

**APPLICATION FORM
STORMWATER AND EROSION CONTROL PERMIT**



To: The Topsfield Planning Board, Town Hall, Topsfield, MA 01983

The undersigned hereby applies for a Stormwater and Erosion Control Permit and herewith submits six (6) copies of a completed application package for a Stormwater Management Permit (SMP) and an electronic application in PDF format on a CD or DVD disc for approval.

The applicant certifies to the truth of the following facts as part of his application.

1. Name of Applicant: The Daly Group LLC
Address: 229 Stedman St.
Lowell MA 01851
Telephone Number: 978-937-5553
E-mail Address: S Belley @ DALYGC.COM
2. Name of Engineer or Surveyor LandPlex
Address 10 George Street Suite #208
Lowell MA 01852
Telephone Number: 978-201-9390
E-mail Address: M Hamor @ Landplex.COM
3. Deed to property is dated 10-6-2017 and is recorded in Essex South District Registry, Book 36235 Page 003.
4. Location of Property for which permit is requested:
Address 3 Kinsman Lane Topsfield

Zoning District IRA
5. Attach hereto a copy of the deed.
6. The exact names in which title to the property is held and the present addresses of persons named are: (If married, give spouse's name.)
3 Kinsman Lane LLC
David T. Daly Manager

7. A complete list of persons with their addresses known to have mortgages, attachments, encumbrances, or liens of any kind upon the property is as follows:

N/A

8. If the property is in the name of a trust, the complete and correct name of the trust, date of the trust declaration, book and page where it is recorded and names and addresses of all trustees are as follows:

N/A

9. If the property is in the name of a corporation, the complete and correct name of the corporation, the name and corporate capacity of all officers authorized to sign deeds and other instruments pertaining to real estate are as follows:

N/A

10. Description of the project for which a Stormwater and Erosion Control Permit is requested. Include total square footage of land to be altered/cleared.

This is a 40,004 s/f single family lot. We are proposing to construct an approximately 2800 s/f single family home on the site.

Signature of Applicant



Date of Submission

10-18-17

Town Clerk Signature

Overview of Topsfield Stormwater and Erosion Control Bylaw

Why do we need a local stormwater runoff and erosion control bylaw?

Stormwater is the leading cause of nonpoint source pollution that impacts local wetlands and water bodies. Every eight months in the United States, 11 million gallons of run off our streets, driveways and other paved surfaces into our waters- the equivalent of the Exxon Valdez oil spill. More than 60% of our coastal rivers and bays are moderately to severely impacted by nutrient runoff from fertilizers and pet waste (Pew Ocean Commission, 2003). Erosion and silt runoff clogs municipal storm drains, pollutes drinking water sources, damages wetland functions such as water filtration and stormwater storage, and negatively impacts wildlife habitat.

Stormwater is currently regulated under the federal Clean Water Act which applies to *municipal* storm water systems only. It is also regulated under the Massachusetts Wetlands Protection Act (MA Stormwater Policy) and enforced by local conservation commissions in or near jurisdictional wetlands. Outside of wetland areas and buffer zones, stormwater discharges for private development have been generally regulated by a patchwork of local codes and municipal boards.

The Topsfield Stormwater and Erosion Control Bylaw, passed in May, 2005, replace this patchwork with a single set of standards, which will result in environmentally sensitive development throughout Topsfield. The bylaw and regulations will provide developers with more predictability, efficiency and faster permitting reviews due to the consistency of site design standards in all permitting processes. These standards will be reflected in all local regulations such as subdivision, wetland, and site plan review regulations.

How does the Stormwater and Erosion Control Bylaw work?

The new bylaw establishes a Stormwater Authority—the Planning Board—and requires that projects over certain thresholds obtain a Stormwater Management Permit issued by the Stormwater Authority. The Conservation Commission will continue to make all permitting decisions for projects that are within its jurisdiction. The Planning Board will be responsible for permitting conditions for all non-wetland jurisdictional areas and is responsible for final permitting decisions in all projects involving both wetland and upland jurisdictions.

The bylaw and accompanying regulations specify permit procedures and performance standards, which must meet or exceed the standards set by the Massachusetts Stormwater Policy. Performance standards include water recharge volumes, peak discharge rates and overall water volumes associated with a particular development.

