The Town of Acton will hold a public hearing on November 3, 2014 at 7:20 PM from an agreement on time extension continuation on October 6, 2014 in the Francis Faulkner Hearing room at the Town Hall, 472 Main Street, Acton on the application of Concord public School, 120 Merriam Road, Concord MA for a Site Plan Special Permit #07/03/14 – 450 required under Section 10.4.3.3, 03.5.24, and 10.4.1.2 (1) of the Acton Zoning Bylaw at 37 Knox Trail, Acton MA. The applicant is proposing to install approximately 610 square feet of additional new pavement to expand the existing driveway

AGREEMENT ON TIME EXTENSION

The Board of Selectmen and the Petitioner for a Special Permit

Use Special Permit
(identify type of permit)

File No. #07/07/14-450

Petitioner Name: Concord Public Schools

Project Name: Driveway Expansion

Location/Address: 37 Knox Trail

hereby agree to continue the Public Hearing to

(date) November 3, 2014

(time) 7:20 pm

and to extend the legally required time limit in which the Board of Selectmen must render a decision to 90 days following the date of the hearing continuance stated above.

Signed this (date) October 6, 2014

Board of Selectmen

Petitioner

This agreement must be filed with the Office of the Acton Town Clerk.

RECEIVED

OCT - 7 2014

TOWN CLERK
ACTON

TOWN OF ACTON
472 Main Street
Acton, Massachusetts, 01720
Telephone (978) 929-6630
Fax (978) 929-6340

Engineering Department

INTERDEPARTMENTAL COMMUNICATION

To: **Board of Selectmen** ***Date:*** 10/28/2014

From: **Engineering Department**

Subject: **Site Plan Special Permit #07/03/14 - #450 – Concord Public Schools – 37 Knox Trail**

We have reviewed the plans titled "37 Knox Trail, Acton, Massachusetts" dated July 3, 2014 with a revision date of October 6, 2014 for the above mentioned special permit. We have also reviewed the additional calculations and information provided under cover in a letter addressed to Mike Gowing dated October 24, 2014.

The applicant has satisfactorily addressed our comments from our memo dated August 1, 2014 and we have no further comments.

Lisa Tomyl

From: Patrick Futterer
Sent: Tuesday, October 07, 2014 1:03 PM
To: Lisa Tomyl
Subject: Fire Department vehicles

Lisa I figure if you give them the largest vehicle then all others will fall under that measurement.

Ladder 28 is our longest vehicle.
The wheelbase is 247.00 inches
The cramp angle is 45 degree max.
Calculated Turning Radius
Inside Turn: 19 ft. 7 in
Curb to Curb: 35 ft. 6 in
Wall to Wall 40 ft. 0 in

I hope this helps.

If you need more let me know.

Respectfully,

Patrick J. Futterer, EFO, CFI
Fire Chief
Acton, MA 01720
Phone: 978-929-7411
Fax: 978-266-2885

AGREEMENT ON TIME EXTENSION

RECEIVED
SEP 24 2014
TOWN CLERK
ACTON

The Board of Selectmen and the Petitioner for a Special Permit

Special Permit
(identify type of permit)

File No. #07/03/14 - 450

Petitioner Name: Mark Bobrowski

Project Name: Driveway Expansion

Location/Address: 37 Knox Trail

hereby agree to continue the Public Hearing to

(date) October 6, 2014

(time) 7:55 pm

and to extend the legally required time limit in which the Board of Selectmen must render a decision to 90 days following the date of the hearing continuance stated above.

Signed this (date) September 22, 2014

Board of Selectmen

Petitioner

This agreement must be filed with the Office of the Acton Town Clerk.

Lisa Tomyl

From: Scott Mutch
Sent: Wednesday, October 01, 2014 12:35 PM
To: Lisa Tomyl
Subject: 37 Knox Trail Site Plan Special Permit

Lisa,

I have nothing new for the Board of Selectmen's hearing Monday night regarding the 37 Knox Trial (Concord School District) Site Plan Special Permit. I have also spoken with the Engineering Department, and they have not received any new documents, drawings or information regarding the project.

If you have any questions, comments or concerns regarding this matter, please feel free to contact our office at (978) 929-6631, Monday through Friday (except for holidays) between the hours of 8:00 am and 5:00 pm. Sincerely,

Scott A. Mutch
Zoning Enforcement Officer & Assistant Town Planner
Town of Acton
Planning Department
33 Nagog Park, 2nd Floor
Acton, MA 01720
Tel: (978) 929-6631
Fax: (978) 929-6333
Email: planning@acton-ma.gov
Website: www.acton-ma.gov

Water Supply District of Acton

693 MASSACHUSETTS AVENUE
P.O. BOX 953
ACTON, MASSACHUSETTS 01720

TELEPHONE (978) 263-9107 FAX (978) 264-0148

August 1, 2014

To: Scott Mutch, Town of Acton Zoning Enforcement Officer
From: Chris Allen, District Manager
Re: Comments on SPSP #07-03-14-450/ 37 Knox Trail, Acton, MA

1. The Acton Water District is currently reviewing the groundwater protection in this area of Knox Trail. The District requests that a decision be delayed until this work is completed later this fall.

2. As requested in the past, the District would like to have the existing stormwater system serving Knox Trail and proposed rain garden evaluated as part of this project. We request that any approval for this project be contingent on the applicant paying for the Town of Acton or the Acton Water District to retain an engineer for this purpose. Specifically we are concerned with the adequacy of the existing and proposed stormwater measures to protect groundwater quality in this area.

3. A snow management plan for the site should be prepared or updated. This needs to demonstrate how the applicant plans to conduct winter maintenance of this parking area and should identify adequate areas for snow storage, ensuring that the proposed rain garden is not utilized for this purpose.

4. Prior to commencement of work at this site by the applicant, the installation of groundwater monitoring wells to establish a refined groundwater flow direction and baseline water quality conditions is requested.

5. Onsite soil management needs to be monitored to prevent runoff of this material from the site and protection of the existing leach field area.

6. An agreement should be written with the applicant stating no maintenance or fueling of the proposed buses stored at this site will occur.

Respectfully submitted
Chris Allen
District Manager

Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

October 24, 2014

Mr. Mike Gowing
Chair of the Board of Selectman
Town of Acton
472 Main Street
Acton, MA 01720

RE: Nitsch Project #10079
Continuation of Use
37 Knox Trail
Acton, MA

Dear Mr. Gowing:

On behalf of Concord Public Schools, Nitsch Engineering is pleased to submit revised plans based on Town of Acton's comments for the Application for Continuation of Use at 37 Knox Trail in Acton, Massachusetts. Comments were received from the Acton Engineering Department, Zoning Enforcement and Assistant Town Planner, Water Supply District of Acton, and the Acton Fire Department. Nitsch Engineering is providing the following information for your review:

1. HydroCAD Output with summary of calculations;
2. Pre- and Post-Development Drainage Areas;
3. Soil Test Pit Log (Form 11);
4. Stormwater Operation and Maintenance Plan; and
5. Plan Set revised through October 24, 2014, including the following:
    a. Cover Sheet – C0.0;
    b. Site Plan – C1.0;
    c. Turning Movements – C2.0;
    d. Details – C3.0;
    e. Snow Storage Plan – C4.0; and
    f. Topographic Plan of Land.

Nitsch Engineering included three (3) hard copies to the Planning Department with this letter and will provide the plans electronically in Portable Document Format (PDF) to Scott Mutch, Town of Acton Zoning Enforcement Officer and Assistant Town Planner, on October 24, 2014.

Nitsch Engineering performed a test pit at the 37 Knox Trail site at the location of the rain garden as requested by the Acton Engineering Department and the Acton Water Department. The test pit information indicated a well-draining soil. Nitsch Engineering revised the rain garden grading to maintain the hydrant location and existing cover over the water line as requested by the Acton Water Department. A representative from the Acton Water Department was present before the test pit was excavated and left the site before excavation began.

