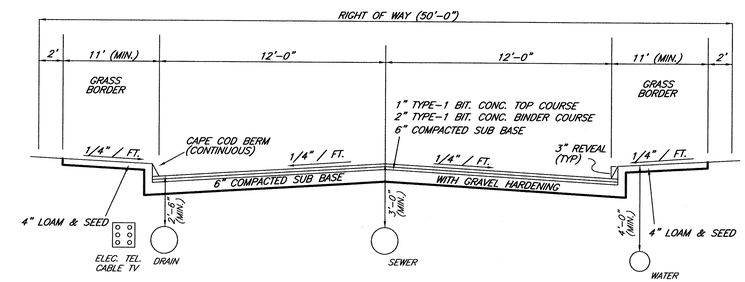
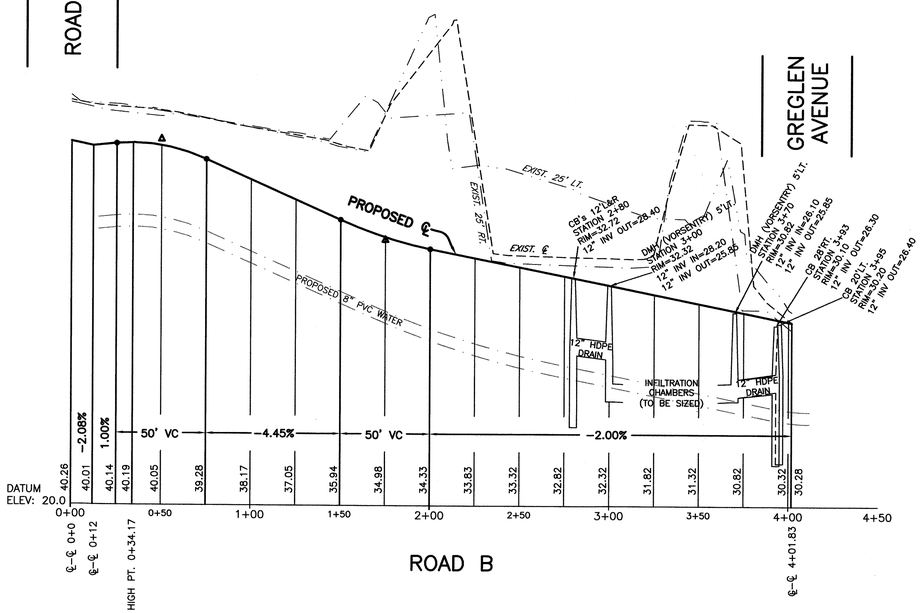


TYPICAL ROADWAY CROSS SECTION

NOT TO SCALE



Seal

COMMONWEALTH OF MASSACHUSETTS
PETER J. OGREN
CIVIL
No. 27145
REGISTERED PROFESSIONAL ENGINEER
6/13/16

Hayes

0' 20' 40' 80' 120'

DEFINITIVE PLAN & PROFILE
ROAD B
NANTUCKET, MASS.

OWNERS:

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Engineer

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NANTUCKET PLANNING BOARD

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

PROFILE SHEET 2 OF 2

SHEET 8 OF 11

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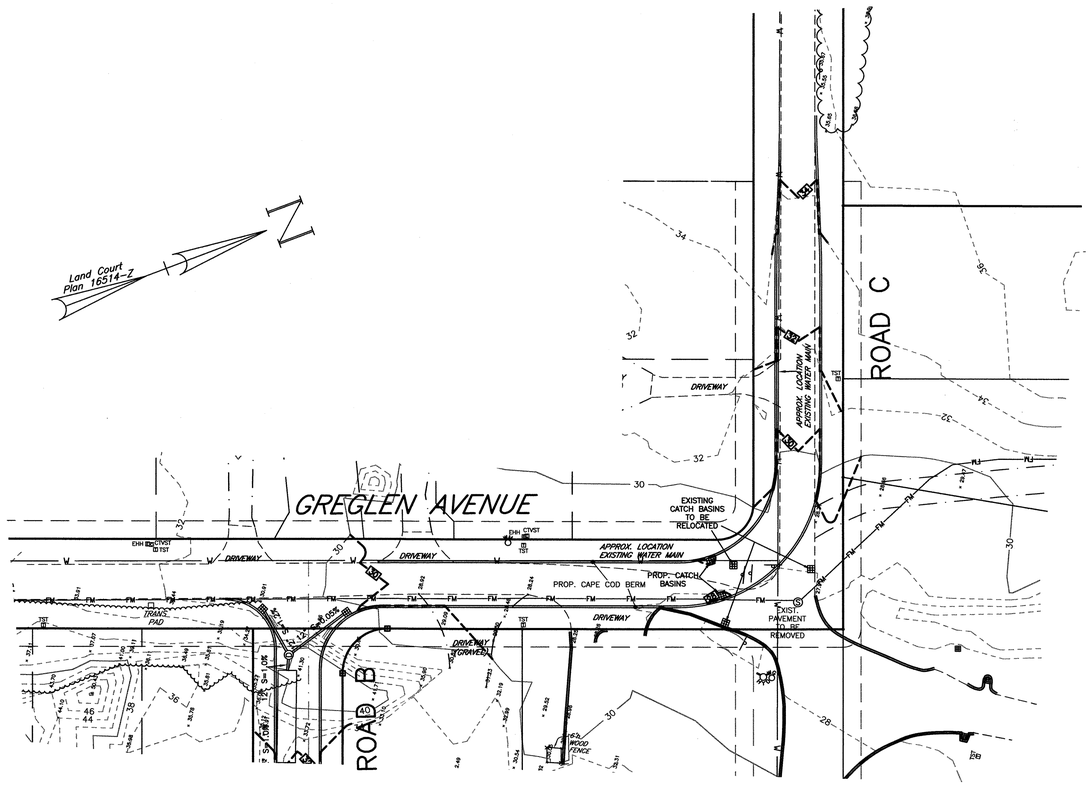
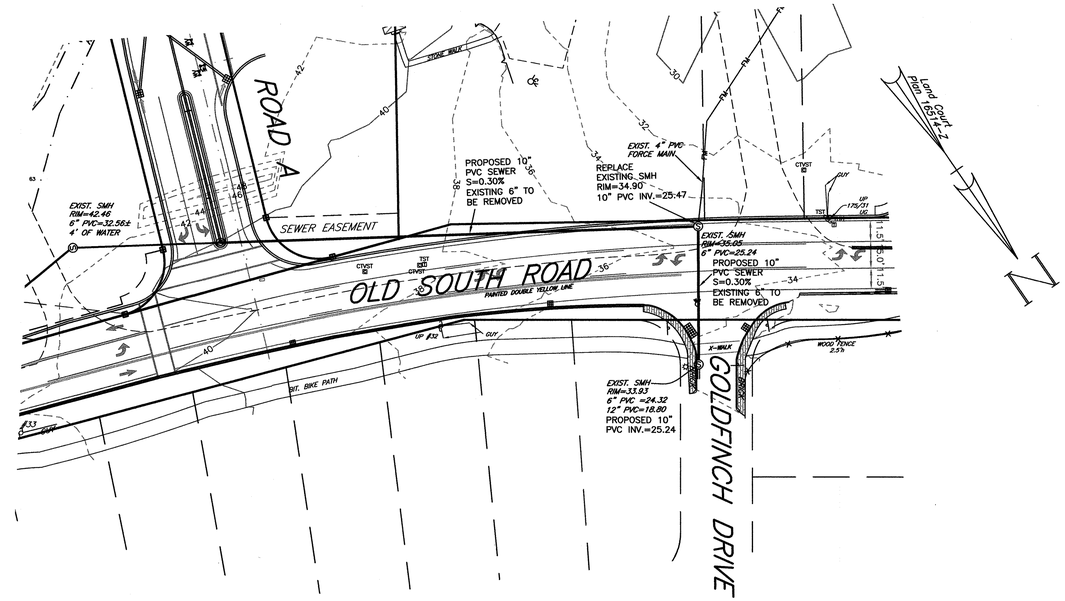


GREGLEN AVENUE & ROAD C
ROADWAY IMPROVEMENTS



PROPOSED SEWER FROM
ROAD A TO EXISTING SEWER
IN GOLDFINCH DRIVE

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 — PETER J. OGREN — CIVIL — No. 27145 — REGISTERED PROFESSIONAL ENGINEER — 6/13/16

Hayes

0' 20' 40' 80' 120'

GREGLEN AVENUE & NANCY ANN ROADWAY IMPROVEMENTS & SEWER 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'

June 9, 2016

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NANTUCKET
PLANNING BOARD

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IMPROVEMENT SHEET 1 OF 2

SHEET 9 OF 11

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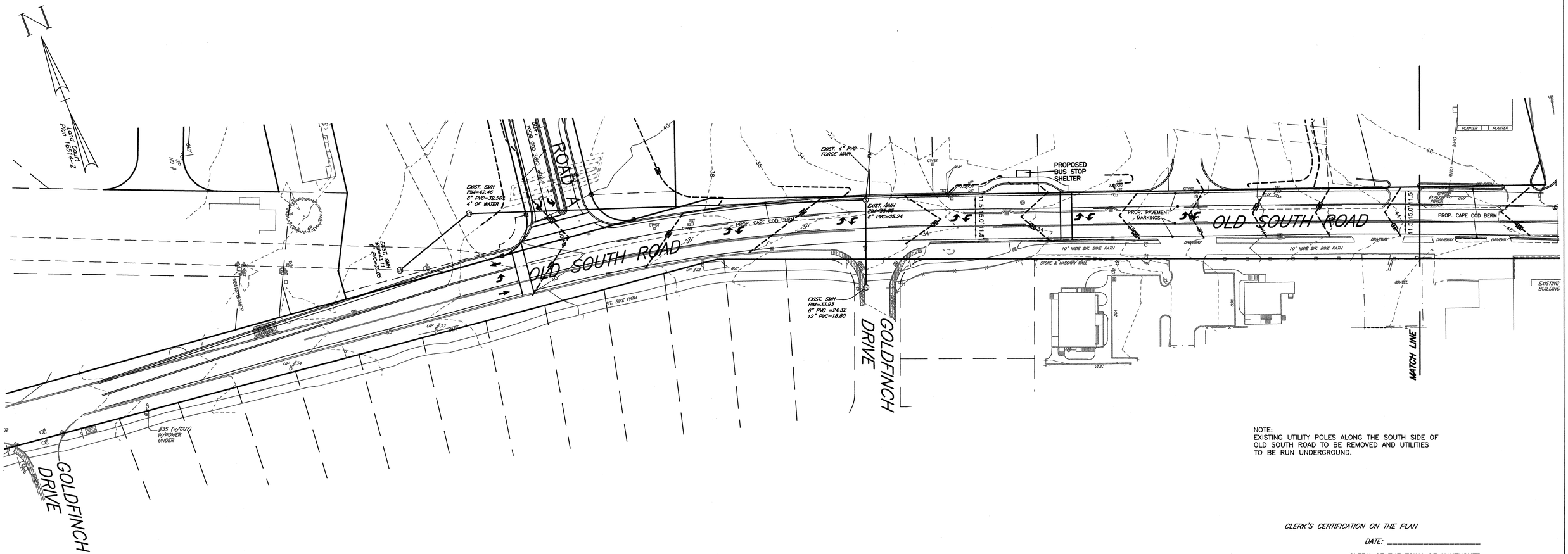

NOTE:
EXISTING UTILITY POLES ALONG THE SOUTH SIDE OF OLD SOUTH ROAD TO BE REMOVED AND UTILITIES TO BE RUN UNDERGROUND.

CLERK'S CERTIFICATION ON THE PLAN

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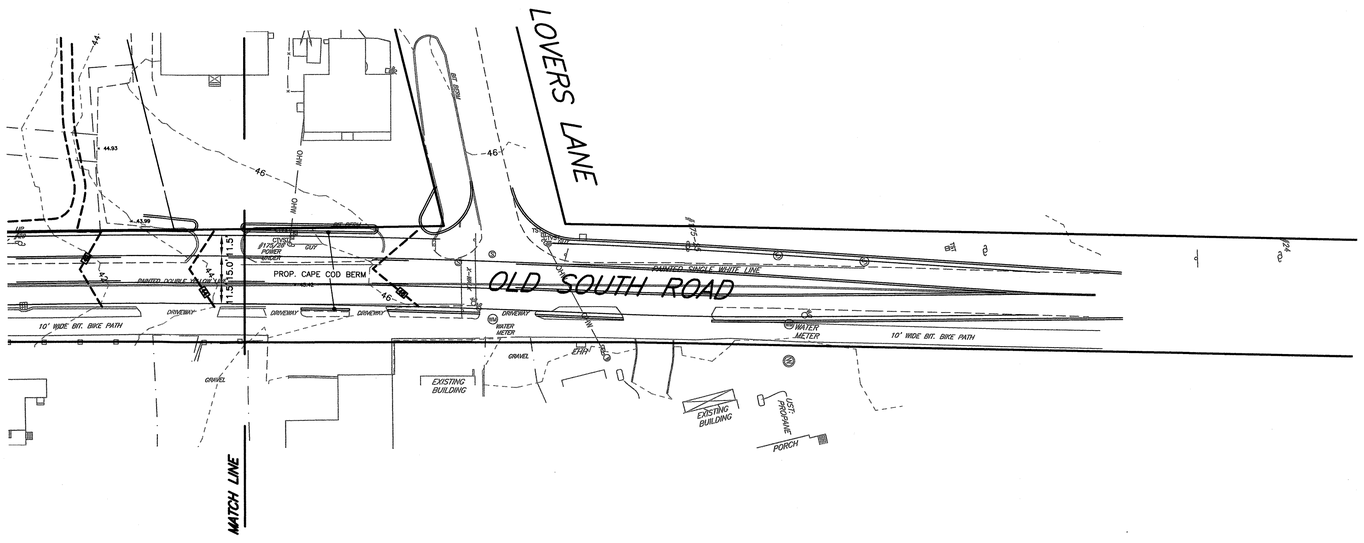
TOWN CLERK



Seal

COMMONWEALTH OF MASSACHUSETTS
PETER J. OGREN
CIVIL
No. 27145
REGISTERED PROFESSIONAL ENGINEER
6/13/16

Hayes
0' 20' 40' 80' 120'

ROADWAY IMPROVEMENT PLAN
OLD SOUTH ROAD
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'

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IMPROVEMENT SHEET 2 OF 2

SHEET 10 OF 11

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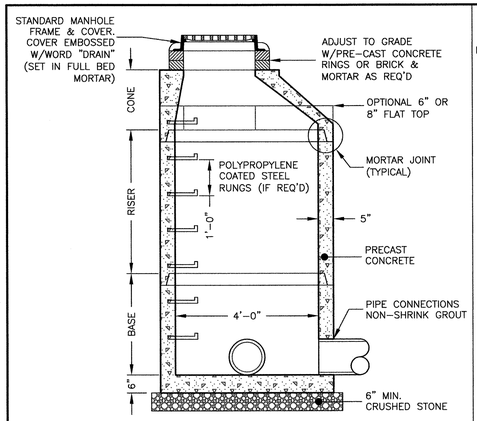
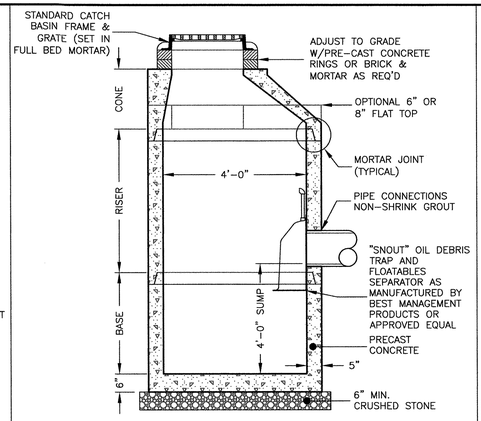


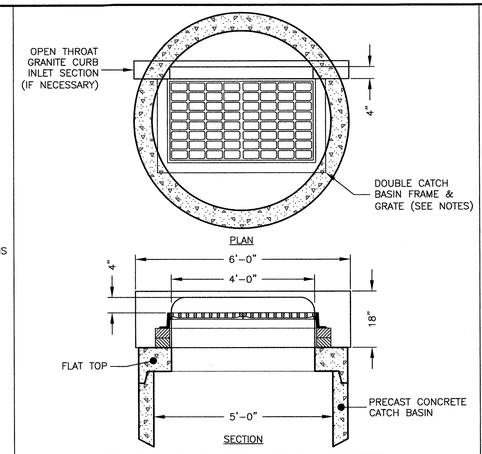
PRE-CAST DRAIN MANHOLE
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



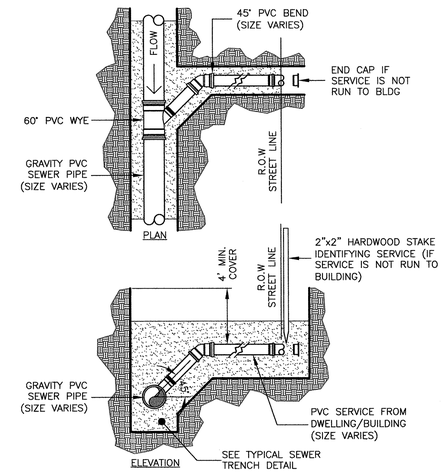
PRE-CAST CATCH BASIN
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."

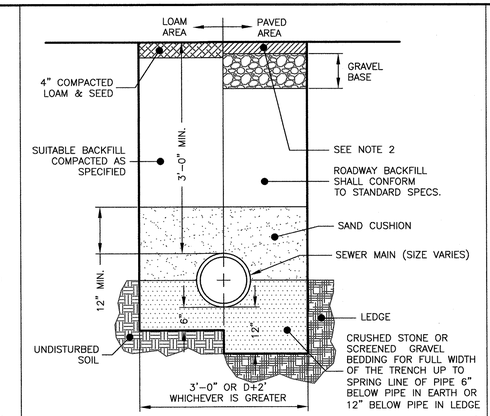


DOUBLE FRAME & GRATE
NOT TO SCALE

NOTES:
1. ON SLOPES USE LEBARON LV2448-2-000 FRAME W/LEBARON LK120D-300 3 FLANGE CASCADE GRATE OR APPROVED EQUAL.
2. AT LOW POINTS USE LEBARON LV2448-2-000 FRAME W/LEBARON LF248-2-000 3 FLANGE GRATE OR APPROVED EQUAL.

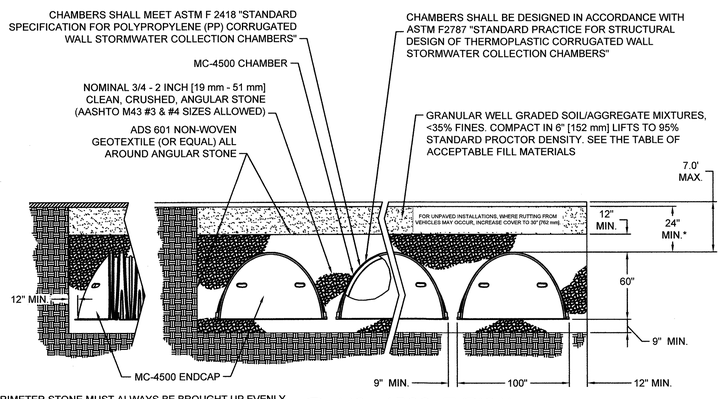


SEWER SERVICE CONNECTION
NOT TO SCALE



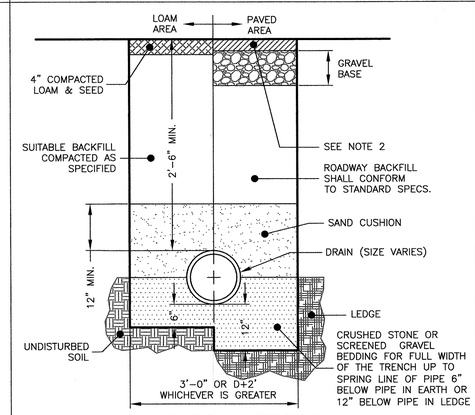
SEWER TRENCH
NOT TO SCALE

NOTES:
1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF DEPARTMENT OF PUBLIC WORKS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



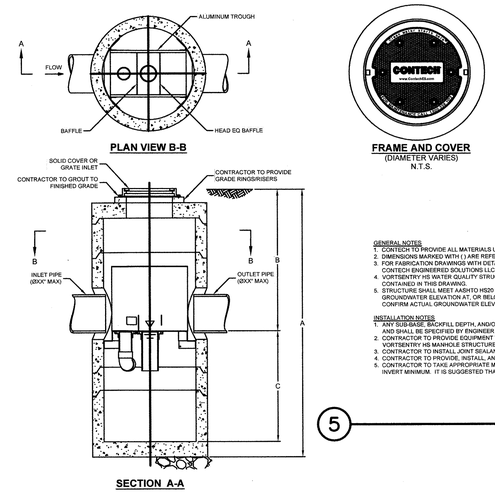
PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.

5 MC-4500 TYPICAL CROSS-SECTION
NOT TO SCALE



DRAIN TRENCH
NOT TO SCALE

NOTES:
1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF DEPARTMENT OF PUBLIC WORKS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. VORTSENTRY HS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.

INSTALLATION NOTES
1. ANY SUBBASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTSENTRY HS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

5 VORTSENTRY HS STANDARD DETAIL

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.

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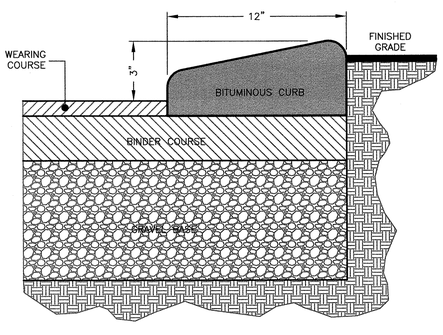
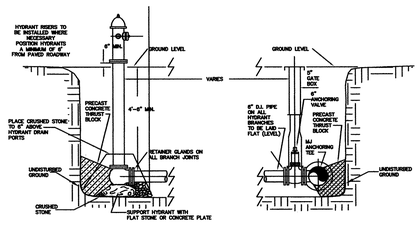
TOWN CLERK

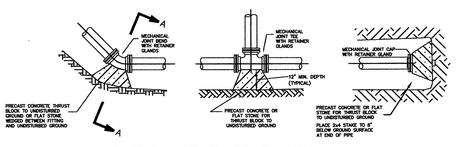


CAPE COD CURB
NOT TO SCALE



TYPICAL HYDRANT ASSEMBLY INSTALLATION
NOT TO SCALE

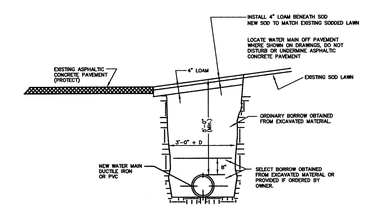
NOTES:
1. HYDRANTS ARE TO BE INSTALLED WITHIN THE ROADWAY LAYOUT
2. FOR HYDRANTS INSTALLED AT DEAD END OF WATER MAINS, INSTALL VALVE WITH RESTRAINED JOINTS AND ONE FULL LENGTH OF PIPE BETWEEN VALVE AND HYDRANT WITH RESTRAINED JOINTS
3. ALL HYDRANT BRANCH PIPING TO BE 6" DUCTILE IRON PIPE.



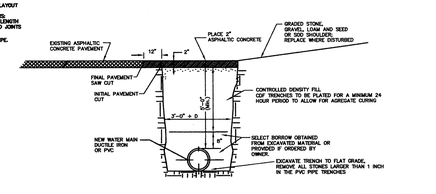
TYPICAL THRUST BLOCK DETAILS
NOT TO SCALE

PIPE DIAMETER	BENDS				TEE
	11.25	22.5	45	90	
6	1	1	1	2	1.5
8	1	1	2	3	2.5
12	1	2	3.5	6.5	5

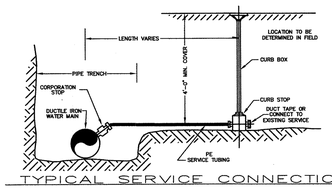
THRUST BLOCK BEARING AREA (SF)
(BASED UPON 100 psi WATER PRESSURE AND 3000 PSF BEARING LOAD CAPACITY)



TYPICAL TRENCH IN SHOULDER (SOD)
(SHOWN RIGHT SIDE INSTALLATION LEFT SIDE SIMILAR)
NOT TO SCALE



TYPICAL CROSS TRENCH IN ROADWAY SURFACE
(SHOWN RIGHT SIDE INSTALLATION LEFT SIDE SIMILAR)
NOT TO SCALE



TYPICAL SERVICE CONNECTION
NOT TO SCALE

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Seal: COMMONWEALTH OF MASSACHUSETTS — PETER J. OGREN — CIVIL — No. 27145 — REGISTERED PROFESSIONAL ENGINEER — 6/13/16

Hayes — 0' 20' 40' 80' 120'

DETAIL SHEET
OLD SOUTH ROAD CROSSING
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.
June 9, 2016

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DETAIL SHEET 1 OF 1

SHEET 11 OF 11

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REQUESTED WAIVERS
OLD SOUTH ROAD CROSSING
NANTUCKET, MASSACHUSETTS

June 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)	Landscape Plan to be provided prior to Planning Board approval.
Section 2.06b(14)(b)	Existing trees to be saved will be decided during construction.
Section 4.03e	No Right-of-way rounding is proposed on the south side of the intersection of Road B and Greglen Avenue. However, a 28 foot curb radius is being proposed.
Section 4.06(b)(3)	Stormtech® MC-4500 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 4.16	Same as Section 2.06b(14)(a) & (b) above.
Section 4.18	No sidewalks are proposed along the sides of the proposed roadway Road B and one sidewalk is proposed along a portion of Road A.
Section 4.23	Soil tests will be provided prior to Planning Board approval.

Hayes Engineering, Inc

603 Salem Street
Wakefield, MA 01880
Tel: (781) 246-2800
Fax: (781) 246-7596

Nantucket, MA 02554
Tel: (508) 228-7909

Refer to File No. **NAN-0107J**

SITE ANALYSIS REPORT
OLD SOUTH ROAD CROSSING
NANTUCKET, MASSACHUSETTS

June 10, 2016

This site analysis report was prepared as part of the submission requirements of a definitive subdivision plan in accordance with Section II, 2.06(a) (11) of the Rules and Regulations of the Planning Board for the Town of Nantucket, as amended. This subdivision plan proposes the creation of thirteen (13) lots, in conjunction with 1,268 linear feet of roadway, together with approximately 2,300 linear feet of improvements to Old South Road, Greglen Avenue and Nancy Ann Lane (Road C) as shown on the subdivision plans. The new roadways, known as Road A and Road B are proposed to be constructed as shown on the typical cross-sections illustrated on the profile plans, in order to provide frontage and adequate access to the lots within the parcel in a safe and convenient manner.

The site, being approximately 24.3 acres in extent, is located approximately 2.1 miles southeast of the town center, and is currently consists of undeveloped meadow, areas of interspersed scrub oak and pines (brush) and areas of developed residential and commercial lands, buildings and driveways. The topography of the site ranges from approximately 22 feet above the North American Vertical Datum of 1988 (NAVD88) to approximately elevation 43.

The area in which the project is proposed to be constructed is within the CN, R-5 and CTEC zoning districts. Zoning requirements for each district are summarized in the table below:

Criteria	CN Zoning District	R-5 Zoning District	CTEC Zoning District
Lot Area	7,500 sf.	5,000 sf.	10,000 sf.
Lot Frontage	50 feet	50 feet	50 feet
Front Yard	10 feet	10 feet	10 feet
Side Yard	5 feet	10 feet on one-side, 5 feet thereafter	5 feet
Rear Yard	10 feet	5 feet	10 feet
Ground Cover	40%	40%	40%

Lot areas of proposed lots vary from 16,000 sf. to 534,000 sf.

The property is comprised of Evesboro soils and were determined by using the Web Soil Survey from the National Cooperative Soil Survey for Nantucket County. The Evesboro sands consist of excessively-drained soil, generally found in smooth, irregular-shaped areas, as reported by the Soil Conservation Service. It is expected that the permeability of the soil is rapid in the surface layer and subsoil, and very rapid in the substratum.

Due to the granular nature and the grain size of the Evesboro soils coupled with the site topography and proposed drainage design leads us to believe that erosion is not expected to be a problem. Likewise, these soils are largely void of the small grain sizes, and do not produce excessively dusty conditions. Should dust control be required, it would be handled by wetting the surface of exposed areas during periods of activity of construction vehicles or in highly windy conditions. No other form of dust control is anticipated.

No surface water resources are present on the parcel being developed, nor are any portion of the site subject to the Wetlands Protection Act for Coastal Wetland Areas (M.G.L. Chapter 131, Section 40).

No areas of the site are represented as having severe limitations due to seasonal high water table. Similarly, no portion of the site is designated as being in a Zone A, B or V, as shown on the Flood Insurance Rate Map (FIRM), Community Panel #25019C0089G, effective date June 9, 2014.

The Evesboro sands typically provide poor potential for growth of vegetation.. The site is generally comprised of a sand and gravel pit with paved areas, numerous storage structures and gravel drives. There exists scattered clusters of vegetation on the southern end of the property of vegetation with the remained either pavement or devoid of vegetation. Any tree removal for the proposed roadways will be minimal as the majority of the area within the proposed roadway is currently gravel driveways or the sand and gravel pit.

An examination of the profile sheets submitted with the plan reveals that no major changes in watershed areas or directions are contemplated by construction of the subdivision proposed in this application. The general design approach for management of storm water is to collect the roadway drainage as well as runoff from portions of the site. This runoff is to be collected in deep sump catch basins, and then directed via a closed pipe system VortSentry treatment devices and discharge to proposed subsurface infiltration areas. The closed piping system shall be designed with sufficient capacity to accommodate the 25-year design storm and mitigation for the 100-year design storm. Stormwater entering the proposed subsurface infiltration area will provide for groundwater recharge in the proposed development. Also, the proposed deep sump catch basins and VortSentry devices will improve the water quality of the runoff from the proposed roadway.

The improvements which are contemplated for construction of the subdivision roadways include rights-of-ways with varying width as depicted on the plans. Existing roadways to be abandoned shall have pavement and infrastructure removed. Minimum pavement width for newly proposed roadways having two-way (bidirectional) traffic is 24-feet.

Sanitary sewer from the lots are proposed to be connected to municipal sanitary facilities available in Old South Road proximate to the intersection with Goldfinch Drive.

Potable water will be provided for domestic purposes by connecting to the Town water supply The proposed eight (8) inch water main through the project will be connected to an existing twelve (12) inch water main in Old South Road and existing eight (8) inch water main in Nancy Ann Lane.

The project roadways are provided to service future commercial and residential\multifamily developments within the project limits. The proposed roadway system will connect two existing roadways, Greglen Avenue and Nancy Ann Lane to Old South Road. These connection will provide for adequate site distances so as to enable vehicles to safely enter and exit the property, as well as providing adequate access for emergency vehicles.

The traffic generated by uses adjacent to the proposed roadway will add to the existing traffic volumes of the surrounding streets. Roadway improvements are proposed in Old South Road to mitigate new traffic generation. The geometry and construction of the proposed roadway system will provide for a safe and convenient alignment for vehicular traffic and access to the lots by emergency vehicles.

A sidewalk is being proposed along one side of the proposed Road A right-of-way.

It is presently anticipated that all construction related to the physical roadway and infrastructure improvements would be completed within two (2) years following the receipt of all necessary approvals.

There are no proposed common open spaces associated with this development.

#39-16 Richmond Great Point Development, LLC
Old South Road Crossing Retail Liner Buildings
63, 67, 73, 75A Old South Road
Map 68 Parcels 157, 158, 129 & 999.2

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 13, 2016

TOWN OF NANTUCKET
TOWN CLERK
16 Broad Street
Nantucket, Massachusetts 02554

Attention: Catherine Flanagan Stover, MMC, CMMC

Subject: Submittal of Application for Special Permit (Retail Major Commercial Development)
Richmond Great Point Development LLC (Owner / Developer)
Old South Road Crossing Retail "Liner" Buildings Development

Dear Mrs. Stover:

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 document submittal of the completed application to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a special permit to allow for the development of the "Old South Road Crossing" retail "liner" buildings development, comprised of +/- 15,500 gross square feet of retail buildings on a series of five (5) contiguous properties totaling +/- 2.4 acres of land located on portions of the 63, 67, 73 and 75 (A) Old South Road properties.

The submittal of the application to your office is being completed as prescribed in Section 139-30(B)(1) of the Town of Nantucket Zoning Bylaw.

Upon your acknowledgment of receipt of the application (by way of time / date stamping the application), we will proceed to file a copy of the application (and all other required materials) forthwith to the Town of Nantucket Planning Board to obtain its review and subsequent action (as prescribed in Section 139-30(B)(2) of the Town of Nantucket Zoning Bylaw.

Should you have any questions with respect to the application and submittal, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Andrew Burek, Esq., TRC
Arthur Reade, Jr., Esq., RGH

RECEIVED
JUN 15 2016
By

Nantucket Planning Board

Application for a Special Permit

Date: June 13, 2016 File #: 39-16

Name of development: Old South Road Crossing Retail "Liner" Buildings

Owner(s) name(s): Richmond Great Point Development LLC (Philip Pastan)

Mailing address: 23 Concord Street, Wilmington MA 01887
Phone number: 978-988-3900 Fax number: 978-988-3950

E-mail: ppastan@richmondco.com

Applicant's name: The Richmond Company, Inc. (David Armanetti and Patty Roggeveen)
Mailing address: 23 Concord Street, Wilmington MA 01887
Phone number: 978-988-3900 Fax number: 978-988-3950
E-mail: darmanetti@richmondco.com; proggeveen@richmondco.com

Engineer / surveyor's name: Hayes Engineering, Inc. (John Ogren)

Mailing address: 603 Salem Street, Wakefield MA 01880 Phone number: 781-246-2800 Fax number: 781-246-7596 E-mail: jogren@hayeseng.com

Location of lot(s):

Street address Portions of 63, 67, 73, and 75(A) Old South Road

Tax Assessors Map _____ Parcel ___ See Attachment "A" for Detail of Multiple Parcels

Nantucket Registry of Deed: See Attachment "B" for Detail of Multiple Parcels
Plan Book Page **OR**

Plan File #_____ **OR** Land Court Plan #_____ at Certificate # _____

Size of parcel: 104,109 SF (2.39 Acres) sq. ft. Zoning District: Commercial Neighborhood (CN)

Special Permit sought: (check one)

- ❍ Cluster subdivision
- ❍ Commercial WECS
- ❍ Driveway Access/Curb Cut Special Permit
- ❍ Harbor Overlay District (HOD)
- ❍ Major Commercial Development (MCD)

- ❍ Multi-family Special Permit
- ❍ Moorlands Management District Subdivision or Construction (MMD)
- ❍ NEHOD (Neighborhood Employee Housing Overlay District)
- ❍ MRD (Major Residential Development)
- ❍ MIPOD (Mid-Island Planned Overlay District)
- ❍ Other Uses Requiring a Special Permit (specify all uses and *Nantucket Code* sections)

Section	Description

Specify all associated Zoning Code relief sought:

Section	Description
139-18(B) - Required parking spaces - request a waiver for four (4) parking space deficit (93 required, 89 provided)	
139-18(A)(4) - Required parking to be provided on same lot - request a waiver for several parking spaces in immediately adjacent lots to be shared in common through binding easement) .	
139-20.1(B)(2)(f)[1] - Maximum driveway corning roundings - request waiver to allow driveway corner roundings with radii up to twenty-eight (28) feet, to better accomodate truck traffic and deliveries.	

Only the zoning relief expressly requested above will be considered as part of this application.

If applying for a Major Commercial Development, specify how the application will comply with Section 139-11 (J) of the *Zoning Code of the Town of Nantucket*, also known as the Town's Affordable Housing Effort:
Owner / Applicant for this MCD is concurrently developing 56 statutorily affordable rental units and 26 statutorily affordable home ownership units on immediately adjacent properties.

Planning Board filing fee due: $_____

Engineering Inspection Escrow Deposit due: $_____

I/ we hereby certify that the applicant(s) cited above have been authorized by me/ us to file a Special Permit application with the Planning Board on property that I/ we own.

_____

_____

Owner(s)' Signature(s) Philip Pastan, as Manager of Richmond Great Point Development LLC

_____

Applicant's Signature

6/13/16

I/we _____, the undersigned, hereby authorize

_____ to act as agent(s) on my/our behalf and to make any necessary revisions on this filed application as they may be requested by the Board to meet its governing rules and guidelines.

_____

_____

Owner(s)' signature(s)

Check List:

- ❑ Planning Board Special Permit abutters list – to be obtained at the Tax Assessor's office
- ❑ Completed application form entitled "Application to the Planning Board for a Special Permit"
- ❑ Application fee of $250.00 payable to Town of Nantucket
- ❑ Abutters fee of $6.11 per abutters payable to Pitney Bowes Reserved Funds
- ❑ Four (4) sets of mailing labels with each abutter's name and address
  - 1" x 2 5/8" size, typed labels, are preferred
  - duplicate labels are not necessary if the same owner is listed for more than one abutting property
- ❑ Completed application form
- ❑ Town Clerk's stamped application (provide 2 copies-one for Town Clerk and one for Planning Board)

"Attachment A" to
Major Commercial Development / Special Permit Application

Old South Crossing Retail "Liner" Buildings Development
63, 67, 73, and 75(A) Old South Road, Town of Nantucket MA

ADDITIONAL SPACE NEEDED TO PROVIDE DETAILED INFORMATION FOR MULTIPLE PARCELS

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63 Old South Road (Portion of 3.41 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 157

Registry / Plan Information; Lot # 872 on Land Court Plan # 16514-103)
(Land Court Certificate # 24872)

67 Old South Road (Portion of 1.69 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 158

Registry / Plan Information; Lot # 59 on Land Court Plan # 16514-L)
(Land Court Certificate # 24872)

73 Old South Road (Portion of 2.92 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 129

Registry / Plan Information; Lot # 853 on Land Court Plan # 16514-97)
(Land Court Certificate # 24872)

75(A) Old South Road (Portion of 0.35 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 999.2

Registry / Plan Information; Lot # 858 on Land Court Plan # 16514-100)
(Land Court Certificate # 25525)

"Attachment B" to
Major Commercial Development / Special Permit Application

Old South Crossing Retail "Liner" Buildings Development
63, 67, 73, and 75(A) Old South Road, Town of Nantucket MA

The title to the land included in the above-referenced application is derived as follows:

As to the Owner of One Hundred Percent (100%) of the 63 Old South Road Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel Thirty-Three" on Page 7 of the "*Deed*").

As to the Owner of One Hundred Percent (100%) of the 67 Old South Road Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel One" on Page 1 of the "*Deed*").

As to the Owner of One Hundred Percent (100%) of the 73 Old South Road Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel Forty-Three" on Page 9 of the "*Deed*").

As to the Owner of One Hundred Percent (100%) of the 75(A) Old South Road Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated February 5, 2015, recorded at the Nantucket County Registry of Deeds, as Certificate # 25525, Document # 00147075, recorded on February 6, 2015 (referred to as "Lot 858 on Land Court Plan numbered 16514-100").

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 10, 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 Application for Major Commercial Development / Special Permit (Retail)
Old South Crossing Retail "Liner" Buildings / 63, 67, 73, and 75(A) Old South Road
Richmond Great Point Development LLC (Owner / Developer)

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 completed application form, plans, drainage reports, and related materials which are required to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a master commercial development / special permit to allow for the development of the series of retail "liner" buildings which are proposed to be located on a combination of five contiguous properties comprising +/- 2.39 acres of land located on portions of 63, 67, 73, and 75(A) Old South Road, fronting on Old South Road, east of Lovers Lane, in the northwestern core of the properties which were acquired by Richmond Great Point Development LLC from Walter J. Glowacki in August of 2013.

The proposed project is comprised of a cumulative total of +/- 15,500 gross square feet of retail, personal services, and restaurant space, allocated within a series of five (5) single story buildings, running from west to east along the frontage of Old South Road, integrated with connecting walkways, parking, and vehicular access. The size of the individual buildings, running from west to east, range in size from 5,170 gross square feet, to 3,235 gross square feet, to 2,400 gross square feet, to 1,500 gross square feet, to 3,200 gross square feet (with an additional 1,200 square feet area for outdoor seating).

The uses, sizes, location, orientation (fronting on Old South Road) and the character of the buildings are expressly consistent with the objectives and recommendations set forth in the land use section of the '*Naushop Crossing Area Plan*" which was created over a two year period by the Naushop Crossing Area Plan Work Group, and was adopted by the Nantucket Planning and Economic Development Commission in March of 2014.

The entirety of the property is designated within the Commercial-Neighborhood (CN) zoning district, which permits the development of retail, personal services, and restaurant uses (small / up to 70 seats).

Because the proposed project is comprised of 5,000 gross square feet or more of commercial use, "located on contiguous tracts of land and held in common or control" in the aggregate, it is subject to the issuance of a major commercial development / special permit by the Planning Board (as set forth in Section 139-11 and Section 139-30 of the Town of Nantucket Zoning Bylaw).

The proposed project is also subject to compliance with the applicable intensity and dimensional criteria set forth in Section 139-16 of the Town of Nantucket Zoning Bylaw (including but not limited to minimum lot size, frontage, yard setbacks, ground cover ratio, and (lot) regularity factor).

Because it is subject to issuance of a major commercial development / special permit, the proposed subject is subject to major site plan review (MSPR) by the Planning Board (as set forth in Section 139-23, and specifically Section 139-23(B)(2) of the Town of Nantucket Zoning Bylaw).

Each of the five (5) individual proposed buildings is located on a separate buildable lot (the subdivision for which will be achieved by way of the processing and endorsement of an Approval Not Required (ANR) Plan) which has been submitted to and is expected to be endorsed by the Planning Board at its June 13, 2016 meeting.