When do I need a Stormwater Management Permit?

For most land uses, you will need a permit when you plan to alter **7500 square feet or more that has slopes of less than 15%. For steeper sloped areas greater than 15%, you will need a permit to alter 4000 square feet or more.** To make the bylaw more flexible for smaller projects still above these thresholds, you can also request that all or some of the application requirements be waived because of the size, character of the project or natural conditions of the site. See Section 6 (B) of the SWEC Regulations for more details.

When don't I need a Stormwater Management permit?

Exemptions include:

- Any activity below the square footage thresholds in the previous section
- Normal maintenance and improvement of agricultural lands as defined by the Wetlands Protection Act
- Any repairs to existing roofs in single or multi-family homes
- Any fence repair or installation that will not alter terrain or drainage patterns
- Utilities construction, except for drainage, that not alter terrain, ground cover, or drainage patterns; emergency repairs to utilities or as approved by the Planning Board
- Repairs to a public way or construction of streets approved by the Planning Board
- The removal of earth products in connection with sand, gravel, or similar enterprise where allowed by zoning
- Any work or projects which gained permit approvals before the effective date of this bylaw
- Redevelopment projects where impervious conditions are reduced by at least 40% from existing conditions or stormwater Best Management Practices are implemented for at least 40% of the sites' impervious area if site conditions don't allow for the reduction of impervious areas

Application Checklist and Procedures Checklist for Stormwater Management Permit

1. Requesting a waiver from the Stormwater Management Permit application requirements.

The applicant files 6 copies of a letter, together with supporting information and documentation, signed by the landowner or designated representative with the Town Clerk.

2. All waiver requests shall be acted upon by the Planning Board within 45 calendar days from the date of application and shall be in writing. Boards may request an extension of the review period. As per the bylaw, the Conservation Commission will have jurisdiction for waiver requests for projects located entirely within the town's wetland jurisdiction and the Planning Board will have jurisdiction for all other waiver requests. **Section 6 B of the SWEC Regulations**

3. Filing a Stormwater Management Permit Application

The applicant shall file with the Town Clerk, six (6) copies of a completed application package for a Stormwater Management Permit (SMP) and an electronic application in PDF format on a CD or DVD disc. The application package shall include:

☒ A completed Application Form with original signatures of all owners

☒ A list of abutters certified by the Assessor's Office including those opposite on any public or private way and abutters within 300 feet of the applicant's property line(s).

☒ Stormwater Management and Erosion Control Plan, stamped by a Professional Engineer licensed in Massachusetts and project description which includes all information listed in **Section 6 L** of the SWEC Regulations.