Nitsch Engineering received fire truck turning information from the Acton Planning Department in an e-mail, dated October 15, 2014, which was used to create the turning movement drawing for 37 Knox Trail on Sheet C2.0.

Nitsch Engineering reviewed the comments and updated the plans and calculations. Nitsch Engineering offers the following responses, noting that the numbering conventions from the comment letters are being followed:

4. The Surveyor revised the existing conditions plan to show the fire hydrant and approximate location of the water line in Knox Trail and connection to the hydrant based on a conversation with Acton Water Department personnel in the field on October 15, 2014 prior to the test pit excavation.

There are no other improvements proposed for the site at this time.

Nitsch Engineering respectfully requests that the 37 Knox Trail project be conditionally approved at the next Board of Selectman's hearing.

Please let me know if you have any questions.

Very truly yours,

Nitsch Engineering, Inc.

Steven Ventresca

Steven Ventresca, PE, LEED® AP BD+C
Project Manager

SV/fmk

cc: File, Concord Public Schools

Q:\10079 CPS Acton Depot\Civil\Project Data\Special Permit Application\10079 BOS Letter-2014-10-24.docx

1.0 INTRODUCTION

The purpose of this document is to specify the pollution prevention measures and stormwater management system operation and maintenance for the 37 Knox Trail site. The Responsible Party indicated below shall implement the management practices outlined in this document and proactively conduct operations at the project site in an environmentally responsible manner. Compliance with this Manual does not in any way dismiss the responsible party, owner, property manager, or occupants from compliance with other applicable federal, state or local laws.

Responsible Party: Town of Concord
Dick Fowler
135 Keyes Road, Concord, MA 01742
978-318-3221

This Document has been prepared in compliance with Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which state:

Standard 4:
The Long Term Pollution Prevention Plan shall include the proper procedures for the following:

- Good housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Pet waste management
- Operation and management of septic systems
- Proper management of deicing chemicals and snow

Standard 9:
The Long-Term Operation and Maintenance Plan shall at a minimum include:

- Stormwater management system(s) owner(s)
- The party or parties responsible for operation and maintenance, including how future property owners shall be notified of the presence of the stormwater management system and the requirement for operation and maintenance
- The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks
- A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point
- A description of public safety features
- An estimated operations and maintenance budget

2.5 Maintenance of Lawns, Gardens, and other Landscaped Areas

Pesticides and fertilizers shall not be used in the landscaped areas associated with the project site and shall not be stored on-site. Dumping of lawn wastes, brush or leaves or other materials or debris is not permitted in any Resource Area. Grass clippings, pruned branches and any other landscaped waste should be disposed of or composted in an appropriate location. No irrigation shall be used in the landscaped areas for this project.

2.6 Management of Deicing Chemicals and Snow

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored on-site. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways. The snow plow contractor shall adhere to these magnesium chloride use and storage requirements.

During typical snow plowing operations, snow shall be pushed to the designated snow removal areas noted on the Snow Storage Plan (Figure 2). Snow shall not be stockpiled in wetland resource areas or the 100-foot Buffer Zone, catch basins, or bioretention basins, . In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.

Use of sand is permitted only for impervious roadways and parking areas. If sand is applied, the snow plowed from impervious areas shall not be stored on porous asphalt.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris. Street and parking lot sweeping should be followed in accordance with the Operation and Maintenance Plan.

2.7 Coordination with other Permits and Requirements

Certain conditions of other approvals affecting the long term management of the property shall be considered part of this Long Term Pollution Prevention Plan. The Owner shall become familiar with those documents and comply with the guidelines set forth in those documents.

Area Drains

Inspect area drains at least once per month and remove debris from the grate. Clean out accumulated sediments at least once per year and more frequently as necessary.

Bioretention Areas

Perform annual maintenance of all components of the bioretention area, including plants, soil, and mulch. Table 1, below, outlines recommended maintenance activities.

Table 1. Bioretention area maintenance recommendations

Location	Description	Frequency	Time of Year
Surface	Inspect and remove trash	Monthly	Year round
Soil	Inspect and repair erosion	Monthly	Year round
Organic Layer	Remulch void areas	Annually	Spring
	Remove previous mulch layer before applying new layer (optional)	Annually	Spring
Plants	Water vegetation at end of day for 14 consecutive days after planting	Immediately after planting	As needed
	Remove and replace all dead and diseased vegetation that cannot be treated	Annually	Spring
	Treat all diseased trees and shrubs	As needed	Variable

During and after storm events, record the length of time standing water remains in the bioretention areas. If the time is greater than 72 hours, thoroughly inspect the basins for signs of clogging and develop a corrective action plan. The corrective action plan, prepared by a qualified professional, will outline procedures to restore infiltrative function. The owner of the site shall take immediate action to implement these corrective measures.

3.3 Street Sweeping

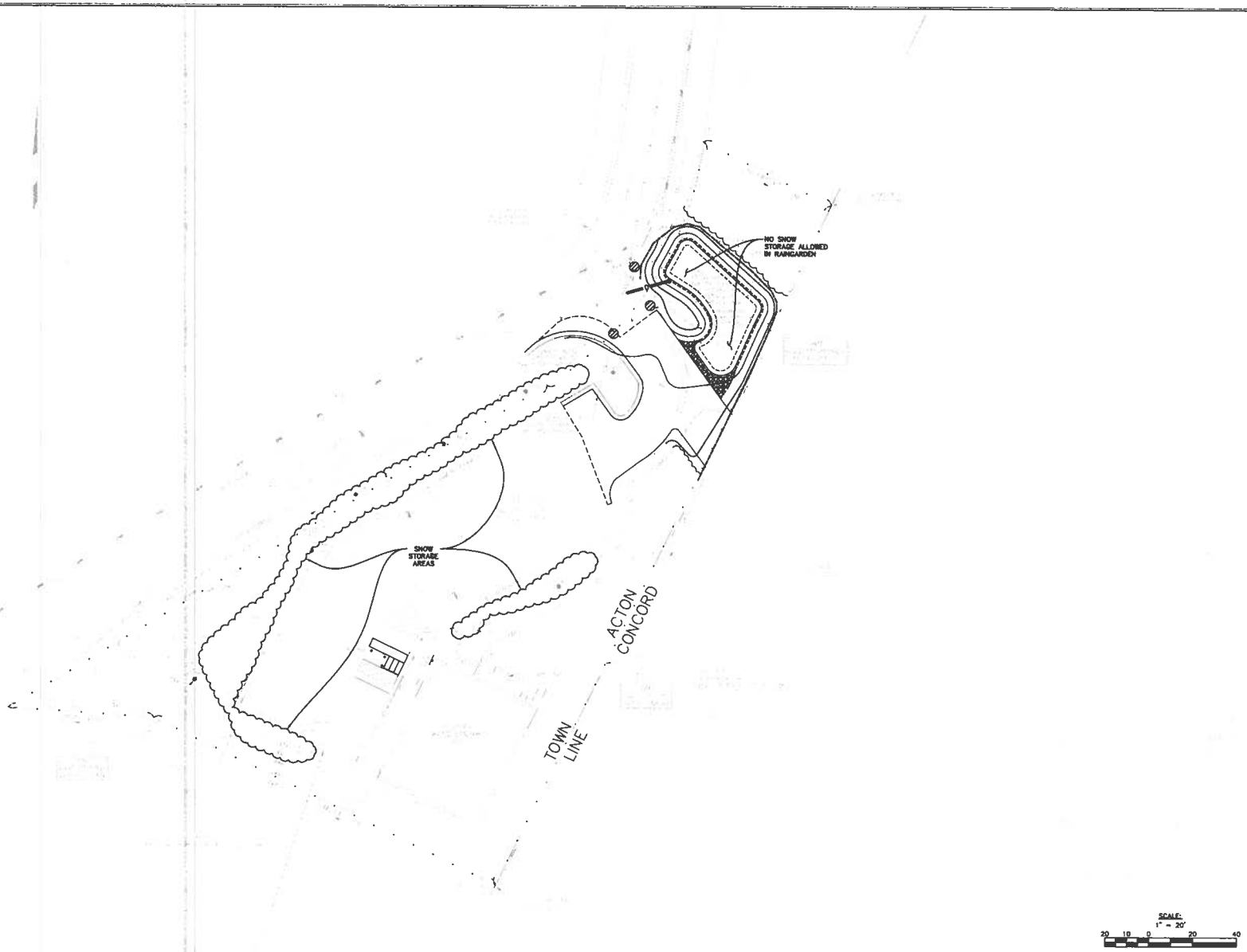
Perform street sweeping at least twice per year, whenever there is significant debris present on roads and parking lots. Street sweeping shall occur in the spring and fall. Sweepings must be handled and disposed of properly according to the Town of Acton DPW.