The lots resulting from the proposed subdivision action (in order to accommodate the development of the proposed project) will meet or exceed the relevant dimensional criteria and related requirements, as such are established in the local zoning bylaw for the applicable zoning district, including but not limited to the following:

- Minimum Lot Area (Not Less than 7,500 Square Feet)
- Minimum Lot Frontage (Not Less than 50 Linear Feet)
- Minimum Lot Regularity Factor (Not Less than 0.55)

The specific dimensional characteristics of the five (5) lots that are proposed to be created (in order to accommodate the development of the proposed project) will be as follows:

Old South Crossing Retail Liner Buildings Project
Summary of Dimensional Characteristics (Proposed Lots / Buildings)

Lot Number on Plan	Lot Area (Square Footage)	Lot Frontage (Linear Feet)	Lot Regularity Factor (rf)
Lot # 1 / Building # 1	40,925	181.78	0.939
Lot # 2 / Building # 2	16,232	114.52	1.009
Lot # 3 / Building # 3	13,583	92.41	0.948
Lot # 4 / Building # 4	8,163	55.54	0.796
Lot # 5 / Building # 5	25,206	171.72	0.992
Subtotal (Average)	**104,109 (2.39 A)**	**123.19**	**0.937**

The proposed project meets or exceeds all of the applicable intensity and dimensional criteria set forth in the Town of Nantucket Zoning Bylaw, including the maximum ground cover and the regularity factor. A summary of the proposal for most of the relevant criteria, broken out by lot / building for each of the five (5) individual buildings, are depicted in the "Zoning Table" that is included on the cover sheet of the plan set that is included as part of this submittal.

A total of eighty-nine (89) off street parking spaces have been proposed to serve the project. A total of ninety-three (93) spaces are required, based on the minimum parking requirements set forth in Section 139-18 of the Town of Nantucket Zoning Bylaw (Off Street Parking Requirements), resulting in the project providing ninety-six percent (96%) of the total required off street parking. Based on the foregoing, a waiver is requested to allow for approval of the project with the anticipated deficit of four (4) off street parking spaces.

The basis and justification for the requested waiver is set forth herein. Because the parking, as designed, is located in adjacent, physically interconnected lots and because the nature of the retail, personal services, and restaurant uses that are anticipated often generate multiple uses by the same patrons during a single trip to the property, and because the nature and operating hours of the specific uses that generally occupy such multi-building and multi-tenant retail clusters create different peaks of operation and gaps in opening / closing times and operating hours, we believe that the four (4) parking space deficit will be deminimus and will not adversely impact the operation of the proposed project and that the parking provided will be more than sufficient.

In addition, because of the nature of the design of the vehicular circulation system and "parking islands" in order to meet the required subdivision and frontage requirements, and to allow for greater open space and a better aesthetic layout overall, the parking lots serving several of the buildings have been consolidated and interconnected as such to where some of the individual parking spaces overlap into adjacent (interior) lots. As a result, a second parking-related waiver is requested, from the requirement set forth in Section 139-18(A)(4) that "all off street parking spaces shall be provided on the same lot as the principal or accessory use they are required to serve".

Should the Planning Board approve the relief described above, the rights and conditions of the shared parking between the lots and uses will be documented in a binding easement that will be recorded and will be applicable to all of the lots, which will essentially function as a small, integrated shopping center.

We appreciate the opportunity to submit the application, plans, and supporting materials for this important development proposal for your review and for consideration by the Planning Board and we look forward to commencing with the public hearing and public review process.

If you have any immediate questions with respect to the proposed project or any of the submittal 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.
On Behalf of Richmond Great Point Development LLC

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

OLD SOUTH ROAD CROSSING RETAIL "LINER BUILDINGS"

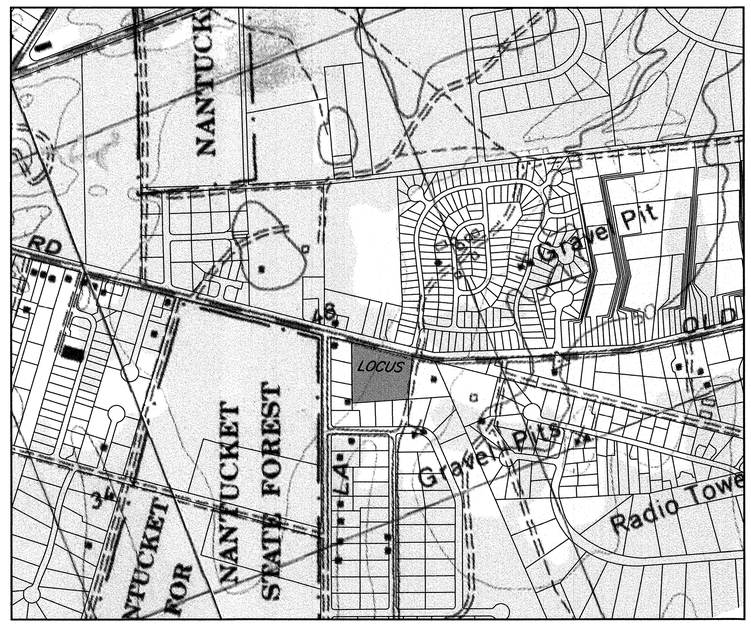
MAJOR COMMERCIAL DEVELOPMENT/ SPECIAL PERMIT SITE PLAN

AT

63, 67, 73 and 75A OLD SOUTH ROAD
NANTUCKET, MASSACHUSETTS

LEGEND OF SYMBOLS & ABBREVIATIONS

EXISTING		PROPOSED
BM No.1	BENCH MARK	P-BM No.1
BB	BITUMINOUS BERM	PBB
CCB	BITUMINOUS CAPE COD BERM	PCCB
	BUILDING	
CATV	UNDERGROUND CABLE	P-CATV
57	COUNTOUR (1')	57
60	CONTOUR (5')	60
EL. 57.2	ZONE A (100-YEAR FLOOD ZONE)	N/A
CONC.	CEMENT CONCRETE	CONC.
SGC	SLOPED GRANITE CURB	PSGC
VGC	VERTICAL GRANITE CURB	PVGC
EOD	EDGE OF DISTURBANCE	LOW
D	UNDERGROUND DRAIN PIPE	D
	CATCH BASIN	
	DRAIN MANHOLE	
	ROUND CATCH BASIN	
E	UNDERGROUND ELECTRIC	E
X	CHAIN LINK FENCE	X
	POST & RAIL FENCE	
	STOCKADE FENCE	
	VINYL FENCE	
FFE=60.43 GFE=57.65	FINISHED FLOOR ELEVATION / GARAGE FLOOR ELEVATION	FF=60.43 GF=57.65
FDN	FOUNDATION	W=119.00
G	UNDERGROUND GAS MAIN	G
GS	UNDERGROUND GAS SERVICE	GS
GRAVEL	EDGE OF GRAVEL	GRAVEL
x 57.83	SPOT GRADE	52X3
GUARD RAIL	GUARD RAIL	PR. GUARD RAIL
	HANDICAP PLACARD PARKING	
WCR	WHEEL CHAIR RAMP	WCR
	HEADWALL	
LDSCP	LANDSCAPE AREA	P-LDSCP
LEDGE	LEDGE OUTCROP	PROP. LEDGE
	BOLLARD	
OHW	OVERHEAD WIRE	P-OHW
UP No. 1	UTILITY POLE	PROP. UP
7 spaces	PAINTED PARKING & SPACE COUNT	7 spaces
PATH	PATH	PR. PATH
EP	EDGE OF PAVEMENT	PR. EP
BLDR RIP-RAP	BOULDER RIP-RAP & SLOPE	1.5:1 RIP-RAP
S	UNDERGROUND SEWER	S
SS	UNDERGROUND SEWER SERVICE	SS
S	SEWER MANHOLE	S
	SEWER CLEANOUT	
BIT. SIDEWALK 4'w	BITUMINOUS CONCRETE SIDEWALK	4'w BIT. SIDEWALK
SIGN	SIGN	SIGN
	EROSION & SEDIMENTATION CONTROL	
	STEPS	
BLDR	BOULDER	
	STONEWALL	
	CENTERLINE OF SWALE	SWALE
T	UNDERGROUND TELEPHONE	T
	TESTHOLE LOCATION	PR. TH
	MONITORING WELL LOCATION	P-MW
	PERCOLATION TEST LOCATION	PR. TS
SINGLE WHITE	PAINTED TRAFFIC LINE & TYPE	PR. SINGLE WHITE
12" MAPLE	DECIDUOUS TREE, SIZE & TYPE	2" OAK
6" PINE	CONIFEROUS TREE, SIZE & TYPE	2" PINE
ARBORVITAE	HEDGE ROW AND TYPE	PR. ARBORVITAE
BW=57.5	RETAINING WALL	PBW=57.5
TW=60.5	UNDERGROUND WATER MAIN	PTW=60.5
W	UNDERGROUND WATER SERVICE	W
WS	PAINTED UNDERGROUND WATER	WS
W-PNT	WATER GATE VALVE BOX	N/A
	WATER SERVICE CURB BOX	



KEY MAP
SCALE: 1"=500'±
0' 500' 1,000'

SOURCE: USGS science for a changing world

ZONING TABLE

ZONE	CN	LOT 1	LOT 2	LOT 3	LOT 4	LOT 5
DIMENSIONAL CONTROLS	REQUIRED/ALLOWED	PROVIDED	PROVIDED	PROVIDED	PROVIDED	PROVIDED
FRONT YARD SETBACK	10 ft.	40.0 ft.	24.2 ft.	25.2 ft.	25.1 ft.	25.2 ft.
SIDE YARD SETBACK	5 ft.	39.9 ft.	14.1 ft.	10.0 ft.	8.0 ft.	42.5 ft.
REAR YARD SETBACK	10 ft.	97.4 ft.	73.2 ft.	72.2 ft.	72.1 ft.	72.2 ft.
MIN. FRONTAGE	50 ft.	181.78 ft.	114.52	92.41 ft.	55.54 ft.	171.72 ft.
MIN. LOT AREA	7,500 s.f.	40,925 sf.	16,232 sf.	13,583 sf.	8,163 sf.	25,206 sf.
MAX. GROUND COVER RATIO	40%	12.6%	19.9%	17.7%	18.4%	12.7%
MIN. OPEN AREA	30% (MCD)	41.5%	31.3%	29.9%	37.3%	39.2%

PROPERTY LIES WITHIN THE WELLHEAD PROTECTION DISTRICT.

NOTES:

1. LOT LINES DEPICTED HEREON ARE TAKEN FROM "SUBDIVISION PLAN OF LAND IN NANTUCKET, MASS." DATE JULY 16, 2015 REVISED THROUGH OCTOBER 5, 2015 PREPARED BY HAYES ENGINEERING, INC.
2. TOPOGRAPHIC INFORMATION DEPICTED HEREON IS THE RESULT OF AN ACTUAL FIELD SURVEY PERFORMED BY HAYES ENGINEERING, INC. ON THE FOLLOWING DATES:
   a. SEPTEMBER 22, 2014
   b. JUNE 16, 2015
   c. SEPTEMBER 17, 2015
3. THE DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. THE ENTIRE PARCEL IS LOCATED WITHIN THE WATER RESOURCE PROTECTION DISTRICT, ZONE II WELLHEAD PROTECTION AREA.
5. THE PROPERTY IS NOT LOCATED WITHIN A FLOOD HAZARD ZONE (A or V) AS DEPICTED ON FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 25019C 0089G EFFECTIVE JUNE 9, 2014.
7. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN COMPILED FROM FIELD SURVEY INFORMATION AND AVAILABLE EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. FURTHER, THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES AND DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND VERIFYING THE LOCATIONS, SIZES, AND ELEVATIONS OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS AND SHALL NOTIFY THE ENGINEER IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED DESIGN AND THE APPROPRIATE REMEDIAL ACTION PRIOR TO PROCEEDING WITH THE WORK.
9. THE CONTRACTORS ARE RESPONSIBLE FOR CONTACTING DIG SAFE AT (800) 322-4844 PRIOR TO THE START OF ANY CONSTRUCTION.

WAIVERS REQUESTED:

1. §139-20.1.B(2)(f)[1] MAXIMUM DRIVEWAY CORNER ROUNDINGS: ALLOW CORNER ROUNDINGS WITH RADII UP TO 28'.
2. §139-18.A(4) REQUIRED OFF STREET PARKING SHALL BE PROVIDED ON THE SAME LOT AS THE PRINCIPAL OR ACCESSORY USE THEY ARE REQUIRED TO SERVE: ALLOW CROSS ACCESS EASEMENTS FOR PARKING.
3. §139-18.B PARKING REQUIREMENTS: ALLOW 89 SPACES IN PLACE OF THE 93 SPACES REQUIRED.

PARKING CALCULATIONS

LOT NO.	REQUIRED	PROVIDED
LOT 1	RETAIL – 1 space PER 200sf OF GROSS FLOOR AREA (GFA) (5,170sf GFA)(1sp/200sf) = 25.8 spaces 1 space PER 3 employees on peak shift (6 employees)(1sp/3emp) = 2 spaces Total = 28 spaces REQUIRED HANDICAPPED ACCESSIBLE SPACES REQUIRED = 2sp	22 spaces (2 handicapped accessible)
LOT 2	RETAIL – 1 space PER 200sf OF GROSS FLOOR AREA (GFA) (3,235sf GFA)(1sp/200sf) = 16.2 spaces 1 space PER 3 employees on peak shift (3 employees)(1sp/3emp) = 1 spaces Total = 17 spaces REQUIRED HANDICAPPED ACCESSIBLE SPACES REQUIRED = 1sp	17 spaces (1 handicapped accessible)
LOT 3	RETAIL – 1 space PER 200sf OF GROSS FLOOR AREA (GFA) (2,400sf GFA)(1sp/200sf) = 12 spaces 1 space PER 3 employees on peak shift (3 employees)(1sp/3emp) = 1 spaces Total = 13 spaces REQUIRED HANDICAPPED ACCESSIBLE SPACES REQUIRED = 1sp	14 spaces (1 handicapped accessible)
LOT 4	RETAIL – 1 space PER 200sf OF GROSS FLOOR AREA (GFA) (1,500sf GFA)(1sp/200sf) = 7.5 spaces 1 space PER 3 employees on peak shift (3 employees)(1sp/3emp) = 1 spaces Total = 9 spaces REQUIRED HANDICAPPED ACCESSIBLE SPACES REQUIRED = 1sp	9 spaces (1 handicapped accessible)
LOT 5	RESTAURANT, TAVERNS AND BARS, including outside seated-service areas – 1 space PER 3 seats (70 seats)(1sp/3 seats) = 23.3 spaces 1 space PER 3 employees on peak shift (9 employees)(1sp/3emp) = 3 spaces Total = 26 spaces REQUIRED HANDICAPPED ACCESSIBLE SPACES REQUIRED = 2sp	27 spaces (2 handicapped accessible)
TOTAL	93 PARKING SPACES	89 PARKING SPACES

NOTE:

CROSS ACCESS AND PARKING EASEMENTS TO BE PROVIDED FOR ALL DRIVEWAYS AND PARKING DEPICTED HEREON.

SHEET INDEX

PLAN TITLE	SHEET DESIGNATION
INDEX	C1
EXISTING CONDITIONS	C2
LAYOUT	C3
GRADING	C4
UTILITIES	C5
DETAILS	C6
DETAILS	C7
INTERIM SITE PLAN	C8

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. OGNIAN CIVIL No. 27148 REGISTERED PROFESSIONAL ENGINEER 3/16

Prepared For:

Owner / Applicant
RICHMOND GREAT POINT DEVELOPMENT, LLC
21 CONCORD STREET
WILMINGTON, MA 01887
(978) 988-3900

Prepared By:

Hayes Engineering, Inc.
603 Salem Road
Westford, MA 01886
Ph: 781.246.2800
Fax: 781.246.7596
www.hayeseng.com

Design By: PJO
Drawn By: AMC
Checked By: PJO
Project File: NAN-0107T
Comp. No: NAN66

- [x] Issued For Permit
- [ ] Issued For Review
- [ ] Issued For Bid
- [ ] Issued For Construction
- [x] Not For Construction

No.	Revision	Date
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Scale: 1"=30' (0' 15' 30' 60')
Date: June 10, 2016

Drawing Title:
OLD SOUTH ROAD CROSSING
INDEX PLAN
OLD SOUTH ROAD
NANTUCKET, MASS.

Drawing No.: C1

SHEET 1 OF 8

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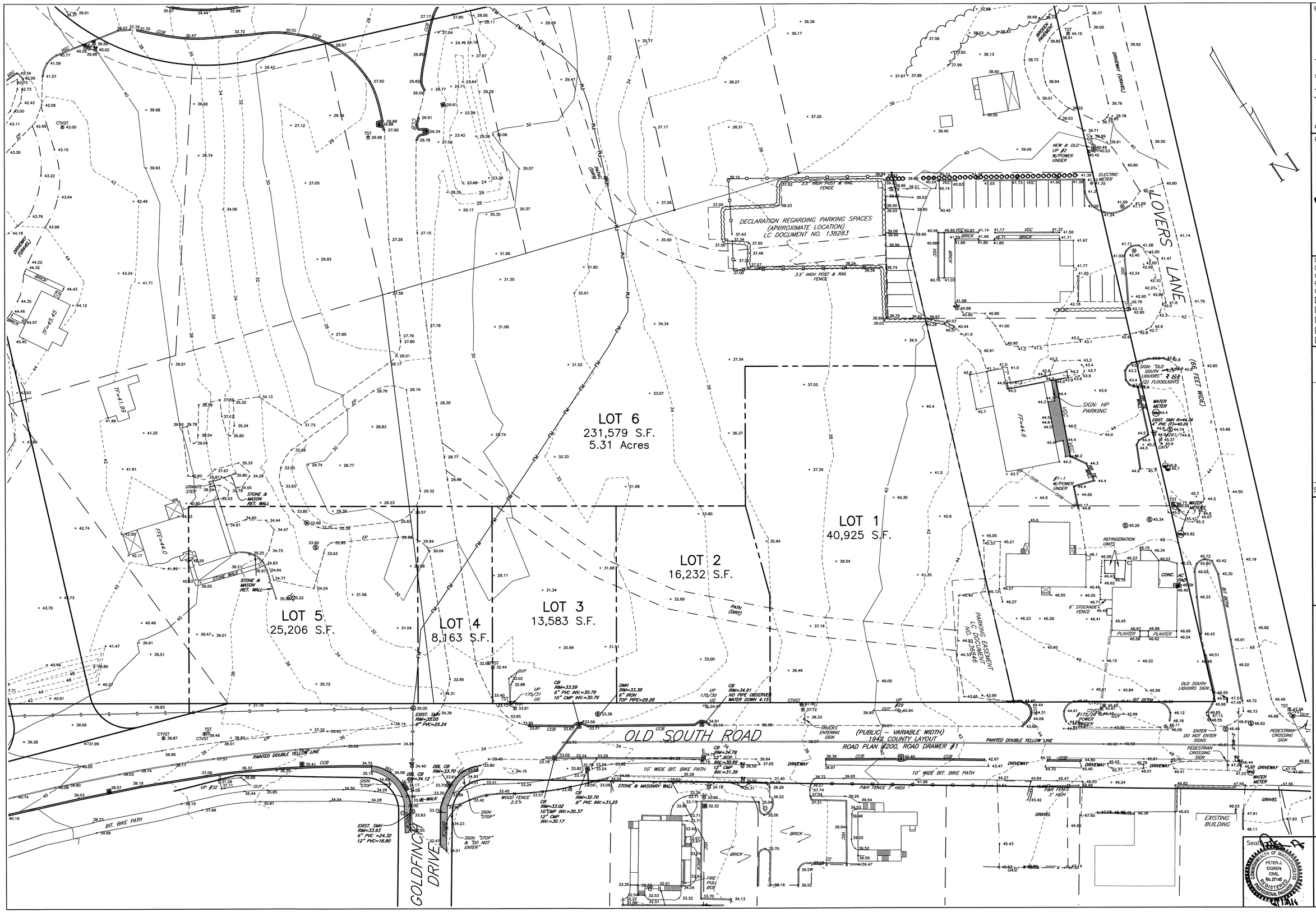

Prepared For:

Owner / Applicant

RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887
(978) 988-3900

Prepared By:

Hayes Engineering, Inc.
603 Salem Street
Wakefield, MA 01880
Ph: 781 246 2800
Fax: 781 246 7596
www.hayesengr.com

Design By: PJO
Drawn By: AMC
Checked By: PJO
Project File: NAN-0107T
Comp. No: NAN66

- [x] Issued For Permit
- [ ] Issued For Review
- [ ] Issued For Bid
- [ ] Issued For Construction
- [x] Not For Construction

No.	Revision	Date
1		
2		
3		
4		
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6		
7		
8		
9		
10		

Scale: 1"=30'
0' 15' 30' 60'

Date: June 10, 2016

Drawing Title:

OLD SOUTH ROAD CROSSING
EXISTING CONDITIONS PLAN
OLD SOUTH ROAD
NANTUCKET, MASS.

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. OGREN CIVIL No. 27145 REGISTERED PROFESSIONAL ENGINEER 6/13/16

Drawing No.:

C2

SHEET 2 OF 8

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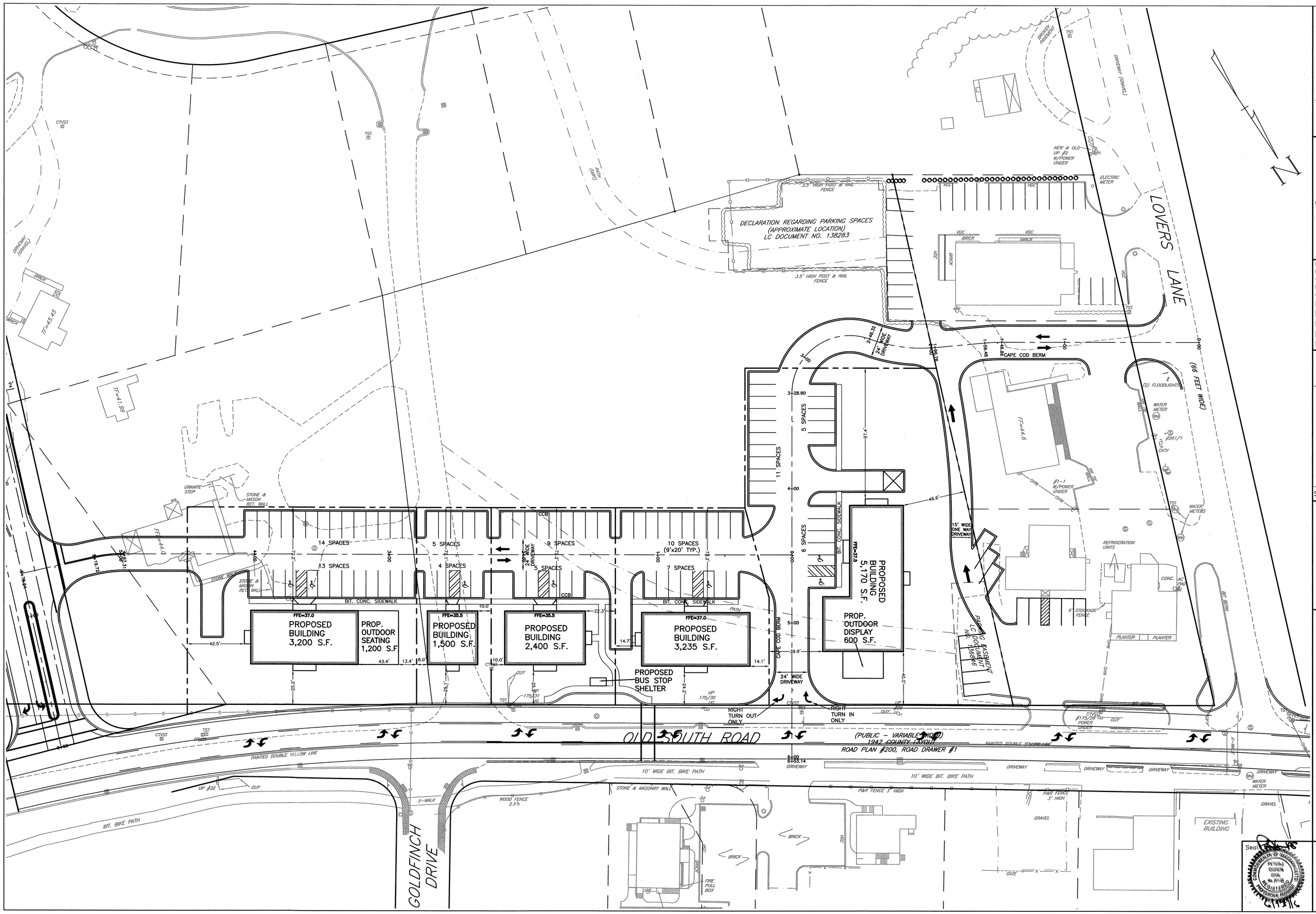

Prepared For:

Owner / Applicant

RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887
(978) 988-3900

Prepared By:

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Wakefield, MA 01880
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www.hayesengineering.com

Design By:	PJO
Drawn By:	AMC
Checked By:	PJO
Project File:	NAN-0107T
Comp. No:	NAN66

- ☒ Issued For Permit
- ☐ Issued For Review
- ☐ Issued For Bid
- ☐ Issued For Construction
- ☒ Not For Construction

No.	Revision	Date
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Scale: 1"=30'
0' 15' 30' 60'

Date: June 10, 2016

Drawing Title:

OLD SOUTH ROAD CROSSING
LAYOUT PLAN
OLD SOUTH ROAD
NANTUCKET, MASS.

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. OSHEN CIVIL No. 29168 REGISTERED PROFESSIONAL ENGINEER

Drawing No.: C3

SHEET 3 OF 8

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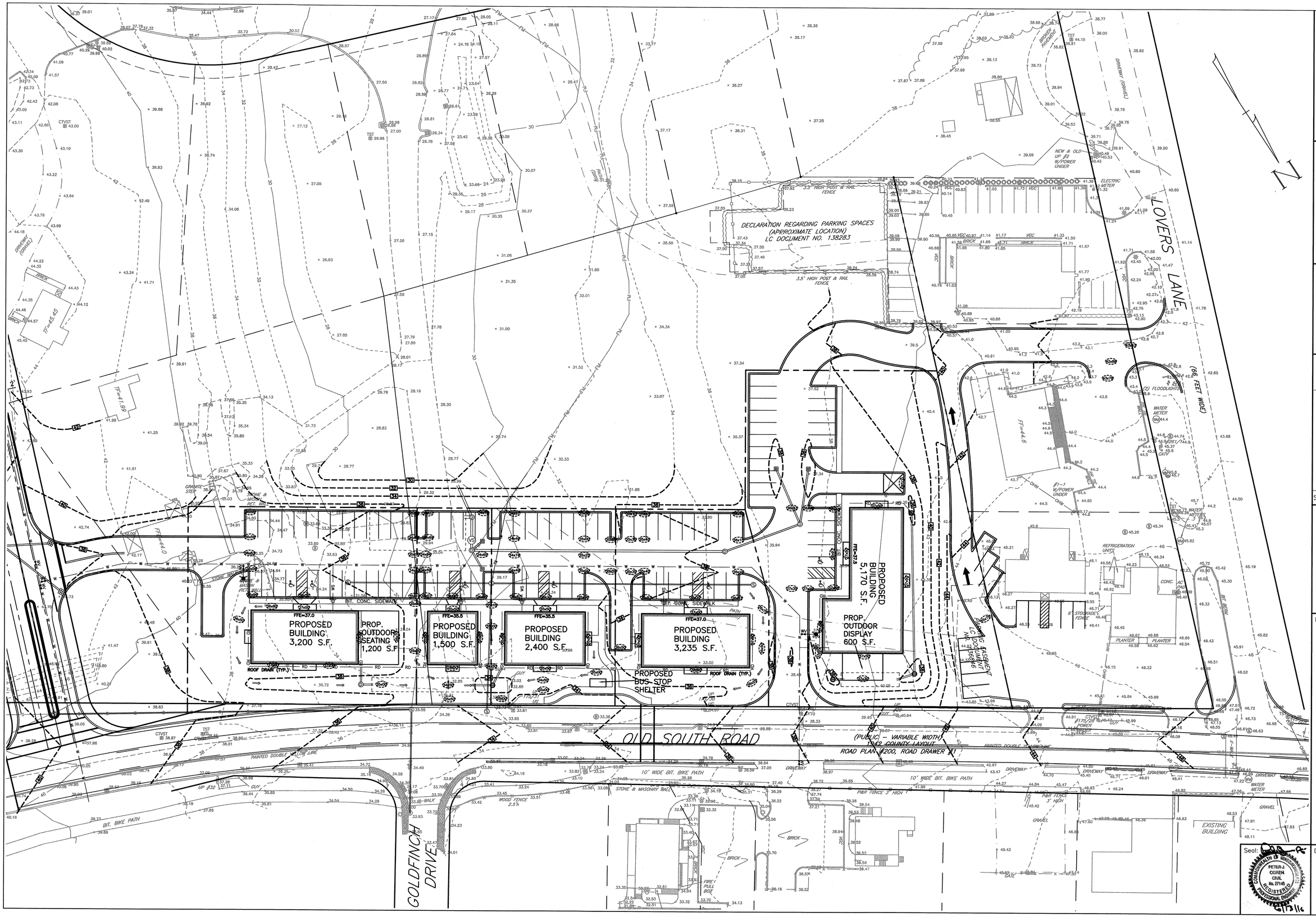

Prepared For:

Owner / Applicant

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Design By:	PJO
Drawn By:	AMC
Checked By:	PJO
Project File:	NAN-0107T
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Scale: 1"=30'

0' 15' 30' 60'

Date: June 10, 2016

Drawing Title:

OLD SOUTH ROAD CROSSING GRADING PLAN OLD SOUTH ROAD NANTUCKET, MASS.

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. COREN CIVIL No. 27148 REGISTERED PROFESSIONAL ENGINEER 6/13/16

Drawing No.:

C4

SHEET 4 OF 8

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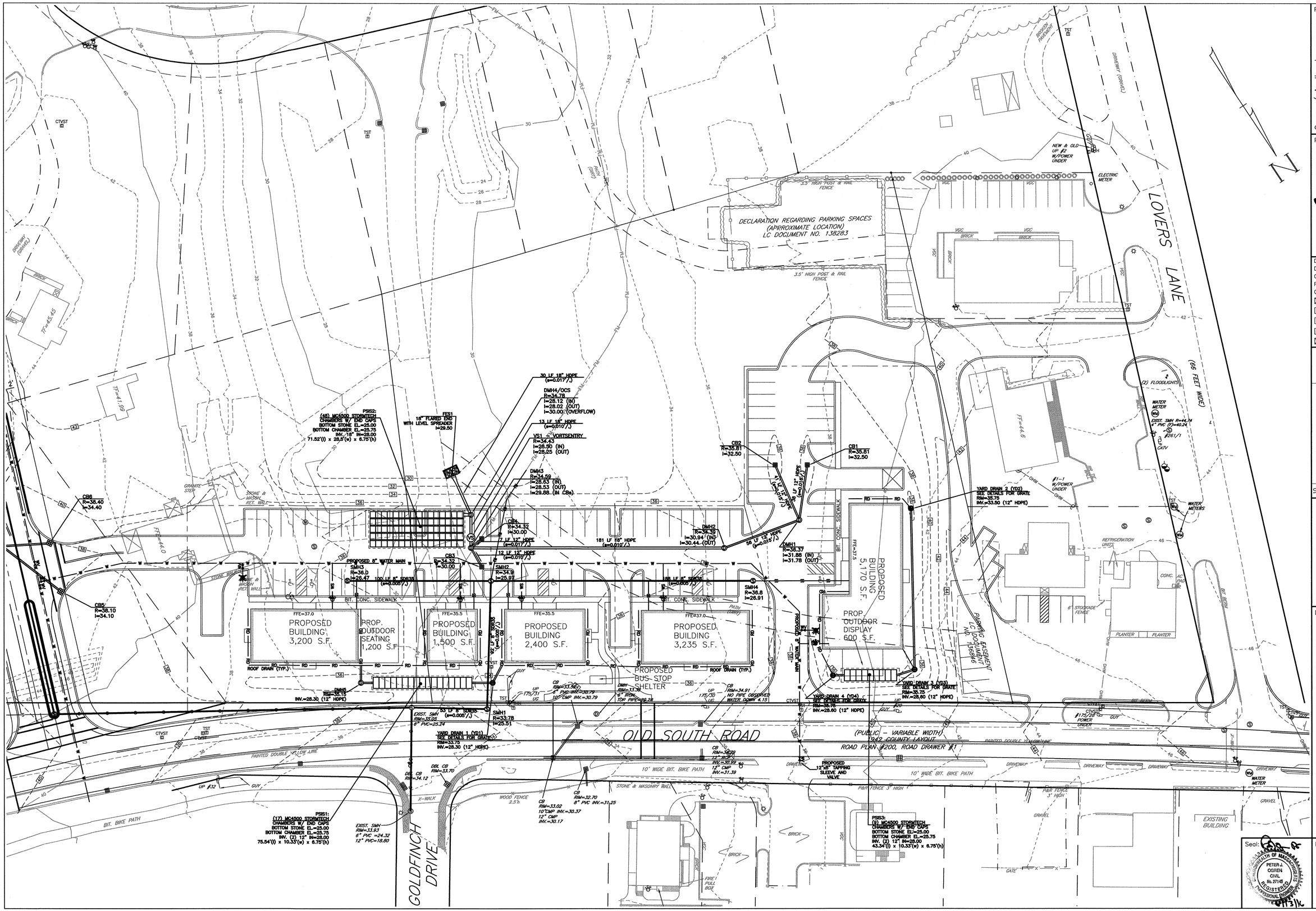

Prepared For:

Owner / Applicant

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Design By: PJO
Drawn By: AMC
Checked By: PJO
Project File: NAN-0107T
Comp. No: NAN66

- [x] Issued For Permit
- [ ] Issued For Review
- [ ] Issued For Bid
- [ ] Issued For Construction
- [x] Not For Construction

No.	Revision	Date
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Scale: 1"=30'
0' 15' 30' 60'

Date: June 10, 2016

Drawing Title:

OLD SOUTH ROAD CROSSING UTILITIES PLAN OLD SOUTH ROAD NANTUCKET, MASS.

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

Drawing No.: C5

SHEET 5 OF 8

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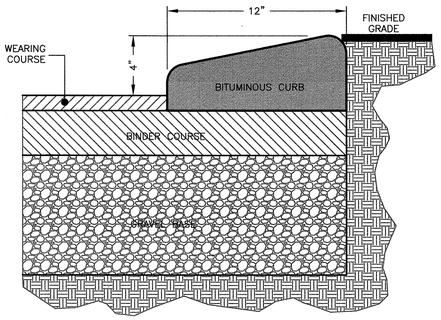
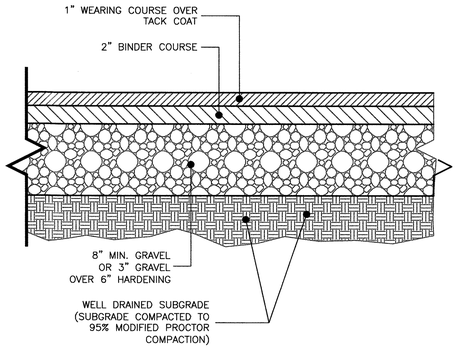
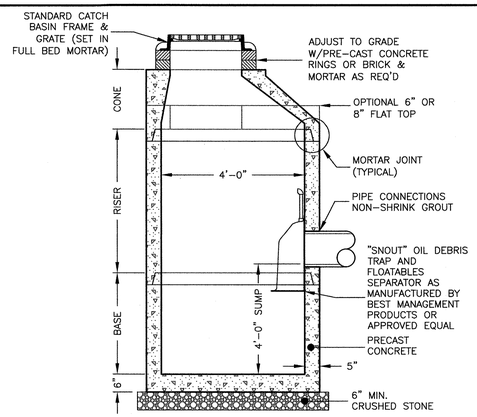


1 CAPE COD CURB
NOT TO SCALE



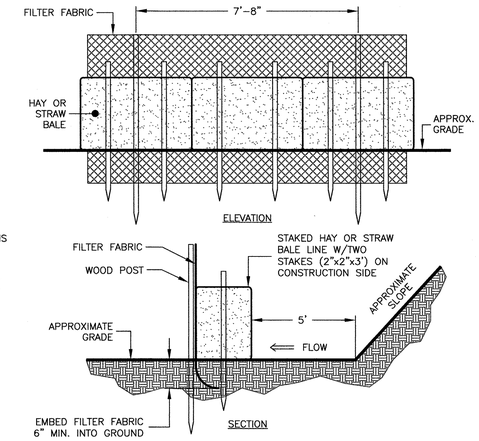
2 PAVEMENT SECTION
NOT TO SCALE

NOTE:
THIS PAVEMENT SECTION DETAIL REFLECTS MINIMUM REQUIREMENTS. ENGINEER TO DETERMINE DESIGN BASED ON GEOTECHNICAL DATA.



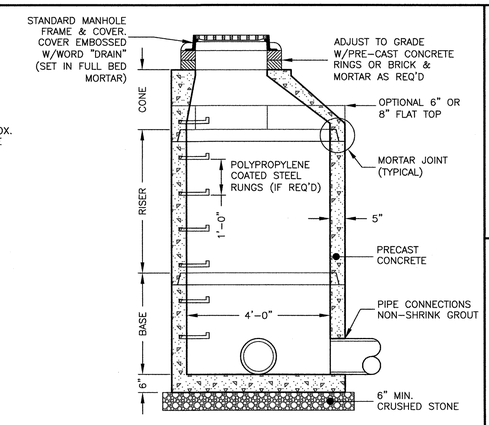
3 PRE-CAST CATCH BASIN
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



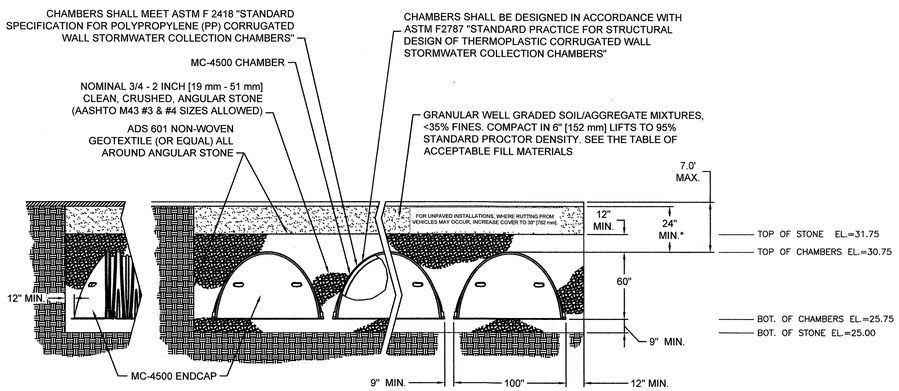
4 SILT FENCE & HAY/STRAW BALE
NOT TO SCALE

NOTE:
USE STRAW BALES ADJACENT TO WETLANDS



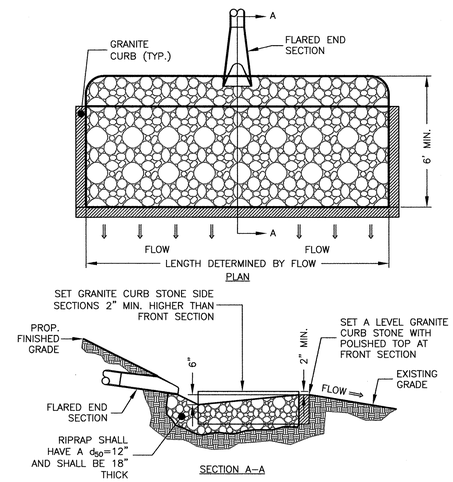
PRE-CAST DRAIN MANHOLE
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."

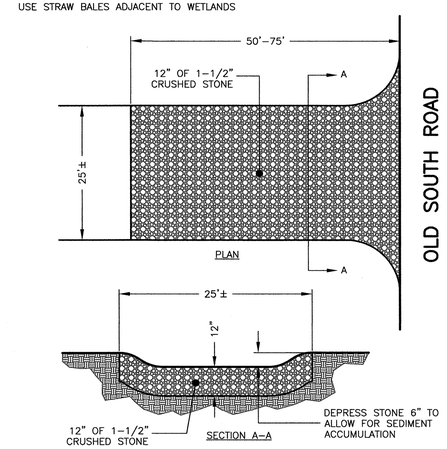


PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.

5 MC-4500 TYPICAL CROSS-SECTION
NOT TO SCALE

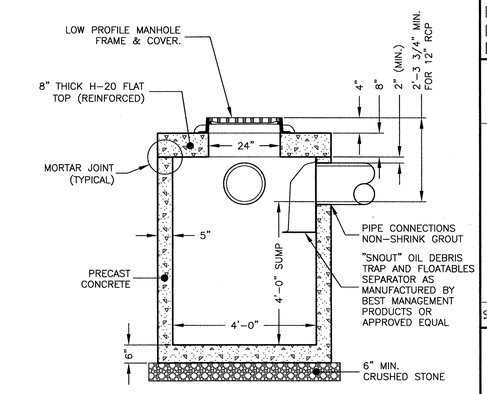


6 LEVEL SPREADER
NOT TO SCALE



7 TIRE TRACKING PAD
NOT TO SCALE

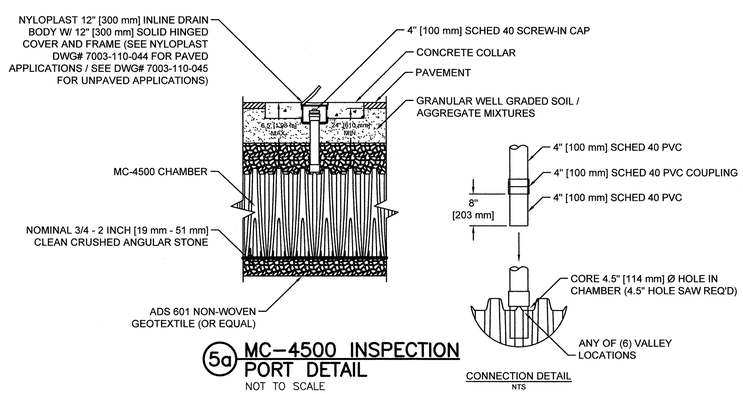
NOTE:
PROVIDE TRANSITION BETWEEN CONSTRUCTION ENTRANCE AND PUBLIC RIGHT-OF-WAY. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OF SEDIMENT INTO PUBLIC RIGHT-OF-WAY



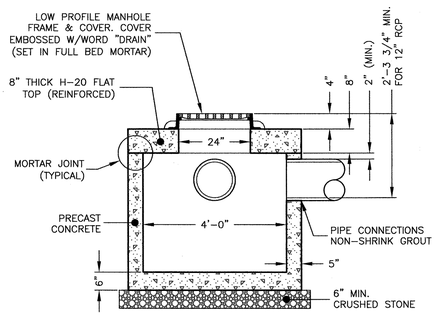
8 REDUCED COVER CATCH BASIN
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."