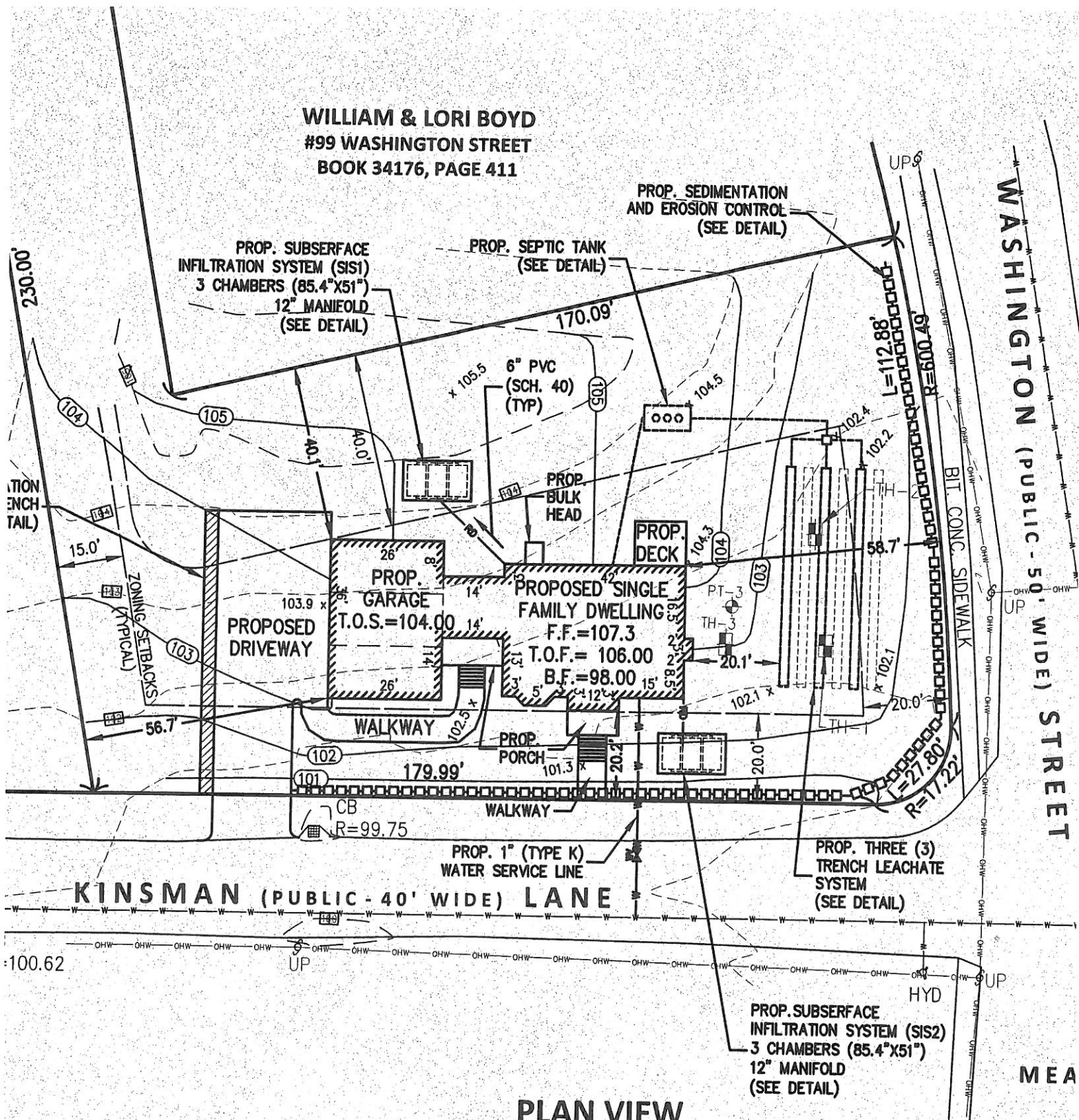
☒ Operation and Maintenance Plan which includes all information listed in **Section 6 M** of the SWEC Regulations.

☒ Payment of the application and review fees. The application fee equals \$100 plus .0030 x the total number of square feet of the proposed project. Example: \$100 + 43560 (1 acre) = \$100 + 43560 square feet x 0.0030 = \$130.68 application fee ~~\$~~ 120.61

☒ Inspection and Maintenance Agreement which includes all information listed in **Section 6 M** of SWEC Regulations

☐ Surety Bond. The Planning Board may require the applicant to post before the start of land disturbance or construction activity, a surety bond to ensure perpetual maintenance of stormwater and erosion controls.

WILLIAM & LORI BOYD
#99 WASHINGTON STREET
BOOK 34176, PAGE 411





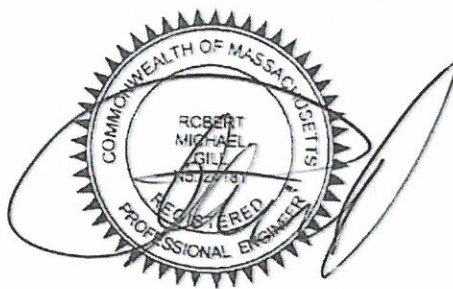
10 GEORGE STREET, SUITE 208, LOWELL, MA 01852 • 978-201-9390 • WWW.LANDPLEX.COM
CONSULTING • SURVEYING • CIVIL ENGINEERING • GEO-TECHNICAL

STORMWATER REPORT

3 KINSMAN LANE

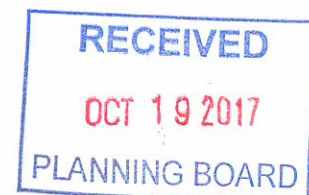
TOPSFIELD, MASSACHUSETTS

OCTOBER 19, 2017



PREPARED FOR:

THE DALY GROUP, LLC
225 STEADMAN STREET
LOWELL, MASSACHUSETTS

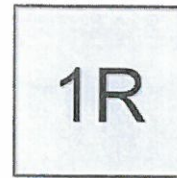


The following table summarizes the Pre- vs. Post-development runoff calculations from the attached HydroCAD data.