3.4 Repair of the Stormwater Management System

The stormwater management system shall be maintained. The repair of any component of the system shall be made as soon as possible to prevent any potential pollutants including silt from entering the resource areas or the existing closed drainage system.

3.5 Reporting

The Owner shall maintain a record of drainage system inspections and maintenance (per this Plan) and submit a yearly report to the Acton Engineering and Water Departments.



Nitsch Engineering

www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Sustainable Site Consulting
- Planning
- GIS

SNOW STORAGE

37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:

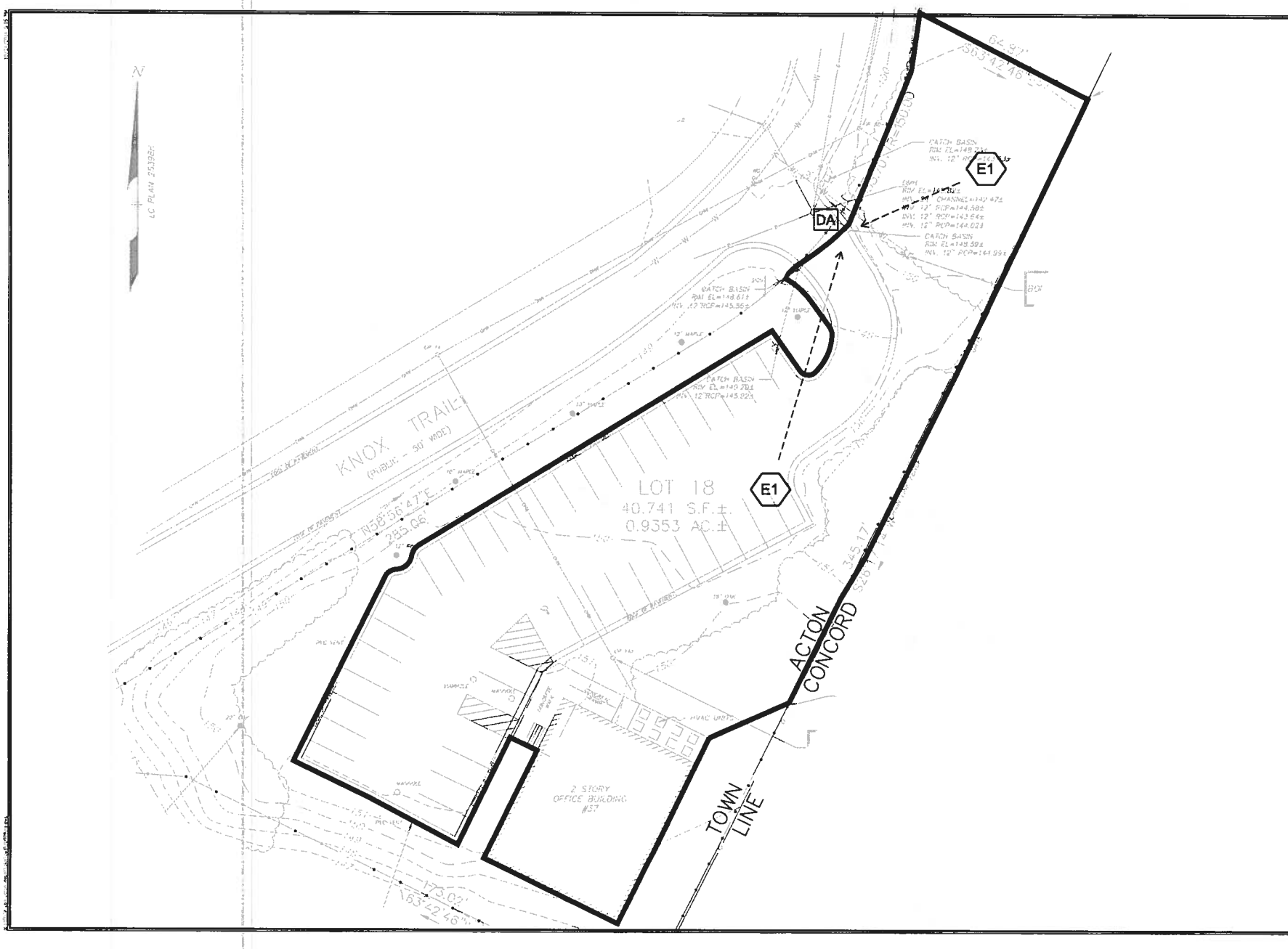
CONCORD PUBLIC SCHOOLS
120 MERIAM ROAD CONCORD, MA 01742

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	09/04/14
1	TOWN'S COMMENTS	09/04/14

REVISIONS

NITSCH PROJECT #	10079
FILE:	10079CL0.DWG
SCALE:	1" = 20'
DATE:	07/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

C4.0



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EXISTING DRAINAGE AREAS

37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:

CONCORD PUBLIC SCHOOLS
120 MERIAM ROAD CONCORD, MA 01742

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	10/21/14
1	TOWN'S COMMENTS	10/6/14

REVISIONS

NITSCH PROJECT #	10079
FILE	10079CLO.DWG
SCALE:	NTS
DATE:	07/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

EX

	Storm Event – Rate, cfs				
	2-year	10-year	25-year	100-year	1 inch
Existing					
	0.60	1.39	1.89	2.68	0.00
Proposed					
	0.00	0.81	1.55	2.36	0.00

	Storm Event – volume, a/f				
	2-year	10-year	25-year	100-year	1 inch
Existing					
	0.046	0.098	0.132	0.186	0.002
Proposed					
	0.002	0.036	0.059	0.099	0.00

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.675	HSG A	E1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	

Ground Covers (all nodes)

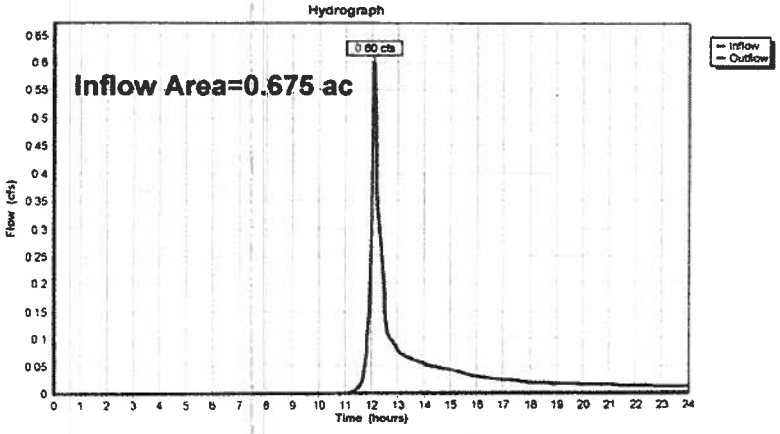
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.409	0.000	0.000	0.000	0.000	0.409	Building and Parking Lot	E1
0.266	0.000	0.000	0.000	0.000	0.266	Woods, Good	E1