NOTES:
1. INSPECTION PORTS MAY BE CONNECTED THROUGH ANY OF (6) CHAMBER CORRUGATION VALLEYS
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED.

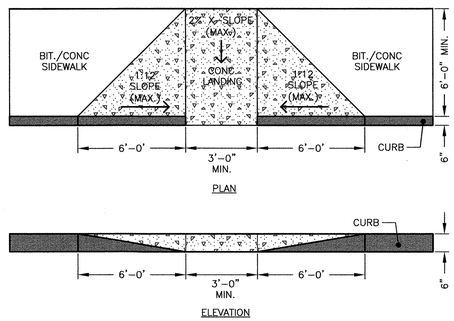


5a MC-4500 INSPECTION PORT DETAIL
NOT TO SCALE



9 REDUCED COVER DRAIN MANHOLE
NOT TO SCALE

NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."

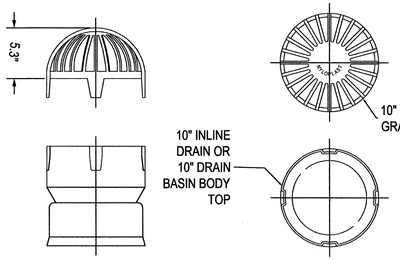


10 WHEELCHAIR RAMP
NOT TO SCALE

NOTE:
WHEELCHAIR RAMP SHALL COMPLY WITH ALL STATE AND FEDERAL RULES AND REGULATIONS.

1099CGD

APPROX. DRAIN AREA = 54.00 SQ IN
APPROX. WEIGHT = 8.36 LBS



11 NYOPLAST YARD DRAIN INLET
NOT TO SCALE

Prepared For:

Owner / Applicant
RICHMOND GREAT POINT DEVELOPMENT, LLC
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Design By: EES
Drawn By: AMC
Checked By: PJO
Project File: NAN-0139
Comp. No: NAN66
☒ Issued For Permit
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☒ Not For Construction

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Scale: 1"=NTS

Date: June 10, 2016

Drawing Title:
OLD SOUTH ROAD CROSSING
DETAIL SHEET 1
OLD SOUTH ROAD
NANTUCKET, MASS.

Seal: COMMONWEALTH OF MASSACHUSETTS PETER J. OGREN CIVIL No. 27145 REGISTERED PROFESSIONAL ENGINEER 6/13/16

Drawing No.:
C6

SHEET 6 OF 8

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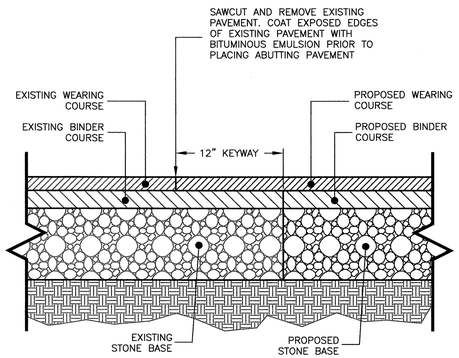
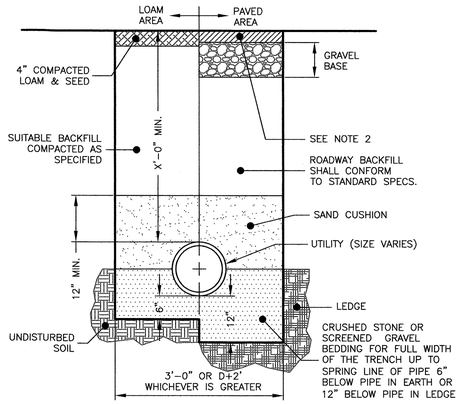


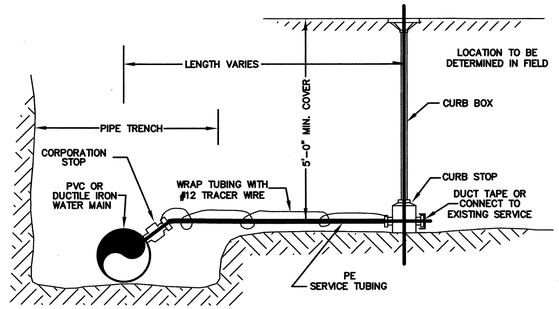
1 PAVEMENT KEYWAY
NOT TO SCALE

NOTE:
THIS PAVEMENT SECTION DETAIL REFLECTS MINIMUM REQUIREMENTS. ENGINEER TO DETERMINE DESIGN BASED ON GEOTECHNICAL DATA.

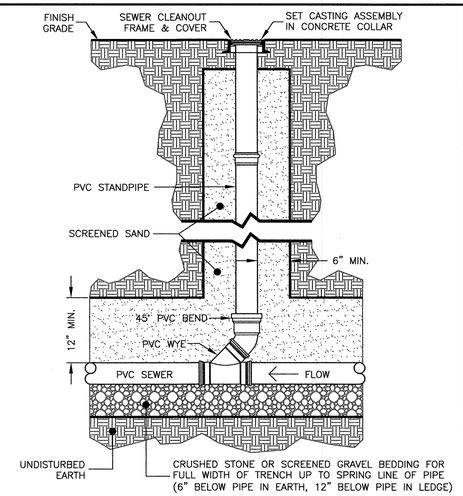


2 UTILITY TRENCH
NOT TO SCALE

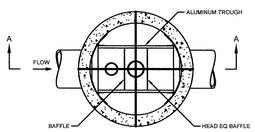
NOTES:
1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF DEPARTMENT OF PUBLIC WORKS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



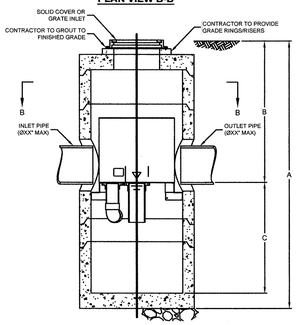
3 TYPICAL WATER SERVICE CONNECTION
NOT TO SCALE



4 SEWER SERVICE CLEANOUT
NOT TO SCALE



PLAN VIEW B-B



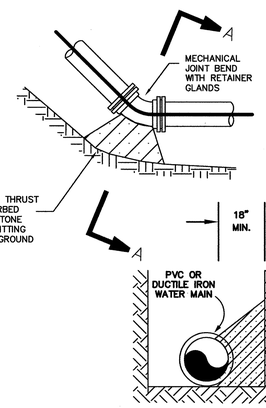
SECTION A-A

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

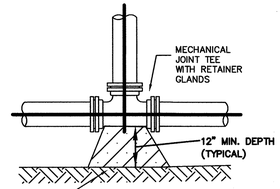
GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. VORTSENTRY HS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.

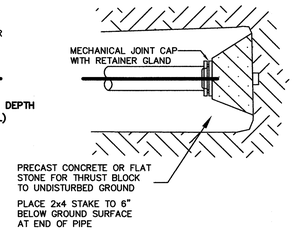
INSTALLATION NOTES
1. ANY SUB-BASE/BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTSENTRY HS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

5 VORTSENTRY HS STANDARD DETAIL



SECTION A–A

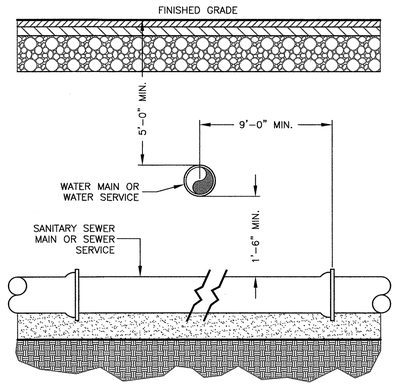




PIPE DIAMETER	BENDS				TEE
	11.25	22.5	45	90	
4 & 6	1	1	1	2	1.5
8	1	1	2	3	2.5
12	1	2	3.5	6.5	5

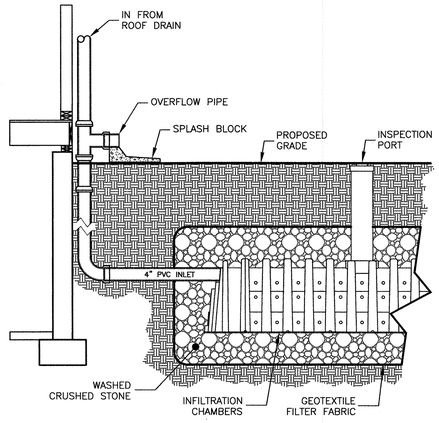
THRUST BLOCK BEARING AREA (SF)
(BASED UPON 100 psi WATER PRESSURE AND 3000 PSF BEARING LOAD CAPACITY)

6 TYPICAL THRUST BLOCK
NOT TO SCALE



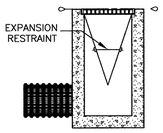
7 WATER/SEWER CROSSING
NOT TO SCALE

NOTES:
1. WHEREVER FEASIBLE, SEWERS WILL BE LAID AT A MINIMUM OF 10 FEET, HORIZONTALLY, FROM ANY EXISTING OR PROPOSED WATER MAIN. SHOULD LOCAL CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET TO A WATER MAIN THE SEWER MAIN WILL BE LAID IN A SEPARATE TRENCH AND THE ELEVATION OF THE CROWN OF THE SEWER PLACED AT LEAST 18 INCHES BELOW THE INVERT OF THE WATER MAIN. WHENEVER SEWERS MUST CROSS UNDER WATER MAINS, THE SEWER SHALL BE LAID AT SUCH AN ELEVATION THAT THE CROWN OF THE SEWER IS AT LEAST 18 INCHES BELOW THE INVERT OF THE WATER MAIN. WHEN IT IS IMPOSSIBLE TO OBTAIN HORIZONTAL OR VERTICAL SEPARATION AS STIPULATED ABOVE, BOTH THE WATER MAIN AND SEWER SHOULD BE ENCASED IN CONCRETE FOR 10 FEET EITHER SIDE OF THE CROSSING.
2. IN LOCATIONS WHERE THE SEWER MAIN DOES NOT HAVE 48" OF COVER THE MAIN WILL BE INSULATED.

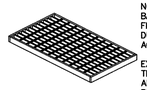


8 ROOF DRAIN TO CHAMBER
NOT TO SCALE

NOTE:
1. CULTECS SHALL BE INSTALLED A MINIMUM OF 10' FROM HOUSE.

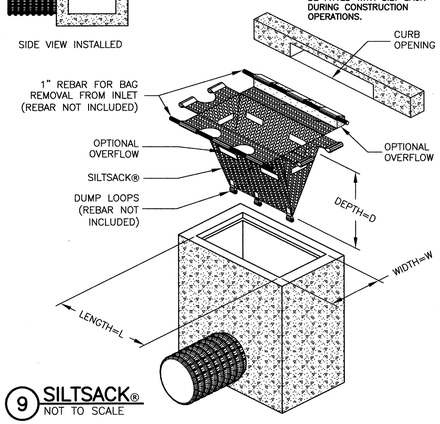


SIDE VIEW INSTALLED



NOTE: ALL PROPOSED CATCH BASINS ON-SITE TO BE FITTED WITH SILT SACK DURING CONSTRUCTION ACTIVITES.

EXISTING CATCH BASIN AT THE INTERSECTION OF NANCY ANN AND LOVERS LANES TO BE FITTED WITH SILT SACK DURING CONSTRUCTION OPERATIONS.



9 SILTSACK®
NOT TO SCALE

Prepared For:

Owner / Applicant
RICHMOND GREAT POINT DEVELOPMENT, LLC
23 CONCORD STREET
WILMINGTON, MA 01887
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Comp. No:	NAN66

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☐ Issued For Bid
☐ Issued For Construction
☒ Not For Construction

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Date: June 10, 2016

Drawing Title:
OLD SOUTH ROAD CROSSING
INDEX PLAN
OLD SOUTH ROAD
NANTUCKET, MASS.

Seal:
COMMONWEALTH OF MASSACHUSETTS
PETER J. OGRIN
No. 27...
6/13/16

Drawing No.:
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SHEET 7 OF 8

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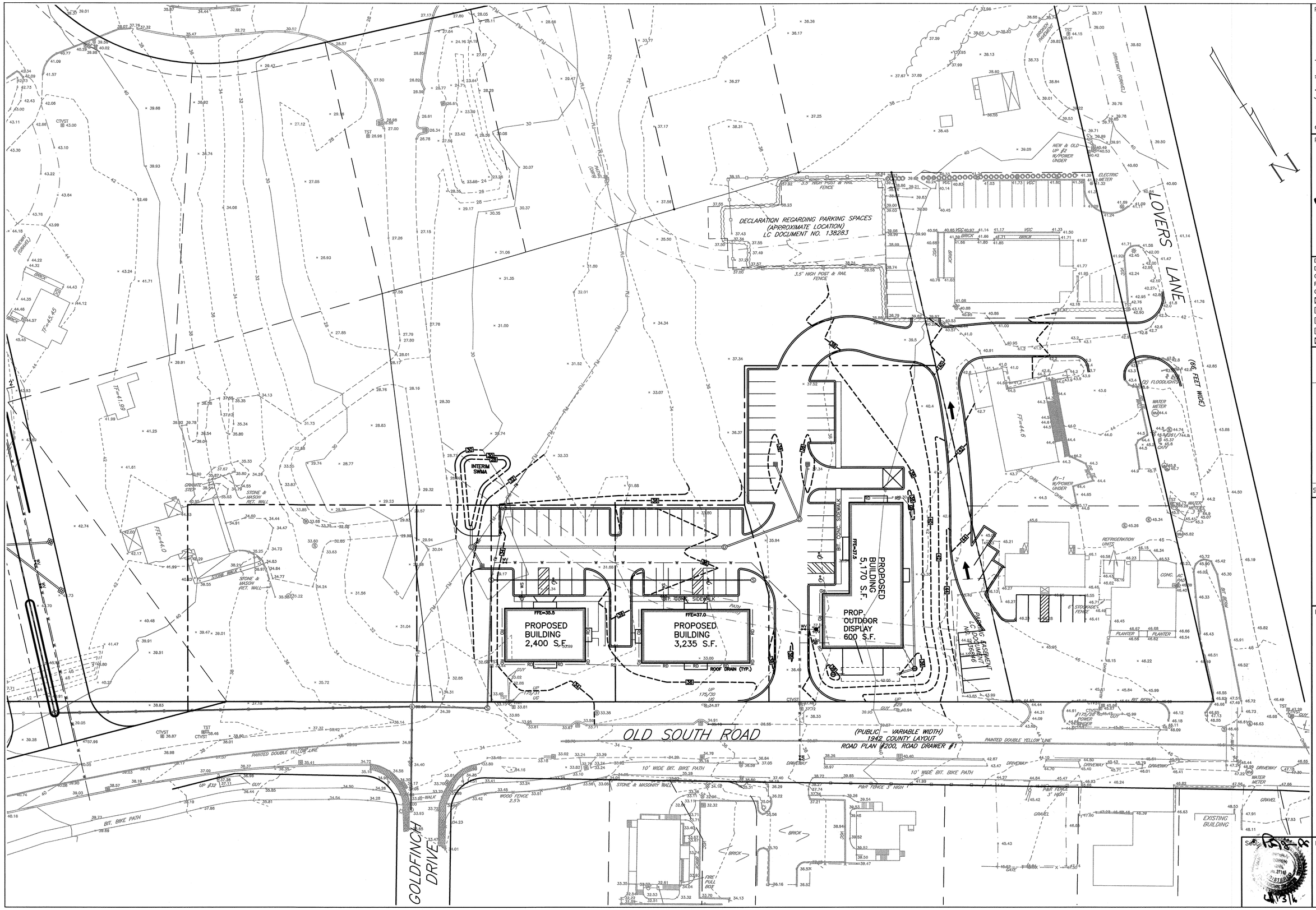

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Comp. No: NAN66

- ☒ Issued For Permit
- ☐ Issued For Review
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Date: June 10, 2016

Drawing Title:

OLD SOUTH ROAD CROSSING
INTERIM SITE PLAN
OLD SOUTH ROAD
NANTUCKET, MASS.

Seal:

Drawing No.:

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SHEET 8 OF 8

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Refer to File No. NAN-0107J

Storm Water Management Report

Major Commercial Development
Special Permit Site Plan
Old South Road Crossing
Nantucket, Massachusetts

6/13/16

June 10, 2016

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Appendix C: Massachusetts DEP Storm Water Checklist

Appendix D: Water Quality Calculations

Appendix E: Construction Period Pollution Prevention Plan

Appendix F: Operations and Maintenance Plan

1.0 Introduction

Richmond Great Point Development, LLC (the "Applicant") propose to construct a multi-unit retail development to be known as "Old South Road Crossing" (the "Project") proximate to the intersection of Old South Road and Lovers Lane. The Project area is depicted on Figure 1 below showing a portion of the United States Geologic Survey (USGS) topographic map. The Project is a portion of a larger project including both residential and commercial uses; this larger project will include improvements to infrastructure through the relocation, improvement and reconfiguration of portions of Old South Road, Nancy Ann Drive, and Davkim Road.

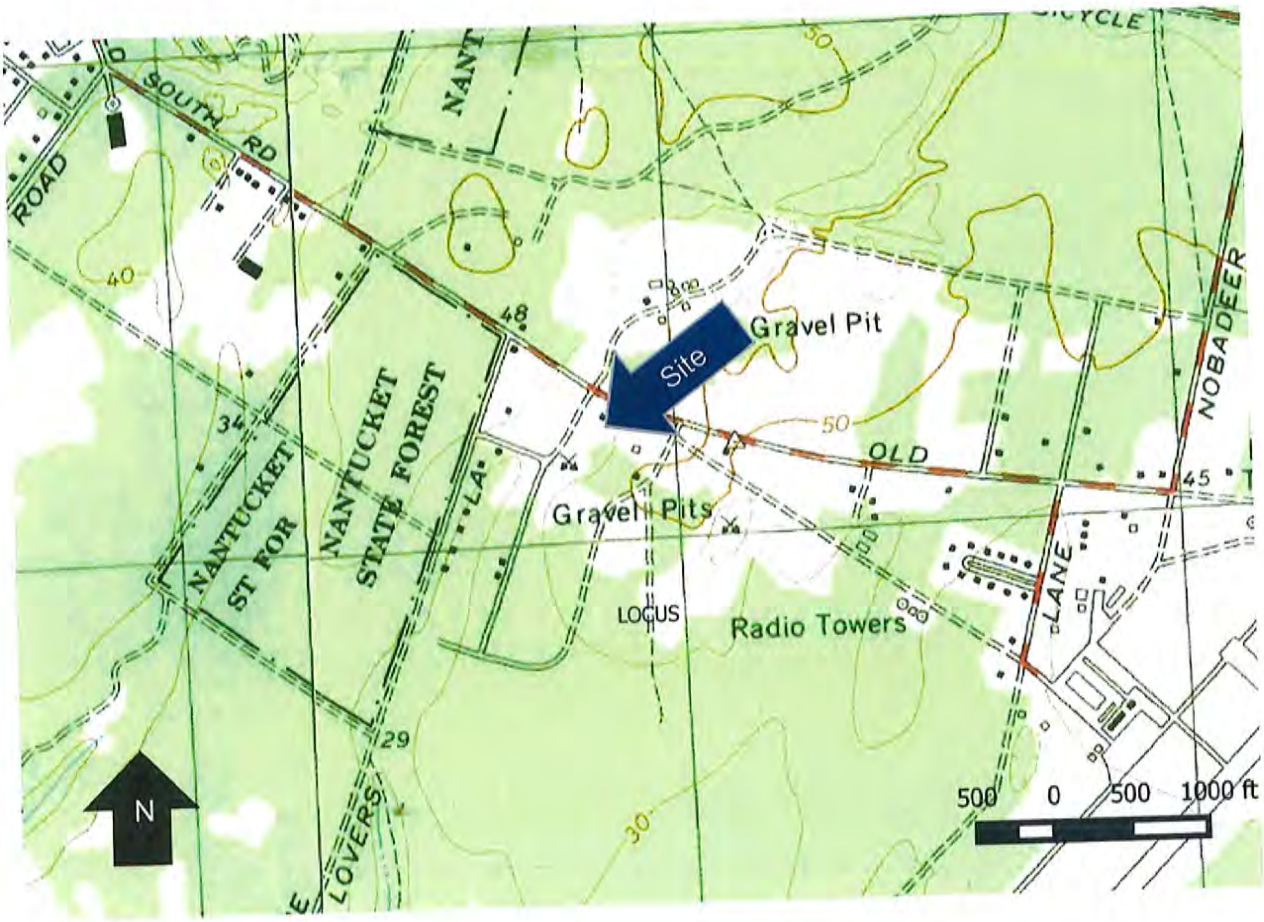

Figure 1- USGS Vicinity Map

1.1 Pre-Development Conditions

The Project site in its existing condition consists of developed and undeveloped areas near the intersection of Old South Road and Lovers Lane.

The United States Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey mapping indicates soils representative of Evesboro sand within the Project area. This well drained soil exhibits deep ground water and is 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 five (5) retail structures varying in size between 1,500 and 5,170 square feet, associated parking and driveways. A comprehensive storm water management and drainage system will also be constructed to capture, convey and treat runoff from the Project.

1.3 Ground Cover Conditions

The hydrologic study area consists of approximately 6.5± 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	0.87	2.46	+1.59
Bare Soil	0.92	0.11	-0.81
Brush, Poor	2.00	0.00	-2.00
Meadow	0.64	0.00	-0.64
Grass, Good	2.06	4.17	+2.11
Total	**6.49**	**6.75**	**+0.26**

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 proposed site generates surface runoff conveyed by overland flow to the South via a broad valley that bisects the site. There is no structured drainage system in this area.

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, is at the intersection of the above aforementioned valley and the downgradient property line of Lot 6.

Sub-catchment EX1 is tributary to Study Point of Comparison 1 (POC1). EX1 encompasses the Project area and consists of undeveloped meadow, areas of interspersed scrub oak and pines (brush) and areas of developed residential and commercial lands, buildings and driveways near the perimeter of the sub-catchment.

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.

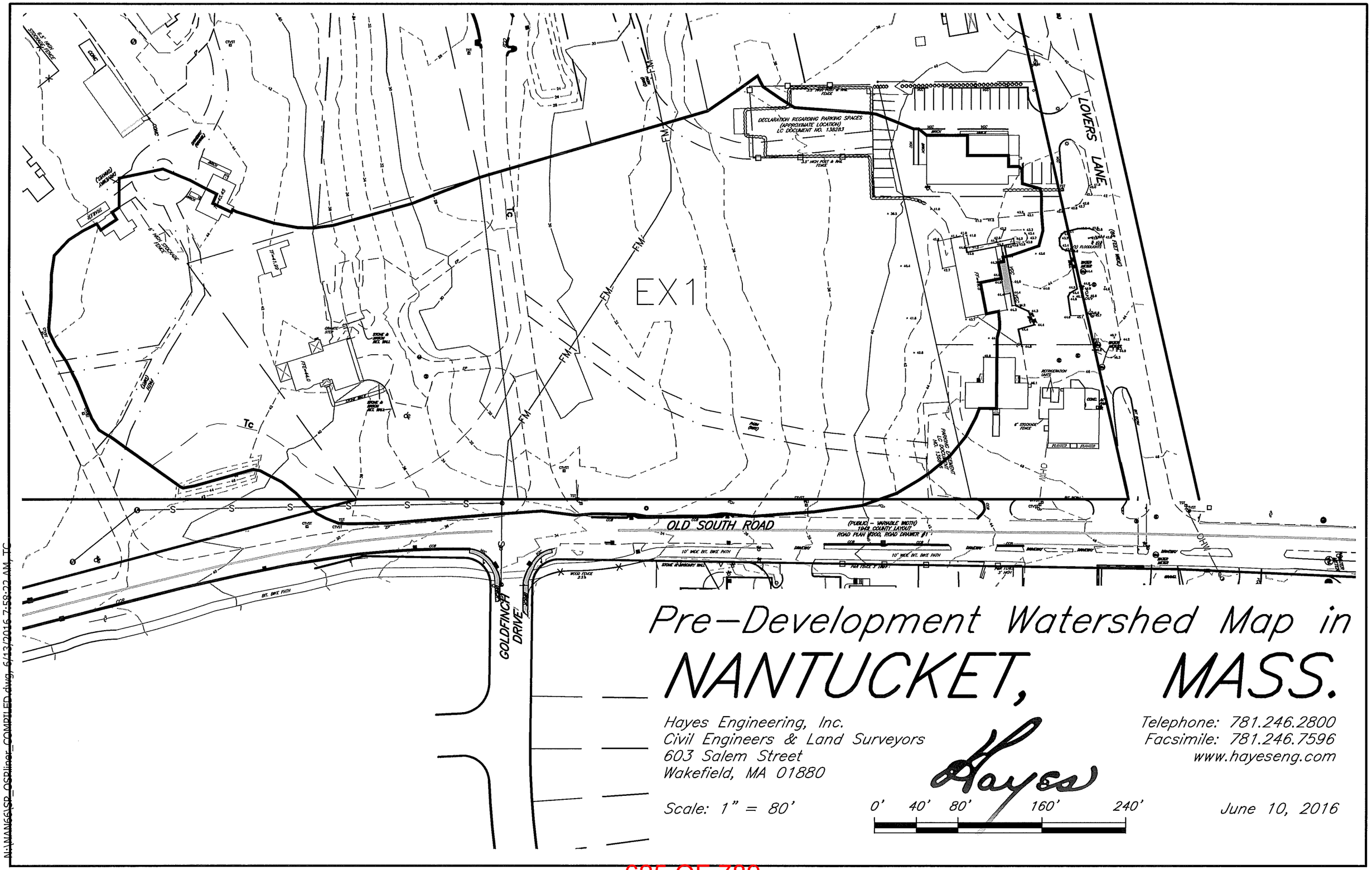

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Table 2 - Design Storms

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	0.9	3.2	5.4	7.4	9.5

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	0.2	0.5	0.7	0.9	1.2

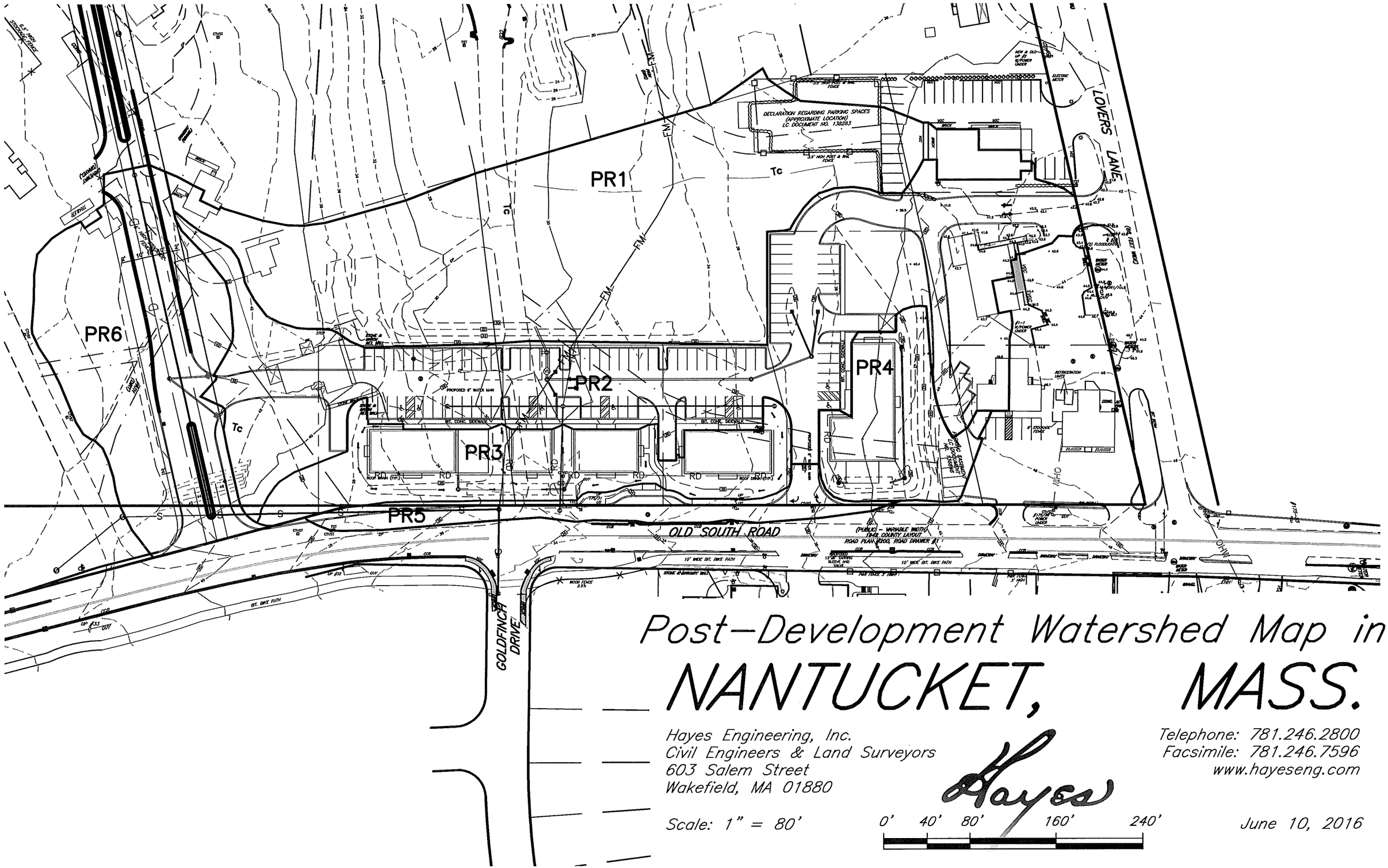
2.2 Post-Development Conditions

2.2.1 Drainage System

The proposed drainage system consists of swales, catch basins, manholes and culverts that direct runoff to treatment and infiltration best management practices (BMPs) on-site.

2.2.2 Watersheds

The Project as proposed divides the study area into six (6) sub-catchments that are ultimately tributary to the Study Point of Comparison (See Figure 3 – Post-Development Watershed Map). The Study Point of


PR1
PR2
PR3
PR4
PR5
PR6
OLD SOUTH ROAD
LOVERS LANE
GOLDFINCH DRIVE
DECLARATION REGARDING PARKING SPACES
(APPROXIMATE LOCATION)
LC DOCUMENT NO. 132283
PROPOSED 8" WATER MAIN
10' WIDE BIT. BIKE PATH
BIT. CONC. SIDEWALK
(PUBLIC) - VARIABLE WIDTH
TOWN COUNTY LAYOUT
ROAD PLAN (2001 ROAD DRAWER A)
Post-Development Watershed Map in
NANTUCKET, MASS.
Hayes Engineering, Inc.
Civil Engineers & Land Surveyors
603 Salem Street
Wakefield, MA 01880
Telephone: 781.246.2800
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www.hayeseng.com
Scale: 1" = 80'
0' 40' 80' 160' 240'
June 10, 2016

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

POC1 – Existing valley at the downgradient property boundary of Lot 6:

- Sub-catchment PR1 consists of the undeveloped portions of the project area to the south including the majority of Lot 6;
- Sub-Catchment PR2 consists of the parking and driveways associated with the Project;
- Sub-catchment PR3 consists of the rooftops and rear landscaped areas for the proposed retail buildings on lots 2 through 5.
- Sub-catchment PR4 consists of the rooftop and rear landscaped area for the proposed retail building on lots 4.
- Sub-catchments PR5 and PR6 are areas of the Project site that are to be modified by the infrastructure improvements proposed as part of the overall development plan of the area. Runoff from these sub-catchments will be addressed by the infrastructure servicing the new and/or modified roadways.

Sub-catchments PR2, PR3 and PR4 are collected and directed to Proposed Sub-Surface Infiltration Systems (PSISs).

- PSIS1 to be constructed under the proposed swale in sub-catchment PR3;
- PSIS2 to be constructed under the parking lot in sub-catchment PR2. Runoff in excess of the infiltration capacity of the PSIS will flow overland to Study Point of Comparison 1.; and
- PSIS3 to be constructed adjacent to the proposed building on Lot 1 in sub-catchment PR4.

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 six (6) 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 proposed sub-surface infiltration systems 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	0.0	0.6	3.7	6.1	8.8

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	0.1	0.2	0.4	0.5

2.2.4 Hydraulic Calculations

The closed drainage system piping was sized for the twenty-five (25) year storm using the peak flow rates calculated for the respective post-development sub-catchments tributary to each catch-basin and Manning's Equation for each section of pipe. Please refer to Appendix C for pipe sizing calculations for the project.

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	0.9	0.0	-0.9	3.2	0.6	-2.7	5.4	3.7	-1.7	7.4	6.1	-1.3	9.5	8.5	-1.0

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	0.2	0.0	-0.2	0.5	0.1	-0.4	0.7	0.2	-0.5	0.9	0.4	-0.5	1.2	0.5	-0.7

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 proposed increase in impervious area at the post-development site was listed previously as 1.59 acres in Table 1 of this report.

The required recharge volume (R_v) for the Project can be calculated as indicated below:

$$R_v = F \times Impervious\ Area$$

$$= (0.6\ inches)\left(\frac{1\ foot}{12\ inches}\right)(1.59\ acres)$$

$$= 0.08\ acre - feet = 3{,}485\ cubic\ feet$$

The Storm Water Handbook also requires that recharge facilities be constructed in soils capable of absorbing the recharge volume within 72 hours. Drawdown time (in hours) can be calculated as indicated below:

$$t_d = \frac{R_v}{(f)(A_b)}$$

Where,

t_d = Drawdown Time (hours)

R_v = Required Recharge Volume in cubic feet (Calculated above)

f = Rawls Infiltration Rate (See Table 3) in feet per hour

A_b = Bottom Area of Infiltration Systems in square feet

(from PSIS1-3, Appendix B)

$$t_d = \frac{3{,}485\ cf}{\left(\frac{8.27\ inches}{hour}\right)\left(\frac{1\ ft}{12\ inches}\right)(780 + 2{,}038 + 448\ sf)}$$

$$t_d = 1.5\ hours$$

The proposed sub-surface infiltration systems (PSIS1, PSIS2 and PSIS3) will infiltrate the required recharge volume in approximately 1.5 hours.

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.

Runoff generated by new impervious surfaces will be collected and, when required, treated with deep sump and hooded catch basins, a proprietary swirl particle separator (VortSentry HS) and then infiltrated to achieve a presumptive removal rate of 80%. TSS Removal Calculations and VortSentry sizing tables are included as Appendix D to this report.

Operations and maintenance plans for construction and post-development phases of the Project are included as Appendix E and Appendix F, 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. As such, the Project uses structural and non-structural BMPs suitable for use within this critical area. Water calculations included in Appendix E are based upon more stringent standards for critical areas that include:

- One-inch of run-off over impervious surfaces to calculate the Required Water Quality Volume
- Achieving a minimum of 44-percent TSS removal prior to discharge into infiltration BMPs.

