STORMWATER MANAGEMENT SUMMARY

"MARSH VIEW"
93 Central Street, Acton, MA
June 19, 2009
6730

EXISTING RUNOFF PATTERNS

The site is located on the northerly side of Central Street at the northwest corner of the intersection with Pine Ridge Road and currently consists of a single family residence. The property is surrounded by residential properties on all sides.

There are no wetland resource areas located on the property and the site is located above the 500 year flood zone elevation as referenced on FIRM Map, Community Panel 250176-0003 C, dated January 6, 1988. Topography at the site slopes gently from a high elevation located in the center of the property to lower elevations located at the southeast corner of the property and towards Central Street located to the southwest. Surface characteristics of the property are an equal mix of thickly wooded and sparse grassy lawn surfaces as well as the impervious roof and driveway surfaces.

Currently surface runoff collects and flows from the center of the property to the southeast and southwest. There are no point source discharges.

SURFICIAL GEOLOGY

The site is shown to be located on a ground moraine (USGS 1948) and soils consisted of till soils containing ground rock fragments ranging from silt size particles to boulders.

STORMWATER MANAGEMENT SYSTEM

The proposed stormwater collection system for the project consists of a series of driveway recharge trenches and drip-line recharge trenches and a deep sump hooded catch basin. The stormwater collection system and recharge trenches have been sized accordingly to collect, store and recharge the projected increase in runoff volume at the site for a 10-year Type III storm event (see recharge volume calculations). There is a slight increase in the rate of runoff for the proposed project, however the increase is minimal and should have no impact on downstream flooding.

The stormwater management system utilizes subsurface recharge for runoff collected from impervious roof and driveway areas. These recharge trenches were selected to allow the design of a stormwater management system to increase recharge to the local aquifer, minimize the impacts of stormwater runoff as well as providing water quality treatment for runoff from the proposed driveway area.

The proposed stormwater management system collects surface runoff through the deep sump hooded catch basin and from the recharge trenches located on the site and recharges runoff on-site. Overflow occurring from the recharge areas exceeding storage volumes

for storm events exceeding a 10 year storm discharge will flow overland towards the southwest and southeast of the property as currently occurs at the site.

RESULTS OF STORMWATER MODEL

As shown by the following results of the recharge volume calculations and information from the HydroCad computer analysis; insignificant increases in the rate and volume of runoff occur and should have no effect on down stream flooding effects.

METHODOLOGY FOR STORMWATER CALCULATIONS

Calculations were performed based on TR-20 methods with a computer model created with the use of HydroCAD software [Version 8].

A complete data sheets for the model is included as well as the results of the HydroCAD modeling.

6730 W161
WESTCHESTER HOMES
93 CENTRAL ST - ACTON

DRAINAGE CALCS - 12/23/08

EASTERN HALF OF SITE (Combines PRE Subcatchments 1 and 3)
PRE - to Wetlands
POST - to Wetlands

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.11	0.41	0.30	0.016	0.038	0.022
10	0.42	0.98	0.56	0.046	0.085	0.039
25	0.66	1.35	0.69	0.067	0.115	0.048
100	1.05	1.94	0.89	0.103	0.164	0.061

WESTERN HALF OF SITE
PRE - to Central Street
POST - to Central Street

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.55	0.74	0.19	0.047	0.057	0.010
10	1.14	1.35	0.21	0.093	0.103	0.010
25	1.50	1.70	0.20	0.122	0.132	0.010
100	2.06	2.25	0.19	0.168	0.176	0.008

TOTAL DISCHARGE FROM SITE

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.66	1.15	0.49	0.063	0.095	0.032
10	1.56	2.33	0.77	0.139	0.188	0.049
25	2.16	3.05	0.89	0.189	0.247	0.058
100	3.11	4.19	1.08	0.271	0.34	0.069

NOTE: Does not include attenuation by any recharge trenches
*** SEE HAND CALCS ***

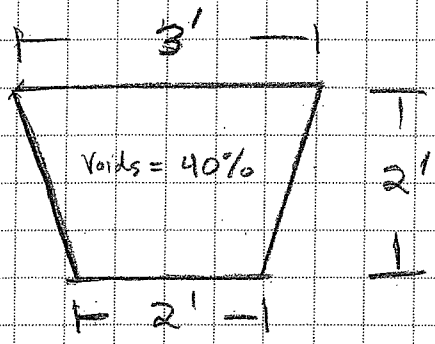
Acton Survey & Engineering, Inc.
P.O. Box 666 97 Great Rd. Suite 6
Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

JOB 6730 W161 — 93 Central St/Act
SHEET NO. 1 OF 3
CALCULATED BY BDA DATE 12/23/08
CHECKED BY DATE
SCALE

RECHARGE FOR EASTERN HALF OF SITE

10-YR ΔVOL = 0.039 ~~ac~~-FT $\left(\frac{43{,}560\ SF}{1\ ~~ac~~}\right) \approx 1700$ CF

TRY TRENCH:



$A = \frac{1}{2}(3+2)(2)$

$A = 5$ SF

$L = 165'$

TRENCH STORAGE = $A \times L \times 0.4 = (5\ SF)(165\ FT)(0.4) \approx 330$ CF

1700 CF — 10 YR ΔVOL
− 330 CF — STORAGE
1370 CF — VOL TO RECHARGE

DAILY RECHARGE

For sandy loam INFILTRATION = $1.02\ \frac{in}{hr}\left(\frac{1\ FT}{12\ in}\right) = 0.085\ FT/hr$

DAILY RECHARGE = $L \times W \times 0.085 \times 24$

$= (165\ FT)(3\ FT)\left(0.085\ \frac{FT}{hr}\right)(24\ hr) = 1010$ CF

1010 CF < 1370 CF

No Good

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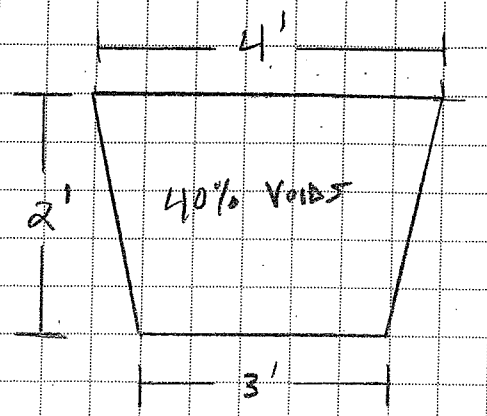
JOB 6730 W161
SHEET NO. 2 OF 3
CALCULATED BY BDA DATE 12/23/08
CHECKED BY DATE
SCALE

TRY TRENCH:



$A = \frac{1}{2}(4+3)(2)$

$A = 7$ SF

$L = 165$ FT

TRENCH STORAGE $= A \times L \times 0.4$
$= (7\ SF)(165\ FT)(0.4)$
$= 462$ CF

1700 CF 10YR ΔVOL
− 462 CF STORAGE
1238 CF VOL TO RECHARGE

DAILY RECHARGE $= L \times W \times 0.085 \times 24$
$= (165\ FT)(4\ FT)(0.085\ \frac{FT}{hr})(24\ hr)$
$= 1346$ CF

1346 CF > 1238 CF OK

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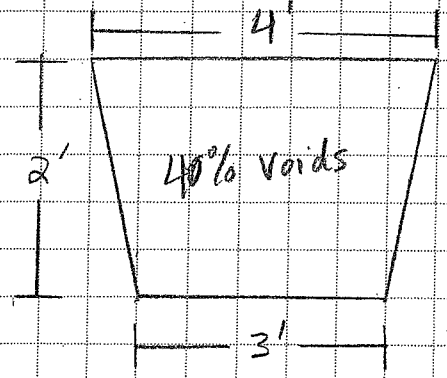
JOB 6730 W161
SHEET NO. 3 OF 3
CALCULATED BY BDA DATE 12/23/08
CHECKED BY DATE
SCALE

RECHARGE FOR WESTERN HALF OF SITE

10-YR $\Delta VOL = 0.01$ ac-ft $\left(\frac{43,560 \text{ SF}}{1 \text{ ac}}\right) = 436$ CF

TRY TRENCH:



$A = \frac{1}{2}(4+3)(2)$

$A = 7$ SF

$L = 116$ FT

TRENCH STORAGE $= A \times L \times 0.4$
$= (7 \text{ SF})(116 \text{ FT})(0.4)$
$= 325$ CF