Summary for Reach DP: Closed Drainage System to Knox Trail

Inflow Area = 0.675 ac, 60.64% Impervious, Inflow Depth > 0.82" for 2-YEAR event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.046 af
Outflow = 0.60 cfs @ 12.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail



Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff Area=29,405 sf 60.64% Impervious Runoff Depth>1.74"
Tc=5.0 min CN=71 Runoff=1.39 cfs 0.098 af

Reach DP: Closed Drainage System to Knox Trail Inflow=1.39 cfs 0.098 af
Outflow=1.39 cfs 0.098 af

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Site Runoff Area=29,405 sf 60.64% Impervious Runoff Depth>2.34"
Tc=5.0 min CN=71 Runoff=1.89 cfs 0.132 af

Reach DP: Closed Drainage System to Knox Trail Inflow=1.89 cfs 0.132 af
Outflow=1.89 cfs 0.132 af

Summary for Subcatchment E1: Existing Site

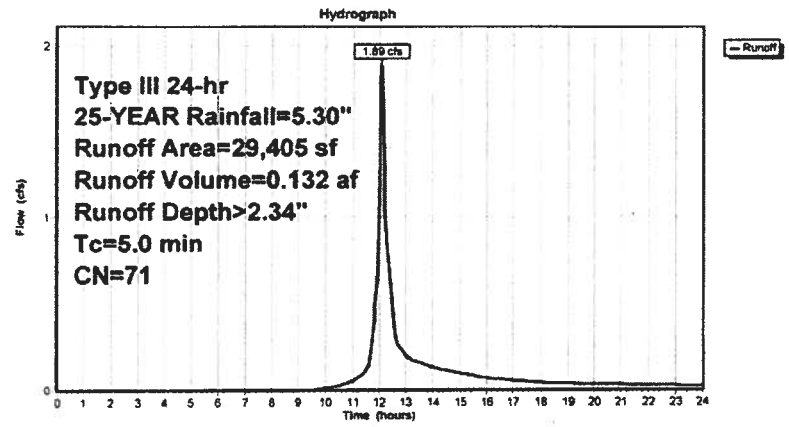
Runoff = 1.89 cfs @ 12.08 hrs, Volume= 0.132 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-YEAR Rainfall=5.30"

	Area (sf)	CN	Description
*	17,832	98	Building and Parking Lot, HSG A
	11,573	30	Woods, Good, HSG A
	29,405	71	Weighted Average
	11,573		39.36% Pervious Area
	17,832		60.64% Impervious Area

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

Subcatchment E1: Existing Site



Summary for Subcatchment E1: Existing Site

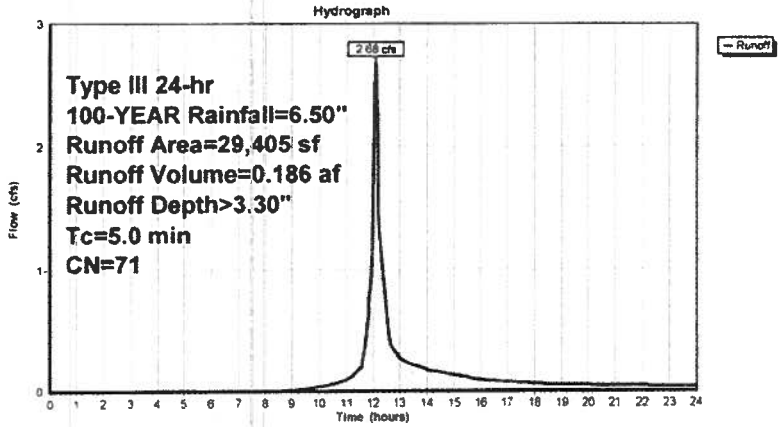
Runoff = 2.68 cfs @ 12.08 hrs, Volume= 0.186 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-YEAR Rainfall=6.50"

	Area (sf)	CN	Description
*	17,832	98	Building and Parking Lot, HSG A
	11,573	30	Woods, Good, HSG A
	29,405	71	Weighted Average
	11,573		39.36% Pervious Area
	17,832		60.64% Impervious Area

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

Subcatchment E1: Existing Site

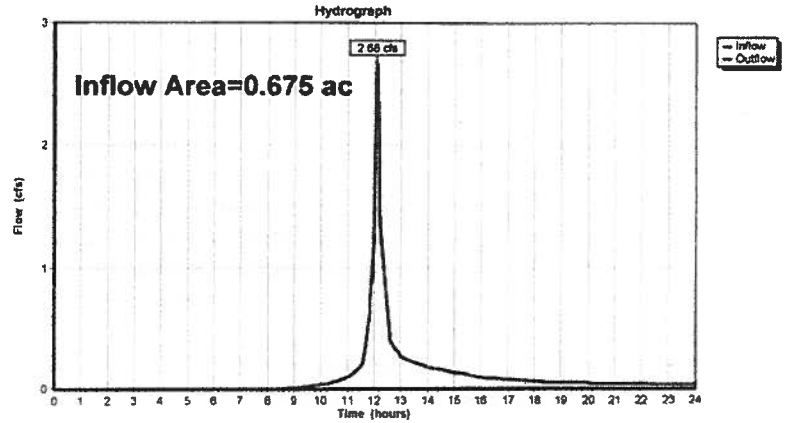


Summary for Reach DP: Closed Drainage System to Knox Trail

Inflow Area = 0.675 ac, 60.64% Impervious, Inflow Depth > 3.30" for 100-YEAR event
Inflow = 2.68 cfs @ 12.08 hrs, Volume= 0.186 af
Outflow = 2.68 cfs @ 12.08 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail

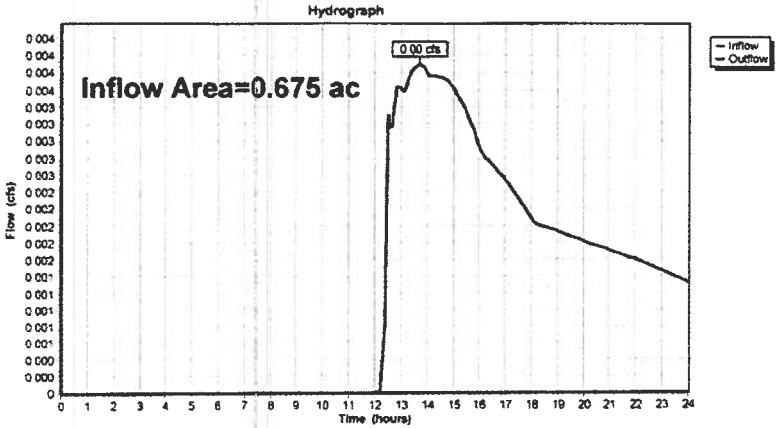


Summary for Reach DP: Closed Drainage System to Knox Trail

Inflow Area = 0.675 ac, 60.64% Impervious, Inflow Depth > 0.04" for One-Inch event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 13.67 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail



Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.675	HSG A	P1, P2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.083	0.000	0.000	0.000	0.000	0.083	Building	P1
0.057	0.000	0.000	0.000	0.000	0.057	>75% Grass cover, Good	P1
0.344	0.000	0.000	0.000	0.000	0.344	Paved parking	P2
0.191	0.000	0.000	0.000	0.000	0.191	Woods, Good	P1