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
(Old South Road Retail)

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

6/8/2016
Page 1 of 3

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	1.3	4.1%
294A	Evesboro sand, 0 to 3 percent slopes	18.7	61.9%
294B	Evesboro sand, 3 to 8 percent slopes	10.3	34.0%
Totals for Area of Interest		**30.3**	**100.0%**

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

180B—Chilmark sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 996s
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

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

Description of Chilmark

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense fine-loamy lodgment till derived from granite and gneiss

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 31 inches: sandy loam
H3 - 31 to 60 inches: stratified sandy clay loam to clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Minor Components

Nantucket

Percent of map unit: 4 percent

Plymouth

Percent of map unit: 4 percent

Evesboro

Percent of map unit: 4 percent

Woodbridge variant

Percent of map unit: 3 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

Data Source Information

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

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	
180B—Chilmark sandy loam, 3 to 8 percent slopes														
Chilmark	85	C	0-10	Sandy loam	ML, SM	A-1, A-2, A-4	0- 0- 0	0- 2- 3	95-98-100	90-95-100	45-65-85	15-35-55	—	NP
			10-31	Sandy loam	SM	A-1, A-2, A-4	0- 0- 0	0- 2- 3	95-98-100	90-95-100	45-60-75	15-28-40	—	NP
			31-60	Stratified sandy clay loam to clay	CL, CL-ML, ML	A-4	0- 0- 0	0- 2- 3	95-98-100	95-98-100	90-95-100	80-88-95	12-19-26	2-6 -10
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

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	
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

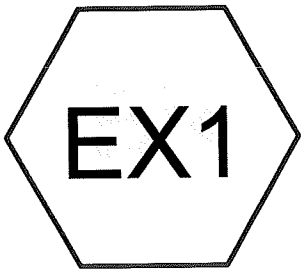
Data Source Information

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

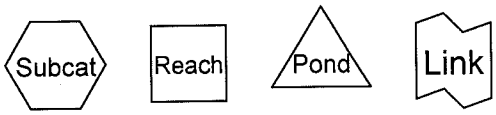
APPENDIX B:

HydroCAD® Calculations

EXISTING RUNOFF



Existing Watershed



Routing Diagram for NAN-0107J-E
Prepared by Hayes Engineering, Inc., Printed 6/13/2016
HydroCAD® 10.00-16 s/n 03206 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
89,730	39	>75% Grass cover, Good, HSG A (EX1)
87,123	48	Brush, Poor, HSG A (EX1)
28,003	30	Meadow, non-grazed, HSG A (EX1)
40,269	77	Newly graded area, HSG A (EX1)
38,088	98	Roofs, HSG A (EX1)
283,213	**54**	**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
89,730	0	0	0	0	89,730	>75% Grass cover, Good	EX1
87,123	0	0	0	0	87,123	Brush, Poor	EX1
28,003	0	0	0	0	28,003	Meadow, non-grazed	EX1
40,269	0	0	0	0	40,269	Newly graded area	EX1
38,088	0	0	0	0	38,088	Roofs	EX1
283,213	**0**	**0**	**0**	**0**	**283,213**	**TOTAL AREA**	

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: Existing Watershed Runoff Area=283,213 sf 13.45% Impervious Runoff Depth=0.35"
Flow Length=610' Tc=24.0 min CN=54 Runoff=0.86 cfs 8,149 cf

Total Runoff Area = 283,213 sf Runoff Volume = 8,149 cf Average Runoff Depth = 0.35"
86.55% Pervious = 245,125 sf 13.45% Impervious = 38,088 sf

Summary for Subcatchment EX1: Existing Watershed

Runoff = 0.86 cfs @ 12.56 hrs, Volume= 8,149 cf, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
38,088	98	Roofs, HSG A
40,269	77	Newly graded area, HSG A
28,003	30	Meadow, non-grazed, HSG A
87,123	48	Brush, Poor, HSG A
89,730	39	>75% Grass cover, Good, HSG A
283,213	54	Weighted Average
245,125		86.55% Pervious Area
38,088		13.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		**Sheet Flow, Sheet1** Woods: Light underbrush n= 0.400 P2= 3.60"
2.0	368	0.0375	3.12		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	192	0.0120	1.76		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
24.0	610	Total			

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: Existing Watershed Runoff Area=283,213 sf 13.45% Impervious Runoff Depth=0.87"
Flow Length=610' Tc=24.0 min CN=54 Runoff=3.19 cfs 20,582 cf

Total Runoff Area = 283,213 sf Runoff Volume = 20,582 cf Average Runoff Depth = 0.87"
86.55% Pervious = 245,125 sf 13.45% Impervious = 38,088 sf

Summary for Subcatchment EX1: Existing Watershed

Runoff = 3.19 cfs @ 12.42 hrs, Volume= 20,582 cf, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
38,088	98	Roofs, HSG A
40,269	77	Newly graded area, HSG A
28,003	30	Meadow, non-grazed, HSG A
87,123	48	Brush, Poor, HSG A
89,730	39	>75% Grass cover, Good, HSG A
283,213	54	Weighted Average
245,125		86.55% Pervious Area
38,088		13.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		**Sheet Flow, Sheet1** Woods: Light underbrush n= 0.400 P2= 3.60"
2.0	368	0.0375	3.12		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	192	0.0120	1.76		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
24.0	610	Total			

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: Existing Watershed Runoff Area=283,213 sf 13.45% Impervious Runoff Depth=1.33"
Flow Length=610' Tc=24.0 min CN=54 Runoff=5.42 cfs 31,393 cf

Total Runoff Area = 283,213 sf Runoff Volume = 31,393 cf Average Runoff Depth = 1.33"
86.55% Pervious = 245,125 sf 13.45% Impervious = 38,088 sf

Summary for Subcatchment EX1: Existing Watershed

Runoff = 5.42 cfs @ 12.39 hrs, Volume= 31,393 cf, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
38,088	98	Roofs, HSG A
40,269	77	Newly graded area, HSG A
28,003	30	Meadow, non-grazed, HSG A
87,123	48	Brush, Poor, HSG A
89,730	39	>75% Grass cover, Good, HSG A
283,213	54	Weighted Average
245,125		86.55% Pervious Area
38,088		13.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		**Sheet Flow, Sheet1** Woods: Light underbrush n= 0.400 P2= 3.60"
2.0	368	0.0375	3.12		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	192	0.0120	1.76		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
24.0	610	Total			

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: Existing Watershed Runoff Area=283,213 sf 13.45% Impervious Runoff Depth=1.73"
Flow Length=610' Tc=24.0 min CN=54 Runoff=7.37 cfs 40,776 cf

Total Runoff Area = 283,213 sf Runoff Volume = 40,776 cf Average Runoff Depth = 1.73"
86.55% Pervious = 245,125 sf 13.45% Impervious = 38,088 sf

Summary for Subcatchment EX1: Existing Watershed

Runoff = 7.37 cfs @ 12.38 hrs, Volume= 40,776 cf, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
38,088	98	Roofs, HSG A
40,269	77	Newly graded area, HSG A
28,003	30	Meadow, non-grazed, HSG A
87,123	48	Brush, Poor, HSG A
89,730	39	>75% Grass cover, Good, HSG A
283,213	54	Weighted Average
245,125		86.55% Pervious Area
38,088		13.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		**Sheet Flow, Sheet1** Woods: Light underbrush n= 0.400 P2= 3.60"
2.0	368	0.0375	3.12		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	192	0.0120	1.76		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
24.0	610	Total			

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: Existing Watershed Runoff Area=283,213 sf 13.45% Impervious Runoff Depth=2.16"
Flow Length=610' Tc=24.0 min CN=54 Runoff=9.49 cfs 50,873 cf

Total Runoff Area = 283,213 sf Runoff Volume = 50,873 cf Average Runoff Depth = 2.16"
86.55% Pervious = 245,125 sf 13.45% Impervious = 38,088 sf

Summary for Subcatchment EX1: Existing Watershed

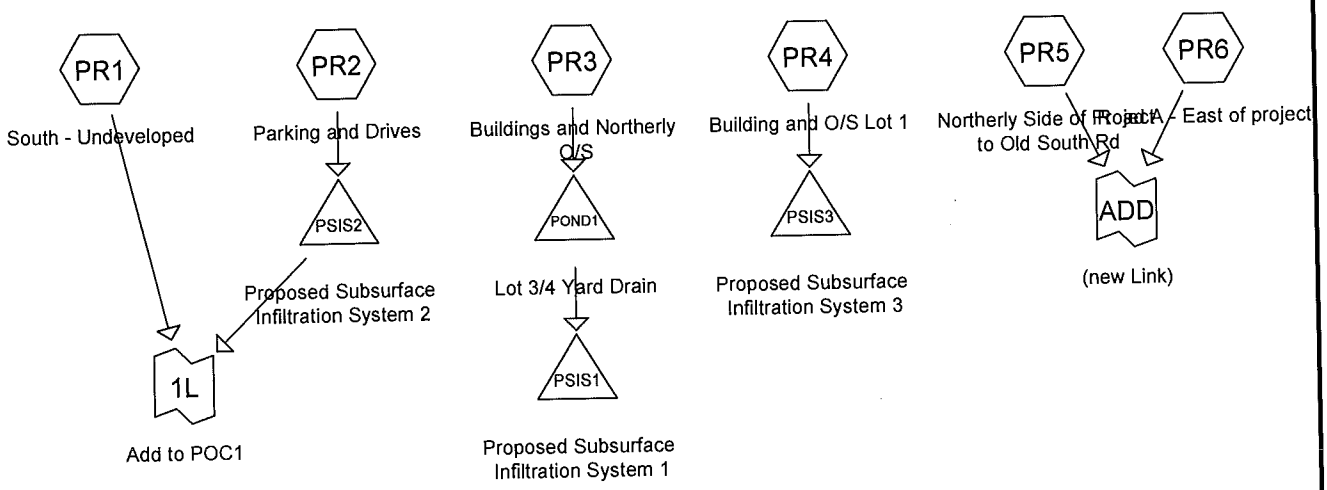
Runoff = 9.49 cfs @ 12.37 hrs, Volume= 50,873 cf, Depth= 2.16"

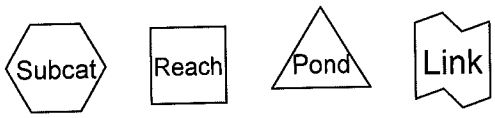
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
38,088	98	Roofs, HSG A
40,269	77	Newly graded area, HSG A
28,003	30	Meadow, non-grazed, HSG A
87,123	48	Brush, Poor, HSG A
89,730	39	>75% Grass cover, Good, HSG A
283,213	54	Weighted Average
245,125		86.55% Pervious Area
38,088		13.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		**Sheet Flow, Sheet1** Woods: Light underbrush n= 0.400 P2= 3.60"
2.0	368	0.0375	3.12		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	192	0.0120	1.76		**Shallow Concentrated Flow, Shallow2** Unpaved Kv= 16.1 fps
24.0	610	Total			

PROPOSED RUNOFF





Routing Diagram for NAN-0107J-P
Prepared by Hayes Engineering, Inc., Printed 6/13/2016
HydroCAD® 10.00-16 s/n 03206 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
181,857	39	>75% Grass cover, Good, HSG A (PR1, PR2, PR3, PR4, PR5, PR6)
4,949	77	Newly graded area, HSG A (PR1)
59,246	98	Paved parking, HSG A (PR2)
23,968	98	Paved roads w/curbs & sewers, HSG A (PR5, PR6)
5,900	98	Roofs, HSG A (PR4)
6,075	98	Unconnected pavement, HSG A (PR1)
11,922	98	Unconnected roofs, HSG A (PR3)
293,917	**61**	**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	Subca Numbe
181,857	0	0	0	0	181,857	>75% Grass cover, Good	
4,949	0	0	0	0	4,949	Newly graded area	
59,246	0	0	0	0	59,246	Paved parking	
23,968	0	0	0	0	23,968	Paved roads w/curbs & sewers	
5,900	0	0	0	0	5,900	Roofs	
6,075	0	0	0	0	6,075	Unconnected pavement	
11,922	0	0	0	0	11,922	Unconnected roofs	
293,917	**0**	**0**	**0**	**0**	**293,917**	**TOTAL AREA**	

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1: South - Undeveloped Runoff Area=96,297 sf 6.31% Impervious Runoff Depth=0.06"
Flow Length=365' Tc=11.4 min UI Adjusted CN=43 Runoff=0.02 cfs 509 cf

Subcatchment PR2: Parking and Drives Runoff Area=93,320 sf 63.49% Impervious Runoff Depth=1.44"
Flow Length=392' Tc=10.1 min CN=76 Runoff=3.05 cfs 11,185 cf

Subcatchment PR3: Buildings and Northerly O/S Runoff Area=29,748 sf 40.08% Impervious Runoff Depth=0.71"
Flow Length=272' Slope=0.0100 '/' Tc=12.5 min CN=63 Runoff=0.36 cfs 1,757 cf

Subcatchment PR4: Building and O/S Lot 1 Runoff Area=17,215 sf 34.27% Impervious Runoff Depth=0.53"
Flow Length=67' Slope=0.0100 '/' Tc=10.4 min CN=59 Runoff=0.14 cfs 765 cf

Subcatchment PR5: Northerly Side of Project to Old Runoff Area=12,291 sf 74.09% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=83 Runoff=0.63 cfs 1,990 cf

Subcatchment PR6: Road A - East of project Runoff Area=45,046 sf 32.99% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=58 Runoff=0.36 cfs 1,850 cf

Pond POND1: Lot 3/4 Yard Drain Peak Elev=33.86' Storage=7 cf Inflow=0.36 cfs 1,757 cf
Discarded=0.02 cfs 153 cf Primary=0.34 cfs 1,604 cf Outflow=0.37 cfs 1,757 cf

Pond PSIS1: Proposed Subsurface Infiltration System 1 Peak Elev=25.65' Storage=202 cf Inflow=0.34 cfs 1,604 cf
Outflow=0.15 cfs 1,605 cf

Pond PSIS2: Proposed Subsurface Infiltration System Peak Elev=27.68' Storage=3,850 cf Inflow=3.05 cfs 11,185 cf
Discarded=0.39 cfs 11,191 cf Primary=0.00 cfs 0 cf Outflow=0.39 cfs 11,191 cf

Pond PSIS3: Proposed Subsurface Infiltration System 3 Peak Elev=25.25' Storage=45 cf Inflow=0.14 cfs 765 cf
Outflow=0.09 cfs 769 cf

Link 1L: Add to POC1 Inflow=0.02 cfs 509 cf
Primary=0.02 cfs 509 cf

Link ADD: (new Link) Inflow=0.98 cfs 3,840 cf
Primary=0.98 cfs 3,840 cf

Total Runoff Area = 293,917 sf Runoff Volume = 18,057 cf Average Runoff Depth = 0.74"
63.56% Pervious = 186,806 sf 36.44% Impervious = 107,111 sf

Summary for Subcatchment PR1: South - Undeveloped

Runoff = 0.02 cfs @ 15.17 hrs, Volume= 509 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Adj	Description
6,075	98		Unconnected pavement, HSG A
4,949	77		Newly graded area, HSG A
85,273	39		>75% Grass cover, Good, HSG A
96,297	45	43	Weighted Average, UI Adjusted
90,222			93.69% Pervious Area
6,075			6.31% Impervious Area
6,075			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0120	0.09		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
1.9	315	0.0300	2.79		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
11.4	365	Total			

Summary for Subcatchment PR2: Parking and Drives

Runoff = 3.05 cfs @ 12.15 hrs, Volume= 11,185 cf, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
59,246	98	Paved parking, HSG A
34,074	39	>75% Grass cover, Good, HSG A
93,320	76	Weighted Average
34,074		36.51% Pervious Area
59,246		63.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0200	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
0.6	127	0.0500	3.60		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	215	0.0100	2.03		**Shallow Concentrated Flow, Shallow2** Paved Kv= 20.3 fps
10.1	392	Total			

Summary for Subcatchment PR3: Buildings and Northerly O/S

Runoff = 0.36 cfs @ 12.21 hrs, Volume= 1,757 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
11,922	98	Unconnected roofs, HSG A
17,826	39	>75% Grass cover, Good, HSG A
29,748	63	Weighted Average
17,826		59.92% Pervious Area
11,922		40.08% Impervious Area
11,922		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
2.3	222	0.0100	1.61		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
12.5	272	Total			

Summary for Subcatchment PR4: Building and O/S Lot 1

Runoff = 0.14 cfs @ 12.20 hrs, Volume= 765 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
5,900	98	Roofs, HSG A
11,315	39	>75% Grass cover, Good, HSG A
17,215	59	Weighted Average
11,315		65.73% Pervious Area
5,900		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
0.2	17	0.0100	1.61		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
10.4	67	Total			

Summary for Subcatchment PR5: Northerly Side of Project to Old South Rd

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 1,990 cf, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
9,106	98	Paved roads w/curbs & sewers, HSG A
3,185	39	>75% Grass cover, Good, HSG A
12,291	83	Weighted Average
3,185		25.91% Pervious Area
9,106		74.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Subcatchment PR6: Road A - East of project

Runoff = 0.36 cfs @ 12.13 hrs, Volume= 1,850 cf, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.60"

Area (sf)	CN	Description
14,862	98	Paved roads w/curbs & sewers, HSG A
30,184	39	>75% Grass cover, Good, HSG A
45,046	58	Weighted Average
30,184		67.01% Pervious Area
14,862		32.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Pond POND1: Lot 3/4 Yard Drain

Inflow Area = 29,748 sf, 40.08% Impervious, Inflow Depth = 0.71" for 2 Year event
Inflow = 0.36 cfs @ 12.21 hrs, Volume= 1,757 cf
Outflow = 0.37 cfs @ 12.21 hrs, Volume= 1,757 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.02 cfs @ 12.21 hrs, Volume= 153 cf
Primary = 0.34 cfs @ 12.21 hrs, Volume= 1,604 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 33.86' @ 12.21 hrs Surf.Area= 125 sf Storage= 7 cf

Plug-Flow detention time= 0.1 min calculated for 1,755 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (898.5 - 898.4)

Volume	Invert	Avail.Storage	Storage Description
#1	33.75'	1,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.75	4	0	0
34.00	275	35	35
34.50	750	256	291
35.00	2,100	713	1,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	33.75'	**Nyoplast 10" Dome Grate Inlet** Head (feet) 0.00 0.10 0.20 1.00 Disch. (cfs) 0.000 0.280 0.800 1.800

Discarded OutFlow Max=0.02 cfs @ 12.21 hrs HW=33.86' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.34 cfs @ 12.21 hrs HW=33.86' TW=25.19' (Dynamic Tailwater)
└**2=Nyoplast 10" Dome Grate Inlet** (Custom Controls 0.34 cfs)

Summary for Pond PSIS1: Proposed Subsurface Infiltration System 1

Inflow Area =	29,748 sf, 40.08% Impervious,	Inflow Depth = 0.65"	for 2 Year event	
Inflow =	0.34 cfs @ 12.21 hrs,	Volume=	1,604 cf	
Outflow =	0.15 cfs @ 12.15 hrs,	Volume=	1,605 cf,	Atten= 56%, Lag= 0.0 min
Discarded =	0.15 cfs @ 12.15 hrs,	Volume=	1,605 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 25.65' @ 12.61 hrs Surf.Area= 781 sf Storage= 202 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.1 min (900.8 - 894.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,355 cf	**10.33'W x 75.54'L x 6.75'H Field A** 5,269 cf Overall - 1,882 cf Embedded = 3,387 cf x 40.0% Voids
#2A	25.75'	1,882 cf	**StormTech MC-4500 +Cap** x 17 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		3,237 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.15 cfs @ 12.15 hrs HW=25.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond PSIS2: Proposed Subsurface Infiltration System 2

Inflow Area =	93,320 sf, 63.49% Impervious,	Inflow Depth = 1.44"	for 2 Year event	
Inflow =	3.05 cfs @ 12.15 hrs,	Volume=	11,185 cf	
Outflow =	0.39 cfs @ 11.85 hrs,	Volume=	11,191 cf,	Atten= 87%, Lag= 0.0 min
Discarded =	0.39 cfs @ 11.85 hrs,	Volume=	11,191 cf	
Primary =	0.00 cfs @ 0.00 hrs,	Volume=	0 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 27.68' @ 13.09 hrs Surf.Area= 2,038 sf Storage= 3,850 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 83.7 min (936.4 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	3,373 cf	**28.50'W x 71.52'L x 6.75'H Field A** 13,758 cf Overall - 5,326 cf Embedded = 8,432 cf x 40.0% Voids
#2A	25.75'	5,326 cf	**StormTech MC-4500 +Cap** x 48 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 16 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		8,699 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	30.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.00' / 29.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Discarded OutFlow Max=0.39 cfs @ 11.85 hrs HW=25.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=25.00' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond PSIS3: Proposed Subsurface Infiltration System 3

Inflow Area =	17,215 sf,	34.27% Impervious,	Inflow Depth =	0.53"	for 2 Year event
Inflow =	0.14 cfs @	12.20 hrs, Volume=	765 cf		
Outflow =	0.09 cfs @	12.20 hrs, Volume=	769 cf,	Atten= 38%,	Lag= 0.0 min
Discarded =	0.09 cfs @	12.20 hrs, Volume=	769 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 25.25' @ 12.51 hrs Surf.Area= 448 sf Storage= 45 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.0 min (916.5 - 914.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	797 cf	**10.33'W x 43.34'L x 6.75'H Field A** 3,023 cf Overall - 1,030 cf Embedded = 1,993 cf x 40.0% Voids
#2A	25.75'	1,030 cf	**StormTech MC-4500 +Cap** x 9 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		1,827 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.09 cfs @ 12.20 hrs HW=25.08' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Link 1L: Add to POC1

Inflow Area = 189,617 sf, 34.45% Impervious, Inflow Depth = 0.03" for 2 Year event
Inflow = 0.02 cfs @ 15.17 hrs, Volume= 509 cf
Primary = 0.02 cfs @ 15.17 hrs, Volume= 509 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Summary for Link ADD: (new Link)

Inflow Area = 57,337 sf, 41.80% Impervious, Inflow Depth = 0.80" for 2 Year event
Inflow = 0.98 cfs @ 12.11 hrs, Volume= 3,840 cf
Primary = 0.98 cfs @ 12.11 hrs, Volume= 3,840 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1: South - Undeveloped Runoff Area=96,297 sf 6.31% Impervious Runoff Depth=0.33"
Flow Length=365' Tc=11.4 min UI Adjusted CN=43 Runoff=0.25 cfs 2,617 cf

Subcatchment PR2: Parking and Drives Runoff Area=93,320 sf 63.49% Impervious Runoff Depth=2.45"
Flow Length=392' Tc=10.1 min CN=76 Runoff=5.30 cfs 19,079 cf

Subcatchment PR3: Buildings and Northerly O/S Runoff Area=29,748 sf 40.08% Impervious Runoff Depth=1.45"
Flow Length=272' Slope=0.0100 '/' Tc=12.5 min CN=63 Runoff=0.85 cfs 3,584 cf

Subcatchment PR4: Building and O/S Lot 1 Runoff Area=17,215 sf 34.27% Impervious Runoff Depth=1.18"
Flow Length=67' Slope=0.0100 '/' Tc=10.4 min CN=59 Runoff=0.40 cfs 1,690 cf

Subcatchment PR5: Northerly Side of Project to Old Runoff Area=12,291 sf 74.09% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=83 Runoff=0.99 cfs 3,159 cf

Subcatchment PR6: Road A - East of project Runoff Area=45,046 sf 32.99% Impervious Runoff Depth=1.11"
Tc=6.0 min CN=58 Runoff=1.14 cfs 4,183 cf

Pond POND1: Lot 3/4 Yard Drain Peak Elev=33.95' Storage=23 cf Inflow=0.85 cfs 3,584 cf
Discarded=0.04 cfs 263 cf Primary=0.81 cfs 3,321 cf Outflow=0.85 cfs 3,584 cf

Pond PSIS1: Proposed Subsurface Infiltration System 1 Peak Elev=26.90' Storage=955 cf Inflow=0.81 cfs 3,321 cf
Outflow=0.15 cfs 3,325 cf

Pond PSIS2: Proposed Subsurface Infiltration System Peak Elev=30.31' Storage=7,494 cf Inflow=5.30 cfs 19,079 cf
Discarded=0.39 cfs 17,781 cf Primary=0.49 cfs 1,302 cf Outflow=0.88 cfs 19,083 cf

Pond PSIS3: Proposed Subsurface Infiltration System 3 Peak Elev=26.54' Storage=412 cf Inflow=0.40 cfs 1,690 cf
Outflow=0.09 cfs 1,694 cf

Link 1L: Add to POC1 Inflow=0.64 cfs 3,920 cf
Primary=0.64 cfs 3,920 cf

Link ADD: (new Link) Inflow=2.13 cfs 7,341 cf
Primary=2.13 cfs 7,341 cf

Total Runoff Area = 293,917 sf Runoff Volume = 34,312 cf Average Runoff Depth = 1.40"
63.56% Pervious = 186,806 sf 36.44% Impervious = 107,111 sf

Summary for Subcatchment PR1: South - Undeveloped

Runoff = 0.25 cfs @ 12.45 hrs, Volume= 2,617 cf, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Adj	Description
6,075	98		Unconnected pavement, HSG A
4,949	77		Newly graded area, HSG A
85,273	39		>75% Grass cover, Good, HSG A
96,297	45	43	Weighted Average, UI Adjusted
90,222			93.69% Pervious Area
6,075			6.31% Impervious Area
6,075			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0120	0.09		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
1.9	315	0.0300	2.79		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
11.4	365	Total			

Summary for Subcatchment PR2: Parking and Drives

Runoff = 5.30 cfs @ 12.15 hrs, Volume= 19,079 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
59,246	98	Paved parking, HSG A
34,074	39	>75% Grass cover, Good, HSG A
93,320	76	Weighted Average
34,074		36.51% Pervious Area
59,246		63.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0200	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
0.6	127	0.0500	3.60		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	215	0.0100	2.03		**Shallow Concentrated Flow, Shallow2** Paved Kv= 20.3 fps
10.1	392	Total			

Summary for Subcatchment PR3: Buildings and Northerly O/S

Runoff = 0.85 cfs @ 12.19 hrs, Volume= 3,584 cf, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
11,922	98	Unconnected roofs, HSG A
17,826	39	>75% Grass cover, Good, HSG A
29,748	63	Weighted Average
17,826		59.92% Pervious Area
11,922		40.08% Impervious Area
11,922		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
2.3	222	0.0100	1.61		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
12.5	272	Total			

Summary for Subcatchment PR4: Building and O/S Lot 1

Runoff = 0.40 cfs @ 12.17 hrs, Volume= 1,690 cf, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
5,900	98	Roofs, HSG A
11,315	39	>75% Grass cover, Good, HSG A
17,215	59	Weighted Average
11,315		65.73% Pervious Area
5,900		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
0.2	17	0.0100	1.61		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
10.4	67	Total			

Summary for Subcatchment PR5: Northerly Side of Project to Old South Rd

Runoff = 0.99 cfs @ 12.09 hrs, Volume= 3,159 cf, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
9,106	98	Paved roads w/curbs & sewers, HSG A
3,185	39	>75% Grass cover, Good, HSG A
12,291	83	Weighted Average
3,185		25.91% Pervious Area
9,106		74.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Subcatchment PR6: Road A - East of project

Runoff = 1.14 cfs @ 12.11 hrs, Volume= 4,183 cf, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
14,862	98	Paved roads w/curbs & sewers, HSG A
30,184	39	>75% Grass cover, Good, HSG A
45,046	58	Weighted Average
30,184		67.01% Pervious Area
14,862		32.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Pond POND1: Lot 3/4 Yard Drain

Inflow Area = 29,748 sf, 40.08% Impervious, Inflow Depth = 1.45" for 10 Year event
Inflow = 0.85 cfs @ 12.19 hrs, Volume= 3,584 cf
Outflow = 0.85 cfs @ 12.21 hrs, Volume= 3,584 cf, Atten= 1%, Lag= 0.9 min
Discarded = 0.04 cfs @ 12.21 hrs, Volume= 263 cf
Primary = 0.81 cfs @ 12.21 hrs, Volume= 3,321 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 33.95' @ 12.21 hrs Surf.Area= 226 sf Storage= 23 cf

Plug-Flow detention time= 0.2 min calculated for 3,580 cf (100% of inflow)
Center-of-Mass det. time= 0.2 min (874.1 - 873.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.75'	1,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.75	4	0	0
34.00	275	35	35
34.50	750	256	291
35.00	2,100	713	1,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	33.75'	**Nyoplast 10" Dome Grate Inlet**
			Head (feet) 0.00 0.10 0.20 1.00
			Disch. (cfs) 0.000 0.280 0.800 1.800

Discarded OutFlow Max=0.04 cfs @ 12.21 hrs HW=33.95' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.80 cfs @ 12.21 hrs HW=33.95' TW=25.90' (Dynamic Tailwater)
↑—**2=Nyoplast 10" Dome Grate Inlet** (Custom Controls 0.80 cfs)

Summary for Pond PSIS1: Proposed Subsurface Infiltration System 1

Inflow Area =	29,748 sf, 40.08% Impervious,	Inflow Depth = 1.34"	for 10 Year event	
Inflow =	0.81 cfs @ 12.21 hrs,	Volume=	3,321 cf	
Outflow =	0.15 cfs @ 12.05 hrs,	Volume=	3,325 cf,	Atten= 81%, Lag= 0.0 min
Discarded =	0.15 cfs @ 12.05 hrs,	Volume=	3,325 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 26.90' @ 12.96 hrs Surf.Area= 781 sf Storage= 955 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 49.4 min (920.7 - 871.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,355 cf	**10.33'W x 75.54'L x 6.75'H Field A** 5,269 cf Overall - 1,882 cf Embedded = 3,387 cf x 40.0% Voids
#2A	25.75'	1,882 cf	**StormTech MC-4500 +Cap** x 17 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		3,237 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.15 cfs @ 12.05 hrs HW=25.16' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond PSIS2: Proposed Subsurface Infiltration System 2

Inflow Area =	93,320 sf, 63.49% Impervious,	Inflow Depth = 2.45"	for 10 Year event	
Inflow =	5.30 cfs @ 12.15 hrs,	Volume=	19,079 cf	
Outflow =	0.88 cfs @ 12.77 hrs,	Volume=	19,083 cf,	Atten= 83%, Lag= 37.1 min
Discarded =	0.39 cfs @ 11.70 hrs,	Volume=	17,781 cf	
Primary =	0.49 cfs @ 12.77 hrs,	Volume=	1,302 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 30.31' @ 12.77 hrs Surf.Area= 2,038 sf Storage= 7,494 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 168.8 min (1,005.8 - 837.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	3,373 cf	**28.50'W x 71.52'L x 6.75'H Field A** 13,758 cf Overall - 5,326 cf Embedded = 8,432 cf x 40.0% Voids
#2A	25.75'	5,326 cf	**StormTech MC-4500 +Cap** x 48 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 16 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		8,699 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	30.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.00' / 29.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Discarded OutFlow Max=0.39 cfs @ 11.70 hrs HW=25.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=0.49 cfs @ 12.77 hrs HW=30.31' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 0.49 cfs @ 1.88 fps)

Summary for Pond PSIS3: Proposed Subsurface Infiltration System 3

Inflow Area =	17,215 sf, 34.27% Impervious,	Inflow Depth =	1.18"	for 10 Year event
Inflow =	0.40 cfs @ 12.17 hrs,	Volume=	1,690 cf	
Outflow =	0.09 cfs @ 12.05 hrs,	Volume=	1,694 cf,	Atten= 79%, Lag= 0.0 min
Discarded =	0.09 cfs @ 12.05 hrs,	Volume=	1,694 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 26.54' @ 12.83 hrs Surf.Area= 448 sf Storage= 412 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 34.3 min (918.6 - 884.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	797 cf	**10.33'W x 43.34'L x 6.75'H Field A** 3,023 cf Overall - 1,030 cf Embedded = 1,993 cf x 40.0% Voids
#2A	25.75'	1,030 cf	**StormTech MC-4500 +Cap** x 9 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		1,827 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.09 cfs @ 12.05 hrs HW=25.11' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Link 1L: Add to POC1

Inflow Area =	189,617 sf,	34.45% Impervious,	Inflow Depth =	0.25"	for 10 Year event
Inflow =	0.64 cfs @	12.76 hrs, Volume=	3,920 cf		
Primary =	0.64 cfs @	12.76 hrs, Volume=	3,920 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Summary for Link ADD: (new Link)

Inflow Area =	57,337 sf,	41.80% Impervious,	Inflow Depth =	1.54"	for 10 Year event
Inflow =	2.13 cfs @	12.10 hrs, Volume=	7,341 cf		
Primary =	2.13 cfs @	12.10 hrs, Volume=	7,341 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1: South - Undeveloped Runoff Area=96,297 sf 6.31% Impervious Runoff Depth=0.60"
Flow Length=365' Tc=11.4 min UI Adjusted CN=43 Runoff=0.64 cfs 4,850 cf

Subcatchment PR2: Parking and Drives Runoff Area=93,320 sf 63.49% Impervious Runoff Depth=3.21"
Flow Length=392' Tc=10.1 min CN=76 Runoff=6.94 cfs 24,949 cf

Subcatchment PR3: Buildings and Northerly O/S Runoff Area=29,748 sf 40.08% Impervious Runoff Depth=2.04"
Flow Length=272' Slope=0.0100 '/' Tc=12.5 min CN=63 Runoff=1.25 cfs 5,052 cf

Subcatchment PR4: Building and O/S Lot 1 Runoff Area=17,215 sf 34.27% Impervious Runoff Depth=1.71"
Flow Length=67' Slope=0.0100 '/' Tc=10.4 min CN=59 Runoff=0.63 cfs 2,456 cf

Subcatchment PR5: Northerly Side of Project to Old Runoff Area=12,291 sf 74.09% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=83 Runoff=1.25 cfs 4,001 cf

Subcatchment PR6: Road A - East of project Runoff Area=45,046 sf 32.99% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=58 Runoff=1.79 cfs 6,132 cf

Pond POND1: Lot 3/4 Yard Drain Peak Elev=34.17' Storage=93 cf Inflow=1.25 cfs 5,052 cf
Discarded=0.08 cfs 369 cf Primary=1.07 cfs 4,683 cf Outflow=1.15 cfs 5,052 cf

Pond PSIS1: Proposed Subsurface Infiltration System 1 Peak Elev=28.11' Storage=1,673 cf Inflow=1.07 cfs 4,683 cf
Outflow=0.15 cfs 4,690 cf

Pond PSIS2: Proposed Subsurface Infiltration System Peak Elev=30.82' Storage=7,940 cf Inflow=6.94 cfs 24,949 cf
Discarded=0.39 cfs 19,678 cf Primary=3.04 cfs 5,277 cf Outflow=3.44 cfs 24,955 cf

Pond PSIS3: Proposed Subsurface Infiltration System 3 Peak Elev=27.67' Storage=799 cf Inflow=0.63 cfs 2,456 cf
Outflow=0.09 cfs 2,462 cf

Link 1L: Add to POC1 Inflow=3.67 cfs 10,128 cf
Primary=3.67 cfs 10,128 cf

Link ADD: (new Link) Inflow=3.03 cfs 10,133 cf
Primary=3.03 cfs 10,133 cf

Total Runoff Area = 293,917 sf Runoff Volume = 47,440 cf Average Runoff Depth = 1.94"
63.56% Pervious = 186,806 sf 36.44% Impervious = 107,111 sf

Summary for Subcatchment PR1: South - Undeveloped

Runoff = 0.64 cfs @ 12.34 hrs, Volume= 4,850 cf, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Adj	Description
6,075	98		Unconnected pavement, HSG A
4,949	77		Newly graded area, HSG A
85,273	39		>75% Grass cover, Good, HSG A
96,297	45	43	Weighted Average, UI Adjusted
90,222			93.69% Pervious Area
6,075			6.31% Impervious Area
6,075			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0120	0.09		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
1.9	315	0.0300	2.79		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
11.4	365	Total			

Summary for Subcatchment PR2: Parking and Drives

Runoff = 6.94 cfs @ 12.15 hrs, Volume= 24,949 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
59,246	98	Paved parking, HSG A
34,074	39	>75% Grass cover, Good, HSG A
93,320	76	Weighted Average
34,074		36.51% Pervious Area
59,246		63.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0200	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
0.6	127	0.0500	3.60		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	215	0.0100	2.03		**Shallow Concentrated Flow, Shallow2** Paved Kv= 20.3 fps
10.1	392	Total			

Summary for Subcatchment PR3: Buildings and Northerly O/S

Runoff = 1.25 cfs @ 12.19 hrs, Volume= 5,052 cf, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
11,922	98	Unconnected roofs, HSG A
17,826	39	>75% Grass cover, Good, HSG A
29,748	63	Weighted Average
17,826		59.92% Pervious Area
11,922		40.08% Impervious Area
11,922		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
2.3	222	0.0100	1.61		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
12.5	272	Total			

Summary for Subcatchment PR4: Building and O/S Lot 1

Runoff = 0.63 cfs @ 12.16 hrs, Volume= 2,456 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
5,900	98	Roofs, HSG A
11,315	39	>75% Grass cover, Good, HSG A
17,215	59	Weighted Average
11,315		65.73% Pervious Area
5,900		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
0.2	17	0.0100	1.61		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
10.4	67	Total			

Summary for Subcatchment PR5: Northerly Side of Project to Old South Rd

Runoff = 1.25 cfs @ 12.09 hrs, Volume= 4,001 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
9,106	98	Paved roads w/curbs & sewers, HSG A
3,185	39	>75% Grass cover, Good, HSG A
12,291	83	Weighted Average
3,185		25.91% Pervious Area
9,106		74.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Subcatchment PR6: Road A - East of project

Runoff = 1.79 cfs @ 12.10 hrs, Volume= 6,132 cf, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.80"

Area (sf)	CN	Description
14,862	98	Paved roads w/curbs & sewers, HSG A
30,184	39	>75% Grass cover, Good, HSG A
45,046	58	Weighted Average
30,184		67.01% Pervious Area
14,862		32.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Pond POND1: Lot 3/4 Yard Drain

Inflow Area = 29,748 sf, 40.08% Impervious, Inflow Depth = 2.04" for 25 Year event
Inflow = 1.25 cfs @ 12.19 hrs, Volume= 5,052 cf
Outflow = 1.15 cfs @ 12.25 hrs, Volume= 5,052 cf, Atten= 8%, Lag= 3.6 min
Discarded = 0.08 cfs @ 12.25 hrs, Volume= 369 cf
Primary = 1.07 cfs @ 12.25 hrs, Volume= 4,683 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 34.17' @ 12.25 hrs Surf.Area= 432 sf Storage= 93 cf

Plug-Flow detention time= 0.4 min calculated for 5,046 cf (100% of inflow)
Center-of-Mass det. time= 0.4 min (863.5 - 863.1)

Volume	Invert	Avail.Storage	Storage Description
#1	33.75'	1,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.75	4	0	0
34.00	275	35	35
34.50	750	256	291
35.00	2,100	713	1,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	33.75'	**Nyoplast 10" Dome Grate Inlet** Head (feet) 0.00 0.10 0.20 1.00 Disch. (cfs) 0.000 0.280 0.800 1.800

Discarded OutFlow Max=0.08 cfs @ 12.25 hrs HW=34.16' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=1.07 cfs @ 12.25 hrs HW=34.16' TW=26.48' (Dynamic Tailwater)
└**2=Nyoplast 10" Dome Grate Inlet** (Custom Controls 1.07 cfs)

Summary for Pond PSIS1: Proposed Subsurface Infiltration System 1

Inflow Area =	29,748 sf,	40.08% Impervious,	Inflow Depth =	1.89"	for 25 Year event
Inflow =	1.07 cfs @	12.25 hrs, Volume=	4,683 cf		
Outflow =	0.15 cfs @	11.90 hrs, Volume=	4,690 cf,	Atten= 86%,	Lag= 0.0 min
Discarded =	0.15 cfs @	11.90 hrs, Volume=	4,690 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 28.11' @ 13.38 hrs Surf.Area= 781 sf Storage= 1,673 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 101.1 min (962.8 - 861.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,355 cf	**10.33'W x 75.54'L x 6.75'H Field A** 5,269 cf Overall - 1,882 cf Embedded = 3,387 cf x 40.0% Voids
#2A	25.75'	1,882 cf	**StormTech MC-4500 +Cap** x 17 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		3,237 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.15 cfs @ 11.90 hrs HW=25.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond PSIS2: Proposed Subsurface Infiltration System 2

Inflow Area =	93,320 sf,	63.49% Impervious,	Inflow Depth =	3.21"	for 25 Year event
Inflow =	6.94 cfs @	12.15 hrs, Volume=	24,949 cf		
Outflow =	3.44 cfs @	12.41 hrs, Volume=	24,955 cf,	Atten= 51%,	Lag= 15.6 min
Discarded =	0.39 cfs @	11.50 hrs, Volume=	19,678 cf		
Primary =	3.04 cfs @	12.41 hrs, Volume=	5,277 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 30.82' @ 12.41 hrs Surf.Area= 2,038 sf Storage= 7,940 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 148.1 min (977.4 - 829.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	3,373 cf	**28.50'W x 71.52'L x 6.75'H Field A** 13,758 cf Overall - 5,326 cf Embedded = 8,432 cf x 40.0% Voids
#2A	25.75'	5,326 cf	**StormTech MC-4500 +Cap** x 48 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 16 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		8,699 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	30.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.00' / 29.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Discarded OutFlow Max=0.39 cfs @ 11.50 hrs HW=25.09' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=3.00 cfs @ 12.41 hrs HW=30.81' TW=0.00' (Dynamic Tailwater)
2=Culvert (Inlet Controls 3.00 cfs @ 3.07 fps)

Summary for Pond PSIS3: Proposed Subsurface Infiltration System 3

Inflow Area =	17,215 sf, 34.27% Impervious,	Inflow Depth = 1.71"	for 25 Year event	
Inflow =	0.63 cfs @ 12.16 hrs,	Volume=	2,456 cf	
Outflow =	0.09 cfs @ 11.95 hrs,	Volume=	2,462 cf,	Atten= 86%, Lag= 0.0 min
Discarded =	0.09 cfs @ 11.95 hrs,	Volume=	2,462 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 27.67' @ 13.22 hrs Surf.Area= 448 sf Storage= 799 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 82.6 min (954.5 - 871.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	797 cf	**10.33'W x 43.34'L x 6.75'H Field A** 3,023 cf Overall - 1,030 cf Embedded = 1,993 cf x 40.0% Voids
#2A	25.75'	1,030 cf	**StormTech MC-4500 +Cap** x 9 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		1,827 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.09 cfs @ 11.95 hrs HW=25.10' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.09 cfs)

Summary for Link 1L: Add to POC1

Inflow Area =	189,617 sf,	34.45% Impervious,	Inflow Depth =	0.64"	for 25 Year event
Inflow =	3.67 cfs @	12.40 hrs, Volume=	10,128 cf		
Primary =	3.67 cfs @	12.40 hrs, Volume=	10,128 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Summary for Link ADD: (new Link)

Inflow Area =	57,337 sf,	41.80% Impervious,	Inflow Depth =	2.12"	for 25 Year event
Inflow =	3.03 cfs @	12.10 hrs, Volume=	10,133 cf		
Primary =	3.03 cfs @	12.10 hrs, Volume=	10,133 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1: South - Undeveloped Runoff Area=96,297 sf 6.31% Impervious Runoff Depth=0.87"
Flow Length=365' Tc=11.4 min UI Adjusted CN=43 Runoff=1.11 cfs 6,950 cf

Subcatchment PR2: Parking and Drives Runoff Area=93,320 sf 63.49% Impervious Runoff Depth=3.82"
Flow Length=392' Tc=10.1 min CN=76 Runoff=8.25 cfs 29,671 cf

Subcatchment PR3: Buildings and Northerly O/S Runoff Area=29,748 sf 40.08% Impervious Runoff Depth=2.53"
Flow Length=272' Slope=0.0100 '/' Tc=12.5 min CN=63 Runoff=1.58 cfs 6,278 cf

Subcatchment PR4: Building and O/S Lot 1 Runoff Area=17,215 sf 34.27% Impervious Runoff Depth=2.17"
Flow Length=67' Slope=0.0100 '/' Tc=10.4 min CN=59 Runoff=0.81 cfs 3,107 cf

Subcatchment PR5: Northerly Side of Project to Old Runoff Area=12,291 sf 74.09% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=83 Runoff=1.45 cfs 4,668 cf

Subcatchment PR6: Road A - East of project Runoff Area=45,046 sf 32.99% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=58 Runoff=2.34 cfs 7,793 cf

Pond POND1: Lot 3/4 Yard Drain Peak Elev=34.34' Storage=181 cf Inflow=1.58 cfs 6,278 cf
Discarded=0.11 cfs 467 cf Primary=1.28 cfs 5,811 cf Outflow=1.40 cfs 6,278 cf

Pond PSIS1: Proposed Subsurface Infiltration System 1 Peak Elev=29.33' Storage=2,337 cf Inflow=1.28 cfs 5,811 cf
Outflow=0.15 cfs 5,814 cf

Pond PSIS2: Proposed Subsurface Infiltration System Peak Elev=31.11' Storage=8,180 cf Inflow=8.25 cfs 29,671 cf
Discarded=0.39 cfs 21,037 cf Primary=5.06 cfs 8,666 cf Outflow=5.45 cfs 29,703 cf

Pond PSIS3: Proposed Subsurface Infiltration System 3 Peak Elev=28.86' Storage=1,176 cf Inflow=0.81 cfs 3,107 cf
Outflow=0.09 cfs 3,108 cf

Link 1L: Add to POC1 Inflow=6.13 cfs 15,616 cf
Primary=6.13 cfs 15,616 cf

Link ADD: (new Link) Inflow=3.79 cfs 12,461 cf
Primary=3.79 cfs 12,461 cf

Total Runoff Area = 293,917 sf Runoff Volume = 58,466 cf Average Runoff Depth = 2.39"
63.56% Pervious = 186,806 sf 36.44% Impervious = 107,111 sf

Summary for Subcatchment PR1: South - Undeveloped

Runoff = 1.11 cfs @ 12.24 hrs, Volume= 6,950 cf, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Adj	Description
6,075	98		Unconnected pavement, HSG A
4,949	77		Newly graded area, HSG A
85,273	39		>75% Grass cover, Good, HSG A
96,297	45	43	Weighted Average, UI Adjusted
90,222			93.69% Pervious Area
6,075			6.31% Impervious Area
6,075			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0120	0.09		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
1.9	315	0.0300	2.79		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
11.4	365	Total			

Summary for Subcatchment PR2: Parking and Drives

Runoff = 8.25 cfs @ 12.14 hrs, Volume= 29,671 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
59,246	98	Paved parking, HSG A
34,074	39	>75% Grass cover, Good, HSG A
93,320	76	Weighted Average
34,074		36.51% Pervious Area
59,246		63.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0200	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
0.6	127	0.0500	3.60		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	215	0.0100	2.03		**Shallow Concentrated Flow, Shallow2** Paved Kv= 20.3 fps
10.1	392	Total			

Summary for Subcatchment PR3: Buildings and Northerly O/S

Runoff = 1.58 cfs @ 12.18 hrs, Volume= 6,278 cf, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
11,922	98	Unconnected roofs, HSG A
17,826	39	>75% Grass cover, Good, HSG A
29,748	63	Weighted Average
17,826		59.92% Pervious Area
11,922		40.08% Impervious Area
11,922		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
2.3	222	0.0100	1.61		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
12.5	272	Total			

Summary for Subcatchment PR4: Building and O/S Lot 1

Runoff = 0.81 cfs @ 12.16 hrs, Volume= 3,107 cf, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
5,900	98	Roofs, HSG A
11,315	39	>75% Grass cover, Good, HSG A
17,215	59	Weighted Average
11,315		65.73% Pervious Area
5,900		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
0.2	17	0.0100	1.61		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
10.4	67	Total			