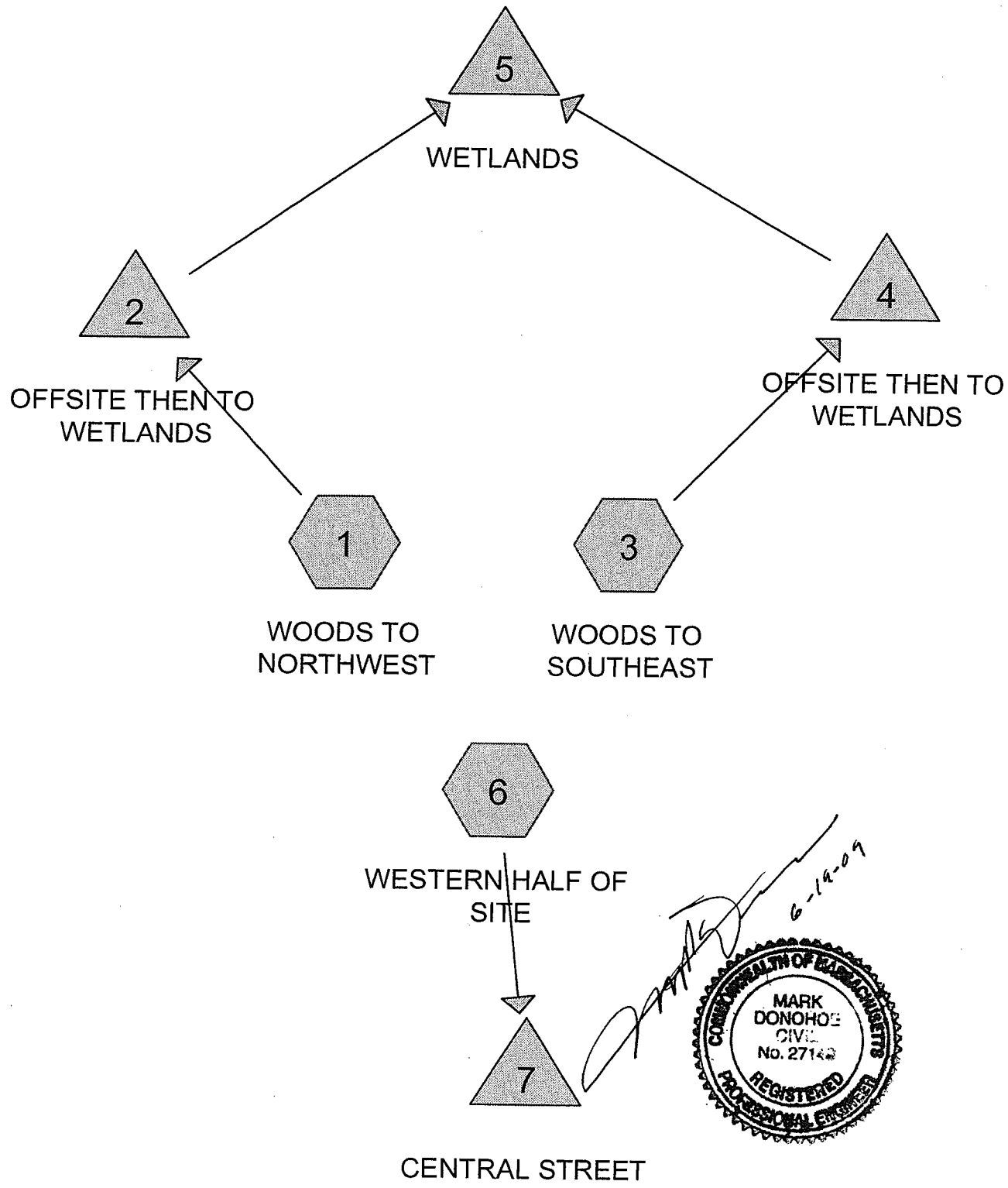
436 CF 10-YR ΔVOL
− 325 CF STORAGE
111 CF VOL TO RECHARGE

DAILY RECHARGE

Use loamy sand infiltration rate $= 2.41 \text{ in/hr} \left(\frac{1 \text{ ft}}{12 \text{ in}}\right) = 0.2 \text{ FT/hr}$

DAILY RECHARGE $= L \times W \times 0.2 \times 24$
$= (116 \text{ FT})(4 \text{ FT})(0.2 \text{ FT/hr})(24 \text{ hr})$
$= 2227$ CF

2227 CF > 111 CF OK



Subcat Reach Pond Link

Drainage Diagram for 6730-PRE
Prepared by {enter your company name here} 6/19/2009
HydroCAD® 8.00 s/n 000857 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.693	60	Woods, Fair, HSG B (1,3,6)
0.138	69	50-75% Grass cover, Fair, HSG B (6)
0.255	79	50-75% Grass cover, Fair, HSG C (6)
0.083	98	Paved parking & roofs (6)
1.169		

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>0.32"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.02 cfs 0.003 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>0.32"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.09 cfs 0.013 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>0.99"
Flow Length=160' Tc=12.1 min CN=76 Runoff=0.55 cfs 0.047 af

Pond 2: OFFSITE THEN TO WETLANDS Inflow=0.02 cfs 0.003 af
Primary=0.02 cfs 0.003 af

Pond 4: OFFSITE THEN TO WETLANDS Inflow=0.09 cfs 0.013 af
Primary=0.09 cfs 0.013 af

Pond 5: WETLANDS Inflow=0.11 cfs 0.016 af
Primary=0.11 cfs 0.016 af

Pond 7: CENTRAL STREET Inflow=0.55 cfs 0.047 af
Primary=0.55 cfs 0.047 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.063 af Average Runoff Depth = 0.64"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetland** Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af, Depth> 0.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street** Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af
Primary = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af
Primary = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.11 cfs @ 12.39 hrs, Volume= 0.016 af
Primary = 0.11 cfs @ 12.39 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 0.99" for Middlesex 002 yr event
Inflow = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af
Primary = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>0.91"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.10 cfs 0.008 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>0.91"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.35 cfs 0.038 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>1.97"
Flow Length=160' Tc=12.1 min CN=76 Runoff=1.14 cfs 0.093 af

Pond 2: OFFSITE THEN TO WETLANDS Inflow=0.10 cfs 0.008 af
Primary=0.10 cfs 0.008 af