	Analysis Point	1R WETLANDS
2-YEAR (3.1 in.)	Pre Runoff (cfs)	0.01
	Post Runoff (cfs)	0.00
	Change	-0.01 (100%)
10-YEAR (4.5 in.)	Pre Runoff (cfs)	0.11
	Post Runoff (cfs)	0.09
	Change	-0.02 (-18%)
100-YEAR (6.4 in.)	Pre Runoff (cfs)	0.77
	Post Runoff (cfs)	0.63
	Change	-0.14 (-18%)



Subcatchment 1S



Kinsman Lane



Subcat



Reach



Pond



Link

Washington - HydroCAD - PRE

Type III 24-hr 2-Year Rainfall=3.10"

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Page 2

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1S

Runoff Area=21,575 sf Runoff Depth>0.07"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.01 cfs 0.003 af

Reach 1R: Kinsman Lane

Inflow=0.01 cfs 0.003 af

Outflow=0.01 cfs 0.003 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.003 af Average Runoff Depth = 0.07"

Subcatchment 1S: Subcatchment 1S

Runoff = 0.01 cfs @ 13.80 hrs, Volume= 0.003 af, Depth> 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
21,575	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow
					Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0260	2.6		Shallow Concentrated Flow, Shallow Flow
					Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Reach 1R: Kinsman Lane

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 0.07" for 2-Year event

Inflow = 0.01 cfs @ 13.80 hrs, Volume= 0.003 af

Outflow = 0.01 cfs @ 13.80 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

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

Washington - HydroCAD - PRE

Type III 24-hr 10-Year Rainfall=4.50"

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Page 4

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1S

Runoff Area=21,575 sf Runoff Depth>0.39"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.11 cfs 0.016 af

Reach 1R: Kinsman Lane

Inflow=0.11 cfs 0.016 af

Outflow=0.11 cfs 0.016 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.016 af Average Runoff Depth = 0.39"

Subcatchment 1S: Subcatchment 1S

Runoff = 0.11 cfs @ 12.15 hrs, Volume= 0.016 af, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
21,575	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow
					Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0260	2.6		Shallow Concentrated Flow, Shallow Flow
					Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Reach 1R: Kinsman Lane

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 0.39" for 10-Year event

Inflow = 0.11 cfs @ 12.15 hrs, Volume= 0.016 af

Outflow = 0.11 cfs @ 12.15 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

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

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Type III 24-hr 100-Year Rainfall=7.00"

Page 6

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1S

Runoff Area=21,575 sf Runoff Depth>1.42"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.77 cfs 0.058 af

Reach 1R: Kinsman Lane

Inflow=0.77 cfs 0.058 af

Outflow=0.77 cfs 0.058 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.058 af Average Runoff Depth = 1.42"

Subcatchment 1S: Subcatchment 1S

Runoff = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
21,575	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow
					Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0260	2.6		Shallow Concentrated Flow, Shallow Flow
					Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Reach 1R: Kinsman Lane

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 1.42" for 100-Year event

Inflow = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af

Outflow = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

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



Subcatchment 2S



Subcatchment 3S
(Driveway)



Subcatchment 4S (Roof)



Infiltration Trench



SIS1



Kinsman Street



Subcat



Reach



Pond



Link

Drainage Diagram for Washington - HydroCAD - POST

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Type III 24-hr 2-Year Rainfall=3.10"

Page 2

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcatchment 2S

Runoff Area=17,620 sf Runoff Depth>0.07"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.00 cfs 0.002 af

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff Area=1,500 sf Runoff Depth>2.68"

Flow Length=70' Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff Area=2,455 sf Runoff Depth>2.68"

Tc=6.0 min CN=98 Runoff=0.17 cfs 0.013 af

Reach 2R: Kinsman Street

Inflow=0.00 cfs 0.002 af

Outflow=0.00 cfs 0.002 af

Pond 1P: Infiltration Trench

Peak Elev=100.61' Storage=46 cf Inflow=0.10 cfs 0.008 af

Outflow=0.04 cfs 0.008 af

Pond 2P: SIS1

Peak Elev=100.34' Storage=108 cf Inflow=0.17 cfs 0.013 af

Outflow=0.04 cfs 0.013 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.023 af Average Runoff Depth = 0.55"