Summary for Subcatchment PR5: Northerly Side of Project to Old South Rd

Runoff = 1.45 cfs @ 12.09 hrs, Volume= 4,668 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
9,106	98	Paved roads w/curbs & sewers, HSG A
3,185	39	>75% Grass cover, Good, HSG A
12,291	83	Weighted Average
3,185		25.91% Pervious Area
9,106		74.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Subcatchment PR6: Road A - East of project

Runoff = 2.34 cfs @ 12.10 hrs, Volume= 7,793 cf, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=6.50"

Area (sf)	CN	Description
14,862	98	Paved roads w/curbs & sewers, HSG A
30,184	39	>75% Grass cover, Good, HSG A
45,046	58	Weighted Average
30,184		67.01% Pervious Area
14,862		32.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Pond POND1: Lot 3/4 Yard Drain

Inflow Area = 29,748 sf, 40.08% Impervious, Inflow Depth = 2.53" for 50 Year event
Inflow = 1.58 cfs @ 12.18 hrs, Volume= 6,278 cf
Outflow = 1.40 cfs @ 12.26 hrs, Volume= 6,278 cf, Atten= 12%, Lag= 4.6 min
Discarded = 0.11 cfs @ 12.26 hrs, Volume= 467 cf
Primary = 1.28 cfs @ 12.26 hrs, Volume= 5,811 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 34.34' @ 12.26 hrs Surf.Area= 594 sf Storage= 181 cf

Plug-Flow detention time= 0.6 min calculated for 6,270 cf (100% of inflow)
Center-of-Mass det. time= 0.6 min (857.2 - 856.6)

Volume	Invert	Avail.Storage	Storage Description
#1	33.75'	1,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.75	4	0	0
34.00	275	35	35
34.50	750	256	291
35.00	2,100	713	1,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	33.75'	**Nyoplast 10" Dome Grate Inlet** Head (feet) 0.00 0.10 0.20 1.00 Disch. (cfs) 0.000 0.280 0.800 1.800

Discarded OutFlow Max=0.11 cfs @ 12.26 hrs HW=34.33' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=1.28 cfs @ 12.26 hrs HW=34.33' TW=26.93' (Dynamic Tailwater)
2=Nyoplast 10" Dome Grate Inlet (Custom Controls 1.28 cfs)

Summary for Pond PSIS1: Proposed Subsurface Infiltration System 1

Inflow Area =	29,748 sf,	40.08% Impervious,	Inflow Depth =	2.34"	for 50 Year event
Inflow =	1.28 cfs @	12.26 hrs,	Volume=	5,811 cf	
Outflow =	0.15 cfs @	11.85 hrs,	Volume=	5,814 cf,	Atten= 88%, Lag= 0.0 min
Discarded =	0.15 cfs @	11.85 hrs,	Volume=	5,814 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 29.33' @ 13.92 hrs Surf.Area= 781 sf Storage= 2,337 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 149.5 min (1,005.5 - 856.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,355 cf	**10.33'W x 75.54'L x 6.75'H Field A** 5,269 cf Overall - 1,882 cf Embedded = 3,387 cf x 40.0% Voids
#2A	25.75'	1,882 cf	**StormTech MC-4500 +Cap** x 17 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		3,237 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.15 cfs @ 11.85 hrs HW=25.10' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.15 cfs)

Summary for Pond PSIS2: Proposed Subsurface Infiltration System 2

Inflow Area =	93,320 sf,	63.49% Impervious,	Inflow Depth =	3.82"	for 50 Year event
Inflow =	8.25 cfs @	12.14 hrs,	Volume=	29,671 cf	
Outflow =	5.45 cfs @	12.30 hrs,	Volume=	29,703 cf,	Atten= 34%, Lag= 9.6 min
Discarded =	0.39 cfs @	11.30 hrs,	Volume=	21,037 cf	
Primary =	5.06 cfs @	12.30 hrs,	Volume=	8,666 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 31.11' @ 12.30 hrs Surf.Area= 2,038 sf Storage= 8,180 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 135.7 min (960.1 - 824.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	3,373 cf	**28.50'W x 71.52'L x 6.75'H Field A** 13,758 cf Overall - 5,326 cf Embedded = 8,432 cf x 40.0% Voids
#2A	25.75'	5,326 cf	**StormTech MC-4500 +Cap** x 48 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 16 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		8,699 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	30.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.00' / 29.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Discarded OutFlow Max=0.39 cfs @ 11.30 hrs HW=25.08' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=5.00 cfs @ 12.30 hrs HW=31.11' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 5.00 cfs @ 3.58 fps)

Summary for Pond PSIS3: Proposed Subsurface Infiltration System 3

Inflow Area =	17,215 sf, 34.27% Impervious,	Inflow Depth =	2.17"	for 50 Year event
Inflow =	0.81 cfs @ 12.16 hrs,	Volume=	3,107 cf	
Outflow =	0.09 cfs @ 11.85 hrs,	Volume=	3,108 cf,	Atten= 89%, Lag= 0.0 min
Discarded =	0.09 cfs @ 11.85 hrs,	Volume=	3,108 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 28.86' @ 13.82 hrs Surf.Area= 448 sf Storage= 1,176 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 131.5 min (996.0 - 864.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	797 cf	**10.33'W x 43.34'L x 6.75'H Field A** 3,023 cf Overall - 1,030 cf Embedded = 1,993 cf x 40.0% Voids
#2A	25.75'	1,030 cf	**StormTech MC-4500 +Cap** x 9 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		1,827 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.09 cfs @ 11.85 hrs HW=25.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Link 1L: Add to POC1

Inflow Area =	189,617 sf,	34.45% Impervious,	Inflow Depth =	0.99" for 50 Year event
Inflow =	6.13 cfs @	12.30 hrs, Volume=	15,616 cf	
Primary =	6.13 cfs @	12.30 hrs, Volume=	15,616 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Summary for Link ADD: (new Link)

Inflow Area =	57,337 sf,	41.80% Impervious,	Inflow Depth =	2.61" for 50 Year event
Inflow =	3.79 cfs @	12.10 hrs, Volume=	12,461 cf	
Primary =	3.79 cfs @	12.10 hrs, Volume=	12,461 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1: South - Undeveloped Runoff Area=96,297 sf 6.31% Impervious Runoff Depth=1.16"
Flow Length=365' Tc=11.4 min UI Adjusted CN=43 Runoff=1.75 cfs 9,326 cf

Subcatchment PR2: Parking and Drives Runoff Area=93,320 sf 63.49% Impervious Runoff Depth=4.44"
Flow Length=392' Tc=10.1 min CN=76 Runoff=9.57 cfs 34,496 cf

Subcatchment PR3: Buildings and Northerly O/S Runoff Area=29,748 sf 40.08% Impervious Runoff Depth=3.05"
Flow Length=272' Slope=0.0100 '/' Tc=12.5 min CN=63 Runoff=1.92 cfs 7,564 cf

Subcatchment PR4: Building and O/S Lot 1 Runoff Area=17,215 sf 34.27% Impervious Runoff Depth=2.65"
Flow Length=67' Slope=0.0100 '/' Tc=10.4 min CN=59 Runoff=1.01 cfs 3,796 cf

Subcatchment PR5: Northerly Side of Project to Old Runoff Area=12,291 sf 74.09% Impervious Runoff Depth=5.22"
Tc=6.0 min CN=83 Runoff=1.65 cfs 5,343 cf

Subcatchment PR6: Road A - East of project Runoff Area=45,046 sf 32.99% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=58 Runoff=2.92 cfs 9,558 cf

Pond POND1: Lot 3/4 Yard Drain Peak Elev=34.50' Storage=293 cf Inflow=1.92 cfs 7,564 cf
Discarded=0.14 cfs 575 cf Primary=1.49 cfs 6,989 cf Outflow=1.63 cfs 7,564 cf

Pond PSIS1: Proposed Subsurface Infiltration System 1 Peak Elev=31.24' Storage=3,077 cf Inflow=1.49 cfs 6,989 cf
Outflow=0.15 cfs 6,990 cf

Pond PSIS2: Proposed Subsurface Infiltration System Peak Elev=31.45' Storage=8,450 cf Inflow=9.57 cfs 34,496 cf
Discarded=0.39 cfs 22,242 cf Primary=7.15 cfs 12,268 cf Outflow=7.54 cfs 34,509 cf

Pond PSIS3: Proposed Subsurface Infiltration System 3 Peak Elev=30.55' Storage=1,612 cf Inflow=1.01 cfs 3,796 cf
Outflow=0.09 cfs 3,800 cf

Link 1L: Add to POC1 Inflow=8.84 cfs 21,594 cf
Primary=8.84 cfs 21,594 cf

Link ADD: (new Link) Inflow=4.57 cfs 14,901 cf
Primary=4.57 cfs 14,901 cf

Total Runoff Area = 293,917 sf Runoff Volume = 70,083 cf Average Runoff Depth = 2.86"
63.56% Pervious = 186,806 sf 36.44% Impervious = 107,111 sf

Summary for Subcatchment PR1: South - Undeveloped

Runoff = 1.75 cfs @ 12.21 hrs, Volume= 9,326 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Adj	Description
6,075	98		Unconnected pavement, HSG A
4,949	77		Newly graded area, HSG A
85,273	39		>75% Grass cover, Good, HSG A
96,297	45	43	Weighted Average, UI Adjusted
90,222			93.69% Pervious Area
6,075			6.31% Impervious Area
6,075			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0120	0.09		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
1.9	315	0.0300	2.79		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
11.4	365	Total			

Summary for Subcatchment PR2: Parking and Drives

Runoff = 9.57 cfs @ 12.14 hrs, Volume= 34,496 cf, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
59,246	98	Paved parking, HSG A
34,074	39	>75% Grass cover, Good, HSG A
93,320	76	Weighted Average
34,074		36.51% Pervious Area
59,246		63.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0200	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
0.6	127	0.0500	3.60		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
1.8	215	0.0100	2.03		**Shallow Concentrated Flow, Shallow2** Paved Kv= 20.3 fps
10.1	392	Total			

Summary for Subcatchment PR3: Buildings and Northerly O/S

Runoff = 1.92 cfs @ 12.18 hrs, Volume= 7,564 cf, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
11,922	98	Unconnected roofs, HSG A
17,826	39	>75% Grass cover, Good, HSG A
29,748	63	Weighted Average
17,826		59.92% Pervious Area
11,922		40.08% Impervious Area
11,922		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.60"
2.3	222	0.0100	1.61		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
12.5	272	Total			

Summary for Subcatchment PR4: Building and O/S Lot 1

Runoff = 1.01 cfs @ 12.16 hrs, Volume= 3,796 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
5,900	98	Roofs, HSG A
11,315	39	>75% Grass cover, Good, HSG A
17,215	59	Weighted Average
11,315		65.73% Pervious Area
5,900		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0100	0.08		**Sheet Flow, Sheet1** Grass: Dense n= 0.240 P2= 3.60"
0.2	17	0.0100	1.61		**Shallow Concentrated Flow, Shallow1** Unpaved Kv= 16.1 fps
10.4	67	Total			

Summary for Subcatchment PR5: Northerly Side of Project to Old South Rd

Runoff = 1.65 cfs @ 12.09 hrs, Volume= 5,343 cf, Depth= 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
9,106	98	Paved roads w/curbs & sewers, HSG A
3,185	39	>75% Grass cover, Good, HSG A
12,291	83	Weighted Average
3,185		25.91% Pervious Area
9,106		74.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Subcatchment PR6: Road A - East of project

Runoff = 2.92 cfs @ 12.10 hrs, Volume= 9,558 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=7.20"

Area (sf)	CN	Description
14,862	98	Paved roads w/curbs & sewers, HSG A
30,184	39	>75% Grass cover, Good, HSG A
45,046	58	Weighted Average
30,184		67.01% Pervious Area
14,862		32.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Tc = 0.1h**

Summary for Pond POND1: Lot 3/4 Yard Drain

Inflow Area = 29,748 sf, 40.08% Impervious, Inflow Depth = 3.05" for 100 Year event
Inflow = 1.92 cfs @ 12.18 hrs, Volume= 7,564 cf
Outflow = 1.63 cfs @ 12.27 hrs, Volume= 7,564 cf, Atten= 15%, Lag= 5.3 min
Discarded = 0.14 cfs @ 12.27 hrs, Volume= 575 cf
Primary = 1.49 cfs @ 12.27 hrs, Volume= 6,989 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 34.50' @ 12.27 hrs Surf.Area= 756 sf Storage= 293 cf

Plug-Flow detention time= 0.9 min calculated for 7,555 cf (100% of inflow)
Center-of-Mass det. time= 0.9 min (851.9 - 851.0)

Volume	Invert	Avail.Storage	Storage Description
#1	33.75'	1,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.75	4	0	0
34.00	275	35	35
34.50	750	256	291
35.00	2,100	713	1,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	33.75'	**Nyoplast 10" Dome Grate Inlet** Head (feet) 0.00 0.10 0.20 1.00 Disch. (cfs) 0.000 0.280 0.800 1.800

Discarded OutFlow Max=0.14 cfs @ 12.27 hrs HW=34.49' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.48 cfs @ 12.27 hrs HW=34.49' TW=27.41' (Dynamic Tailwater)
└**2=Nyoplast 10" Dome Grate Inlet** (Custom Controls 1.48 cfs)

Summary for Pond PSIS1: Proposed Subsurface Infiltration System 1

Inflow Area =	29,748 sf,	40.08% Impervious,	Inflow Depth =	2.82"	for 100 Year event
Inflow =	1.49 cfs @	12.27 hrs,	Volume=	6,989 cf	
Outflow =	0.15 cfs @	11.80 hrs,	Volume=	6,990 cf,	Atten= 90%, Lag= 0.0 min
Discarded =	0.15 cfs @	11.80 hrs,	Volume=	6,990 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 31.24' @ 14.38 hrs Surf.Area= 781 sf Storage= 3,077 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 204.2 min (1,055.4 - 851.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,355 cf	**10.33'W x 75.54'L x 6.75'H Field A** 5,269 cf Overall - 1,882 cf Embedded = 3,387 cf x 40.0% Voids
#2A	25.75'	1,882 cf	**StormTech MC-4500 +Cap** x 17 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		3,237 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.15 cfs @ 11.80 hrs HW=25.11' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond PSIS2: Proposed Subsurface Infiltration System 2

Inflow Area =	93,320 sf,	63.49% Impervious,	Inflow Depth =	4.44"	for 100 Year event
Inflow =	9.57 cfs @	12.14 hrs,	Volume=	34,496 cf	
Outflow =	7.54 cfs @	12.24 hrs,	Volume=	34,509 cf,	Atten= 21%, Lag= 6.1 min
Discarded =	0.39 cfs @	11.05 hrs,	Volume=	22,242 cf	
Primary =	7.15 cfs @	12.24 hrs,	Volume=	12,268 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 31.45' @ 12.25 hrs Surf.Area= 2,038 sf Storage= 8,450 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 125.2 min (945.3 - 820.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	3,373 cf	**28.50'W x 71.52'L x 6.75'H Field A** 13,758 cf Overall - 5,326 cf Embedded = 8,432 cf x 40.0% Voids
#2A	25.75'	5,326 cf	**StormTech MC-4500 +Cap** x 48 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 16 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		8,699 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	30.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.00' / 29.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Discarded OutFlow Max=0.39 cfs @ 11.05 hrs HW=25.09' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=7.09 cfs @ 12.24 hrs HW=31.43' TW=0.00' (Dynamic Tailwater)
└2=Culvert (Inlet Controls 7.09 cfs @ 4.08 fps)

Summary for Pond PSIS3: Proposed Subsurface Infiltration System 3

Inflow Area =	17,215 sf,	34.27% Impervious,	Inflow Depth = 2.65"	for 100 Year event
Inflow =	1.01 cfs @	12.16 hrs, Volume=	3,796 cf	
Outflow =	0.09 cfs @	11.80 hrs, Volume=	3,800 cf, Atten= 92%, Lag= 0.0 min	
Discarded =	0.09 cfs @	11.80 hrs, Volume=	3,800 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 30.55' @ 14.31 hrs Surf.Area= 448 sf Storage= 1,612 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 189.3 min (1,047.6 - 858.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	797 cf	**10.33'W x 43.34'L x 6.75'H Field A** 3,023 cf Overall - 1,030 cf Embedded = 1,993 cf x 40.0% Voids
#2A	25.75'	1,030 cf	**StormTech MC-4500 +Cap** x 9 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap Cap Storage= +35.7 cf x 2 x 1 rows = 71.4 cf
		1,827 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.09 cfs @ 11.80 hrs HW=25.09' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.09 cfs)

Summary for Link 1L: Add to POC1

Inflow Area =	189,617 sf,	34.45% Impervious,	Inflow Depth =	1.37"	for 100 Year event
Inflow =	8.84 cfs @	12.24 hrs, Volume=	21,594 cf		
Primary =	8.84 cfs @	12.24 hrs, Volume=	21,594 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Summary for Link ADD: (new Link)

Inflow Area =	57,337 sf,	41.80% Impervious,	Inflow Depth =	3.12"	for 100 Year event
Inflow =	4.57 cfs @	12.10 hrs, Volume=	14,901 cf		
Primary =	4.57 cfs @	12.10 hrs, Volume=	14,901 cf,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

APPENDIX C:

Massachusetts DEP Storm Water Checklist

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

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

6/13/16

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:

Water Quality Calculations

To POC 1:

Water Quality Volume Calculation:

$$V_{wq} = d_{wq} \times A_{imp}$$

Where,

V_{wq} = Water Quality Volume

d_{wq} = Water Quality Depth (1.0-inch for Critical Areas, ½-inch for Non-Critical Areas)

A_{imp} = Impervious Area Directed to BMP (Sub-catchment PR2)

$$V_{wq} = (1.0") \left(\frac{1\ foot}{12\ inches}\right)(59{,}246\ sf)$$

$$V_{wq} = 4{,}937\ cf$$

PSIS2 Storage Volume = 8,576 cf

Proprietary Structure Sizing Calculation per MassDEP "Standard Method to Covert Required Water Quality Volume to a Discharge Rate (October 15, 2013):

Impervious Area to VortSentry = 59,246 sf (0.00213 sq. mi.).

Time of Concentration for Watershed PR1 = 10.1 minutes (0.17 hours)

Unit Peak Discharge (q_u) from DEP Figure 3: 700 csm/in

$$Q_{1.0"} = (q_u)(A_{imp})(d_{wq})$$

Where,

$Q_{1.0"}$ = Peak Flow Rate associated with the first 1.0-inches of runoff

q_u = Unit Peak Discharge, in Cubic Feet per Second per Square Mile per Inch (csm/in.)

A_{imp} = Impervious Area in Drainage Area in Square Miles

d_{wq} = Water Quality Depth in Inches

$$Q_{1.0"} = \left(700\frac{csm}{in}\right)(0.00213\ sq.mi.)(1.0\ in)$$

$$Q_{1.0"} = 1.49\ cfs$$

Maximum Design Flow Rate for VortSentry HS60 = 2.2 cfs

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Old South Road Crossing

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Proprietary Treatment Practice	0.75	0.75	0.56	0.19
Infiltration Basin	0.80	0.19	0.15	0.04
	0.00	0.04	0.00	0.04
	0.00	0.04	0.00	0.04

Total TSS Removal = 96%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: NAN-0107J
Prepared By: AMC
Date: 6/10/2016

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

NAN-0107J

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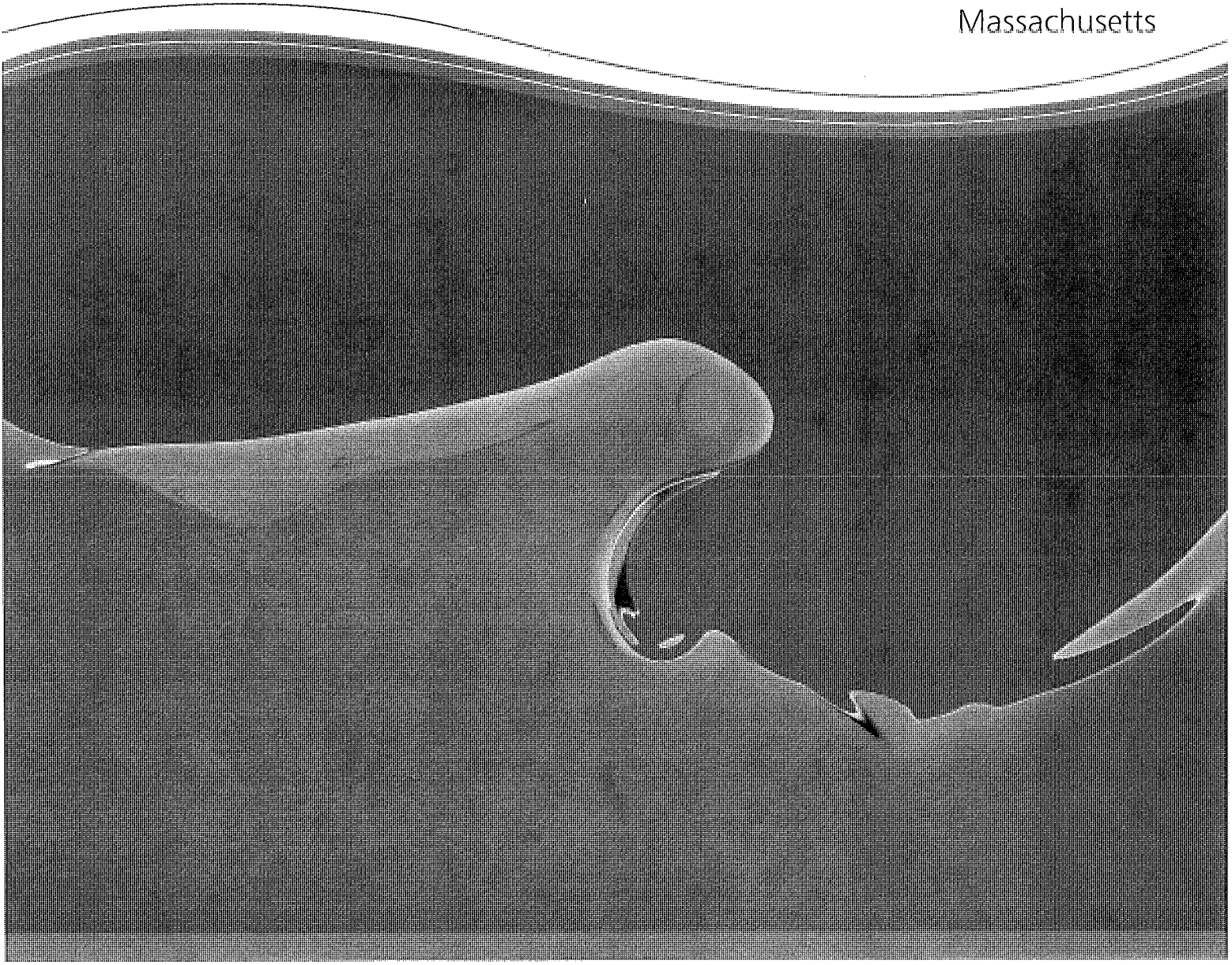
Hydrodynamic Separation Products Overview

Massachusetts



GDS

Vortechs®

VortSentry® HS

Available Models

Vortechs Model	Swirl Chamber Diameter		Internal Length		Peak Treatment Flow[1]		Sediment Storage[2]	
	ft	m	ft	m	cfs	L/s	yd3	m3
1000	3	0.9	9	2.7	1.6	45.3	0.7	0.5
2000	4	1.2	10	3	2.8	79.3	1.2	0.9
3000	5	1.5	11	3.4	4.5	127.4	1.8	1.4
4000	6	1.8	12	3.7	6	169.9	2.4	1.8
5000	7	2.1	13	4	8.5	240.7	3.2	2.4
7000	8	2.4	14	4.3	11	311.5	4	3.1
9000	9	2.7	15	4.6	14	396.4	4.8	3.7
11000	10	3	16	4.9	17.5	495.5	5.6	4.3
16000	12	3.7	18	5.5	25	707.9	7.1	5.4

1. Peak Treatment Flow is maximum flow treated for each unit listed. This flow represents an infrequent storm event such as a 10 or 25 yr storm.
   Standard Vortechs System depth below invert is 3' for all precast models.
   Cast-in-place system are available to treat higher flows. Check with your local representatives for specifications.
2. Maintenance recommended when sediment depth has accumulated to within 12-18 inches of the dry weather water surface elevation.

VortSentry HS Model	Swirl Chamber Diameter (ft)	Typical Depth Below Invert (ft)	Treatment Capacity (cfs)[1]	Max. Inlet/Outlet Pipe Diameter (in)	Maximum Sediment Storage Capacity (CF)
VortSentry HS36*	3	5.6	0.55	18	39
w/ 1' added sump	3	6.6	0.55	18	47
w/ 2' added sump	3	7.6	0.55	18	54
w/ 3' added sump	3	8.6	0.55	18	61
w/ 4' added sump	3	9.6	0.55	18	68
w/ 5' added sump	3	10.6	0.55	18	75
VortSentry HS48**	4	6.8	1.2	24	85
w/ 1' added sump	4	7.8	1.2	24	97
w/ 2' added sump	4	8.8	1.2	24	110
w/ 3' added sump	4	9.8	1.2	24	123
w/ 4' added sump	4	10.8	1.2	24	135
VortSentry HS60***	5	8.0	2.2	30	156
w/ 1' added sump	5	9.0	2.2	30	176
w/ 2' added sump	5	10.0	2.2	30	196
w/ 3' added sump	5	11.0	2.2	30	215

*maintenance recommended when sediment reaches a height of 3'-7" below water surface elevation in sump.
**maintenance recommended when sediment reaches a height of 4'-9" below water surface elevation in sump.
***maintenance recommended when sediment reaches a height of 6.0' below water surface elevation in sump.

1. Design Flow Rate is based on 80% removal of particle size distribution with an average particle size of 240 micron. This flow also represents the maximum flow prior to which bypass occurs.

Notes: Systems can be sized based on a water quality flow (e.g. 1 inch storm) or on a net annual basis depending on the local regulatory requirement.
When sizing based on a water quality storm, the required flow to be treated should be equal or less than the listed water quality flow for the selected system. Systems sized based on a water quality storm are generally more conservatively sized.
Additional particle size distributions are available for sizing purposes upon request.
Depth below invert is measured to the inside bottom of the system. This depth can be adjusted to meet specific storage or maintenance requirements.
Contact our support staff for the most cost effective sizing for your area.

APPENDIX E:

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

Construction Period Pollution Prevention Plan
Old South Road Crossing – Nantucket, MA
June 10, 2016

Project Name: Old South Road Crossing
Retail Liner Buildings
Nantucket, MA

Owner's Name: Richmond Great Point Development, LLC
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 (the "Applicant") propose to construct a multi-unit retail development to be known as "Old South Road Crossing" (the "Project") proximate to the intersection of Old South Road and Lovers Lane.

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					
PR2					
PR3					
PR4					
PR5					
PR6					

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)
Old South Road				

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			
VortSentry			
PSIS1			
PSIS2			
PSIS3			

Maintenance required: _____

_____

_____

_____

_____

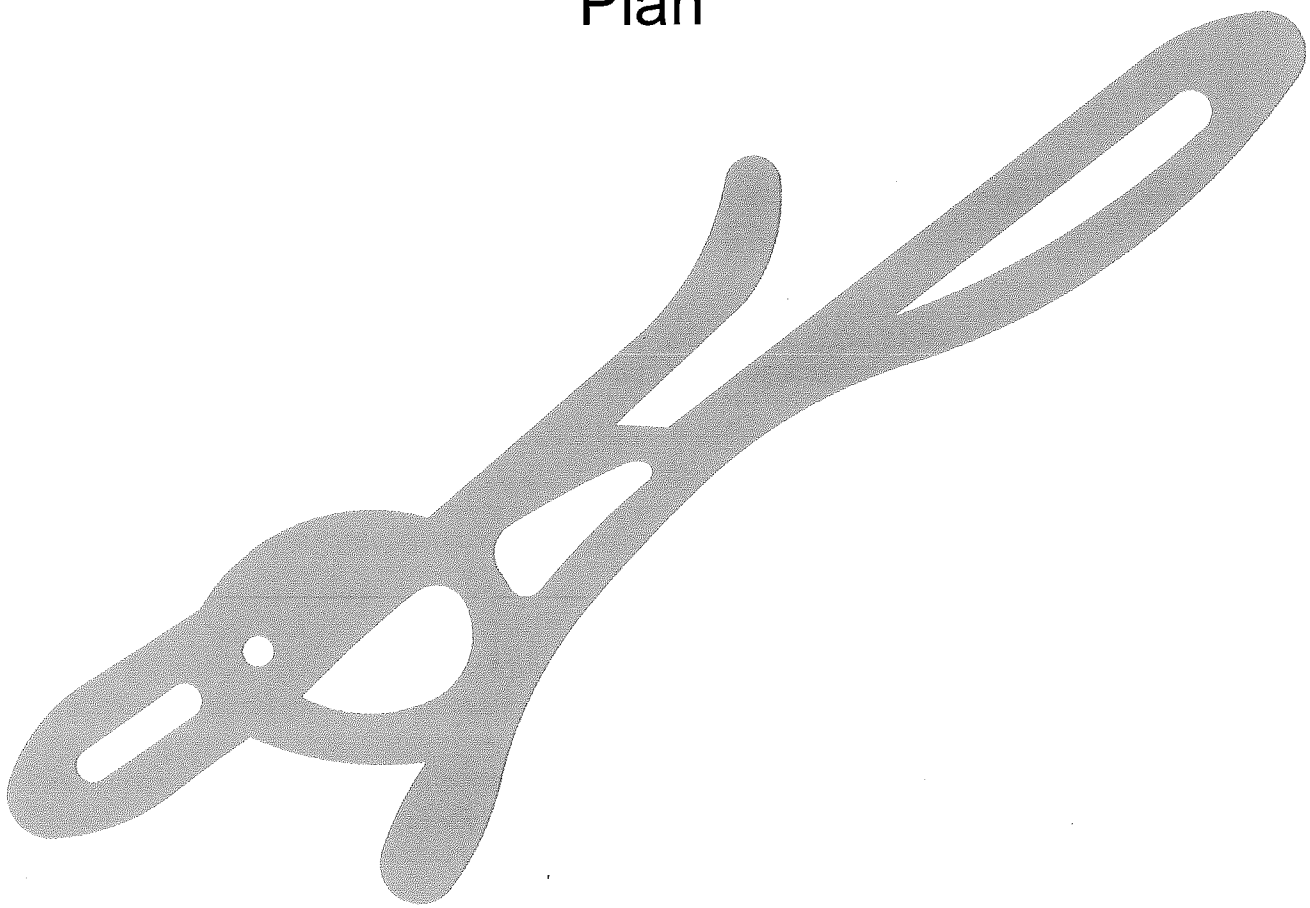
To be performed by: _____ on or before: _____

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 F:

Long Term Operation and Maintenance Plan



Long Term Operations and Maintenance Plan
Old South Road Crossing – Nantucket, MA
June 10, 2016

Project Name: Old South Road Crossing
Retail Liner Buildings
Nantucket, MA

Owner's Name: Richmond Great Point Development, LLC and
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 (the "Applicant") propose to construct a multi-unit retail development to be known as "Old South Road Crossing" (the "Project") proximate to the intersection of Old South Road and Lovers Lane.

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.

VortSentry HS – Swirl Particle Seperator

In accordance with Manufacturer's recommendations, accompanying this report.

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: _____

_____

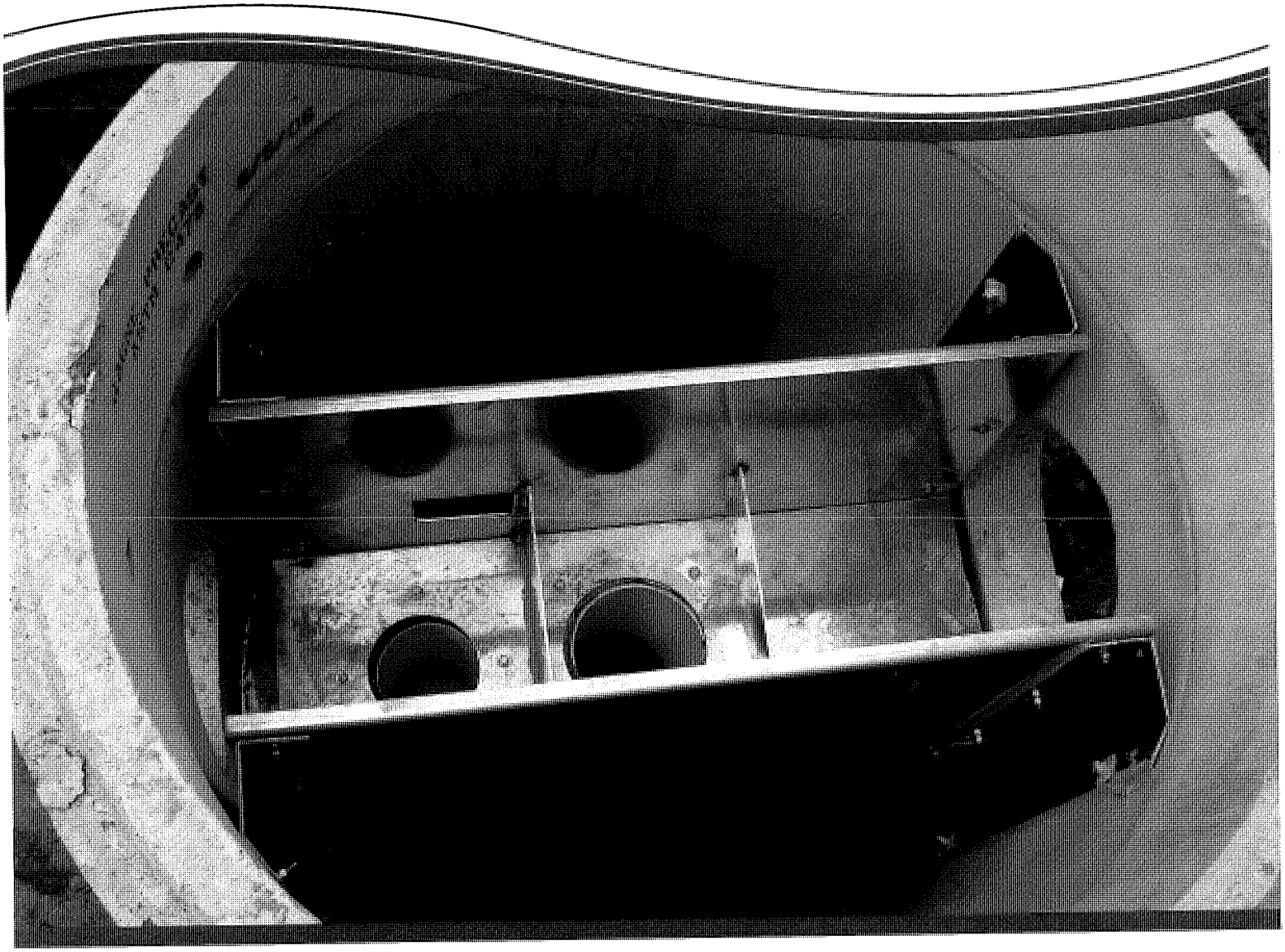
Inspection Type: ☐ Routine ☐ Spill ☐ Other: _____

☐ 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		

CONTECH®
ENGINEERED SOLUTIONS

VortSentry® HS Guide
Operation, Design, Performance and Maintenance



VortSentry® HS

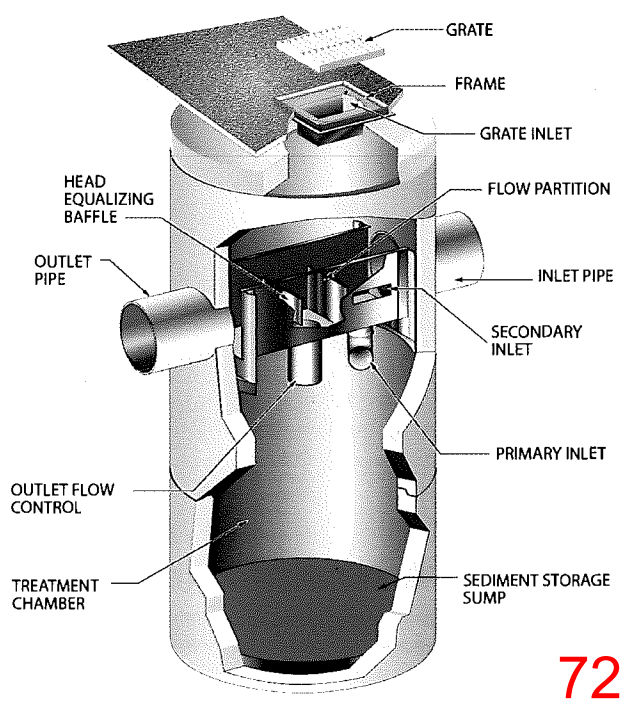
The VortSentry HS is a compact, below grade stormwater treatment system that employs helical flow technology to enhance gravitational separation of floating and settling pollutants from stormwater flows. With the ability to accept a wide range of pipe sizes, the VortSentry HS can treat and convey flows from small to large sites. A unique internal bypass design means higher flows can be diverted without the use of external bypass structures. The VortSentry HS is also available in a grate inlet configuration, which is ideal for retrofit installations.

Operation Overview

Low, frequently occurring storm flows are directed into the treatment chamber through the primary inlet. The tangentially oriented downward pipe induces a swirling motion in the treatment chamber that increases capture and containment abilities. Moderate storm flows are directed into the treatment chamber through the secondary inlet, which allows for capture of floating trash and debris. The secondary inlet also provides for treatment of higher flows without significantly increasing the velocity or turbulence in the treatment chamber. This allows for a more quiescent separation environment. Settleable solids and floating pollutants are captured and contained in the treatment chamber.

Flow exits the treatment chamber through the outlet flow control, which manages the amount of flow that is treated and helps maintain the helical flow patterns developed within the treatment chamber.

Flows exceeding the system's rated treatment flow are diverted away from the treatment chamber by the flow partition. Internal diversion of high flows eliminates the need for external bypass structures. During bypass, the head equalizing baffle applies head on the outlet flow control to limit the flow through the treatment chamber. This helps prevent re-suspension of previously captured pollutants.



Design Basics

There are two primary methods of sizing a VortSentry HS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow for a defined particle size. The summation process of the Rational Rainfall Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically, VortSentry HS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a particle gradation with an average particle size (d_{50}) of 240-microns (μm).

Water Quality Flow Rate Method

In many cases, regulations require that a specific flow rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval (i.e. the six-month storm) or a water quality depth (i.e. 1/2-inch of rainfall).

The VortSentry HS is designed to treat all flows up to the WQQ. Due to its internal bypass weir configuration, flow rates in the treatment chamber only increase minimally once the WQQ is surpassed. At influent rates higher than the WQQ, the flow partition will allow most flow exceeding the treatment flow rate to bypass the treatment chamber. This allows removal efficiency to remain relatively constant in the treatment chamber and reduces the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the VortSentry HS will remove a specific gradation of sediment at a specific removal efficiency. Therefore they are variable based on the gradation and removal efficiency specified by the design engineer and the unit size is scaled according to the project goal.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. The Rational Rainfall Method is a sizing program Contech uses to estimate a net annual sediment load reduction for a particular VortSentry HS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics. For more information on the Rational Rainfall Method, see *Vortechs Technical Bulletin 4: Modeling Long Term Load Reduction: The Rational Rainfall Method*, available at **www.ContechES.com/stormwater**

Treatment Flow Rate

The outlet flow control is sized to allow the WQQ to pass entirely through the treatment chamber at a water surface elevation equal to the crest of the flow partition. The head equalizing baffle applies head on the outlet flow control to limit the flow through the treatment chamber when bypass occurs, thus helping to prevent re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The VortSentry HS is available in three standard configurations: inline (with inlet and outlet pipes at 180° to each other), grated inlet, and a combination of grate and pipe inlets. All three configurations are available in 36-inch (900-mm) through 96-inch (2400-mm) diameter manholes.

727 OF 789

The configuration of the system is determined by the suffix of the model name:

- A model name without a suffix denotes a standard pipe inlet (Example HS48).
- A "G" at the end of the model designation denotes a grate inlet (Example HS48G).
- A "GP" at the end of the model designation denotes a combination of grate and pipe inlets (Example HS48GP).

Performance

Full-Scale Laboratory Test Results

Laboratory testing of the VortSentry HS was conducted using F-55 Silica, a commercially available sand product with an average particle size of 240-μm (Table 1). This material was metered into a model HS48 VortSentry HS at an average concentration of between 250-mg/L and 300-mg/L at flow rates ranging from 0.50-cfs to 1.5-cfs (14-L/s to 56-L/s).

US Standard Sieve Size	Particle Size Micron (μm)	Cumulative Passing %
30	600	99.7%
40	425	95.7%
50	300	74.7%
70	212	33.7%
100	150	6.7%
140	106	0.7%

Table 1 : US Silica F-55 Particle Size Distribution

Removal efficiencies at each flow rate were calculated based on net sediment loads passing the influent and effluent sampling points. Results are illustrated in Figure 1.

Assuming that sediment in the inlet chamber is ideally mixed, removal rates through the system will decay according to the percentage of flow bypassed. This effect has been observed in the laboratory where the test system is designed to produce a

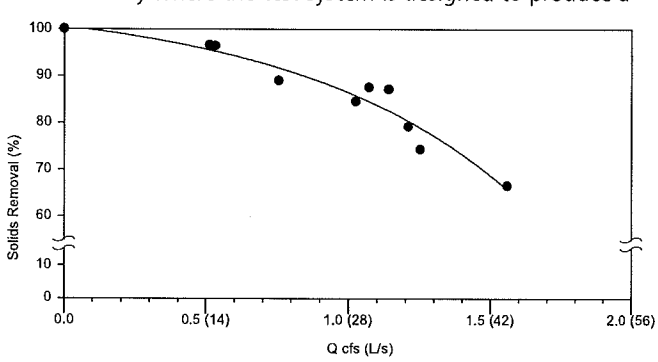


Figure 1: VortSentry HS Removal Efficiencies for 240-μm Particle Gradation

thoroughly mixed inlet stream. All VortSentry HS models have the same aspect ratio regardless of system diameter (i.e. an increase in diameter results in a corresponding increase in depth). Operating rates are expressed volumetrically.