Pond 4: OFFSITE THEN TO WETLANDS Inflow=0.35 cfs 0.038 af
Primary=0.35 cfs 0.038 af

Pond 5: WETLANDS Inflow=0.42 cfs 0.046 af
Primary=0.42 cfs 0.046 af

Pond 7: CENTRAL STREET Inflow=1.14 cfs 0.093 af
Primary=1.14 cfs 0.093 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.138 af Average Runoff Depth = 1.42"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetland** Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street** Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af
Primary = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af
Primary = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.42 cfs @ 12.28 hrs, Volume= 0.046 af
Primary = 0.42 cfs @ 12.28 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 1.97" for Middlesex 010 yr event
Inflow = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af
Primary = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>1.34"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.15 cfs 0.012 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>1.33"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.54 cfs 0.055 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>2.59"
Flow Length=160' Tc=12.1 min CN=76 Runoff=1.50 cfs 0.122 af

Pond 2: OFFSITE THEN TO WETLANDS Inflow=0.15 cfs 0.012 af
Primary=0.15 cfs 0.012 af

Pond 4: OFFSITE THEN TO WETLANDS Inflow=0.54 cfs 0.055 af
Primary=0.54 cfs 0.055 af

Pond 5: WETLANDS Inflow=0.66 cfs 0.067 af
Primary=0.66 cfs 0.067 af

Pond 7: CENTRAL STREET Inflow=1.50 cfs 0.122 af
Primary=1.50 cfs 0.122 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.189 af Average Runoff Depth = 1.94"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetland**
					Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street** Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 1.34" for Middlesex 025 yr event
Inflow = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af
Primary = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 1.33" for Middlesex 025 yr event
Inflow = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af
Primary = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 1.33" for Middlesex 025 yr event
Inflow = 0.66 cfs @ 12.26 hrs, Volume= 0.067 af
Primary = 0.66 cfs @ 12.26 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 2.59" for Middlesex 025 yr event
Inflow = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af
Primary = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>2.06"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.24 cfs 0.019 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>2.05"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.87 cfs 0.085 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>3.56"
Flow Length=160' Tc=12.1 min CN=76 Runoff=2.06 cfs 0.168 af

Pond 2: OFFSITE THEN TO WETLANDS Inflow=0.24 cfs 0.019 af
Primary=0.24 cfs 0.019 af

Pond 4: OFFSITE THEN TO WETLANDS Inflow=0.87 cfs 0.085 af
Primary=0.87 cfs 0.085 af

Pond 5: WETLANDS Inflow=1.05 cfs 0.103 af
Primary=1.05 cfs 0.103 af

Pond 7: CENTRAL STREET Inflow=2.06 cfs 0.168 af
Primary=2.06 cfs 0.168 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.271 af Average Runoff Depth = 2.78"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetland** Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard**
					Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street**
					Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 2.06" for Middlesex 100 yr event
Inflow = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af
Primary = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 2.05" for Middlesex 100 yr event
Inflow = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af
Primary = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

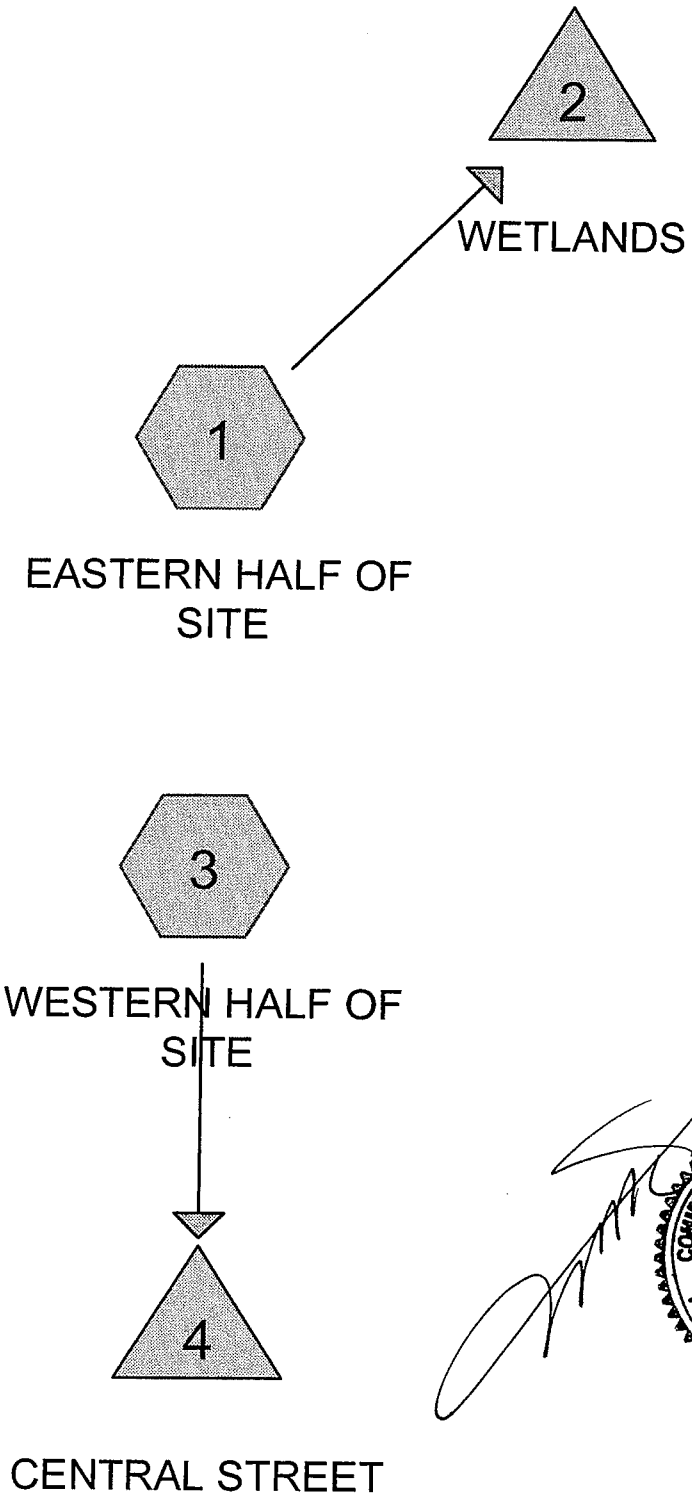
Inflow Area = 0.604 ac, Inflow Depth > 2.05" for Middlesex 100 yr event
Inflow = 1.05 cfs @ 12.25 hrs, Volume= 0.103 af
Primary = 1.05 cfs @ 12.25 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 3.56" for Middlesex 100 yr event
Inflow = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af
Primary = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