Subcatchment 2S: Subcatchment 2S

Runoff = 0.00 cfs @ 13.80 hrs, Volume= 0.002 af, Depth> 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
17,620	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0250	2.5		Shallow Concentrated Flow, Shallow Concentrated Flow Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
1,500	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.7		Sheet Flow, Sheet Flow Smooth surfaces n= 0.011 P2= 3.10"
0.1	20	0.0500	4.5		Shallow Concentrated Flow, Shallow Paved Kv= 20.3 fps
0.6	70	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,455	98	Paved parking & roofs

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Type III 24-hr 2-Year Rainfall=3.10"

Page 4

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

Reach 2R: Kinsman Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 0.06" for 2-Year event
 Inflow = 0.00 cfs @ 13.80 hrs, Volume= 0.002 af
 Outflow = 0.00 cfs @ 13.80 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

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

Pond 1P: Infiltration Trench

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.034 ac, Inflow Depth > 2.68" for 2-Year event
 Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
 Outflow = 0.04 cfs @ 12.00 hrs, Volume= 0.008 af, Atten= 65%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 12.00 hrs, Volume= 0.008 af

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

Peak Elev= 100.61' @ 12.35 hrs Surf.Area= 186 sf Storage= 46 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 5.9 min (744.7 - 738.9)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	298 cf	3.00'W x 62.00'L x 4.00'H Prismatic 744 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 12.00 hrs HW=100.08' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Pond 2P: SIS1**

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.056 ac, Inflow Depth > 2.68" for 2-Year event
 Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af
 Outflow = 0.04 cfs @ 11.85 hrs, Volume= 0.013 af, Atten= 74%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 11.85 hrs, Volume= 0.013 af

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

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Type III 24-hr 2-Year Rainfall=3.10"

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Page 5

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Peak Elev= 100.34' @ 12.45 hrs Surf.Area= 224 sf Storage= 108 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 12.4 min (751.2 - 738.9)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	276 cf	44.6"W x 30.0"H x 7.12'L StormTech SC-740 x 6 Inside #2
#2	99.50'	204 cf	15.75"W x 14.24'L x 3.50'H PrismaToid
			785 cf Overall - 276 cf Embedded = 509 cf x 40.0% Voids
			479 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 11.85 hrs HW=99.54' (Free Discharge)**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

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Type III 24-hr 10-Year Rainfall=4.50"

Page 6

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcatchment 2S

Runoff Area=17,620 sf Runoff Depth>0.39"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.09 cfs 0.013 af

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff Area=1,500 sf Runoff Depth>3.96"

Flow Length=70' Tc=6.0 min CN=98 Runoff=0.15 cfs 0.011 af

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff Area=2,455 sf Runoff Depth>3.96"

Tc=6.0 min CN=98 Runoff=0.24 cfs 0.019 af

Reach 2R: Kinsman Street

Inflow=0.09 cfs 0.013 af

Outflow=0.09 cfs 0.013 af

Pond 1P: Infiltration Trench

Peak Elev=101.40' Storage=104 cf Inflow=0.15 cfs 0.011 af

Outflow=0.04 cfs 0.011 af

Pond 2P: SIS1

Peak Elev=100.95' Storage=215 cf Inflow=0.24 cfs 0.019 af

Outflow=0.04 cfs 0.019 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.043 af Average Runoff Depth = 1.05"

Subcatchment 2S: Subcatchment 2S

Runoff = 0.09 cfs @ 12.15 hrs, Volume= 0.013 af, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
17,620	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0250	2.5		Shallow Concentrated Flow, Shallow Concentrated Flow Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,500	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.7		Sheet Flow, Sheet Flow Smooth surfaces n= 0.011 P2= 3.10"
0.1	20	0.0500	4.5		Shallow Concentrated Flow, Shallow Concentrated Flow Paved Kv= 20.3 fps
0.6	70	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,455	98	Paved parking & roofs

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Type III 24-hr 10-Year Rainfall=4.50"