Removal efficiency at each operating rate is calculated according to the average of volumetric and Froude scaling methods and is described by Equation 1.

Equation 1: $$\left(\frac{\text{Diameter Prototype}}{\text{Diameter Model}}\right)^{2.75} = \left(\frac{\text{Flow Rate Prototype}}{\text{Flow Rate Model}}\right)$$

Equation 1 and actual laboratory test results were used to determine the flow rate which would be required for the various VortSentry HS models to remove 80% of solids.

View report at **www.ContechES.com/stormwater**

Maintenance

The VortSentry HS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, i.e., unstable soils or heavy winter sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in equipment washdown areas and in climates where winter sanding operations may lead to rapid accumulations of a large volume of sediment. It is useful and often required as part of a permit to keep a record of each inspection. A simple inspection and maintenance log form for doing so is available for download at **www.ContechES.com/stormwater**

The VortSentry HS should be cleaned when the sediment has accumulated to a depth of two feet in the treatment chamber. This determination can be made by taking two measurements with a stadia rod or similar measuring device; one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the distance given in Table 2, the VortSentry HS should be maintained to ensure effective treatment.

Cleaning

Cleaning of the VortSentry HS should be done during dry weather conditions when no flow is entering the system. Cleanout of the VortSentry HS with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Simply remove the manhole cover and insert the vacuum hose into the sump. All pollutants can be removed from this one access point from the surface with no requirements for Confined Space Entry.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads, which solidify the oils. These are usually much easier to remove from the unit individually, and less expensive to dispose than the oil/water emulsion that may be

created by vacuuming the oily layer. Floating trash can be netted out if you wish to separate it from the other pollutants.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. If anyone physically enters the unit, Confined Space Entry procedures need to be followed.

Disposal of all material removed from the VortSentry HS should be done is accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

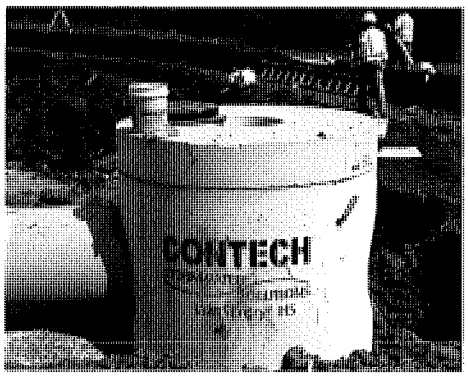
VortSentry HS Model	Diameter		Distance Between Water Surface and Top of Storage Sump		Sediment Storage		Oil Spill Storage	
	in.	m	ft.	m	yd^3	m^3	gal.	liter
HS36	36	0.9	3.6	1.1	0.5	0.4	83	314
HS48	48	1.2	4.7	1.4	0.9	0.7	158	598
HS60	60	1.5	6.0	1.8	1.5	1.1	258	978
HS72	72	1.8	7.1	2.2	2.1	1.6	372	1409
HS84	84	2.1	8.4	2.6	2.9	2.2	649	2458
HS96	96	2.4	9.5	2.9	3.7	2.8	845	3199

Table 2: VortSentry HS Maintenance Indicators and Sediment Storage Capacities.

Note: To avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile. Finer, silty particles at the top of the pile may be more difficult to feel with the measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.

Logon to **www.ContechES.com/stormwater** to download the VortSentry HS Inspection and Maintenance Log.

For assistance with maintaining your VortSentry HS, contact us regarding the Contech Maintenance compliance certification program.



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Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other Contech division offerings, visit ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

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Support

- Drawings and specifications are available at contechstormwater.com.
- Site-specific design support is available from our engineers.

PESCE ENGINEERING & ASSOCIATES, INC.
451 Raymond Road
Plymouth, MA 02360
Phone: 508-743-9206 Cell: 508-333-7630
epesce@comcast.net

July 4, 2016

Nantucket Planning Board
Attn: Ms. Leslie Snell, AICP, LEED ® AP
Deputy Director, Planning & Land Use Services
2 Fairgrounds Road
Nantucket, MA 02554

Subject: Engineering Review of the Proposed **Old South Road Crossing – Retail "Liner Buildings" MCD**

Dear Mrs. Snell & Members of the Board:

Pesce Engineering & Associates, Inc. is pleased to provide you this engineering review of the proposed Old South Road Crossing – Retail "Liner Buildings" Major Commercial Development, Nantucket, MA. We have evaluated the plans for consistency with the Town's Zoning Bylaw, and general conformance with the Massachusetts Stormwater Management Regulations.

We have reviewed the following documents and information to prepare this letter report:

- Letter from The Richmond Company to the Town of Nantucket Planning Board, Subject: Submittal of Application for Major Commercial Development / Special Permit (Retail), Old South Road Crossing Retail "Liner" Buildings / 62, 67, 73 and 75(A) Old South Road, Richmond Great point Development LLC (Owner Developer), dated June 10, 2016.

- Site Development Plans: "*Old South Road Crossing Retail "Liner Buildings", Major Commercial Development Special Permit Site Plan, at 62, 67, 73 and 75(A) Old South Road, Nantucket, MA*," 8 sheets, prepared by Hayes Engineering, Inc., dated June 10, 2016.

- Storm Water Management Report, Major Commercial Development Special Permit Site Plan, Old South Road Crossing, Nantucket, MA, prepared by Hayes Engineering, Inc., dated June 10, 2016.

- Application for a Special Permit, dated June 13, 2016, with description of zoning relief sought.

This project involves approximately 2.39 acres of land as part of the proposed Old South Road Crossing development of the former Glowacki property. This site is located in the Commercial-Neighborhood (CN) Zoning District, and lies within the Nantucket Sewer and Wellhead Protection Districts, as well as a Zone II of a public drinking water supply. No wetlands are located on the property, and it is not located within the 100-yr. flood plain.

The MCD site involves the development of 5 lots for new commercial/retail uses abutting Old South Road. The lots propose the construction of 5 new buildings ranging from 1,500 sf to 5,1270 sf for a total of approximately 15,000 sf, with a 1,200 sf outdoor seating area included for Lot 5 (restaurant). Municipal water and sewer services are planned for this project. The design also calls for widening of Old South Road, and the addition of a center left or right turning lane between east-west Old South road travel lanes.

The following are our review comments:

Definitive Plans, Utilities, and Site Layout

1. We recommend that the applicant discuss with the Board the justification and explanation for the waivers requested. From our review of these waivers, we find they do not present any major additional engineering issues or concerns. Furthermore, we would support the request for larger corner turning radii to better accommodate truck traffic.

2. We recommend that the applicant review this plan with the Nantucket Fire Dept., and provide the Board with their written comments for the record.

3. As mentioned above, the plans also call for widening of Old South Road to add a center left or right turning lane between the east-west Old South road travel lanes. However, no construction details were included with the plans. We have been informed that this widening is shown as conceptual, in order to discuss this with the Board and obtain comment and direction for this project. We recommend that if the Board approves of this design concept, that a condition be added to the Special Permit requiring that additional design details be provided for the Board's review, including the relocation of the drainage and electrical infrastructure on Old South Road.

4. Again, we understand that these plans may represent a preliminary design to provide discussion points with the Board. However, we recommend that the following additional information be added to the future plan revision:

a. The proposed locations for trash dumpster pads (especially for the proposed restaurant), and a pad construction detail, with screening fencing, as appropriate.

b. A Landscaping Plan and Lighting Plan.

c. An Erosion Control Plan, showing the proposed locations of silt fence erosion controls, and the locations for the details for the "Tire Tracking Pad," and "Silt Sack" shown on Sheets 6 & 7.

d. The locations for and a detail of Handicapped Parking signage.

e. A "Stop" sign (with painted stop line) at the intersections with Road "A" (the proposed Old South Road Crossing intersection), and at Lovers Lane.

f. Parking space dimensions, proposed aisle widths, and curb radii.

g. Proposed sidewalk width and a construction detail.

h. The Pavement Section detail on sheet 6 indicates *"8" Min. Gravel or 3" Gravel over 6" hardening."* We recommend that this roadway base material be specified with a design sieve specification (such as MA DOT M2.01.7, M1.03.0 or similar).

i. The line type shown for the proposed grading is nearly identical to that for the existing grading, making it difficult to follow/read. We recommend that the proposed grading lines be changed to make them easier to read (perhaps thicken them, or change the line type, or both). NOTE: The line type shown on Sheet 8 for the proposed grades were much more legible than on the other sheets.

j. Add notes with leader arrows for the proposed removal and relocation of the existing sewer Force Main (FM) shown in the vicinity of CB 4, for better clarity during construction.

k. Add notes to indicate the connection of the outlet lines for CBs 5 & 6 to a downstream drainage structure.

5. The Sheet 8 shows the proposed "Interim Site Plan" layout and grading. We recommend that the phasing for this be discussed with the Board, and additional notes added to the plan regarding the timing, and other details/notes, as appropriate, or requested by the Board.

Stormwater Management

This project proposes to mitigate post-development runoff for the project roadway by collecting runoff into a series of deep sump catch basins and drain manholes, which flow to three subsurface infiltration areas. Additionally, the subsurface system that collects runoff form the main parking area will be pre-treated through the use of a VortSentry® HS stormwater treatment unit. This stormwater management system will remove over 80% of the Total Suspended Solids (TSS) in the stormwater, and recharge the stormwater to the aquifer. The proposed design also reduces the peak rate of runoff as compared to the existing conditions, and is additionally designed for the 100-yr. storm.

We have the following stormwater management comments:

1. The proposed Nyloplast Yard Drain Inlet detail is shown on Sheet 6, however no inlet basin detail was included on the plans. We recommend that an appropriate detail be added to the plans, which includes a 4 ft. sediment sump, and outlet tee or elbow, in accordance with Stormwater Best Management Practices.

2. No soil test pit data was provided to evaluate the separation distance from the bottom of the StormTech™ chambers from the estimated seasonal high groundwater elevation. Subject to the approval of the Board, we recommend that the requirement to provide test pit data be added as a condition of the Special Permit, to conduct these test pits and provide this information to the Board prior to the construction start.

3. Sheet 6 shows details for a “Reduced Cover Drain Manhole” and “Reduced Cover Catch Basin.” We recommend that the locations for these be shown on the plans (or removed if not needed).

4. We recommend that at least 2 inspection ports be shown for PSIS#1 & PSIS#3 (at each end of the chamber line), and that least 6 inspection ports be provided for PSIS#2 (1 at each corner, and 2 in the middle of the chamber field).

5. The proposed rim elevation of the Yard Drain #1 (Lot 3/4 area) is 33.75 ft. The drainage calculations in the Storm Water Management Report indicate a peak elevation of 34.17 ft. at this site for the 25-yr. storm. We recommend the infiltration system be modified/enlarged to contain the 25-yr. storm, and consideration be given for the same for the lager storms as well.

6. The drainage calculations for PSIS#2 indicate a peak storm elevation of 30.82 ft. for the 25-yr. storm, which exceeds the BMH4/OCS overflow elevation of 30.00 ft. We

recommend the infiltration system be modified/enlarged to contain the 25-yr. storm, and consideration be given for the same for the lager storms as well.

7. The Post-Development Watershed map included in the Storm Water Management Report is difficult to read. It is difficult to see the subcatchment area boundaries, the Tc flow lines for each subcatchment area, and the POC1 location is not indicated on the map. We recommend that this map be amended.

Thank you again for this opportunity to assist the Planning Board in their review of this project. As always, please call if you have any questions or comments.

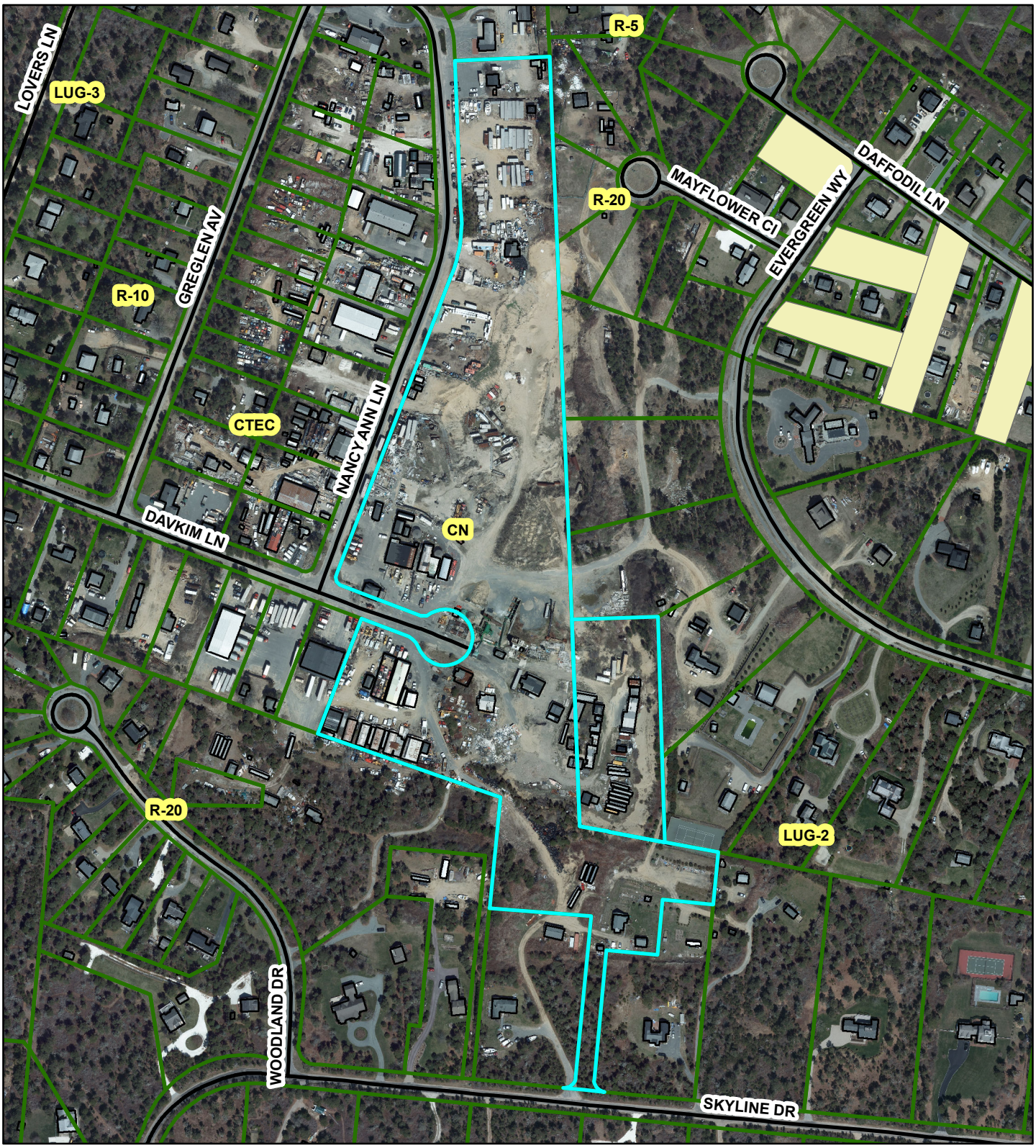
Sincerely,

PESCE ENGINEERING & ASSOCIATES, INC.

Edward L. Pesce., P.E., LEED ® AP
Principal

David Armanetti, The Richmond Co.
P. John Ogren, P.E., Hayes Engineering, Inc.

#40-16 Richmond Great Point Development, LLC
Meadows II Rental Apartment Development Project
20 & 20R Davkim Lane
Map 68 Parcels 56.1 & 57



Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

JUN 15 2016

Nantucket Planning Board

RECEIVED
JUN 15 2016
By

Application for a Special Permit

Date: _____ June 13, 2016 _____ File #:_____

Name of development: _____ "Meadows II" Rental Apartment Development Project _____

Owner(s) name(s): _____ Richmond Great Point Development LLC (Philip Pastan) _____

Mailing address: _____ 23 Concord Street, Wilmington MA 01887 _____
Phone number: ___ 978-988-3900 _____ Fax number:____ 978-988-3950 _____

E-mail: ___ ppastan@richmondco.com _____

Applicant's name: __ The Richmond Company, Inc. (David Armanetti and Patty Roggeveen) ___
Mailing address: _____ 23 Concord Street, Wilmington MA 01887 _____
Phone number: ___ 978-988-3900 _____ Fax number:____ 978-988-3950 _____
E-mail: ___ darmanetti@richmondco.com; proggeveen@richmondco.com _____

Engineer / surveyor's name: _____ Green Seal Environmental, Inc. (Heather Twiss) _____

Mailing address: _____ 114 State Road, Sagamore Beach MA 02562 _____ Phone number:
__ 508-888-6034 __Fax number:__ 508-888-1506 __E-mail:___ htwiss@gseenv.com ___

Location of lot(s):

Street address _____ 20 and 20 (R) Davkim Lane _____

Tax Assessors Map _____ Parcel ___ See Attachment "A" for Detail of Multiple Parcels

Nantucket Registry of Deed: See Attachment "B" for Detail of Multiple Parcels
_____ Book _____ Page _____ **OR** Plan Book

Plan File #_____ **OR** Land Court Plan #_____ at Certificate # _____

Size of parcel: __ 631,620 SF (14.50 Acres) __ sq. ft. Zoning District: _Commercial Neighborhood (CN) _

Special Permit sought: (check one)

- ❍ Cluster subdivision
- ❍ Commercial WECS
- ❍ Driveway Access/Curb Cut Special Permit
- ❍ Harbor Overlay District (HOD)
- ❍ Major Commercial Development (MCD)

- ❍ Multi-family Special Permit
- ❍ Moorlands Management District Subdivision or Construction (MMD)
- ❍ NEHOD (Neighborhood Employee Housing Overlay District)
- ❍ MRD (Major Residential Development)
- ❍ MIPOD (Mid-Island Planned Overlay District)
- ❍ Other Uses Requiring a Special Permit (specify all uses and *Nantucket Code* sections)

Section	Description

Specify all associated Zoning Code relief sought:

Section	Description
None	

Only the zoning relief expressly requested above will be considered as part of this application.

If applying for a Major Commercial Development, specify how the application will comply with Section 139-11 (J) of the *Zoning Code of the Town of Nantucket*, also known as the Town's Affordable Housing Effort:
Not Applicable (Application is not a Major Commercial Development Project)

Planning Board filing fee due: $_____

Engineering Inspection Escrow Deposit due: $_____

I/ we hereby certify that the applicant(s) cited above have been authorized by me/ us to file a Special Permit application with the Planning Board on property that I/ we own.

_____

_____

Owner(s)' Signature(s) Philip Pastan, as Manager of Richmond Great Point Development LLC

_____

Applicant's Signature

6/13/16

I/we _____, the undersigned, hereby authorize _____ to act as agent(s) on my/our behalf and to make any necessary revisions on this filed application as they may be requested by the Board to meet its governing rules and guidelines.

_____

_____

Owner(s)' signature(s)

Check List:

- ☐ Planning Board Special Permit abutters list – to be obtained at the Tax Assessor's office
- ☐ Completed application form entitled "Application to the Planning Board for a Special Permit"
- ☐ Application fee of $250.00 payable to Town of Nantucket
- ☐ Abutters fee of $6.11 per abutters payable to Pitney Bowes Reserved Funds
- ☐ Four (4) sets of mailing labels with each abutter's name and address
  - 1" x 2 5/8" size, typed labels, are preferred
  - duplicate labels are not necessary if the same owner is listed for more than one abutting property
- ☐ Completed application form
- ☐ Town Clerk's stamped application (provide 2 copies-one for Town Clerk and one for Planning Board)

"Attachment A" to
Special Permit Application

"Meadows II" Rental Apartments Development
20 and 20 (R) Davkim Lane, Town of Nantucket MA

ADDITIONAL SPACE NEEDED TO PROVIDE DETAILED INFORMATION FOR MULTIPLE PARCELS

---

20 Davkim Lane (Entirety of 12.5 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 57

Registry / Plan Information; Lot # 184 on Land Court Plan # 16514-Z)
(Land Court Certificate # 24872)

20 (R) Davkim Lane (Entirety of 2.00 Acre Total)

Tax Assessors Map Information: Map # 68, Parcel # 56.1

Registry / Plan Information; Lot # 206 on Land Court Plan # 16514-7)
(Land Court Certificate # 24872)

"Attachment B" to
Special Permit Application

"Meadows II" Rental Apartments Development
20 and 20 (R) Davkim Lane, Town of Nantucket MA

The title to the land included in the above-referenced application is derived as follows:

As to the Owner of One Hundred Percent (100%) of the 20 Davkim Lane Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel Thirty-Two" on Page 7 of the "*Deed*").

As to the Owner of One Hundred Percent (100%) of the 20 (R) Davkim Lane Property

RICHMOND GREAT POINT DEVELOPMENT LLC

"*Deed*" dated August 7, 2013, recorded at the Nantucket County Registry of Deeds, in Book # 01397, Page # 312, recorded on August 8, 2013 (referred to as "Recorded Land – Parcel Forty-Two" on Page 9 of the "*Deed*").

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 10, 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 Application for Special Permit (Workforce Rental Community)
Richmond Great Point Development LLC (Owner / Developer)
"Meadows II" Multi-Family Workforce Rental Community Development
20 Davkim Lane and 20 (R) Davkim Lane

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 completed application form, plans, drainage reports, and related materials which are required to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a special permit to allow for the development of the "workforce rental community" project which is proposed to be located on a combination of two (2) contiguous properties comprising +/- 14.5 acres of land located at 20 Davkim Lane and 20(R) Davkim Lane (this land comprises the existing asphalt plant / gravel pit" and storage yard components of the former Glowacki property).

The proposed project is comprised of the land area that was specifically re-zoned for this purpose, to the Commercial Neighborhood (CN) zoning district and to qualify as a "workforce rental community" by the approval of Article 1 and Article 2 at the Nantucket Special Town Meeting of November 9, 2015, the provisions of which have been codified as Section 139-8(D) (Residential Development Options) of the Town of Nantucket Zoning Bylaw.

The proposed project is also expressly consistent with and complies with the terms and provisions of the "*2015 Richmond Great Point Development, LLC / Town of Nantucket Memorandum of Agreement*" dated November 9, 2015, which memorializes the specific terms under which a workforce homeownership housing community could be developed on the above-captioned properties (the "MOA").

As reflected on the attached site plan, the development program includes a total of 225 apartment units in a series of approximately forty (40) low density, two story, residential structures, designed in a "campus" style layout with interconnected walkways and bike paths and generous off street parking, well in excess of the off street parking required under Section 139-18(B) of the Town of Nantucket Zoning Bylaw, which is equal to requiring one (1) off street parking space per bedroom.

The proposed project will be served by a range of new infrastructure improvements (including water, sewer, drainage, street lighting, landscaping, etc.).

The proposed project will offer a mix / range of studio, one bedroom, two bedroom, and three bedroom units. The mix of units that are proposed to be created, are as follows (this unit mix is preliminary and is subject to change, based on further market research by the owner / developer or a change in conditions prior to the issuance of final approval for the proposed project.

"Meadows II" Workforce Rental Community Project
Summary of Preliminary Proposed Unit Mix

Unit Types	Number of Units (Per Type)	Percentage of All Units (Per Type)
Studio (S) Units	22	10 %
One (1) Bedroom Units	87	39 %
Two (2) Bedroom Units	94	42 %
Three (3) Bedroom Units	22	10 %
Subtotal	**225 Units**	**100 %**

Based on the preliminary unit mix described above, the proposed project will have a total of three hundred and sixty-three (363) individual bedrooms, which is equal to a bedroom per unit ratio of 1.61 bedrooms per unit.

Twenty-five percent of all of the proposed units, equal to fifty-six (56) units will be rented to tenants who qualify under the household income and related eligibility criteria set forth in the MOA (including the local preference and lottery provisions described therein).

This will include the rental of all of the affordable units to tenants whose household incomes are equal to or less than eighty percent (80%) of the Area Median Income (AMI) established for Nantucket County by the US Department of Housing and Urban Development (HUD). In 2015, these (80% of AMI) annual income limits were equal to $71,800 in annual income for a three person household and $79,750 in annual income for a four person household. Based on these income limits and the formulas set by the Commonwealth of Massachusetts Department of Housing and Community Development and Mass Housing under how the maximum monthly rents for the affordable units are established, the maximum monthly rent for the (80% AMI) affordable apartment units will be +/- $1,270 per month for a studio unit, +/- $1,325 per month for a one bedroom unit, +/- $1,590 per month for a two bedroom units, and +/- $1,825 per month for a three bedroom unit (all of these monthly rents excludes utilities, which must be paid by the individual tenants, in addition to the monthly rent. By the time the proposed project is approved, these maximum income and monthly rent limits will likely be tied to the 2016 income data that is issued / updated by the federal and state government, so these limits will likely change (slightly).

Per the terms of the MOA, all of the affordable units will be dispersed uniformly throughout the project and the appearance and quality of finishes of the affordable units will be directly comparable to the market rate apartment units that are also being developed within the property.

Based on the foregoing and in accordance with the MOA, all of the fifty-six (56) affordable rental units in the proposed project will quality for placement on the Town of Nantucket's Subsidized Housing Inventory List (the "SHI List") which is administered by the Commonwealth of Massachusetts Department of Housing and Community Development and is the official data base that determines whether the Town has met the provision of the statutory minimum of ten percent (10%) of its overall year round housing stock being rented or sold as qualifying affordable units which determines whether the Town is subject to development from so called "Chapter 40B" housing projects. The affordable units to be provided in the proposed project, which will be maintained as affordable in perpetuity, will significantly increase the Town's inventory of affordable units in its attempts to meet this objective.

The proposed project is also subject to compliance with the applicable intensity and dimensional criteria set forth in Section 139-16 of the Town of Nantucket Zoning Bylaw (including but not limited to minimum lot size, frontage, yard setbacks, ground cover ratio, and (lot) regularity factor, as modified by the site flexibility standards that are set forth in Section 139(8)(D) of the Town of Nantucket Zoning Bylaw for workforce rental community, which the proposed project is qualified for,

Because it is subject to issuance of a workforce rental community special permit, as specified in Section 139-8(D)(1)(a)[3] of the Town of Nantucket Zoning Bylaw, the proposed subject is subject to major site plan review (MSPR) by the Planning Board (as set forth in Section 139-23, and specifically Section 139-23(B)(2) of the Town of Nantucket Zoning Bylaw).

We appreciate the opportunity to submit the application, plans, and supporting materials for this important development proposal for your review and for consideration by the Planning Board and we look forward to commencing with the public hearing and public review process.

If you have any immediate questions with respect to the proposed project or any of the submittal 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.
On Behalf of Richmond Great Point Development LLC

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

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 13, 2016

TOWN OF NANTUCKET
TOWN CLERK
16 Broad Street
Nantucket, Massachusetts 02554

Attention: Catherine Flanagan Stover, MMC, CMMC

Subject: Submittal of Application for Special Permit (Workforce Rental Community)
Richmond Great Point Development LLC (Owner / Developer)
"Meadows II" Multi-Family Workforce Rental Community Development

Dear Mrs. Stover:

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 document submittal of the completed application to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a special permit to allow for the development of the "Meadows II" workforce rental community development, comprised of two hundred and twenty-five (225) rental apartment units on a combination of two (2) properties totaling +/- 17.2 acres of land located at 20 Davkim Lane and 20 (R) Davkim Lane.

The submittal of the application to your office is being completed as prescribed in Section 139-30(B)(1) of the Town of Nantucket Zoning Bylaw.

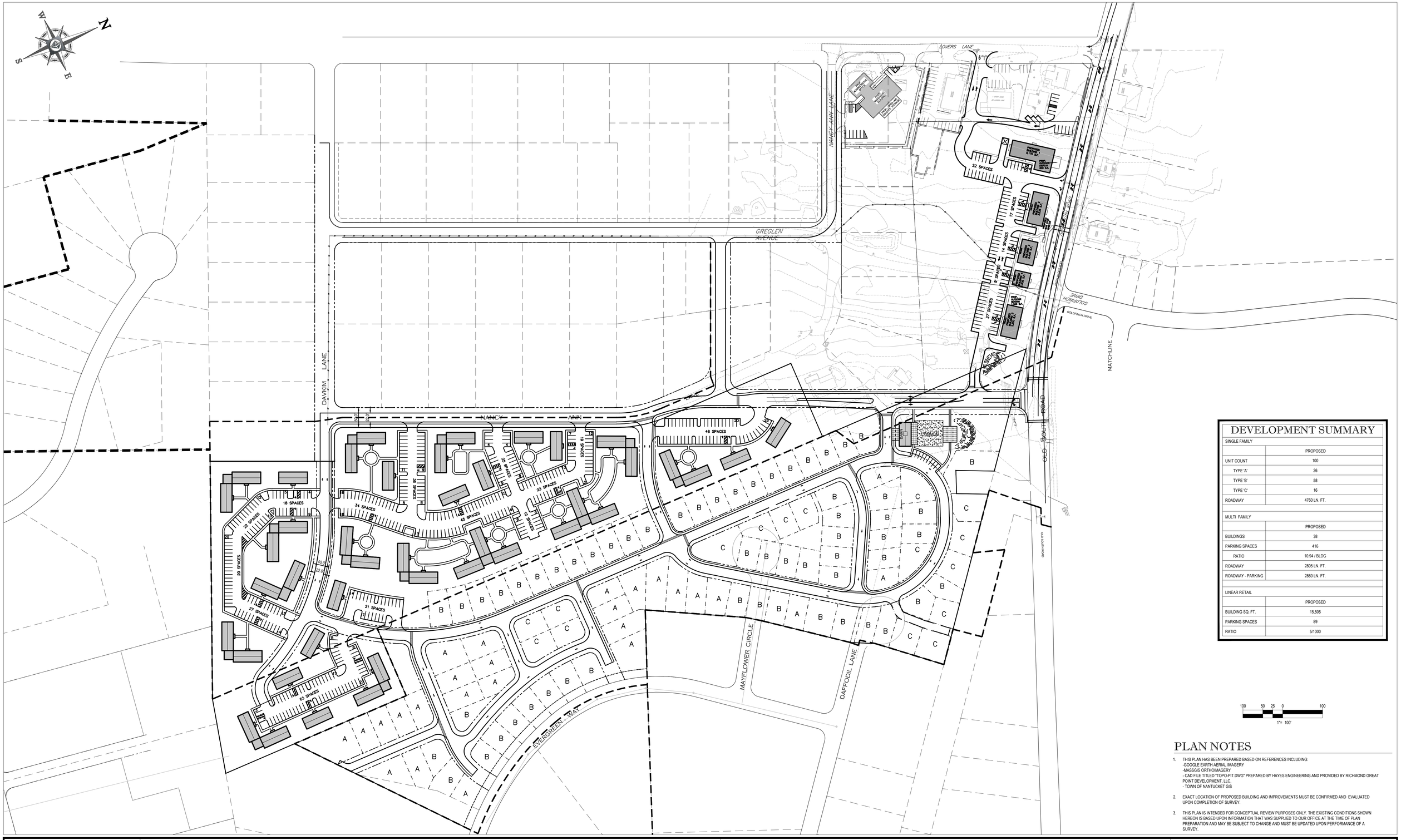
Upon your acknowledgment of receipt of the application (by way of time / date stamping the application), we will proceed to file a copy of the application (and all other required materials) forthwith to the Town of Nantucket Planning Board to obtain its review and subsequent action (as prescribed in Section 139-30(B)(2) of the Town of Nantucket Zoning Bylaw.

Should you have any questions with respect to the application and submittal, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Andrew Burek, Esq., TRC
Arthur Reade, Jr., Esq., RGH



DEVELOPMENT SUMMARY

SINGLE FAMILY	
	PROPOSED
UNIT COUNT	100
TYPE 'A'	26
TYPE 'B'	58
TYPE 'C'	16
ROADWAY	4760 LN. FT.

MULTI FAMILY	
	PROPOSED
BUILDINGS	38
PARKING SPACES	416
RATIO	10.94 / BLDG
ROADWAY	2805 LN. FT.
ROADWAY - PARKING	2860 LN. FT.

LINEAR RETAIL	
	PROPOSED
BUILDING SQ. FT.	15,505
PARKING SPACES	89
RATIO	5/1000

100 50 25 0 100

1"= 100'

PLAN NOTES

1. THIS PLAN HAS BEEN PREPARED BASED ON REFERENCES INCLUDING:
   - GOOGLE EARTH AERIAL IMAGERY
   - MASSGIS ORTHOIMAGERY
   - CAD FILE TITLED "TOPO-PIT.DWG" PREPARED BY HAYES ENGINEERING AND PROVIDED BY RICHMOND GREAT POINT DEVELOPMENT, LLC.
   - TOWN OF NANTUCKET GIS
2. EXACT LOCATION OF PROPOSED BUILDING AND IMPROVEMENTS MUST BE CONFIRMED AND EVALUATED UPON COMPLETION OF SURVEY.
3. THIS PLAN IS INTENDED FOR CONCEPTUAL REVIEW PURPOSES ONLY. THE EXISTING CONDITIONS SHOWN HEREON IS BASED UPON INFORMATION THAT WAS SUPPLIED TO OUR OFFICE AT THE TIME OF PLAN PREPARATION AND MAY BE SUBJECT TO CHANGE AND MUST BE UPDATED UPON PERFORMANCE OF A SURVEY.

RICHMOND GREAT POINT DEVELOPMENT LLC
OLD SOUTH ROAD PROPERTIES

NANTUCKET, MA

MASTER PLAN

SCALE 1" 100

DATE 06 16 2016

PRO ECT 141196

REFERENCES

RICHMOND GREAT POINT DEVELOPMENT LLC

PLAN NOTES

1. THIS PLAN HAS BEEN PREPARED BASED ON REFERENCES INCLUDING:
   -GOOGLE EARTH AERIAL IMAGERY
   -MASSGIS ORTHOIMAGERY
   - CAD FILE TITLED "TOPO-PIT.DWG" PREPARED BY HAYES ENGINEERING AND PROVIDED BY RICHMOND GREAT POINT DEVELOPMENT, LLC.
   - TOWN OF NANTUCKET GIS
2. EXACT LOCATION OF PROPOSED BUILDING AND IMPROVEMENTS MUST BE CONFIRMED AND EVALUATED UPON COMPLETION OF SURVEY.
3. THIS PLAN IS INTENDED FOR CONCEPTUAL REVIEW PURPOSES ONLY. THE EXISTING CONDITIONS SHOWN HEREON IS BASED UPON INFORMATION THAT WAS SUPPLIED TO OUR OFFICE AT THE TIME OF PLAN PREPARATION AND MAY BE SUBJECT TO CHANGE AND MUST BE UPDATED UPON PERFORMANCE OF A SURVEY.

RICHMOND GREAT POINT DEVELOPMENT LLC
OLD SOUTH ROAD PROPERTIES
NANTUCKET, MA

MASTER PLAN

SCALE: 1"=100'
DATE: 06/10/2016
PROJECT #: W141196

REFERENCES:

RICHMOND GREAT POINT DEVELOPMENT LLC

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 30, 2016

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

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

Subject: Transmittal of Copy of Housing Initiatives "*Memorandum of Agreement"* (MOA)
Town of Nantucket Board of Selectmen and Richmond Great Point Development LLC

Dear Ms. Snell:

As part of the presentation that we will be making as the development manager on behalf of the applicant (Richmond Great Point Development LLC) on the two special permit applications that will be subject to consideration at the July 11, 2016 meeting of the Planning Board (the "Meadows II" Workforce Rental Housing Community and the "Sandpiper Place" Workforce Homeownership Housing) we intend to provide a summary of the status and the major provisions of the "*Memorandum of Agreement*" dated November 9, 2015 by and between the Town of Nantucket, by and through its Board of Selectmen, and Richmond Great Point Development LLC, as relates to these two major housing initiatives.

Accordingly, we have attached / submitted a PDF copy of the document herein and respectfully request that copies be provided to the respective members of the Planning Board in their agenda / meeting package for the July 11, 2016 meeting.

Should you have any questions with respect to the enclosed document or our request to provide copies to the members of the Planning Board, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Patty Roggeveen, RGPDLLC
Andrew Burek, Esq., RGPDLLC
Arthur Reade, Jr., Esq., RGH

2015 RICHMOND GREAT POINT DEVELOPMENT, LLC/TOWN OF NANTUCKET MEMORANDUM OF AGREEMENT

This Agreement ("Agreement") is entered into by and between Richmond Great Point Development, LLC, a Delaware limited liability company, with a usual place of business at 23 Concord Street, Wilmington, MA 01887 and its successors in interest ("Richmond"), and the Town of Nantucket, a municipal corporation organized under the laws of the Commonwealth of Massachusetts, with a usual place of business at 16 Broad Street, Nantucket, MA ("Town"), acting by and through its duly elected Board of Selectmen ("Board of Selectmen"). Richmond, the Town and Board of Selectmen are collectively referred to herein as the "Parties."

WHEREAS, the Town has not yet achieved and seeks to achieve the goal of having ten percent affordable housing placed on the Subsidized Housing Inventory Lists ("SHI List") as such is inventoried by the Commonwealth of Massachusetts Department of Housing and Community Development ("DHCD") as defined under the affordable housing statute and regulations, respectively, G.L. c.40B, §§20-23 and 760 CMR 56.00;

WHEREAS, the Town has 4,896 Year Round Housing units, based upon the 2010 Census;

WHEREAS, the Town, as of December 2014, has 121 units on the SHI List equal to the ratio of 2.5% affordable housing based upon its total year round housing inventory based upon the 2010 Census.

WHEREAS, the Town needs a total of 490 SHI Units to achieve 10 percent SHI affordable housing ratio, or a total of 369 additional SHI Units.

WHEREAS, Richmond is the fee owner of property in Nantucket, Massachusetts that is shown on the attached exhibits (Exhibits A and B), which depict land fronting on Nancy Ann Lane, Old South Lane, Mayflower Circle, Daffodil Lane, Evergreen Way and on both sides of Davkim Lane (the "Property"), which includes, the following parcels:

- Properties known as the entirety of 30, 32, 34 and 35 Daffodil Lane, the entirety of 3, 4, 5, 7, 8, 9 and 10 Mayflower Circle, the entirety of 75(A) Old South Road, the entirety of 73 Old South Road and the Mayflower Circle right of way and Daffodil Lane right of way, containing approximately 9 or more acres, being, at least in part, the entirety of Lots 615, 618, 621, 622, 623, 624, 625, 628, 629, 630, 631 and Lot 663 shown on Land Court Plan 16514-40, the entirety of Lot 858 shown on Land Court Plan 16514-100 and a portion of Lot 47 shown on Land Court Plan 16514-G, all as filed and recorded with the Nantucket Registry District of the Land Court and as shown on Exhibit C attached hereto and shown as the "Proposed 40B Homeownership Project (100 Single Family Homes) on Exhibit B and as the land owned by Richmond on Exhibit A;
- 20 Davkim Lane (Southern Portion) and 20 Davkim Land (Rear), containing approximately12 or more acres, being Lots 184 and 206 shown on Land Court Plan

16514-Z and 16514-, as filed and recorded at the Nantucket Registry District of the Land Court and as shown on Exhibit D attached hereto and shown as the property "Being developed as a 40B Rental Project (150 Rental Units) on Exhibit B;

- Properties known as the entirety of 6 Mayflower Circle, 24 Evergreen Way, 26 Evergreen, 28 Evergreen Way and 30 Evergreen Way; and
- Properties that are shown on the areas shaded in gray on Exhibit A that are not already specified above. (Collectively, the above parcels and properties are referred to as the "Property".)

WHEREAS, Richmond seeks to develop the Property for multi-family rental housing and single family home ownership, with an affordability component that is defined and guaranteed as provided for hereunder.

WHEREAS, Richmond has submitted applications to MassHousing for Project Eligibility Letters for two proposed 40B projects for a portion of the Property , which would create a total of 200 residential units, with 150 rental units and 50 home ownership units;

WHEREAS, Richmond intends to develop the entire Property with a total of 325 units (225 rental units and 100 ownership units);

WHEREAS, Richmond submitted two citizen petitions for the November 2015 Nantucket Special Town Meeting to: (1) rezone portions of the Property from Residential 20 (R-20) and Limited Use General 2 (LUG-2) to Residential 5 (R-5), and portions of the Property from Residential 20 (R-20) to Commercial Neighborhood (CN); and (2) introduce density bonuses in exchange for provision of affordable workforce housing in the R-5 and CN zoning districts;

WHEREAS, Richmond has requested the November 2015 Nantucket Town Meeting to rezone the following specific parcels of land under Article 1 of the Town Meeting Warrant:

Map	Parcel	Number	Street
68	129 (a portion of)	73	Old South Road
68	999.2 (a portion of)	75A	Old South Road
68	739	30	Daffodil Lane
68	740	32	Daffodil Lane
68	741	34	Daffodil Lane
68	742	35	Daffodil Lane
68	736	3	Mayflower Circle
68	735	5	Mayflower Circle
68	729	4	Mayflower Circle
68	730	6	Mayflower Circle
68	734	7	Mayflower Circle
68	731	8	Mayflower Circle
68	733	9	Mayflower Circle

68	732	10	Mayflower Circle
68	57	20	Nancy Ann Lane
68	56.1	20R	Davkim Lane
68	711	24	Evergreen Way
68	712	26	Evergreen Way
68	713	28	Evergreen Way
68	714	30	Evergreen Way

WHEREAS, Richmond has requested the November 2015 Town Meeting to adopt zoning changes to rezone portions of the Property (Article 1) and to adopt zoning provisions to provide for density bonuses in exchange for provision of defined and guaranteed affordable housing (Article 2), so as to allow the development of 325 units (225 rental and 100 home ownership);

WHEREAS, the Planning Board voted unanimously to provide a favorable report to Town Meeting, regarding Article 1 and Article 2, with modifications (which are set forth in Exhibit E), provided a development agreement is signed by Richmond with the Town (by and through the Board of Selectmen) prior to the November 2015 Town Meeting;

WHEREAS, Richmond has agreed with the Planning Board's modifications to Article 1 and 2, which are attached hereto as Exhibit E;

WHEREAS, if Richmond designs and obtains all necessary approvals to construct and in fact constructs the 325 Units, including 225 rental Units that would all be SHI eligible under the Local Action Unit program maintained by DHCD and the 7 home ownership units that would be SHI eligible under the Local Action Unit program and 18 homeownership units that would be permanently restricted as affordable at 175% of Area Median Income ("AMI"), the Town would make significant progress toward achieving the necessary SHI Units to achieve the goal of provision of not less than a ten percent affordable housing ratio and toward providing significant additional affordable housing for Nantucket.