Summary for Subcatchment P2: Driveway

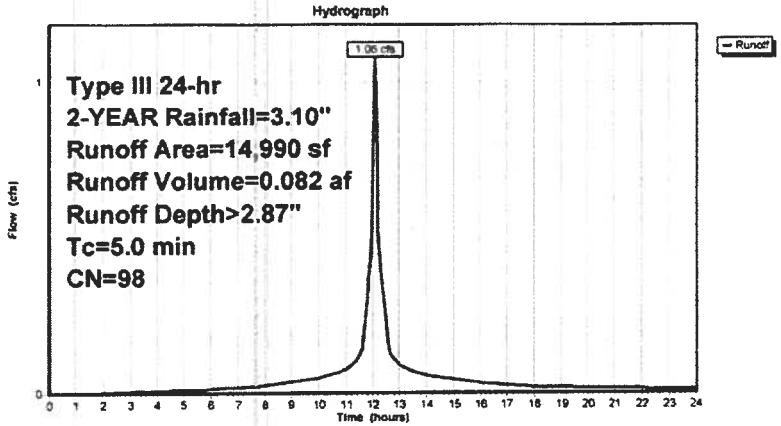
Runoff = 1.06 cfs @ 12.07 hrs, Volume= 0.082 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-YEAR Rainfall=3.10"

Area (sf)	CN	Description
14,990	98	Paved parking, HSG A
14,990		100.00% Impervious Area

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

Subcatchment P2: Driveway

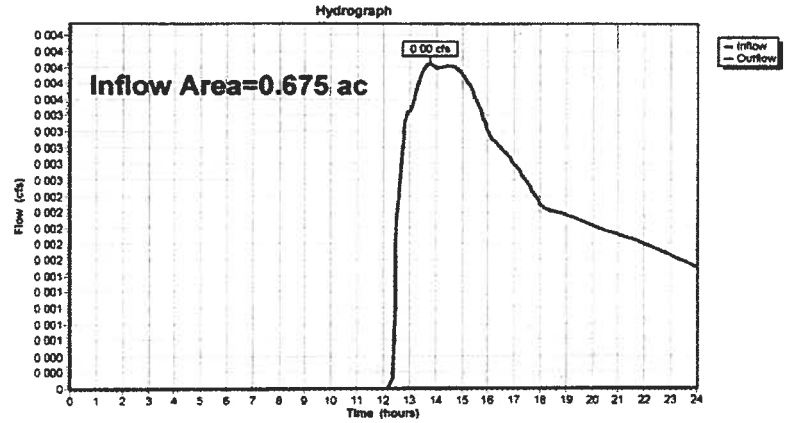


Summary for Reach DP: Closed Drainage System to Knox Trail

Inflow Area = 0.675 ac, 63.27% Impervious, Inflow Depth > 0.04" for 2-YEAR event
Inflow = 0.00 cfs @ 13.79 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 13.79 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail



Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Existing Building, Runoff Area=14,415 sf 25.08% Impervious Runoff Depth>0.46"
Tc=5.0 min CN=49 Runoff=0.08 cfs 0.013 af

Subcatchment P2: Driveway Runoff Area=14,990 sf 100.00% Impervious Runoff Depth>4.26"
Tc=5.0 min CN=98 Runoff=1.54 cfs 0.122 af

Reach DP: Closed Drainage System to Knox Trail Inflow=0.81 cfs 0.036 af
Outflow=0.81 cfs 0.036 af

Pond RG: Rain Garden Peak Elev=148.61' Storage=1,663 cf Inflow=1.54 cfs 0.122 af
Discarded=0.09 cfs 0.098 af Primary=0.73 cfs 0.023 af Outflow=0.82 cfs 0.121 af

Summary for Subcatchment P1: Existing Building, Woods, and Raingarden

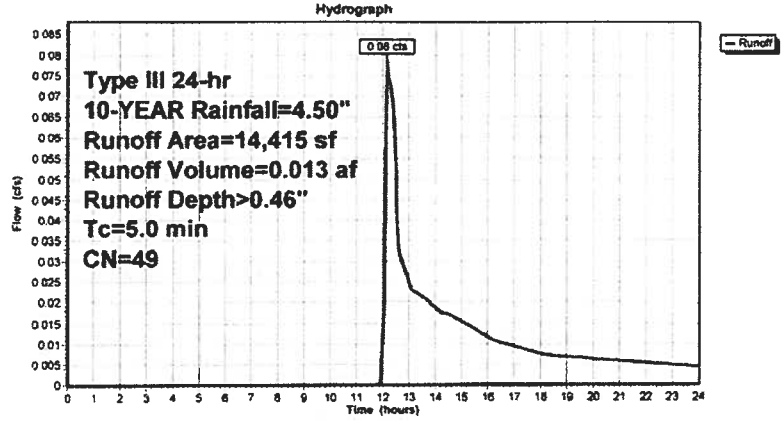
Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-YEAR Rainfall=4.50"

	Area (sf)	CN	Description
*	3,615	98	Building, HSG A
	8,300	30	Woods, Good, HSG A
	2,500	39	>75% Grass cover, Good, HSG A
	14,415	49	Weighted Average
	10,800		74.92% Pervious Area
	3,615		25.08% Impervious Area

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

Subcatchment P1: Existing Building, Woods, and Raingarden



Summary for Pond RG: Rain Garden

Inflow Area = 0.344 ac,100.00% Impervious, Inflow Depth > 4.26" for 10-YEAR event
Inflow = 1.54 cfs @ 12.07 hrs, Volume= 0.122 af
Outflow = 0.82 cfs @ 12.20 hrs, Volume= 0.121 af, Atten= 47%, Lag= 7.6 min
Discarded = 0.09 cfs @ 12.20 hrs, Volume= 0.098 af
Primary = 0.73 cfs @ 12.20 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 148.61' @ 12.20 hrs Surf.Area= 1,568 sf Storage= 1,663 cf

Plug-Flow detention time= 135.0 min calculated for 0.121 af (99% of inflow)
Center-of-Mass det. time= 128.8 min (877.3 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	147.25'	1,890 cf	**Rain Garden (Prismatic)** Listed below (Recalc)

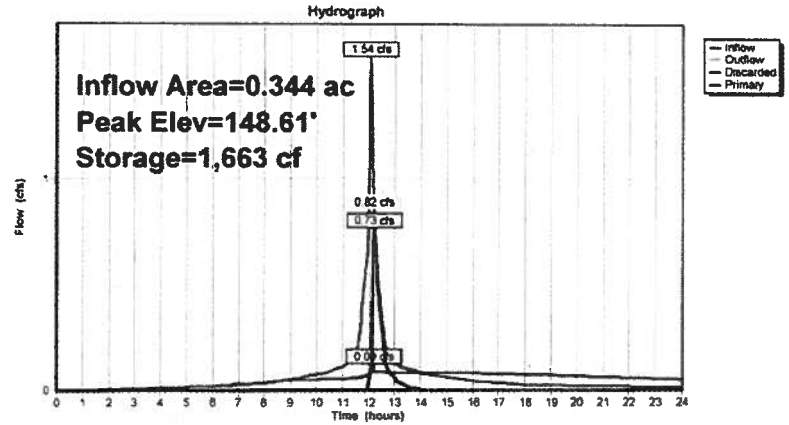
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
147.25	880	0	0
148.75	1,640	1,890	1,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	144.50'	**12.0" Round New Drain to existing DMH** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 144.50' / 144.30' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	148.50'	**24.0" Horiz. Dome Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 12.20 hrs HW=148.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.73 cfs @ 12.20 hrs HW=148.61' (Free Discharge)
└─**2=New Drain to existing DMH** (Passes 0.73 cfs of 5.67 cfs potential flow)
  └─**3=Dome Grate** (Weir Controls 0.73 cfs @ 1.08 fps)