6.19.09

COMMONWEALTH OF MASSACHUSETTS
MARK DONOHOE
CIVIL
NO. 27142
REGISTERED PROFESSIONAL ENGINEER

Subcat Reach Pond Link

Drainage Diagram for 6730-POST
Prepared by {enter your company name here} 6/19/2009
HydroCAD® 8.00 s/n 000857 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.103	60	Woods, Fair, HSG B (1)
0.493	61	>75% Grass cover, Good, HSG B (1,3)
0.200	74	>75% Grass cover, Good, HSG C (1,3)
0.374	98	Paved parking & roofs (1,3)
1.169		

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=28,931 sf Runoff Depth>0.69"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=70 Runoff=0.41 cfs 0.038 af

Subcatchment 3: WESTERN HALF OF SITE Runoff Area=21,971 sf Runoff Depth>1.35"
Flow Length=128' Tc=10.0 min CN=82 Runoff=0.74 cfs 0.057 af

Pond 2: WETLANDS Inflow=0.41 cfs 0.038 af
Primary=0.41 cfs 0.038 af

Pond 4: CENTRAL STREET Inflow=0.74 cfs 0.057 af
Primary=0.74 cfs 0.057 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.095 af Average Runoff Depth = 0.98"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 0.41 cfs @ 12.21 hrs, Volume= 0.038 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
6,580	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
28,931	70	Weighted Average
22,351		Pervious Area
6,580		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: WESTERN HALF OF SITE

Runoff = 0.74 cfs @ 12.15 hrs, Volume= 0.057 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
9,693	98	Paved parking & roofs
21,971	82	Weighted Average
12,278		Pervious Area
9,693		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Pond 2: WETLANDS

Inflow Area = 0.664 ac, Inflow Depth > 0.69" for Middlesex 002 yr event
Inflow = 0.41 cfs @ 12.21 hrs, Volume= 0.038 af
Primary = 0.41 cfs @ 12.21 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth > 1.35" for Middlesex 002 yr event
Inflow = 0.74 cfs @ 12.15 hrs, Volume= 0.057 af
Primary = 0.74 cfs @ 12.15 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=28,931 sf Runoff Depth>1.53"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=70 Runoff=0.98 cfs 0.085 af

Subcatchment 3: WESTERN HALF OF SITE Runoff Area=21,971 sf Runoff Depth>2.46"
Flow Length=128' Tc=10.0 min CN=82 Runoff=1.35 cfs 0.103 af

Pond 2: WETLANDS Inflow=0.98 cfs 0.085 af
Primary=0.98 cfs 0.085 af

Pond 4: CENTRAL STREET Inflow=1.35 cfs 0.103 af
Primary=1.35 cfs 0.103 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.93"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 0.98 cfs @ 12.20 hrs, Volume= 0.085 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
6,580	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
28,931	70	Weighted Average
22,351		Pervious Area
6,580		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: WESTERN HALF OF SITE

Runoff = 1.35 cfs @ 12.14 hrs, Volume= 0.103 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
9,693	98	Paved parking & roofs
21,971	82	Weighted Average
12,278		Pervious Area
9,693		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Pond 2: WETLANDS