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Page 8

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

Reach 2R: Kinsman Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 0.32" for 10-Year event
 Inflow = 0.09 cfs @ 12.15 hrs, Volume= 0.013 af
 Outflow = 0.09 cfs @ 12.15 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

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

Pond 1P: Infiltration Trench

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.034 ac, Inflow Depth > 3.96" for 10-Year event
 Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
 Outflow = 0.04 cfs @ 11.85 hrs, Volume= 0.011 af, Atten= 76%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 11.85 hrs, Volume= 0.011 af

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

Peak Elev= 101.40' @ 12.47 hrs Surf.Area= 186 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 14.4 min (750.2 - 735.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	298 cf	3.00'W x 62.00'L x 4.00'H Prismatic 744 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 11.85 hrs HW=100.06' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Pond 2P: SIS1

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.056 ac, Inflow Depth > 3.96" for 10-Year event
 Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.019 af
 Outflow = 0.04 cfs @ 11.75 hrs, Volume= 0.019 af, Atten= 82%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 11.75 hrs, Volume= 0.019 af

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

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Type III 24-hr 10-Year Rainfall=4.50"

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Page 9

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Peak Elev= 100.95' @ 12.54 hrs Surf.Area= 224 sf Storage= 215 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 27.5 min (763.3 - 735.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	276 cf	44.6"W x 30.0"H x 7.12'L StormTech SC-740 x 6 Inside #2
#2	99.50'	204 cf	15.75"W x 14.24'L x 3.50'H Prismatoid
			785 cf Overall - 276 cf Embedded = 509 cf x 40.0% Voids
			479 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs HW=99.55' (Free Discharge)**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

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Page 10

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcatchment 2S

Runoff Area=17,620 sf Runoff Depth>1.42"

Flow Length=127' Tc=6.0 min CN=49 Runoff=0.63 cfs 0.048 af

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff Area=1,500 sf Runoff Depth>6.24"

Flow Length=70' Tc=6.0 min CN=98 Runoff=0.23 cfs 0.018 af

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff Area=2,455 sf Runoff Depth>6.24"

Tc=6.0 min CN=98 Runoff=0.38 cfs 0.029 af

Reach 2R: Kinsman Street

Inflow=0.63 cfs 0.048 af

Outflow=0.63 cfs 0.048 af

Pond 1P: Infiltration Trench

Peak Elev=103.00' Storage=223 cf Inflow=0.23 cfs 0.018 af

Outflow=0.04 cfs 0.018 af

Pond 2P: SIS1

Peak Elev=102.38' Storage=424 cf Inflow=0.38 cfs 0.029 af

Outflow=0.04 cfs 0.029 af

Total Runoff Area = 0.495 ac Runoff Volume = 0.095 af Average Runoff Depth = 2.30"

Subcatchment 2S: Subcatchment 2S

Runoff = 0.63 cfs @ 12.11 hrs, Volume= 0.048 af, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
17,620	49	50-75% Grass cover, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.2		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.10"
0.5	77	0.0250	2.5		Shallow Concentrated Flow, Shallow Concentrated Flow Unpaved Kv= 16.1 fps
4.8	127	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3S: Subcatchment 3S (Driveway)

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 6.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
1,500	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.7		Sheet Flow, Sheet Flow Smooth surfaces n= 0.011 P2= 3.10"
0.1	20	0.0500	4.5		Shallow Concentrated Flow, Shallow Concentrated Flow Paved Kv= 20.3 fps
0.6	70	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Subcatchment 4S (Roof)

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 6.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
2,455	98	Paved parking & roofs

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Type III 24-hr 100-Year Rainfall=7.00"

Page 12

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

Reach 2R: Kinsman Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.495 ac, Inflow Depth > 1.16" for 100-Year event
 Inflow = 0.63 cfs @ 12.11 hrs, Volume= 0.048 af
 Outflow = 0.63 cfs @ 12.11 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

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

Pond 1P: Infiltration Trench

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.034 ac, Inflow Depth > 6.24" for 100-Year event
 Inflow = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 11.75 hrs, Volume= 0.018 af, Atten= 85%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 11.75 hrs, Volume= 0.018 af