WHEREAS, to accomplish the above goals, Richmond is committed to designing, obtaining approval for, constructing and maintaining an affordable rental and home ownership housing project at the Property with the density and affordability and mitigation set forth below;

WHEREAS, the Board of Selectmen has supported the appropriateness of the Richmond site for issuance of Project Eligibility Letters, in comments made to Mass Housing, subject to stated concerns;

NOW THEREFORE, based upon good and valuable consideration, the receipt and value of which is hereby expressly and specifically acknowledged by the Parties, agree as follows:

I. Richmond's Undertakings

1. Richmond agrees, if Articles 1 and 2, as modified by the Planning Board and attached hereto as Exhibits A and B are adopted at the November 2015 Town Meeting, without substantive amendments, and go on to take final effect, final effect being defined as the adoption of said Articles, proper filing with the Secretary of the Commonwealth of Massachusetts and the expiration of any procedural or substantive challenge of the Office of the Attorney General, collectively referred to as perfection under MGL c. 40, §32, then Richmond shall design and then seek all necessary approvals to build and then shall build up to a total of 325 Units at the Property (up to a total of 225 rental apartments and up to a total of 100 single-family home ownership units). At least twenty-five (25%) percent of all units at the Property shall have a permanent affordability component and shall be restricted to being rented or sold as affordable Units and maintaining SHI eligibility as specified herein. A sufficient percentage of the rental units shall be restricted as affordable, so that all of the rental units shall be SHI eligible. All of the affordable rental units shall be restricted to occupancy by tenants (households) earning at or below eighty (80%) percent of the Area Median Income ("AMI") at the maximum monthly rents prescribed for this income category under DHCD's Guidelines and 760 CMR 56.00 or under the Zoning Bylaw, or Under MGL c. 40R. At least twenty-five percent of the homeownership units shall have a permanent affordability restriction. Not less than seventy-five (75%) percent of the affordable home ownership units shall be restricted to purchase by Buyers (households) earning at or below eighty (80%) of the AMI and shall be sold at the maximum initial sales prices prescribed for this income category under DHCD's Guidelines and 760 CMR 56.00 or under the Zoning Bylaw, or under MGL c. 40R. Accordingly, not less than seventy-five (75%) of the affordable homeownership units shall be SHI eligible, with the remaining twenty-five (25%) percent restricted to being sold to Buyers (households) earning at or below one hundred seventy-five (175%) percent of AMI at the maximum initial sales prices prescribed for this income category under DHCD's Guidelines and 760 CMR 56.00 or under the Zoning Bylaw, or under MGL c. 40R. For the purposes of this paragraph and as it pertains to amendments of Article 1 and Article 2 rendering them, in any way, different than as attached hereto, Richmond hereby expressly agrees that it shall state its position at Town Meeting as to each amendment, if any amendment is offered, as to whether Richmond asserts the proposed amendment is substantive and shall be bound by its stated position that an amendment is not substantive, and Articles 1 and 2, as modified and not substantively amended. Richmond shall so restrict those units and shall use all commercially reasonable efforts to comply with any requirement that is within its control that is required under DHCD's Guidelines to make all of the up to 225 rental units SHI eligible and to make twenty-five (25%) percent of the affordable homeownership Units SHI eligible and shall cooperate with any requirement that the Town needs to undertake to render those units SHI eligible.

2. Richmond agrees that there shall be a maximum of up to 325 Units (including increments of up to 225 rental and up to 100 ownership), with a maximum of 700 bedrooms at the Property, the mix and allocation of which shall be within Richmond's sole and absolute discretion, subject to the review of the Nantucket Planning Board and the requirement that the bedroom mix for any affordable unit, including those "locally affordable" home ownership units to be restricted to sales to Buyers whose households earn at a maximum one hundred seventy-five (175%) percent of AMI, shall be the same bedroom mix as the bedroom mix used for the market rate units and the restricted units shall not be distinguishable from the non-restricted units as provided for under any requirement of DHCD.

3. Richmond agrees it shall as soon as reasonably practicable apply for and diligently pursue all necessary approvals for the first phase of the development of up to 325 units following the perfection of Articles 1 and 2, and then shall begin construction as phased below within ninety (90) calendar days of obtaining all necessary approvals required to construct the Project including the expiration of all applicable appeal periods, including but not limited to a Special Permit to be issued by the Town Planning Board, Major Site Plan approval to be issued by the Town Planning Board, endorsement of a definitive subdivision (or subdivisions) to be approved by the Town Planning Board and acceptance thereof for filing by Land Court for the District of Nantucket, certificates of appropriateness to be approved by the Town of Nantucket Historic District Commission, and building permits to be issued by the Town of Nantucket Building Commissioner. For purposes of this Agreement, approvals shall be defined as the final issuance of all necessary approvals and the expiration of all applicable appeal periods thereto.

4. Upon the issuance of the necessary approvals as described above and the endorsement of the subdivision plan by the Planning Board, each of which no longer being subject to any applicable appeal, Richmond agrees all of the rental units shall be subject to a permanent deed restriction that shall be delivered to the Town and accepted and recorded before any building permit issues which shall require that all of the rental units shall remain rental units and shall not be converted to ownership units without the approval of Town Meeting to release the restriction and that the affordable rental units shall remain affordable units permanently unless released by Town Meeting. The leases to any renter of any affordable unit shall strictly prohibit subletting of the unit and this requirement prohibiting subletting of rental units shall be set forth in the permanent deed restriction and enforceable by the Town. There shall be no short term rental of any of the rental units. A short term rental shall mean a rental period with a duration of less than thirty (30) calendar days.

5. Upon the issuance of the final relief, including but not limited to a Special Permit to be issued by the Town Planning Board, Major Site Plan approval to be issued by the Town Planning Board, endorsement of a definitive subdivision (or subdivisions) to be approved

by the Town Planning Board and acceptance thereof for filing by Land Court for the District of Nantucket, certificates of appropriateness to be approved by the Town of Nantucket Historic District Commission, and building permits to be issued by the Town of Nantucket Building Commissioner each of which no longer being subject to any applicable appeal , Richmond agrees the affordable ownership units (both the twenty-five (25%) percent of affordable home ownership Units restricted at 80% AMI and the remaining seventy-five (75%) percent restricted at 175% AMI) shall be subject to a permanent deed restriction upon the terms contained in the preceding parenthetical that shall be delivered to the Town and accepted and recorded before any building permit issues for any of the 100 home ownership units, which shall not be released from the restriction without Town Meeting approval. There shall be no short term rentals of any of the home ownership units. Leases to any renter of any affordable home ownership unit shall strictly prohibit short term rentals. For the purposes of this section 5, short term rentals shall mean a rental period the duration of which is as much as or less than thirty (30) calendar days and each such home ownership unit shall contain a permanent deed restriction conforming to the terms of this Section 5 which shall be enforceable by the Town.

6. Richmond agrees that it and its successors in interest shall be bound by the new zoning provided for under Articles 1 and 2 of the November 2015 Town Meeting, should that zoning take final effect as provided for hereunder, and Richmond shall be bound by this agreement and its requirements and hereby surrenders and releases any zoning freeze and/or any and all other so-called grandfathering protections that might be otherwise available to Richmond and its successors for the Property under G.L.c.40A, §6 and to all lienholder and owners for the Property, other than Walter Glowacki, that exists or may exist when Articles 1 and 2 take final effect, provided Richmond makes no waiver, whether express or implied, to any future Zoning changes. Richmond represents that there are no lienholders of record or other owners of the Property, other than Richmond or Walter Glowacki.

7. Richmond shall provide the Board of Selectmen, Finance Committee and the relevant permit granting authority (either the Planning Board or Zoning Board of Appeals, in the case of a 40B application) with an expert Fiscal Impact Report and a Student Projection Report, regarding the total number of children projected to reside at the Project and the number of school aged children that are projected to reside at the Project and the report shall be provided to the Nantucket Public School District for informational and planning purposes during the permit granting process and the Student Projection Report shall be updated by Richmond when building permits issue for the first phase of the project and then, thereafter, each time that an additional 75 new units are sought.

Richmond shall provide the Planning Board and Board of Selectmen a detailed traffic report as required Section 139 of the Code of the Town of Nantucket, which contains updated traffic counts and an analysis of recommended mitigation measures.

8. Richmond agrees to reimburse the Town of Nantucket, within three business days of receipt of a bill for professional services rendered, itemized hourly of the legal costs to the Board of Selectmen pursuant to G.L. c. 44, §53A in order for the Town to pay for the services of Kopelman and Paige, P.C., as attorneys for the Town of Nantucket, including but not limited to professional services rendered in assisting with the costs of preparing this Agreement, attendance at Special Town Meeting and any other services or costs incidental or related thereto. In no event shall Richmond's obligation under this Section 8 require reimbursement to the Town of Nantucket in excess of Twelve Thousand and No/100 ($12,000.00) Dollars. As a separate matter, Richmond agrees to reimburse the Town of Nantucket, within three business days of receipt of a bill to fund the Town's costs of conducting the November 2015 Special Town Meeting, relating to notice and publication and other costs.

9. Whether Richmond elects to pursue the 40B projects or a Special Permit as provided for under Article 1 and 2, Richmond shall not assert to any party, any permitting authority, agency or court that the payment of any of the improvements or costs concerning any required water and sewer connection fees, as set forth in the Nantucket Code or in any duly adopted regulation or fee schedule for the Town or the Wannacomet Water Company, which causes or contributes towards causing the development of part or all of the 325 units to be uneconomic whether under G.L. c.40B or 760 CMR 56.00, et seq. or otherwise, and only provided that all of the terms of this Agreement are satisfied, including that only reasonable infrastructure upgrades shall be required. The parties to this Agreement agree and acknowledge that the provision of this Section 9 shall apply only as it relates to the above referenced water and sewer connection fees and Richmond in no way is subject to a waiver of its rights to the same as relates to any other improvements, mitigation or other costs that may be allowable by any agency with competent jurisdiction including with specificity the Zoning Board of Appeals and/or the Housing Appeals Committee. Additionally, Richmond agrees that the water bills for the 225 apartments shall be administered by and paid by Richmond to the Wannacomet Water Company and that the Wannacomet Water Company shall not be required to send individual bills to 225 rental units occupants, with Richmond, in its sole discretion, to decide whether it wishes to have one water meter per apartment building or one water for each rental unit, but with Richmond to be responsible for the cost of administration and collection of the water payments and to pay the Wannacomet Water Company the full charges due and owed for each building, regardless of how each building is metered. Nothing contained herein shall be interpreted to restrict Richmond from further sub-metering such services with a third-party provider.

10. Richmond and/or its successors shall pay all applicable water and sewer fees at the time customarily collected by the Town, including, as appropriate, when the infrastructure is permitted to be installed, but the connection fees for lateral connections to the individual homeownership units shall be paid at the time that building permits are issued. The timing of payment of the fees and the amount of fees shall be the same as that for market rate developers and Richmond agrees not to challenge the fees in any fashion, either as to the validity of the fees as adopted or the amount of the fees as imposed for any of the up to 325 units.

11. Richmond shall provide, at its sole expense, all of the necessary sewer and water infrastructure to serve the 325 units at the Property and connect them to the municipal infrastructure and shall comply with all of the rules and regulations and bylaws regarding water and sewer infrastructure design and installation. Richmond shall provide sewer and water main upgrades, as reasonably required by any Town permitting agency with jurisdiction, after consultation with the Nantucket DPW, the Nantucket Water and Sewer Commission and Wannacomet Water Company. The Town and Richmond agree that any infrastructure which is required to be funded or installed by Richmond in conjunction with the development of the Property shall be sufficiently sized to avoid multiple mains being installed in the public way.

12. Richmond agrees to, upon reasonable written request, use commercially reasonable efforts to provide the information to the relevant permit granting authority as requested in and shall address all of the concerns raised by the Board of Selectmen in Board's PEL comment letters, which were previously provided to Richmond.

13. As the 325 units at the Property receive final approval from local permitting boards, Richmond shall seek building permits based on a phased plan that shall be compatible with and allow the Town to satisfy the Town's Housing Production Plan goals on a yearly basis, but this shall not be interpreted as curtailing the provision of the affordable units as quickly as Richmond can produce them.

14. Construction of the 325 units at the Property shall be completed in accordance with a phased agreement to be completed by the Parties in the future.

15. As noted above, Richmond shall use its best efforts to satisfy all of the requirements imposed by DHCD to allow all of the 225 rental units and 19 of the 100 home ownership units to be SHI eligible and shall cooperate with the provision of all information and documents and execution of all required documents and procedures necessary for that to occur.

16. Richmond shall cooperate with the Town and shall, upon reasonable written request within 30 days provide the Town Manager with all relevant information and material to support applications by the Town to DHCD to add the eligible units to the SHI.

17. Richmond shall pay all reasonable monitoring fees as provided for under DHCD's Guidelines and under any regulatory agreement, as applicable.

18. Richmond shall place a prohibition in each lease for each and every rental unit that strictly prohibits exterior storage of personal property, including but not limited to: inoperable vehicles of any type, including mopeds, boats, bicycles, motorcycles, junk, building materials. Operable mopeds, boats, bicycles, motorcycles shall be allowed to be stored in appropriate locations at the Property. Each lease shall also provide for a maximum of number of vehicles, so that the maximum number of available parking spaces is not exceeded and so that there shall be sufficient visitor spaces in accordance with a Special Permit issued by the Town of Nantucket Planning Board or any other final approval. There shall be sufficient snow storage areas provided and excess snow shall be removed from the site if the ways are narrowed to less than 18 feet of clear, paved width following snow events for two-way access ways. Richmond shall provide for 24hour/7 day per week property management, which may consist of off-site personnel who are available by telephone or e-mail to timely respond to issues, problems and emergencies.

19. Richmond shall provide as-built plans to the Town for the water and sewer main infrastructure within 90 days of completion of the infrastructure and shall provide the remaining as-built plans within six months of completion of the Project, unless the Project is phased, in which case as-built plans for each Phase shall be provided within six (6) months of completion of each Phase or as otherwise provided by the relevant permit granting authority and any Special Permit or other final approval.

20. Richmond agrees to execute a mutually satisfactory written agreement with Housing Nantucket, subject to the Town's reasonable satisfaction within 30 days after the necessary prerequisites have been met, to complete the intent of the land exchange with Housing Nantucket to the extent the same is consistent with the Release of Restriction and Right of Reverter approved by the Town filed with the Nantucket County District of the Land Court as Document Number 146007 on October 17, 2014.

21. Richmond agrees that this agreement shall bind it and its successors in interest and that a mutually satisfactory Notice of the MOA, with approval not to be unreasonably withheld, may be recorded or filed with the Land Court, as the case may be, against the Property by the Town.

II. <u>Town's Undertakings</u>

1. Upon request by Richmond, the Town Manager shall review and respond to any inquiry by Richmond regarding proposed changes to the Project and the Manager shall refer any change that she deems substantial to the Board of Selectmen for action under this Agreement for a determination as to whether the proposed change would or would not

cause the Selectmen to exercise its rights to cancel this Agreement as provided for hereunder.

2. The Board of Selectmen shall support a LAU/LIP application or a 40R warrant article at a future Town Meeting, provided that the final terms and conditions of the LAU/LIP application or the 40R warrant article shall be consistent with this agreement and the final details are negotiated and mutually agreed to by the parties, with agreement not to be unreasonably withheld.

3. The Board of Selectmen shall not withdraw its PEL comment letters to MassHousing.

4. The Board of Selectmen is willing to discuss any Local Action Unit, G.L.c.40R and LIP proposal with Richmond in the future to attempt to develop a memorandum of agreement that is mutually satisfactory.

5. The Town acknowledges and agrees that should any of the affordable housing units generated by the Project be placed on the SHI List and should the Town be availed of any of the so called "safe harbor" protections set forth in G.L. c.40B or 760 CMR 56.00, et seq., as long as this Agreement shall be valid and in full force and effect, that the Town, by and through the Board of Selectmen, shall support the waiver of and/or support as consistent with local needs at any Zoning Board of Appeals or Housing Appeals Committee hearing, any such "safe harbor" protections to deny any future applications filed or processed by Richmond under G.L. c.40B or 760 CMR 56.00, et seq., on any portion of the Property, or any other land contiguous to the Property and currently owned by Richmond and located in the Town of Nantucket. This waiver and agreement of support relates only to the use of any such "safe harbor" protections and does not prevent or preclude the Town from otherwise commenting upon, opposing, or appealing any other such future applications filed or processed by Richmond under G.L. c.40B or 760 CMR 56.00, et seq., under any other grounds. The parties acknowledge that this agreement does not bind the Zoning Board of Appeals.

III. <u>Parties' Right to Cancellation</u>

1. In the event that Articles 1 and 2 are not adopted at the 2015 Special Town Meeting, as recommended by the Planning Board and attached hereto without any substantial amendments that Richmond does not agree to at Town Meeting, in writing, then this Agreement shall be of no further effect and shall immediately and irrevocably terminate by its own terms upon no further condition, express or implied, and neither party to this Agreement shall have any further obligation to or recourse against the other as it relates to the entire subject matter of this Agreement.

2. If the final approvals for a project proposed by Richmond for the Property are (1) denied by a decision of the Zoning Board of Appeals on the grounds that the Town has achieved

the Statutory Minima as relates to the Town having met its Housing Unit Minimum, or so-called "Safe Harbor", or (2) a Regulatory Agreement subsequently entered into by the parties under the LAU/LIP Program or a Comprehensive Permit subsequently issued to Richmond for the development of the Property under the LIP program:

(a) decrease the number of total units or total bedrooms as agreed to above; and/or

(b) increases the number of affordable units other than as agreed to above and, unless voluntarily agreed to by Richmond,

Then Richmond shall have the right for those reasons, in its unfettered discretion, to void this Agreement by providing written notice of the same to the Board of Selectmen within 30 days of the final approval becoming final or the receipt of a denial by the Zoning Board of Appeals and the Parties shall have no further recourse against one another and a release instrument upon timely receipt of the notice may be recorded.

3. If the final approvals for a project proposed by Richmond for the Property:

(a) does not include the improvements and costs required by this Agreement;

(b) increases the number of total units or total bedrooms other than as agreed to above; and/or

(c) decreases the number of affordable units as provided for herein (including the non-SHI affordable units),

then Richmond and the Board of Selectmen agree that the Board shall have the right for those reasons, in its unfettered discretion, to compel Richmond to limit the density at the Property to no more than 266 residential units, as allowed under current zoning, except under a comprehensive permit which has issued and taken final effect, provided that the Board gives notice of the exercise of this right within 20 days of the issuance of any such final permission and its filing with the Town Clerk's Office and receipt of written notice by Richmond of the issuance of the relief to the Board of Selectmen, deliverable to the Town Manager.

Notwithstanding the foregoing, the Parties to this Agreement agree and acknowledge that this Section 3 is in no way intended as a waiver or limitation of Richmond's rights under MGL c. 40B to apply for and pursue a Chapter 40B project on any portion of the Property.

IV. <u>Miscellaneous</u>

1. Richmond acknowledges that this Agreement impacts the terms and condition of relief that a local permitting agency may grant, but that no local permitting agency is bound by this Agreement, and a Notice of Memorandum of Agreement shall be recorded against

the Property when Articles 1 and 2 take final effect and this Agreement shall bind Richmond and its successors in interest and assigns. Richmond has provided a letter that represents and warrants that there are no other owners or lienholders of record other than Richmond and Walter Glowacki.

2. Notwithstanding any of the terms and provisions of this Agreement, nothing herein shall prohibit or prevent Richmond from continuing to pursue its current housing applications filed under G.L. c.40B or 760 CMR 56.00, et seq., or shall prohibit or prevent Richmond from pursuing future housing applications filed under G.L. c.40B or 760 CMR 56.00, et seq., at any other locations within the Property, and /or at any other locations in the Town of Nantucket.

3. Any breach of this Agreement shall be enforceable by the Parties.

4. Any amendment to this Agreement shall occur only pursuant to a written amendment that is duly voted and authorized by the Parties and then duly executed by the Parties.

5. The Parties acknowledge they had advice of counsel before executing the Agreement.

6. A mutually satisfactory Notice of this Agreement, with agreement to the notice to not be unreasonably withheld, may be recorded by either party once Articles 1 and 2 take final effect under G.L. c.40, §32, but a discharge of the Notice shall be provided and recorded if the Agreement is cancelled as provided for hereunder.

7. This Agreement may be executed in any number of counterparts which together shall constitute one instrument. An electronic signature on this Agreement shall have the same effect as an original.

8. All notices and other communications required or permitted to be given under or by reason of this Agreement shall be in writing and may be delivered by electronic mail, facsimile, US mail or overnight mail. Notices, demands, and communications will, unless another address is specified in writing, be sent to the persons and at the addresses indicated below:

To: Board of Selectmen: Ilana M. Quirk, Esq.
Kopelman and Paige, P.C.
101 Arch Street
Boston, MA 02110
iquirk@k-plaw.com

with a copy to the Town Manager and Board of Selectmen Chairman

To: Richmond: Andrew D. Burek, Esq.
The Richmond Company, Inc.
23 Concord Street

Wilmington, MA 01887
aburek@richmondco.com

with a copy to : Arthur Reade, Esq.
Reade, Gullicksen, Hanley & Gifford, LLC
6 Young's Way
Nantucket, MA 02554
air@readelaw.com

[END OF INSTRUMENT. SIGNATURE PAGE(S) TO FOLLOW]

IN WITNESS, the parties hereunto set their hands and fixed their seals as of November 9, 2015.

NANTUCKET BOARD OF SELECTMEN*
By:

Robert DeCosta, Chairman

Matthew Fee, Vice Chairman

Tobias Glidden, Member

Dawn E. Hill Holdgate, Member

Rick Atherton, Member

*Pursuant to a vote taken by the Board of Selectmen on November 9, 2015.

COMMONWEALTH OF MASSACHUSETTS

Nantucket, SS.

On this 9 day of November 2015, before me, the undersigned Notary Public, personally appeared Robert DeCosta, Chair of the Nantucket Board of Selectmen, as aforesaid, who proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding document, and acknowledged to me that he signed it voluntarily for its stated purpose on behalf of the Town of Nantucket.

(Official Signature and Seal of Notary)

ERIKA DAVIDSON MOONEY
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
November 17, 2017

Richmond Great Point Development, LLC
By:

Philip Pastan, Manager

COMMONWEALTH OF MASSACHUSETTS

Nantucket, SS.

On this 9 day of Nov., 2015, before me, the undersigned Notary Public, personally appeared Philip Pastan, as Manager of Richmond Great Point Development, LLC, who proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed above, and acknowledged he signed it voluntarily for its stated purpose on behalf of Richmond Great Point Development, LLC and with full authority to do so.

(Official Signature and Seal of Notary)

ERIKA DAVIDSON MOONEY
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
November 17, 2017

EXHIBITS:

Exhibit A Article 1 of November 9, 2015 Special Town Meeting

Exhibit B Article 2 of November 9, 2015 Special Town Meeting

535199/NANT40B/19729-0001

Exhibit A

ARTICLE 1
(Zoning Map Change: R-20 to R-5 -- Daffodil Lane and Mayflower Circle;
LUG-2 to CN -- Davkim Lane; LUG-2 to R-5 -- Evergreen Way)

To see if the Town will vote to amend the Zoning Map of the Town of Nantucket by taking the following actions:

1. By placing the following properties currently located in the Residential-20 (R-20) district in the Residential-5 (R-5) district:

Map	Lot	Number	Street
68	739	30	Daffodil Lane
68	740	32	Daffodil Lane
68	741	34	Daffodil Lane
68	742	35	Daffodil Lane
68	736	3	Mayflower Circle
68	729	4	Mayflower Circle
68	735	5	Mayflower Circle
68	730	6	Mayflower Circle
68	734	7	Mayflower Circle
68	731	8	Mayflower Circle
68	733	9	Mayflower Circle
68	732	10	Mayflower Circle
68	A Portion of Mayflower Circle, starting at a location formed by a line connecting the eastern property boundaries of the lots shown as 3 Mayflower Circle and 4 Mayflower Circle and extending in a westerly direction to include the bulb of the existing cul-de-sac of Mayflower Circle, being the westerly portion of Lot # 615 on Land Court Plan 16514-40.		
68	A Portion of Daffodil Lane, starting at a location formed by a line connecting the eastern property boundaries of the lots shown as 35 Daffodil Lane and 3 Mayflower Circle and extending in a westerly direction to include the bulb of the existing cul-de-sac of Daffodil Lane, being the westerly portion of Lot # 663 on Land Court Plan 16514-40.		

2. By placing the following property currently located in the Limited Use General-2 (LUG-2) district in the Commercial-Neighborhood (CN) district:

Map	Lot	Number	Street
68	56.1	20(R)	Davkim Lane

3. By placing the following properties currently located in the Limited Use General-2 (LUG-2) district in the Residential-5 (R-5) district:

Exhibit A

Map	Lot	Number	Street
68	711	24	Evergreen Way
68	712	26	Evergreen Way
68	713	28	Evergreen Way
68	714	30	Evergreen Way

All as shown on a map entitled "2015 Special Town Meeting Warrant Article __ R-20 to R-5: Daffodil Lane and Mayflower Circle: LUG-2 to CN –Davkim Lane: and LUG-2 to R-5: Evergreen Way" dated October 2015 and filed herewith at the Office of the Town Clerk.

Or to take any other action related thereto.

(Philip Pastan, et al)
PLANNING BOARD MOTION: Moved that the Zoning Map of the Town of Nantucket be amended by taking the following actions:

1. By placing the following properties currently located in the Residential-20 (R-20) district in the Residential-5 (R-5) district:

Map	Lot	Number	Street
68	739	30	Daffodil Lane
68	740	32	Daffodil Lane
68	741	34	Daffodil Lane
68	742	35	Daffodil Lane
68	736	3	Mayflower Circle
68	729	4	Mayflower Circle
68	735	5	Mayflower Circle
68	730	6	Mayflower Circle
68	734	7	Mayflower Circle
68	731	8	Mayflower Circle
68	733	9	Mayflower Circle
68	732	10	Mayflower Circle
~~68~~	~~A Portion of Mayflower Circle, starting at a location formed by a line connecting the eastern property boundaries of the lots shown as 3 Mayflower Circle and 4 Mayflower Circle and extending in a westerly direction to include the bulb of the existing cul-de-sac of Mayflower Circle, being the westerly portion of Lot # 615 on Land Court Plan 16514-40.~~		
~~68~~	~~A Portion of Daffodil Lane, starting at a location formed by a line connecting the eastern property boundaries of the lots shown as 35 Daffodil Lane and 3 Mayflower Circle and extending in a westerly direction to include the bulb of the existing cul-de-sac of Daffodil Lane, being the westerly portion of Lot # 663 on Land Court Plan 16514-40.~~		

2. By placing the following property currently located in the Limited Use General-2 (LUG-2) district in the Commercial-Neighborhood (CN) district:

Map	Lot	Number	Street
68	56.1	20(R)	Davkim Lane

3. By placing the following properties currently located in the Limited Use General-2 (LUG-2) district in the Residential-5 (R-5) district:

Map	Lot	Number	Street
68	711	24	Evergreen Way
68	712	26	Evergreen Way
68	713	28	Evergreen Way
68	714	30	Evergreen Way

All as shown on a map entitled "2015 Special Town Meeting Warrant Article 1 R-20 to R-5: Daffodil Lane and Mayflower Circle: LUG-2 to CN –Davkim Lane: and LUG-2 to R-5: Evergreen Way" dated October 2015 and filed herewith at the Office of the Town Clerk.

PLANNING BOARD COMMENT: Articles 1 and 2 are companion articles. The motion printed in the Warrant is based upon passage of Article 2 as recommended by the Planning Board. The zoning changes proposed within this article were supported based upon the representation of Richmond Great Point Development, LLC ("RGP") that a Memorandum of Agreement followed by a Developer's Agreement would be executed between RGP and the Board of Selectmen ("BOS"). This binding agreement, if approved by the BOS, will require RGP to exercise the changes approved in Articles 1 and 2 as a package, and will not allow them to simply utilize the zoning map changes independently. The production of affordable housing is imperative to make progress toward the state mandated requirement of 10% of the year-round housing stock and implementation of the zoning provisions contained within Article 2 will provide for local control of the process.

FINANCE COMMITTEE COMMENT: To be provided at Town Meeting, pending review of the Memorandum of Agreement executed between the Board of Selectmen and Richmond Great Point Development, LLC.

Exhibit B

ARTICLE 2
(Zoning Bylaw Amendment: Workforce Housing)

To see if the Town will vote to amend the Code of the Town of Nantucket, Chapter 139 (Zoning), by taking the following actions:

1. Amend section 2 (definitions) to insert a new definition of “workforce housing” and to amend the existing definitions of “apartment building”, “affordable housing”, “apartment”, “eligible household”, “Nantucket Housing Needs Ownership Form”, to the extent necessary or required, and to insert any new definition or amend any existing definition to the extent necessary or required to implement the overall objectives of this article.

2. Amend section 7A (use chart) by inserting a new use(s) related to workforce housing dwelling units as necessary or required;

3. Insert a new section 8D, and/or to amend 8C, to provide new language, the purpose of which is as follows:

    a. To incentivize the creation of workforce and affordable rental and ownership housing opportunities;

    b. To promote consistency, quality, and flexibility in the site layout and design;

    c. To mitigate traffic congestion by encouraging the creation of compact neighborhoods proximate to compatible adjacent commercial uses that reduce the need for vehicle trips to already congested areas, and;

    d. To promote economic vitality and a greater diversity of housing opportunities in compliance with objectives contained within plans adopted or accepted by the Town of Nantucket, Nantucket Planning and Economic Development Commission, or the Nantucket Housing Authority.

4. Insert a new section 8D and/or amend 8C to provide new language for the allowance of density bonuses by the issuance of a special permit granted by the Planning Board, as follows:

    a. To allow the aggregation of lots for apartment buildings for workforce housing at a density of 1 unit per 1,250 square feet of lot area in the CN district with a maximum of 20 dwelling units containing up to 40 bedrooms on a single lot;

    b. To alter or remove the minimum lot size, frontage, setback(s), ground cover ratio, and regularity formula compliance as designated in section 16 for lots within the R-5 district.

    c. To establish minimum “affordability” criteria, programmatic and design standards, including, but not limited to: establishing minimum percentages of units restricted based on income limits between 50% and 200% of the annual area median income, establishing the minimum duration of affordability

restrictions, establishing interior and exterior features/finishes to marking rate units, requiring equal disbursement among market rate units.

5. To amend sections 16 (change 33 reference to 30) and 18 (specify apartment, apartment building, workforce housing apartment), 20 (screening waived where lots are in common ownership), 23 (exempt SF and duplex from site plan review), and any other section of the Bylaw implement the overall objectives of this article.

   Or, to take any other action related thereto.

(Philip Pastan, et al)
PLANNING BOARD MOTION: Moved that Code of the Town of Nantucket, Chapter 139 (Zoning), be amended by taking the following actions:

1. Amend Section 2 (definitions) to insert two new definitions, of "workforce homeownership housing" and "workforce rental housing", in alphabetical order with existing definitions, as follows:

   WORKFORCE HOMEOWNERSHIP HOUSING
   Ownership or rental of single family dwelling units, pursuant to §139-8D, where at least 25% of the total dwelling units are restricted to occupancy by households earning at or below the percentages of area median income set forth herein. An increment of 75% of the total 25% of the restricted units shall be restricted to occupancy by households earning at or below 80% of area median income. The remaining increment of 25% of the total 25% of the restricted units shall be restricted to occupancy by households earning at or below 175% of area median income.

   WORKFORCE RENTAL HOUSING
   Rental of multi-family dwelling units, pursuant to §139-8D, where at least 25% of the total dwelling units are restricted to occupancy by households earning at or below 80% of area median income.

2. Amend Section 7A (use chart) by inserting in the "Use" column, between "Duplex" and "Elder Housing Facilities" a new use "Workforce Rental Community" to be allowed by Special Permit (SP) in the CN district only.

3. Insert a new Section 8D as follows:

D. Special permit issued by the Planning Board to create workforce homeownership housing in the R-5 zoning district through a Workforce Homeownership Housing Bonus Lots allowance and in the CN zoning district through a Workforce Rental Community. The purpose of this provision is to incentivize the creation of workforce and affordable rental and ownership housing opportunities; to promote consistency, quality, and flexibility in the site layout and design; to mitigate traffic congestion by encouraging the creation of compact neighborhoods proximate to compatible adjacent commercial uses that reduce the need for vehicle trips to already congested areas, and; to promote economic vitality and a greater diversity of housing opportunities in compliance with objectives contained within plans adopted or accepted by the Town of Nantucket, Nantucket Planning and Economic

Development Commission, or the Nantucket Housing Authority. This Bylaw, which sets a minimum size lot area, is intended to allow for aggregation of buildings, parking spaces, and open areas to improve design quality. Consistent design quality shall be applied to all dwelling units and affordable units shall be distributed evenly throughout the development.

(1) Requirements.

a. The following requirements shall apply to Workforce Homeownership Housing Bonus Lots in the R-5 zoning district and to Workforce Housing Rental Community in the CN zoning district.

i. Minimum lot requirement of 60,000 square feet;

ii. The term of affordability shall be in perpetuity or the longest term allowed by law;

iii. The application shall be subject to Major Site Plan Review;

iv. The Planning Board shall be the sole special permit granting authority for any relief pursuant to any provision of this Chapter;

v. Planning Board approval of a special permit shall not substitute for approval of a definitive subdivision or approval not required (ANR) plan.

vi. Project must be eligible for approval as Local Action Units (LAU) through the Local Initiative Program (LIP) or otherwise included on the Town's Subsidized Housing Inventory. It shall be the responsibility of the applicant to take all reasonable steps necessary to ensure the units are included, including without limitation, preparation and execution of a Regulatory Agreement in a form to be approved by the Town of Nantucket, through its Board of Selectmen, and by the Department of Housing and Community Development ("DHCD") and provision of any other documents requested by DHCD.

(2) Workforce Homeownership Housing Bonus Lots.

a. Bonus lots, subject to the requirements below, shall be based on the number of building lots which could have been created through a conventional subdivision plan. The maximum number of building lots, excluding any bonuses, shall not exceed the number which may have otherwise been created on a conventional subdivision plan meeting all dimensional and upland requirements of the Zoning Bylaw and in full conformance with (and requiring no waivers from) the "Rules and Regulations Governing the Subdivision of Land," as may be amended by the Planning Board from time to time, as demonstrated by the submission of a dimensioned lotting plan. For all density calculations that result in a fractional number, only fractions equal to or greater than 0.51 should be rounded to the next highest whole number.

i. The total number of lots shall be calculated by multiplying the number of lots allowed by-right, as described above, by a factor of 1.33.

ii. 25% of the total number of lots allowed, using the bonus provision, must be allocated and restricted to ownership by households earning at or below the area median income limits set forth in the definition of Workforce Homeownership Housing, as defined in §139-2, or, the rental dwelling units located on the lots achieved through the bonus provision must be restricted to households earning at or below 80% of area median income. Said lots shall be subject to a Nantucket

Housing Needs Covenant -Ownership Form or other instrument restricting sale or rental to households earning at or below the area median income limits set forth in the definition of Workforce Homeownership Housing, as defined in §139-2.

b. The Planning Board may reduce, by up to 100%: the front yard setback (but not the side or rear yard setbacks applied to the perimeter of the project area), internal side or rear yard setbacks (meaning setbacks between lots which are the subject of the application), side or rear yard setbacks between the lots which are the subject of the application and other land in common ownership or control of the applicant, and the required frontage, provided that the lot has sufficient vehicular access through an easement.
c. The Planning Board may allow an increase in the ground cover ratio up to 50%.
d. A minimum buffer area of at least 20 feet shall be established between the Workforce Homeownership Housing Bonus Lots and residentially zoned abutting properties. The Planning Board may require the buffer area to include plantings, fencing, walls, or other improvements to mitigate impacts to abutting properties.

(3) Workforce Rental Community

a. Rental dwelling units in one or more structures, shall be subject to the following requirements:
    i. The maximum number of dwelling units shall not exceed 32, at least 8 of which must (25% of which) be restricted to occupancy by households earning at or below 80% of area median income. An instrument, in a form approved by the Planning Board, restricting rental of at least 8 of the dwelling units to households earning at or below 80% of area median income must encumber the subject lot(s);
    ii. The maximum number of bedrooms contained within the Workforce Rental Community Lot shall not exceed 57;
    iii. At least 10% of the total dwelling units within the Workforce Housing Rental Community must contain at least 3 bedrooms, unless such requirement is reduced by a future binding directive from the Commonwealth of Massachusetts Department of Housing and Community Development which confirms that fewer than 10% three bedroom units may be included in the Workforce Rental Community while still confirming that all of the units in the Workforce Rental Community shall be eligible for inclusion on the Town's Subsidized Housing Inventory. In such an instance, the Planning Board shall have the discretion to approve fewer 3 bedroom units within the Workforce Rental Community, in conjunction with the issuance of the special permit, as long as the requirement described above with respect to confirmation of the eligibility of all of the units in the Workforce Rental Community relative to inclusion on the Town's Subsidized Housing Inventory has been met.
b. A minimum buffer area of at least 20 feet shall be established between the Workforce Rental Community and residentially zoned abutting properties.

The Planning Board may require the buffer area to include plantings, fencing, walls, or other improvements to mitigate impacts to abutting properties.

c. The Planning Board may, in addition to those requirements included in §139-23, require submission of additional documentation, including without limitation, detailed floor plans, operation and management plan for the project, including maintenance of the structure(s) and the site.

d. The Planning Board may reduce, by up to 100%, the side and rear yard setbacks where two or more Workforce Rental Community Lot projects are adjacent to each other.

4. Amend Section 18B by adding an asterisk after "Apartment" and inserting the following language under the "Notes" section:

   *For interpretation purposes, apartment shall include the following uses contained within the Use Table in §7A: apartment, apartment building, garage apartment, and workforce rental community.

5. Amend Section 23A(1) as follows:

   The construction or alteration of any single-family or duplex dwelling, or building accessory to such dwelling, except when such dwellings are an integral part of workforce homeownership housing bonus lots or a workforce rental community application pursuant to § 139-8 of this chapter, major commercial development application pursuant to § 139-11 of this chapter, and except where such dwellings are located in the Moorlands Management District, § 139-13 of this chapter;

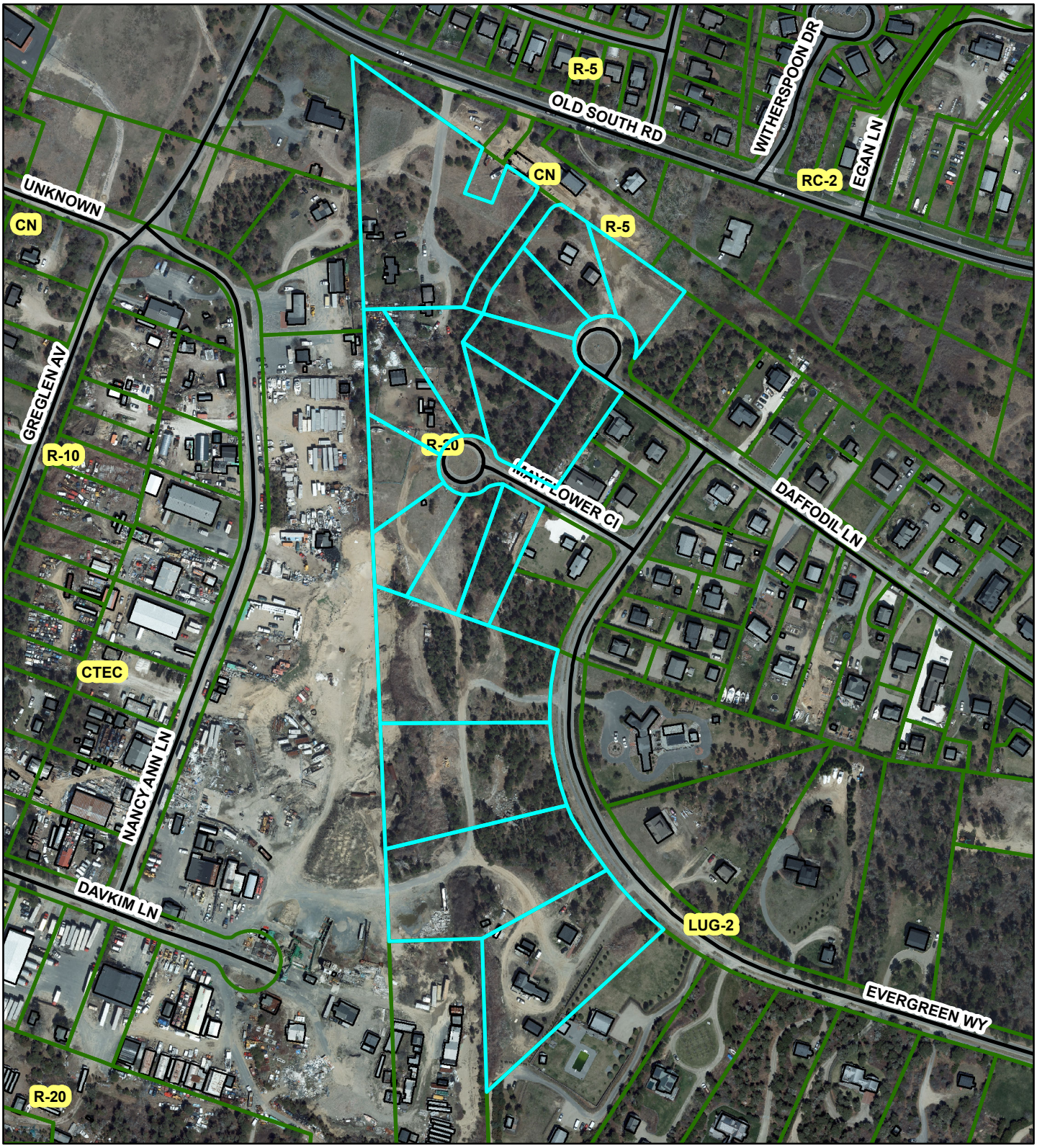
6. Amend section 16A as follows:

   Except as expressly provided by § 139-330 of this chapter....