Inflow Area = 0.664 ac, Inflow Depth > 1.53" for Middlesex 010 yr event
Inflow = 0.98 cfs @ 12.20 hrs, Volume= 0.085 af
Primary = 0.98 cfs @ 12.20 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth > 2.46" for Middlesex 010 yr event
Inflow = 1.35 cfs @ 12.14 hrs, Volume= 0.103 af
Primary = 1.35 cfs @ 12.14 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=28,931 sf Runoff Depth>2.08"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=70 Runoff=1.35 cfs 0.115 af

Subcatchment 3: WESTERN HALF OF SITE Runoff Area=21,971 sf Runoff Depth>3.14"
Flow Length=128' Tc=10.0 min CN=82 Runoff=1.70 cfs 0.132 af

Pond 2: WETLANDS Inflow=1.35 cfs 0.115 af
Primary=1.35 cfs 0.115 af

Pond 4: CENTRAL STREET Inflow=1.70 cfs 0.132 af
Primary=1.70 cfs 0.132 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.247 af Average Runoff Depth = 2.54"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 1.35 cfs @ 12.20 hrs, Volume= 0.115 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
6,580	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
28,931	70	Weighted Average
22,351		Pervious Area
6,580		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: WESTERN HALF OF SITE

Runoff = 1.70 cfs @ 12.14 hrs, Volume= 0.132 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
9,693	98	Paved parking & roofs
21,971	82	Weighted Average
12,278		Pervious Area
9,693		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Pond 2: WETLANDS

Inflow Area = 0.664 ac, Inflow Depth > 2.08" for Middlesex 025 yr event
Inflow = 1.35 cfs @ 12.20 hrs, Volume= 0.115 af
Primary = 1.35 cfs @ 12.20 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth > 3.14" for Middlesex 025 yr event
Inflow = 1.70 cfs @ 12.14 hrs, Volume= 0.132 af
Primary = 1.70 cfs @ 12.14 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=28,931 sf Runoff Depth>2.97"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=70 Runoff=1.94 cfs 0.164 af

Subcatchment 3: WESTERN HALF OF SITE Runoff Area=21,971 sf Runoff Depth>4.18"
Flow Length=128' Tc=10.0 min CN=82 Runoff=2.25 cfs 0.176 af

Pond 2: WETLANDS Inflow=1.94 cfs 0.164 af
Primary=1.94 cfs 0.164 af

Pond 4: CENTRAL STREET Inflow=2.25 cfs 0.176 af
Primary=2.25 cfs 0.176 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.340 af Average Runoff Depth = 3.49"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 1.94 cfs @ 12.19 hrs, Volume= 0.164 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
6,580	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
28,931	70	Weighted Average
22,351		Pervious Area
6,580		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: WESTERN HALF OF SITE

Runoff = 2.25 cfs @ 12.14 hrs, Volume= 0.176 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
9,693	98	Paved parking & roofs
21,971	82	Weighted Average
12,278		Pervious Area
9,693		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Pond 2: WETLANDS

Inflow Area = 0.664 ac, Inflow Depth > 2.97" for Middlesex 100 yr event
Inflow = 1.94 cfs @ 12.19 hrs, Volume= 0.164 af
Primary = 1.94 cfs @ 12.19 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth > 4.18" for Middlesex 100 yr event
Inflow = 2.25 cfs @ 12.14 hrs, Volume= 0.176 af
Primary = 2.25 cfs @ 12.14 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Acton Survey & Engineering, Inc.
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Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

JOB MARSH VIEW 6730
SHEET NO. 1 OF 1
CALCULATED BY MTO DATE 6-17-09
CHECKED BY DATE
SCALE

WATER BALANCE

COMMONWEALTH OF MASSACHUSETTS
MARK DONOHOE
CIVIL
No. 27143
REGISTERED PROFESSIONAL ENGINEER
6/17/09

SITE ALTERATIONS WILL REQUIRE REMOVAL OF 2ND GROWTH WOODS RESULTING IN A DECREASE IN EVAPOTRANSPIRATION (LOSS OF WATER TO ATMOSPHERE THROUGH LEAVES)

DECREASE IN LOSS

ON SITE RUNOFF IS CONTROLED BY STORAGE AND RECHARGE TO GROUNDWATER — ESPECIALLY FOR SMALL STORM EVENTS

NO NET LOSS

WATER IS SUPPLIED BY AWD AND SEWAGE DISPOSAL IS ON SITE

9 NEW BEDROOMS @ 70 GPD
= 630 GPD (AVG DAY)

630 × 365/7.48 = 31,000 CUBIC FEET/YR

GAIN

NOTE: 3,100 CF GAIN = 9" OF RAINFALL ON SITE

CONCLUSION BY INSPECTION THERE IS A GAIN IN RECHARGE AND THE REQUIREMENTS OF 4.3.6.2 ARE MET

Acton Survey & Engineering, Inc.
P.O. Box 666 97 Great Rd. Suite 6
Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