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

Peak Elev= 103.00' @ 12.57 hrs Surf.Area= 186 sf Storage= 223 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 36.5 min (770.0 - 733.5)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	298 cf	3.00'W x 62.00'L x 4.00'H Prismatic 744 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs HW=100.09' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Pond 2P: SIS1**

[82] Warning: Early inflow requires earlier time span

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 0.056 ac, Inflow Depth > 6.24" for 100-Year event
 Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.029 af
 Outflow = 0.04 cfs @ 11.65 hrs, Volume= 0.029 af, Atten= 89%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 11.65 hrs, Volume= 0.029 af

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

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Type III 24-hr 100-Year Rainfall=7.00"

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Page 13

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Peak Elev= 102.38' @ 12.72 hrs Surf.Area= 224 sf Storage= 424 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 65.9 min (799.4 - 733.5)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	276 cf	44.6"W x 30.0"H x 7.12'L StormTech SC-740 x 6 Inside #2
#2	99.50'	204 cf	15.75"W x 14.24'L x 3.50'H Prismatic
			785 cf Overall - 276 cf Embedded = 509 cf x 40.0% Voids
			479 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 11.65 hrs HW=99.56' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)



TOWN OF TOPSFIELD

Board of Health

461 Boston Street, Unit E-6, Topsfield, Massachusetts 01983

(978)887-1520

Website: www.topsfield-ma.gov Email: health@topsfield-ma.gov

October 9, 2017

Robert M. Gill
10 George Street
Ste. 208
Lowell, MA 01852

Property Location: 3 Kinsman Lane

Dear Mr. Gill,

On October 6, 2017, the Health Agent **APPROVED** the septic design plan for 3 Kinsman Lane, dated 8/28/17. Received 9/7/17.

If you have any questions, please contact our office at **health@topsfield-ma.gov**.

Sincerely,

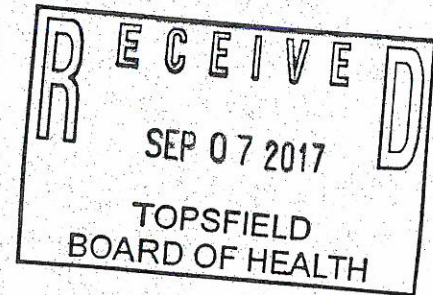
John J. Coulon RS
Topsfield, Board of Health Agent

CHARK
SPIKE IN
TY POLE
=103.62

ZONING

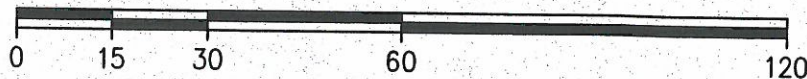
DISTRICT: IRA, INNER RESIDENTIAL AND AGRICULTURAL DISTRICT

DESCRIPTION	REQUIRED
MINIMUM LOT AREA	40,000 SF
MINIMUM FRONTAGE	150'
MINIMUM FRONT YARD	20'
MINIMUM SIDE YARD	15'
MINIMUM REAR YARD	40'



APPROVED OCT 06 2017

SCALE: 1"=30'



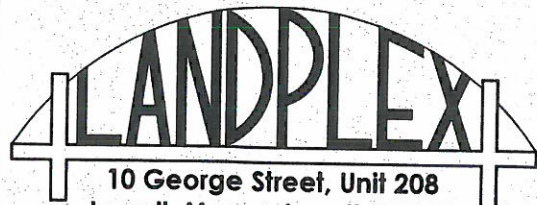
PROPOSED SEWAGE DISPOSAL SYSTEM PLAN

101 WASHINGTON STREET
TOPSFIELD, MASSACHUSETTS

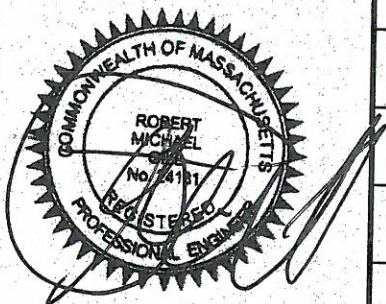
PLAN PREPARED FOR:
THE DALY GROUP, LLC
229 STEDMAN STREET
LOWELL, MA

AUGUST 28, 2017

SCALE: 1" = 30'



10 George Street, Unit 208
Lowell, Massachusetts 01852
978-201-9390 - landplex.com



NO.	REVISION DESCRIPTION	DATE
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