Pond RG: Rain Garden



Summary for Subcatchment P2: Driveway

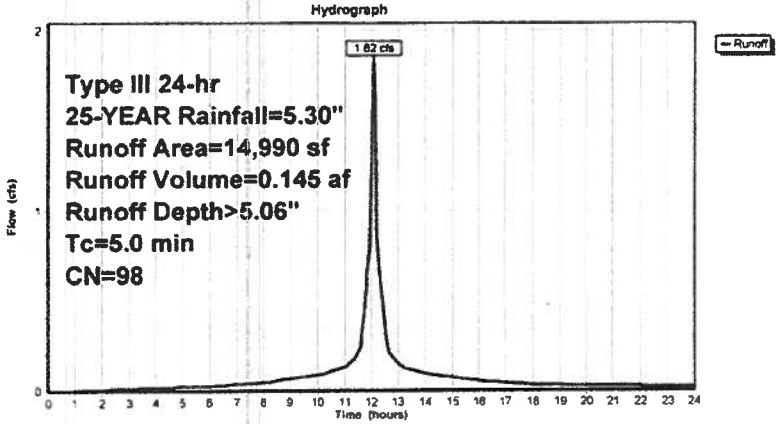
Runoff = 1.82 cfs @ 12.07 hrs, Volume= 0.145 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-YEAR Rainfall=5.30"

Area (sf)	CN	Description
14,990	98	Paved parking, HSG A
14,990		100.00% Impervious Area

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

Subcatchment P2: Driveway

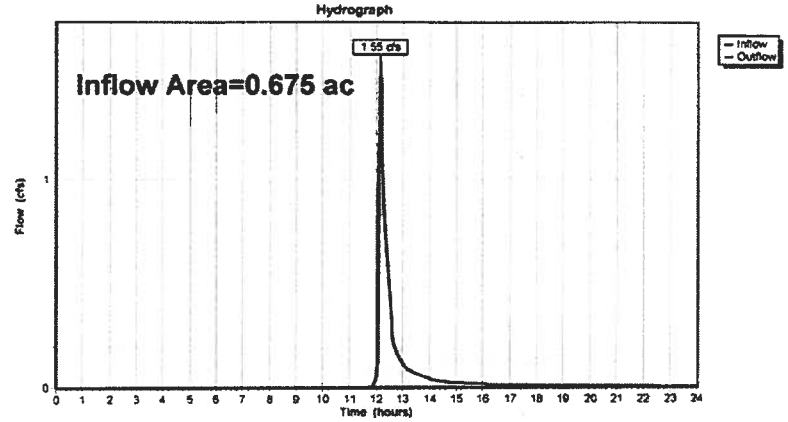


Summary for Reach DP: Closed Drainage System to Knox Trail

Inflow Area = 0.675 ac, 63.27% Impervious, Inflow Depth > 1.05" for 25-YEAR event
Inflow = 1.55 cfs @ 12.13 hrs, Volume= 0.059 af
Outflow = 1.55 cfs @ 12.13 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail



Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Existing Building, Runoff Area=14,415 sf 25.08% Impervious Runoff Depth>1.32"
Tc=5.0 min CN=49 Runoff=0.43 cfs 0.036 af

Subcatchment P2: Driveway Runoff Area=14,990 sf 100.00% Impervious Runoff Depth>6.26"
Tc=5.0 min CN=98 Runoff=2.24 cfs 0.179 af

Reach DP: Closed Drainage System to Knox Trail Inflow=2.36 cfs 0.099 af
Outflow=2.36 cfs 0.099 af

Pond RG: Rain Garden Peak Elev=148.71' Storage=1,821 cf Inflow=2.24 cfs 0.179 af
Discarded=0.09 cfs 0.110 af Primary=1.95 cfs 0.062 af Outflow=2.04 cfs 0.172 af

Summary for Subcatchment P1: Existing Building, Woods, and Raingarden

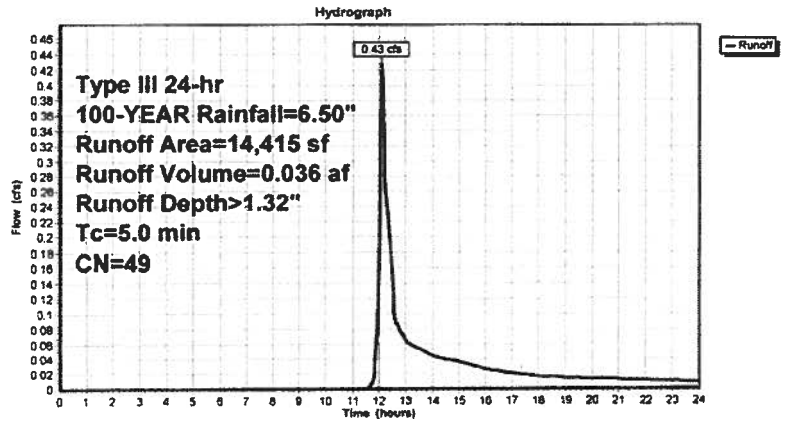
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.036 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-YEAR Rainfall=6.50"

	Area (sf)	CN	Description
*	3,615	98	Building, HSG A
	8,300	30	Woods, Good, HSG A
	2,500	39	>75% Grass cover, Good, HSG A
	14,415	49	Weighted Average
	10,800		74.92% Pervious Area
	3,615		25.08% Impervious Area

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

Subcatchment P1: Existing Building, Woods, and Raingarden



Summary for Pond RG: Rain Garden

Inflow Area = 0.344 ac,100.00% Impervious, Inflow Depth > 6.26" for 100-YEAR event
Inflow = 2.24 cfs @ 12.07 hrs, Volume= 0.179 af
Outflow = 2.04 cfs @ 12.10 hrs, Volume= 0.172 af, Atten= 9%, Lag= 1.9 min
Discarded = 0.09 cfs @ 12.10 hrs, Volume= 0.110 af
Primary = 1.95 cfs @ 12.10 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 148.71' @ 12.10 hrs Surf.Area= 1,619 sf Storage= 1,821 cf

Plug-Flow detention time= 113.3 min calculated for 0.172 af (96% of inflow)
Center-of-Mass det. time= 89.3 min (832.0 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1	147.25'	1,890 cf	**Rain Garden (Prismatic)** Listed below (Recalc)

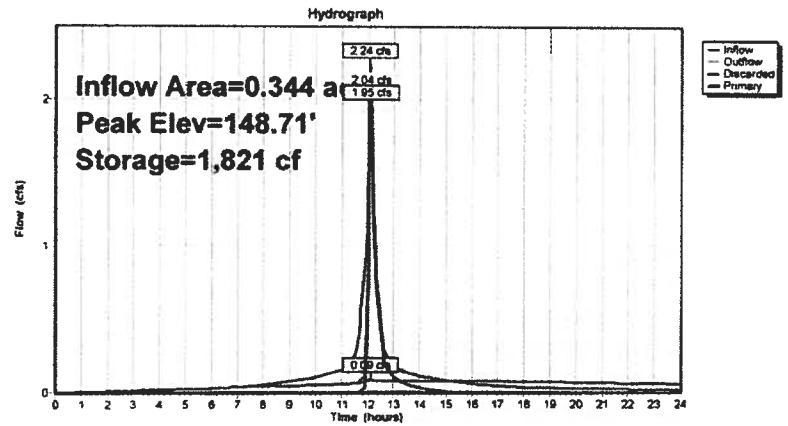
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
147.25	880	0	0
148.75	1,640	1,890	1,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	147.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	144.50'	**12.0" Round New Drain to existing DMH** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 144.50' / 144.30' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	148.50'	**24.0" Horiz. Dome Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 12.10 hrs HW=148.71' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=1.91 cfs @ 12.10 hrs HW=148.71' (Free Discharge)
└─**2=New Drain to existing DMH** (Passes 1.91 cfs of 5.75 cfs potential flow)
  └─**3=Dome Grate** (Weir Controls 1.91 cfs @ 1.48 fps)