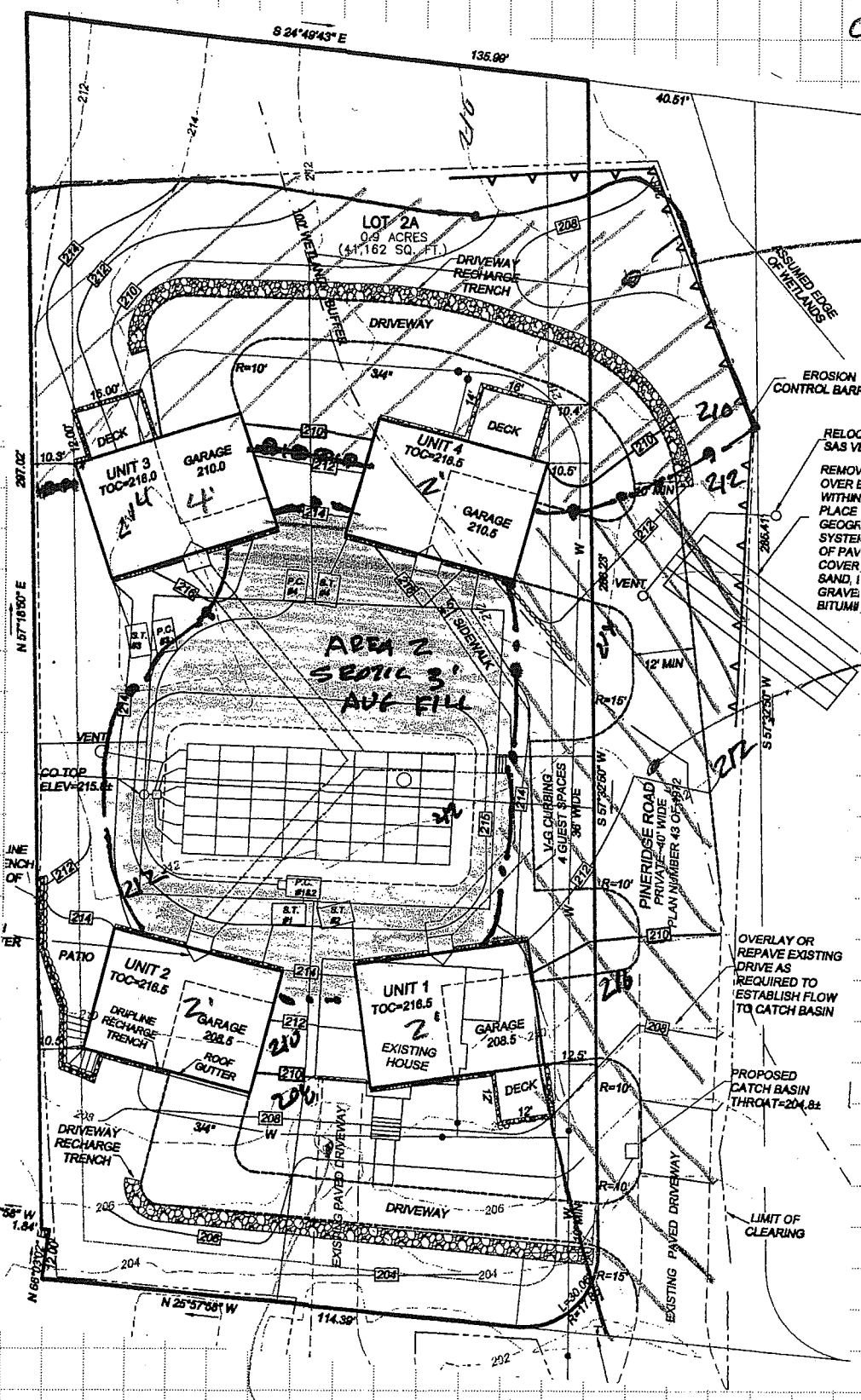
JOB MARSH VIEW 6730

SHEET NO. 1 OF 2

CALCULATED BY MTD DATE 6/17/09

CHECKED BY _____ DATE _____

SCALE 1"=40' CUT/FILL FOR APPROVAL PROCESS ONLY



COMMONWEALTH OF MASSACHUSETTS
MARK DONOHOE
CIVIL
No. 27[illegible]
REGISTERED PROFESSIONAL ENGINEER

6/17/09

AREA 1
2' AVG CUT

AREA 3 ±
ON GRADE
PROCESSED
MATERIALS
REQ'D
1' CUT

AREA 4 1' FILL PROCESSED MATERIALS

Acton Survey & Engineering, Inc.
P.O. Box 666 97 Great Rd. Suite 6
Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

JOB MARSH VIEW 6730
SHEET NO. 2 OF 2
CALCULATED BY MTA DATE 6/17/9
CHECKED BY DATE
SCALE

PURPOSE OF CALCULATIONS IS TO ALLOW DETERMINATION OF CONSTRUCTION TRAFFIC RELATED TO SITE CONSTRUCTION AND IS NOT TO BE UTILIZED AS A BASIS OF CONSTRUCTION BIDS