PLANNING BOARD COMMENT: A locally based process for the creation of affordable/workforce housing units, as opposed to the 40B application process that is strictly controlled by the state, will become available if this zoning amendment is passed. Local regulations, including those regulations within the purview of the Historic District Commission, will guide the process for ownership and rental housing production.

FINANCE COMMITTEE COMMENT: To be provided at Town Meeting, pending review of the Memorandum of Agreement executed between the Board of Selectmen and Richmond Great Point Development, LLC.

#43-16 Richmond Great Point Development, LLC
Sandpiper Place Single Family Home Development Project
Off Daffodil Lane, Mayflower Circle, Evergreen Way & Old South Road
Map 68 Parcels 129, 711, 712, 713, 714, 729, 730, 731, 732, 733, 734, 735, 736, 739, 740, 741, 742, 999.2



Town Clerk
Town & County Building
16 Broad St
Nantucket, MA 02554

JUN 15 2016

Nantucket Planning Board

RECEIVED
JUN 15 2016
By

Application for a Special Permit

Date: _____ June 13, 2016 _____ File #:_____

Name of development: ___ "Sandpiper Place" Single Family Home Development Project _____

Owner(s) name(s): _____ Richmond Great Point Development LLC (Philip Pastan) _____

Mailing address: _____ 23 Concord Street, Wilmington MA 01887 _____
Phone number: ___ 978-988-3900 _____ Fax number:____ 978-988-3950 _____

E-mail: ___ ppastan@richmondco.com _____

Applicant's name: __ The Richmond Company, Inc. (David Armanetti and Patty Roggeveen) ___
Mailing address: _____ 23 Concord Street, Wilmington MA 01887 _____
Phone number: ___ 978-988-3900 _____ Fax number:____ 978-988-3950 _____
E-mail: ___ darmanetti@richmondco.com; proggeveen@richmondco.com _____

Engineer / surveyor's name: _____ Green Seal Environmental, Inc. (Heather Twiss) _____

Mailing address: _____ 114 State Road, Sagamore Beach MA 02562 _____ Phone number:
__ 508-888-6034 __Fax number:__ 508-888-1506 __E-mail:___ htwiss@gseenv.com ___

Location of lot(s): Off Daffodil Lane, Maflower Circle, Evergreen Way, and Old South Road

Street address _____ Nineteen (19) Separate Parcels / Addresses _____

Tax Assessors Map _____ Parcel ___ See Attachment "A" for Detail of Multiple Parcels

Nantucket Registry of Deed: See Attachment "B" for Detail of Multiple Parcels
Plan Book Page _____ **OR**

Plan File #_____ **OR** Land Court Plan #_____ at Certificate # _____

Size of parcel: __ 749,235 SF (17.20 Acres) __ sq. ft. Zoning District: ___R-5 (Residential-5) ___

Special Permit sought: (check one)

- ❍ Cluster subdivision
- ❍ Commercial WECS
- ❍ Driveway Access/Curb Cut Special Permit
- ❍ Harbor Overlay District (HOD)
- ❍ Major Commercial Development (MCD)

- ❍ Multi-family Special Permit
- ❍ Moorlands Management District Subdivision or Construction (MMD)
- ❍ NEHOD (Neighborhood Employee Housing Overlay District)
- ❍ MRD (Major Residential Development)
- ❍ MIPOD (Mid-Island Planned Overlay District)
- ❍ Other Uses Requiring a Special Permit (specify all uses and *Nantucket Code* sections)

Section	Description

Specify all associated Zoning Code relief sought:

Section	Description
None	

Only the zoning relief expressly requested above will be considered as part of this application.

If applying for a Major Commercial Development, specify how the application will comply with Section 139-11 (J) of the *Zoning Code of the Town of Nantucket*, also known as the Town's Affordable Housing Effort:
Not Applicable (Application is not a Major Commercial Development Project)

Planning Board filing fee due: $_____

Engineering Inspection Escrow Deposit due: $_____

I/ we hereby certify that the applicant(s) cited above have been authorized by me/ us to file a Special Permit application with the Planning Board on property that I/ we own.

_____

_____

Owner(s)' Signature(s) Philip Pastan, as Manager of Richmond Great Point Development LLC

_____

Applicant's Signature

6/13/16

I/we _____, the undersigned, hereby authorize _____ to act as agent(s) on my/our behalf and to make any necessary revisions on this filed application as they may be requested by the Board to meet its governing rules and guidelines.

_____

_____

Owner(s)' signature(s)

Check List:

- ❑ Planning Board Special Permit abutters list – to be obtained at the Tax Assessor's office
- ❑ Completed application form entitled "Application to the Planning Board for a Special Permit"
- ❑ Application fee of $250.00 payable to Town of Nantucket
- ❑ Abutters fee of $6.11 per abutters payable to Pitney Bowes Reserved Funds
- ❑ Four (4) sets of mailing labels with each abutter's name and address
  - 1" x 2 5/8" size, typed labels, are preferred
  - duplicate labels are not necessary if the same owner is listed for more than one abutting property
- ❑ Completed application form
- ❑ Town Clerk's stamped application (provide 2 copies-one for Town Clerk and one for Planning Board)

"ATTACHMENT A"
LIST OF INDIVIDUAL PROPERTIES FOR PLANNING BOARD SPECIAL PERMIT CERTIFIED ABUTTERS LIST REQUEST
RICHMOND GREAT POINT DEVELOPMENT LLC
"SANDPIPER PLACE" SINGLE FAMILY HOME OWNERSHIP DEVELOPMENT PROJECT

Index	Parcel Address	Assessor's Tax Map / Parcel ID		Land Court Plan Information	
		Map	Parcel	Plan Number	Lot
1	30 Daffodil Lane	68	739	16514-40	628
2	32 Daffodil Lane	68	740	16514-40	629
3	34 Daffodil Lane	68	741	16514-40	630
4	35 Daffodil Lane	68	742	16514-40	631
5	3 Mayflower Circle	68	736	16514-40	625
6	4 Mayflower Circle	68	729	16514-40	618
7	5 Mayflower Circle	68	735	16514-40	624
8	6 Mayflower Circle	68	730	16514-40	619
9	7 Mayflower Circle	68	734	16514-40	623
10	8 Mayflower Circle	68	731	16514-40	620
11	9 Mayflower Circle	68	733	16514-40	622
12	10 Mayflower Circle	68	732	16514-40	621
13	24 Evergreen Way	68	711	16514-16	431
14	26 Evergreen Way	68	712	16514-16	432
15	28 Evergreen Way	68	713	16514-16	433
16	30 Evergreen Way	68	714	16514-16	434
17	73 Old South Road	68	129	16514-97	853
18	75(A) Old South Road	68	999.2	16514-100	858
19	Private Way (Adjacent to 73 Old South Road)	n/a	n/a	16514-G	"40.00 Wide Way"

"ATTACHMENT B"
LIST OF INDIVIDUAL PROPERTIES FOR DERIVATION OF TITLE FOR SPECIAL PERMIT APPLICATION
RICHMOND GREAT POINT DEVELOPMENT LLC
"SANDPIPER PLACE" SINGLE FAMILY HOME OWNERSHIP DEVELOPMENT PROJECT

Index	Parcel Address	Deed Recording Reference (Date, Book, Page)			Internal Reference in Deed	
		Date	Book	Page	Parcel Number	Page
1	30 Daffodil Lane	August 8, 2013	O1397	312	Fifty-Five	11
2	32 Daffodil Lane	August 8, 2013	O1397	312	Fifty-Six	11
3	34 Daffodil Lane	August 8, 2013	O1397	312	Fifty-Seven	11
4	35 Daffodil Lane	August 8, 2013	O1397	312	Fifty-Eight	11
5	3 Mayflower Circle	August 8, 2013	O1397	312	Fifty-Four	11
6	4 Mayflower Circle	August 8, 2013	O1397	312	Forty-Seven	9
7	5 Mayflower Circle	August 8, 2013	O1397	312	Fifty-Three	11
8	6 Mayflower Circle	August 8, 2013	O1397	312	Forty-Eight	10
9	7 Mayflower Circle	August 8, 2013	O1397	312	Fifty-Two	10
10	8 Mayflower Circle	August 8, 2013	O1397	312	Forty-Nine	10
11	9 Mayflower Circle	August 8, 2013	O1397	312	Fifty-One	10
12	10 Mayflower Circle	August 8, 2013	O1397	312	Fifty	10
13	24 Evergreen Way	August 8, 2013	O1397	312	Thirty-Seven	8
14	26 Evergreen Way	August 8, 2013	O1397	312	Thirty-Eight	8
15	28 Evergreen Way	August 8, 2013	O1397	312	Thirty-Nine	8
16	30 Evergreen Way	August 8, 2013	O1397	312	Forty	8
17	73 Old South Road	August 8, 2013	O1397	312	Forty-Three	9
18	75(A) Old South Road	February 6, 2015	Document # 00147075		n/a	n/a
19	Private Way (Adjacent to 73 Old South Road)	n/a	n/a	n/a	n/a	n/a

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 10, 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 "Conventional Subdivision Plan" (Dimensioned Lotting Plan)
In Support of Application for Special Permit (Workforce Homeownership Housing)
"Sandpiper Place" Single Family (Home Ownership) Housing Development
Old South Road, Daffodil Lane, Mayflower Circle, and Evergreen Way
Richmond Great Point Development LLC (Owner / Developer)

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 "Conventional Subdivision Plan" (including the description provided herein and the attached plans) in support of the application / plans for a special permit that is being submitted (concurrently) to the Town of Nantucket Planning Board to provide for the development of the "workforce homeownership housing" project which is proposed to be located on a combination of nineteen (19) contiguous properties comprising +/- 17.2 acres of land located on portions of 73, and 75(A) Old South Road; 30, 32, 34, and 35 Daffodil Lane, 3, 4, 5, 6, 7, 8, 9, and 10 Mayflower Circle, and 24, 26, 28, and 30 Evergreen Way, and an existing "Private Way" abutting and located immediately east of the 73 Old South Road property.

As you know, the applicable zoning, eligibility criteria, and process for applying for this category of special permit (workforce homeownership housing) is set forth in Section 139(8)(D) of the Town of Nantucket Zoning Bylaw, including an explanation of the parameters by which a project's eligibility for "bonus lots" is to be determined, and a description of the methodology for calculating the "bonus lots" that the project may be eligible for.

Section 139(8)(D)(2)(a) requires that the determination of any "bonus lots" is based on an analysis of the total number of building lots that can be created on the subject property by way of:

> *"a conventional subdivision plan meeting all dimensional and upland requirements of the Zoning Bylaw and in full conformance with (and requiring no waivers from) the Rules and Regulations Governing the Subdivision of Land, as may be amended by the Planning Board from time to time, as demonstrated by the submission of a dimensioned lotting plan.*

The remainder of this correspondence briefly describes the methodology and calculations utilized to create the dimensioned lotting plan, which is attached hereto, and the conclusion that has been reached with respect to the total number of conventional building lots and bonus building lots that could be developed on the subject property, per the applicable criteria and regulations, as described above, subject to the issuance of the requisite special permit by the Town of Nantucket Planning Board.

The subject property is comprised of a total of +/- 17.2 acres of land area, encompassing a total of nineteen (19) existing lots, all of which has been designated within the Residential-5 (R-5) zoning district.

As shown in the attached "dimensioned lotting" plan, in accordance with the criteria set forth in Section 139(8)(D)(2)(a) of the Town of Nantucket Zoning Bylaw, and based on our engineering and zoning analysis, a conventional subdivision can be created on the subject property which yields a total of eighty-one (81) individual "by right" building lots.

This includes the design of building lots that all meet or exceed the (five thousand square foot) minimum lot area criteria, the fifty linear feet) minimum lot frontage criteria, and the (not less than 0.55) minimum lot regularity factor. The proposed plan also includes an access road (connecting to Old South Road) and internal roadways that are a minimum of the (forty linear feet wide) right of way width that is prescribed in the Rules and Regulations Governing the Subdivision of Land

Based on the foregoing, by applying the 1.33 "bonus lots" factor to the number of building lots allowed "by right" as set forth in Section 139(8)(D)(2)(a)[1] of the Town of Nantucket Zoning Bylaw, the subject property would be permitted to include a total of one hundred and eight (108) building lots, with the "by-right" base of eighty-one (81) building lots and an increment of twenty-seven (27) "bonus lots".

The accompanying "sub-area" plan documents how the overall subject property can be broken up into four (4) individual subdivisions of not less than 60,000 square feet of land area, and shows the total number of ("by-right") building lots that can be created in each sub-area / subdivision (see table below).

Calculations of Sub Areas (Individual Subdivisions) within Subject Property

Sub Area	Land Area (Square Feet)	Land Area (Acres)	"By-Right" Lots
Sub Area # 1	210,000 SF	4.8 Acres	38 Lots
Sub Area # 2	120,200 SF	2.8 Acres	16 Lots
Sub Area # 3	60,000 SF	1.4 Acres	9 Lots
Sub Area # 4	100,000 SF	2.3 Acres	18 Lots
Roads / Open Space	257,000 SF	5.9 Acres	n/a
Total	**747,200 SF**	**17.2 Acres**	**81 Lots**

Notwithstanding the maximum one hundred and eight (108) total building lots that can be created within the subject property, including the twenty-seven (27) "bonus lots" as described and demonstrated herein through submittal of the conventional subdivision plan, the maximum total single family building lots that were agreed to be developed on the subject property in the "*2015 Richmond Great Point Development, LLC / Town of Nantucket Memorandum of Agreement*" that was entered into on November 9, 2015, by and between Richmond Great Point Development LLC and the Town of Nantucket, acting by and through its Board of Selectmen, were limited to one hundred (100) building lots.

Based on the foregoing, the (workforce homeownership housing) special permit application that is being submitted concurrently with this correspondence, to facilitate the development of the proposed "Sandpiper Place" development on the subject property includes a total of one hundred (100) building lots, a total that is eight (8) building lots less than the maximum total that could otherwise be created on the subject property.

We look forward to the results of your review of the enclosed information / calculations and the attached plans, to confirm the accuracy and conclusions of the dimensioned lotting plan and the maximum number of building lots which could be created on the subject property.

If you have any immediate questions with respect to the information and materials submitted herein or the proposed project in general, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Philip Pastan, TRC
Kathryn Fossa, TRC
Patricia Roggeveen, RGPDLLC
Shane Valero, RGPDLLC
Andrew Burek, Esq., RGPDLLC
Arthur Reade Jr., Esq., RGH

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 10, 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 Application for Special Permit (Workforce Homeownership Housing)
"Sandpiper Place" Single Family (Home Ownership) Housing Development
Old South Road, Daffodil Lane, Mayflower Circle, and Evergreen Way
Richmond Great Point Development LLC (Owner / Developer)

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 completed application form, plans, drainage reports, and related materials which are required to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a special permit to allow for the development of the "workforce homeownership housing" project which is proposed to be located on a combination of nineteen (19) contiguous properties comprising +/- 17.2 acres of land located on portions of 73, and 75(A) Old South Road; 30, 32, 34, and 35 Daffodil Lane, 3, 4, 5, 6, 7, 8, 9, and 10 Mayflower Circle, and 24, 26, 28, and 30 Evergreen Way, and an existing "Private Way" abutting and located immediately east of the 73 Old South Road property.

The proposed project is comprised of the land area that was specifically re-zoned for this purpose, to the Residential-5 (R-5) zoning district and to qualify for the "workforce homeownership housing bonus lots" by the approval of Article 1 and Article 2 at the Nantucket Special Town Meeting of November 9, 2015, the provisions of which have been codified as Section 139-8(D) (Residential Development Options) of the Town of Nantucket Zoning Bylaw.

The proposed project is also expressly consistent with and complies with the terms and provisions of the "*2015 Richmond Great Point Development, LLC / Town of Nantucket Memorandum of Agreement*" dated November 9, 2015, which memorializes the specific terms under which a workforce homeownership housing community could be developed on the above-captioned properties (the "MOA").

The proposed project is comprised of a series of one hundred (100) single family residential lots, located in a subdivision / neighborhood that incorporates roadways, pedestrian walkways / bicycle paths, street lighting, and is served by a range of new infrastructure improvements (water, sewer, drainage, etc.).

The range of lot sizes that are proposed to be created, as shown on the attached plans, are as follows:

"Sandpiper Place" Single Family Home Ownership Project
Summary of Proposed Lot Types / Sizes

Lot Number on Plan	Range in Size of Lots	Number of Each Type of Lot in Project
"A" Lots	4,500 SF (90' by 50')	26 Lots
"B" Lots	4,000 SF (80' by 50')	58 Lots
"C" Lots	4,125 SF (75' by 55')	16 Lots
Subtotal	**4,000 SF to 4,500 SF**	**100 Lots**

Twenty-five percent of all of the proposed lots / homes, equal to twenty-five (25) lots / homes, will be developed as homes that will be sold to buyers who qualify under the household income and related eligibility criteria set forth in the MOA (including the local preference and lottery provisions described therein).

This will include the sale of nineteen (19) of the homes to buyers whose household incomes are equal to or less than eighty percent (80%) of the Area Median Income (AMI) established for Nantucket County by the US Department of Housing and Urban Development (HUD). In 2015, these (80% of AMI) annual income limits were equal to $67,700 in annual income for a three person household and $75,200 in annual income for a four person household. Based on these income limits and recent thirty year fixed rate mortgage interest rates which set the formula under how the maximum sales prices are established, the maximum sales price for the (80% AMI) affordable homes will be +/- $260,000 for a two bedroom home and +/- $285,000 for a three bedroom home. By the time the proposed project is approved, these maximum income and sales price limits will likely be tied to the 2016 income data that is issued / updated by the federal government, so these limits will likely change (slightly).

Under the "local affordability" provision set forth in the MOA, the other six (6) affordable homes will be sold to buyers whose household incomes are equal to or less than eighty percent (80%) of the Area Median Income (AMI) established for Nantucket County by the US Department of Housing and Urban Development (HUD). In 2015, these (175% of AMI) annual income limits were equal to $148,000 in annual income for a three person household and $164,500 in annual income for a four person household. Based on these income limits and recent thirty year fixed rate mortgage interest rates which set the formula under how the maximum sales prices are established, the maximum sales price for the (175% AMI) affordable homes will be +/- $540,000 for a two bedroom home and +/- $598,000 for a three bedroom home. By the time the proposed project is approved, these maximum income and sales price limits will likely be tied to the 2016 income data that is issued / updated by the federal government, so these limits will likely change (slightly).

Per the terms of the MOA, all of the twenty-five (25) affordable homes will be dispersed uniformly throughout the project and the appearance and quality of finishes of the affordable homes will be directly comparable to the market rate homes that are developed within the property.

The proposed project is also subject to compliance with the applicable intensity and dimensional criteria set forth in Section 139-16 of the Town of Nantucket Zoning Bylaw (including but not limited to minimum lot size, frontage, yard setbacks, ground cover ratio, and (lot) regularity factor, as modified by the site flexibility standards that are set forth in Section 139(8)(D) of the Town of Nantucket Zoning Bylaw for workforce homeownership housing, which the proposed project is qualified for,

Because it is subject to issuance of a workforce homeownership housing special permit, as specified in Section 139-8(D)(1)(a)[3] of the Town of Nantucket Zoning Bylaw, the proposed subject is subject to major site plan review (MSPR) by the Planning Board (as set forth in Section 139-23, and specifically Section 139-23(B)(2) of the Town of Nantucket Zoning Bylaw).

The proposed project also includes a major "community focal point", which is proposed to be located at a highly visible and accessible location adjacent to the main entrance to the proposed project, immediately south of Old South Road, in the center of the 73 Old South Road property, that has been designed to incorporate a series of public spaces for community use, including a meeting house / barn structure, an outdoor common area, an outdoor patio / stage area, and landscaping improvements, all of which will be made available for public and community use for events and performance activities.

We appreciate the opportunity to submit the application, plans, and supporting materials for this important development proposal for your review and for consideration by the Planning Board and we look forward to commencing with the public hearing and public review process.

If you have any immediate questions with respect to the proposed project or any of the submittal 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.
On Behalf of Richmond Great Point Development LLC

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

THE RICHMOND COMPANY, INC.

The Richmond Company, Inc.
23 Concord Street
Wilmington, Massachusetts 01887
(979) 988-3900

June 13, 2016

TOWN OF NANTUCKET
TOWN CLERK
16 Broad Street
Nantucket, Massachusetts 02554

Attention: Catherine Flanagan Stover, MMC, CMMC

Subject: Submittal of Application for Special Permit (Workforce Homeownership Housing)
Richmond Great Point Development LLC (Owner / Developer)
"Sandpiper Place" Single Family Homeownership Development

Dear Mrs. Stover:

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 document submittal of the completed application to petition the Town of Nantucket Planning Board to consider the above-captioned proposal which requires the issuance of a special permit to allow for the development of the "Sandpiper Place" workforce homeownership housing development, comprised of one hundred (100) single family housing lot on a combination of nineteen (19) properties totaling +/- 17.2 acres of land located Old South Road, Daffodil Lane, Mayflower Circle, and Evergreen Way.

The submittal of the application to your office is being completed as prescribed in Section 139-30(B)(1) of the Town of Nantucket Zoning Bylaw.

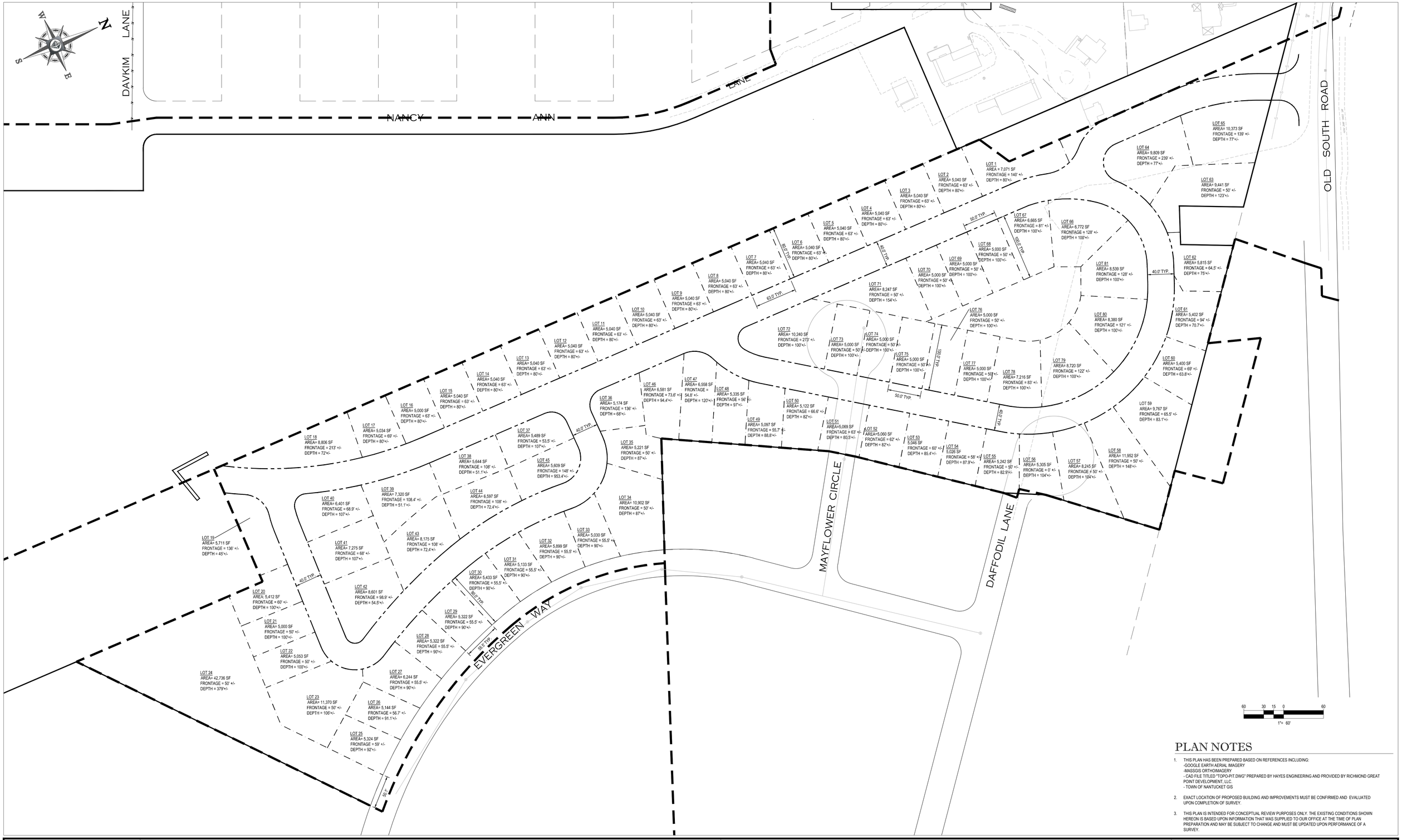
Upon your acknowledgment of receipt of the application (by way of time / date stamping the application), we will proceed to file a copy of the application (and all other required materials) forthwith to the Town of Nantucket Planning Board to obtain its review and subsequent action (as prescribed in Section 139-30(B)(2) of the Town of Nantucket Zoning Bylaw.

Should you have any questions with respect to the application and submittal, 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.
On Behalf of Richmond Great Point Development LLC

Cc: Andrew Burek, Esq., TRC
Arthur Reade, Jr., Esq., RGH



PLAN NOTES

1. THIS PLAN HAS BEEN PREPARED BASED ON REFERENCES INCLUDING:
   -GOOGLE EARTH AERIAL IMAGERY
   -MASSGIS ORTHOIMAGERY
   - CAD FILE TITLED "TOPO-PIT.DWG" PREPARED BY HAYES ENGINEERING AND PROVIDED BY RICHMOND GREAT POINT DEVELOPMENT, LLC.
   - TOWN OF NANTUCKET GIS
2. EXACT LOCATION OF PROPOSED BUILDING AND IMPROVEMENTS MUST BE CONFIRMED AND EVALUATED UPON COMPLETION OF SURVEY.
3. THIS PLAN IS INTENDED FOR CONCEPTUAL REVIEW PURPOSES ONLY. THE EXISTING CONDITIONS SHOWN HEREON IS BASED UPON INFORMATION THAT WAS SUPPLIED TO OUR OFFICE AT THE TIME OF PLAN PREPARATION AND MAY BE SUBJECT TO CHANGE AND MUST BE UPDATED UPON PERFORMANCE OF A SURVEY.

RICHMOND GREAT POINT DEVELOPMENT LLC
OLD SOUTH ROAD PROPERTIES
NANTUCKET, MA

DIMENSIONED LOTTING PLAN

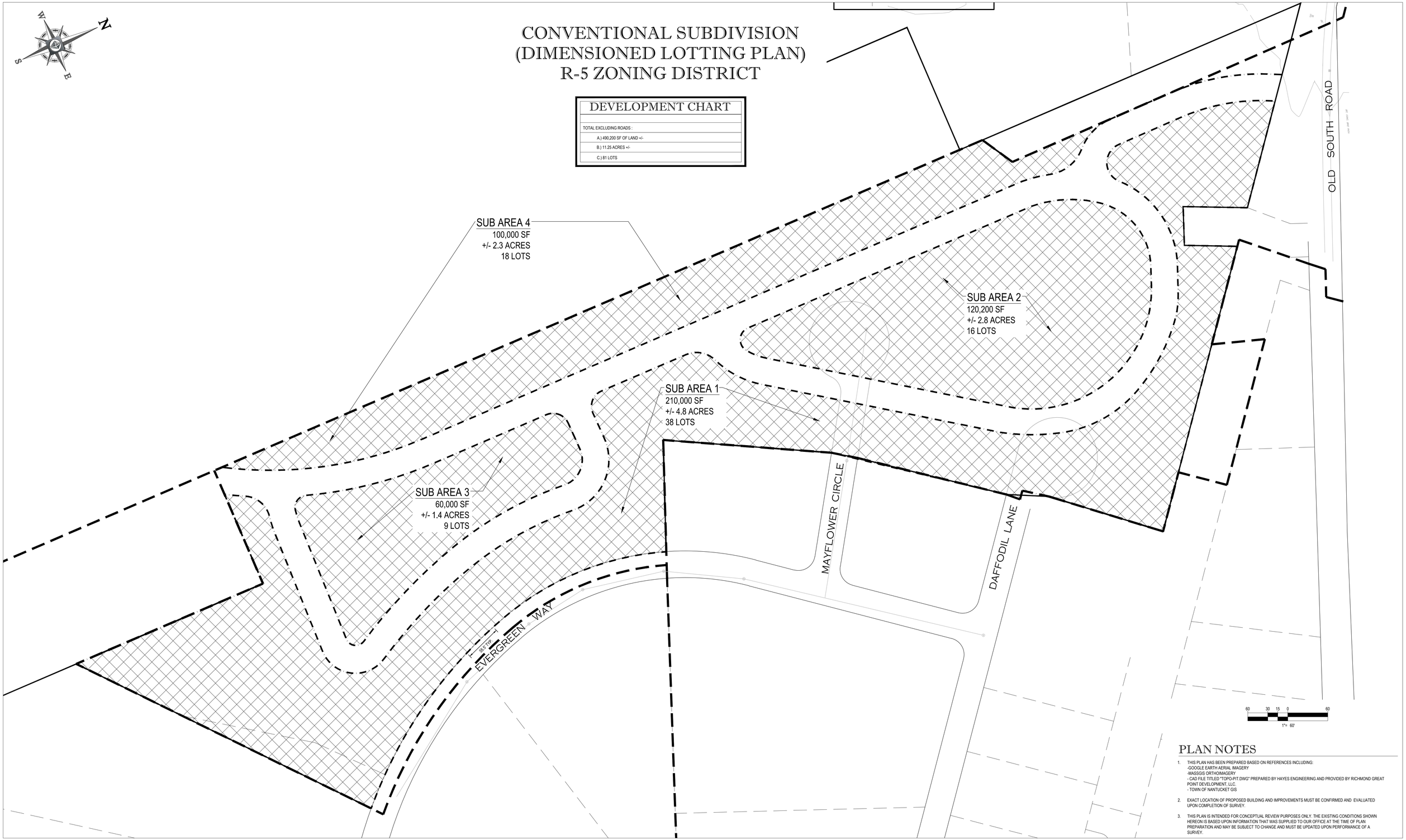
SCALE 1" 60
DATE 06 10 2016
PRO ECT 141196

REFERENCES

RICHMOND GREAT POINT DEVELOPMENT LLC

CONVENTIONAL SUBDIVISION
(DIMENSIONED LOTTING PLAN)
R-5 ZONING DISTRICT

DEVELOPMENT CHART
TOTAL EXCLUDING ROADS :
A.) 490,200 SF OF LAND +/-
B.) 11.25 ACRES +/-
C.) 81 LOTS



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RICHMOND GREAT POINT DEVELOPMENT LLC
OLD SOUTH ROAD PROPERTIES
NANTUCKET, MA

CON□ENTIONAL SUBDI□ISION
□DIMENSIONED LOTTING PLAN□R□5 □ONING DISTRICT

SCALE□1"□60□
DATE□06□10□2016
PRO□ECT □□□ 141196

REFERENCES□

RICHMOND GREAT POINT DEVELOPMENT LLC

Posted with Town Clerk on July 8, 2016
Posting # ___

TOWN OF NANTUCKET
BOARD OF APPEALS
NANTUCKET, MA 02554

Agenda
(Subject to Change)

Thursday, July 14, 2016
12:00 PM
4 Fairgrounds Road
Public Safety Facility – 1st Floor Community Room

1 ▪ **CALL TO ORDER:**

▪ **APPROVAL OF THE AGENDA:**

▪ **APPROVAL OF THE MINUTES:**
- June 9, 2016

▪ **OLD BUSINESS:**

- 66-00 Abrem Quary (40B)
  Vote to approve and sign Monitoring Services Agreement between Nantucket Zoning Board of Appeals and Nantucket Housing Authority and NHA Properties *d/b/a* Housing Nantucket.

- 04-16 Donald J. Mackinnon, Trustee of Nantucket 106 Surfside Realty Trust – *a/k/a* SURFSIDE COMMONS 40B 106 Surfside Road Mackinnon / Schwartz
  Extended Close of Public Hearing deadline October 31, 2016 (180 days from Initial Public Hearing with Extension)
  Decision Action deadline December 12, 2016 (40 days from close of Public Hearing)
  The Applicant is seeking a Comprehensive Permit in accordance with M.G.L. Chapter 40B, as approved by Massachusetts Housing Partnership, in order to allow a multi-family project consisting of 56 rental apartments with fourteen (14) to be designated as affordable units. The apartments will be arranged in two 2 ½ story buildings with thirteen units each and two 3 ½ story buildings with fifteen (15) units each. There will be a total of two 1-bedroom units, forty two 2-bedroom units, and twelve 3-bedroom units. The project will also include a clubhouse and pool. If approved, the property will be permanently deed-restricted for the purpose of providing affordable year-round housing. The file with a copy of the complete and updated list

2 Fairgrounds Road Nantucket Massachusetts 02554
508-228-7215 telephone 508-228-7298 facsimile

of requested waivers is available at the Zoning Board of Appeals office at 2 Fairgrounds Road between the hours of 7:30 A.M. and 4:30 P.M., Monday through Friday or via link to posting of all document related to this project found on Town of Nantucket website below:

http://www.nantucket-ma.gov/708/Atlantic-Development---106-Surfside-Road

The Locus, situated at 106 Surfside Road, is shown on Assessor's Map 67 as Parcel 80. Locus is also shown as Block 22 on Plan File 3-D and as Parcels 7 -11 (inclusive) on Plan No. 2014-52. Evidence of owner's title is recorded in Book 1410, Page 205 and Book 1488 Page 213, both on file at the Nantucket County Registry of Deeds. The site is zoned Limited Use General 2 (LUG-2) and Limited Use General 3 (LUG-3).

- 16-16 Todd W. Winship & Elizabeth W. Winship and Bess W. Clarke, Tr., Sixteen Monohansett Road Trust 16 Monohansett Road Brescher
  Action deadline July 20, 2016 **REQUESTED WITHDRAWAL WITHOUT PREJUDICE**

- 20-16 Gerald T. Vento & Margaret Vento, Tr. of Ninety-One Low Beach Road Nominee Trust
  Action deadline August 22, 2016 91 Low Beach Road Cohen

- **NEW BUSINESS:**

- 15-16 Madaket Wheelhouse, LLC 13 Massachusetts Avenue Cohen
  Action deadline October 12, 2016
  Applicant is seeking relief by Special Permit pursuant to Zoning By-law Section 139-33.A in order to alter the pre-existing nonconforming dwelling and garage. Applicant proposes to build an addition to the southeast corner of the dwelling which will be no closer than the existing westerly side yard setback distance of 4.4 feet where minimum side yard setback is ten (10) feet. Other dimensionally compliant additions are also proposed to the dwelling. Applicant further proposes to convert the garage/cottage into a secondary dwelling. The expansion will not bring the structure any closer than the current easterly side yard setback distance of 2.9 feet or the southerly front yard setback distance of 5.7 feet where minimum front yard setback is twenty (20) feet. The Locus is situated at 13 Massachusetts Avenue, is shown on Assessor's Map 60 as Parcel 75, and as Lots 12-15, Block 29 upon Land Court Plan 2408-Y and unregistered land lying north of said Lots. Evidence of owner's title is registered on Certificate of Title No. 25696 at the Nantucket County District of the Land Court and in Book 1494, Page 39 on file at the Registry of Deeds. The site is zoned Village Residential (VR).

- 22-16 John N. Jordin & Julie M. Jordin 28 Lovers Lane Hanley
  Action deadline October 12, 2016
  Applicant is requesting Special Permit relief pursuant to Zoning By-law Section 139-16.C to either reduce or validate unintentional side yard setback intrusions caused by the siting of an existing garage as close as 9.3 feet from the northerly lot line and an above-ground Jacuzzi tub as close as 8.2 feet from the southerly lot line, where a ten (10) foot setback is required. In the alternative, and to the extent necessary, Applicant requests relief by Variance pursuant to Section 139-32 to allow said setback intrusions. The Locus is situated at 28 Lovers Lane, is shown on Assessor's Map 68 as Parcel 145, and as Lot 90 upon Land Court Plan 16514-R. Evidence of owner's title is registered on Certificate of Title No. 20283 at the Nantucket County District of the Land Court. The site is zoned Residential 20 (R-20).

- 23-16 Mark Bono & Elizabeth Gilbert Bono, as Owner, and EK Associates, LLC, as Applicant
  Action deadline October 12, 2016 15 Black Fish Lane Hanley
  Applicant is requesting Special Permit relief pursuant to Zoning By-law Section 139-16.C to either reduce or validate unintentional side yard setback intrusions caused by the siting of an existing garage as close as 9.5 feet from the easterly lot line, where a ten (10) foot setback is required. In the alternative, and to the extent necessary, Applicant requests relief by Variance pursuant to Section 139-32 to allow said setback intrusion.

2 Fairgrounds Road Nantucket Massachusetts 02554
508-228-7215 telephone 508-228-7298 facsimile

The Locus is situated at 15 Black Fish Lane, is shown on Assessor's Map 73 as Parcel 108, and as Lot 3 upon Plan No. 2007-55. Evidence of owner's title is in Book 1540, Page 9 on file at the Nantucket County Registry of Deeds. The site is zoned Sconset Residential 20 (SR-20).

- 24-16 6 Lily Street LLC & Sconset Partners LLC 6 and 8 Lily Street Dale
  Action deadline October 12, 2016
  Applicant is requesting Special Permit relief pursuant Zoning By-law Section 139-33 to reduce the area of 6 Lily Street without creating any new non-conformities and to enlarge the area of 8 Lily Street to allow for a new dwelling with a reduced side yard setback nonconformity. To the extent necessary, applicant further requests Site Plan Review pursuant to Section 139-23. Both properties are improved undersized lots of record. In the alternative, and to the extent necessary, Applicant requests relief by Variance pursuant to Section 139-32 from the provisions of Section 139-16. The properties are located at 6 and 8 Lily Street, are shown on Assessor's Map 73.3.1 as Parcels 109 and 110, and as Lot 5 and portion of Lot 7 upon Plan No. 2014-02. Evidence of owners' titles are in Book 1415, Page 296 and Book 1415, Page 287 on file at the Nantucket County Registry of Deeds. The site is zoned Sconset Old Historic (SOH).

- 25-16 George Gray, LLC 55 Union Street Alger
  Action deadline October 12, 2016
  Applicant is requesting Special Permit relief pursuant Zoning By-law Section 139-16.C(2) to validate the unintentional side yard setback intrusion of a dwelling sited as close as 4.8 feet from the southerly lot line, where a five (5) foot setback is required. Applicant further seeks clarification and correction of rear yard setback distance referenced in prior Zoning Administrator decision from 2.4 to 2.3 feet. The Locus is situated at 55 Union Street, is shown on Assessor's Map 55.1.4 as Parcel 89, and upon Plan No. 2014-92. Evidence of owner's title is in Book 1459, Page 294 on file at the Nantucket County Registry of Deeds. The site is zoned Residential Old Historic (ROH).

- 26-16 Paul Benk and Lauri LeJeune Benk 8 North Gully Road Brescher
  Action deadline September 21, 2016
  Applicant is seeking relief by Variance pursuant to Zoning By-law Section 139-32 from the provisions of Section 139-16 to validate the siting of an existing shed/studio within the five (5) foot side and rear yard setbacks. Applicant requests further relief to allow alteration of said structure with the ground cover expansion taking place outside of the setback areas and small portion of upward expansion occurring within the easterly setback area. The Locus is situated at 8 North Gully Road, is shown on Assessor's Map 73.1.3 as Parcel 48, and upon Land Court Plan 38853-A. Evidence of owner's title is registered on Certificate of Title No. 24677 at the Nantucket County District of the Land Court. The site is zoned Sconset Residential 1 (SR-1).

- 27-16 Kite Hill Lane, LLC 5 Kite Hill Lane Reade
  Action deadline September 23, 2016
  Applicant is seeking relief by Variance pursuant to Zoning By-law Section 139-32 for a waiver of the provisions in Section 139-16. Specifically, applicant seeks to reconfigure Locus by conveying portions of existing lots which comprise locus to 3 Kite Hill Lane and 86 Center Street. The conveyances will result in creation of new nonconformity relative to the shed's siting from the easterly side yard lot line and will intensify the nonconforming regularity factor. The Locus is situated at 5 Kite Hill Lane, is shown on Nantucket Tax Assessor's Map 42.4.4 as Parcel 65, and as upon Land Court Plans 15206-C and 15206-D. Evidence of owners' title is on Certificate of Title No. 26033 at the Nantucket County District of the Land Court. The property is zoned Residential Old Historic (ROH).