Pond RG: Rain Garden



Summary for Subcatchment P2: Driveway

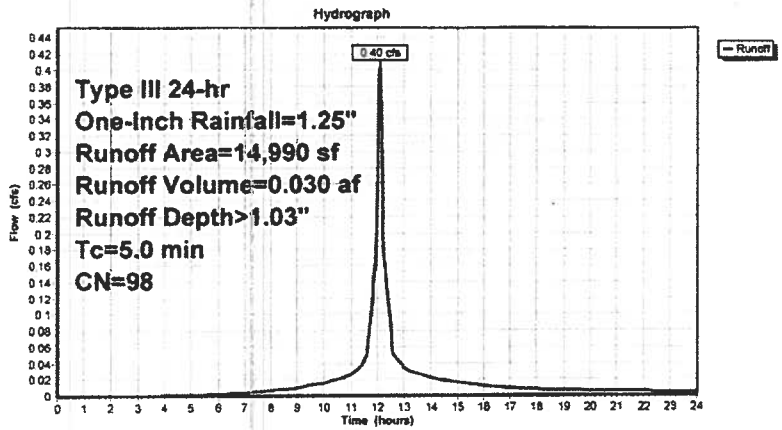
Runoff = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr One-Inch Rainfall=1.25"

Area (sf)	CN	Description
14,990	98	Paved parking, HSG A
14,990		100.00% Impervious Area

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

Subcatchment P2: Driveway

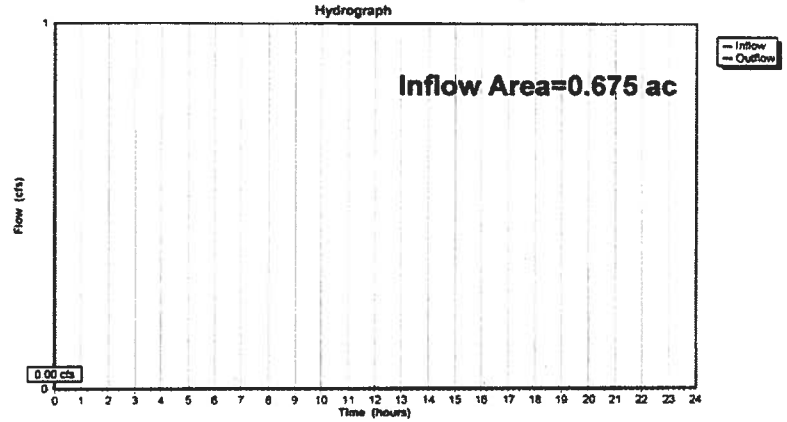


Summary for Reach DP: Closed Drainage System to Knox Trail

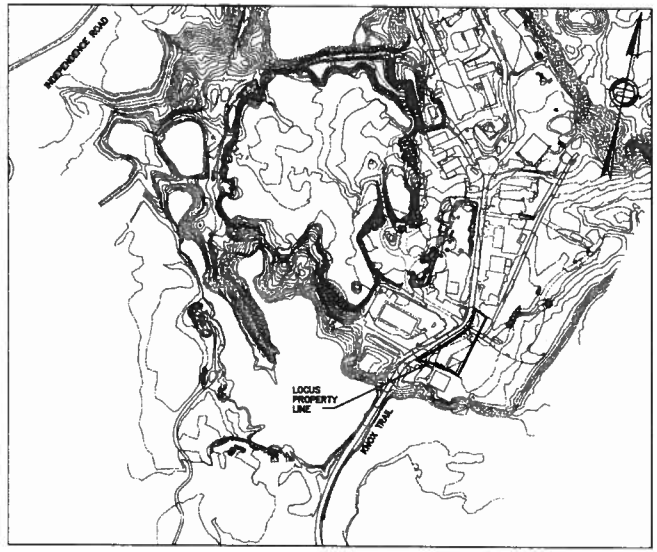
Inflow Area = 0.675 ac, 63.27% Impervious, Inflow Depth = 0.00" for One-Inch event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Reach DP: Closed Drainage System to Knox Trail

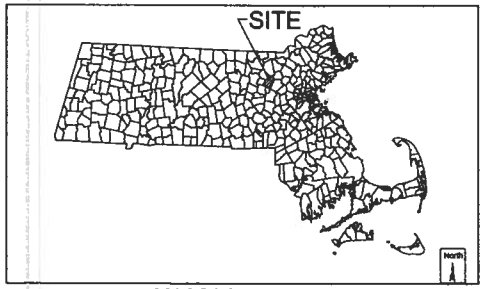


ORTHOPHOTOGRAPH WITH LOCUS



LOCUS MAP

SCALE:
1" = 300'
300 150 0 300 600



MASSACHUSETTS
Graphic Scale

DRAWING LIST

COVER SHEET	C0.0
SITE PLAN	C1.0
TURNING MOVEMENTS	C2.0
DETAILS	C3.0
SNOW STORAGE	C4.0
TOPOGRAPHIC PLAN OF LAND	

ZONING TABLE*

USE: OFFICE ZONING DISTRICT: TECHNOLOGY DISTRICT (TD)	REQUIRED	EXISTING OFFICE BUILDING
MINIMUM LOT AREA	40,000 SF	40,741± SF
MINIMUM LOT FRONTAGE	100 LF	420.7± LF
FRONT SETBACKS	45 FT	80± FT
SIDE SETBACKS	50 FT	20± FT*
REAR SETBACKS	50 FT	18± FT*
MAX. BUILDING HEIGHT	40 FT	N/A
MINIMUM OPEN SPACE (EXISTING)	35%	44% (17,906± S.F. IMP)* 56% (22,835± S.F. PERV)*
MINIMUM OPEN SPACE (PROPOSED)	35%	46% (18,677± S.F. IMP)** 54% (22,064± S.F. PERV)**

THE PROJECT SITE DOES NOT ABUT A RESIDENTIAL AREA
*PRE-EXISTING NON-CONFORMING SETBACKS AND OPEN SPACE – OPEN SPACE REQUIREMENT WAS CONFORMING WHEN INITIALLY PERMITTED IN 1983
**PROPOSED OPEN SPACE

GROUNDWATER PROTECTION DISTRICT (SECTION 4.3)

THE ENTIRE SITE IS WITHIN THE ZONE 3 GROUNDWATER PROTECTION OVERLAY DISTRICT

PARKING TABLE (SECTION 6.3.1.9)

USE: OFFICE	REQUIRED	EXISTING (MARKED)
OFFICE USE: ONE SPACE (1 PS) FOR EVERY 250 S.F. NET FLOOR AREA	NOT APPLICABLE – NO CHANGE IN USE	41
BIKE PARKING (6.3.7.5): 1 BICYCLE PARK SPACE/20 EXISTING CAR PARKING SPACES	3 PROVIDED	--
TOTAL		41

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- Sustainable Site Consulting
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COVER SHEET
37 KNOX TRAIL, ACTON, MA 01720

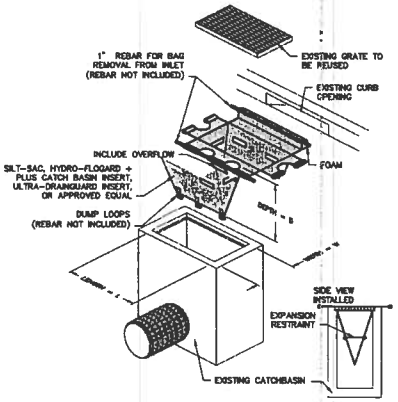
PREPARED FOR:
CONCORD PUBLIC SCHOOLS
120 MERIAM ROAD CONCORD, MA 01742

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	10/24/14
1	TOWN'S COMMENTS	09/09/14