PROCESSED MATERIALS

SHRINKAGE FACTOR 1.1

DRIVEWAY BASE
11500 SF X 0.75 — 360 CY

TITLE & SAND
2900 SF X 4' — 470 CY

RECHARGE STONE

DRIVEWAY	275 X 8	2200 SF	
DRIPLINE	360 X 1	360	
PATIO	450 X 0.5	225	
BSM'T SLAB	240 X 1	240	
		3025	110 CY

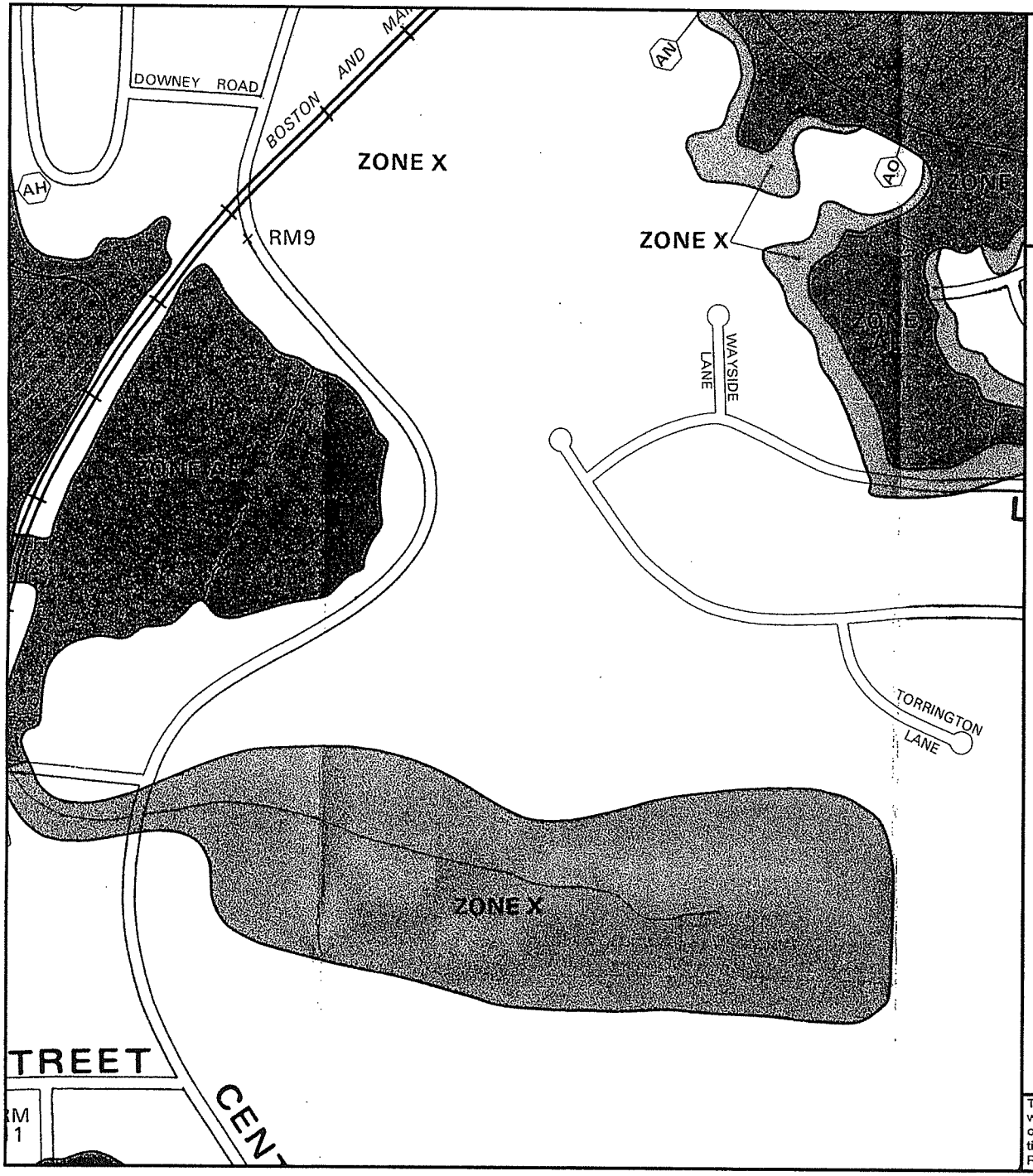
CUT

ASSUME TOP SOIL TO BE RETAINED & IS INCLUDED IN FILL VOLUMES

AREA 1	9500 X 2	700 CY		
AREA 3	10000 X 1	400 CY	1100 CY	

FILL

AREA 2	7500 X 3	850 CY	
AREA 4	4500 X 1	150 CY	1000 CY



N

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
ACTON, MASSACHUSETTS
MIDDLESEX COUNTY

PANEL 3 OF 8

(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
250176 0003 C

MAP REVISED:
JANUARY 6, 1988

Federal Emergency Management Agency