REVISIONS

NITSCH PROJECT #	10079
FILE:	10079COVER.DWG
SCALE:	AS NOTED
DATE:	07/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	ADB
CHECKED BY:	

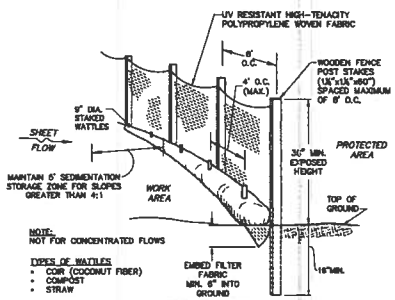
C0.0



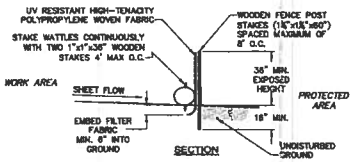
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS SHEET, OVERLAND OR CONCENTRATED FLOWS (NOT GREATER THAN 1 CFS). THE METHOD CAN DRAIN FLAT AREA TO STEEP SLOPES. INLET CAPACITY WILL BE DECREASED WITH THIS METHOD AND THE CONTRACTOR SHALL EXPECT PONDING DURING HIGH FLOW EVENTS.

INLET PROTECTION ② CATCH BASIN W/ SILTATION SACK

NOT TO SCALE



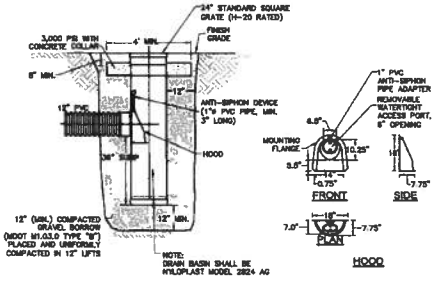
PERSPECTIVE VIEW

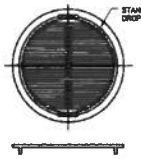


SECTION

PERIMETER PROTECTION BARRIER SILT FENCE DETAIL WITH WATTLES

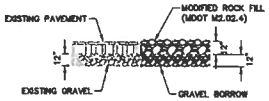
NOT TO SCALE





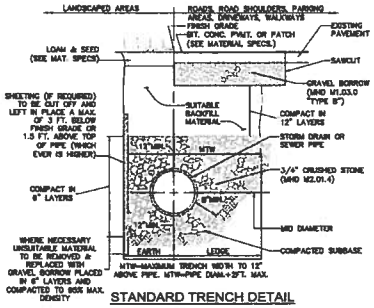
24" IN LAWN AREA DRAIN WITH SUMP AND HOOD

NOT TO SCALE



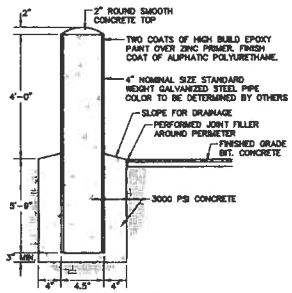
MODIFIED STONE FOR BIORETENTION DETAIL

NOT TO SCALE



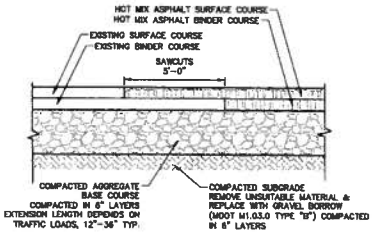
STANDARD TRENCH DETAIL FOR UTILITY PIPE

NOT TO SCALE



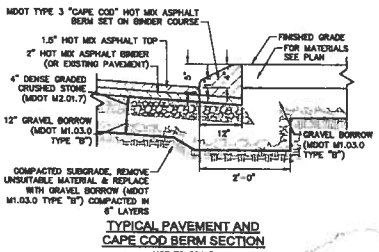
BOLLARD DETAIL

NOT TO SCALE



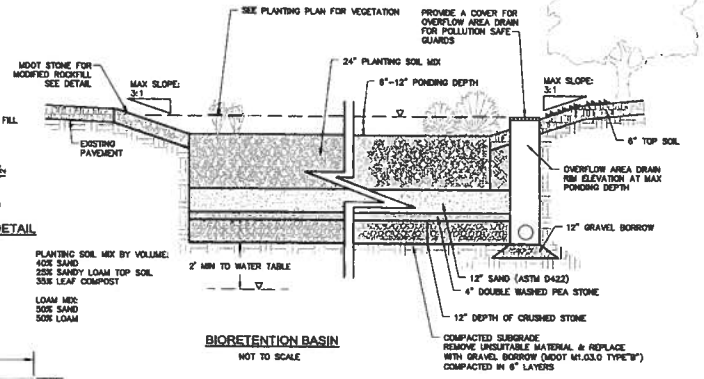
PAVEMENT MATCHING DETAIL

NOT TO SCALE



TYPICAL PAVEMENT AND CAPE COD BERM SECTION

NOT TO SCALE

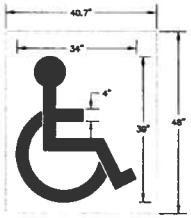


PLANTING SOIL MIX BY VOLUME:
40% SAND
25% SANDY LOAM TOP SOIL
35% LEAF COMPOST

LOAM MIX:
50% SAND
50% LOAM

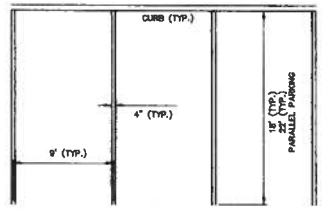
BIORETENTION BASIN

NOT TO SCALE



ACCESSIBLE PARKING STENCIL DETAIL

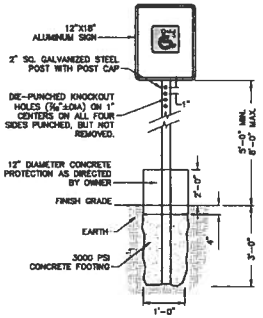
NOT TO SCALE



NOTE: STRIPING SHALL BE INSTALLED PER SPECIFICATIONS

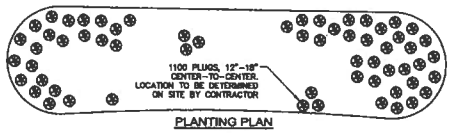
TYPICAL PARKING STRIPING DETAIL

NOT TO SCALE



HANDICAPPED PARKING SIGNAGE DETAIL

NOT TO SCALE



PLANTING PLAN

NOT TO SCALE

PERENNIALS, GRASSES, AND GROUNDCOVERS - RAIN GARDENS					
CV	300	PLUGS	CAREX VULPINOIDEA (FOX SEDGE)	1'-3'/1'-2'	SEDGE; GROWS IN FULL SUN TO PART SHADE
EP	100	PLUGS	ECHINACEA PURPUREA (PURPLE CONEFLOWER)	2'-3'/2'	PERENNIAL WITH PURPLE BLOOMS JUNE-AUGUST; GROWS IN FULL SUN TO PART SHADE
ED	100	PLUGS	EUPATORIUM DUBIUM (DWARF JOE PYE WEED)	3'-4'/2'-3'	PERENNIAL WITH PURPLE BLOOMS JULY-SEPTEMBER; GROWS IN FULL SUN TO PART SHADE
LC	100	PLUGS	LOBELIA CARDINALIS (CARDINAL FLOWER)	2'-4'/1'-2'	PERENNIAL WITH RED BLOOMS JULY-SEPT.; GROWS IN FULL SUN TO PART SHADE
RT	100	PLUGS	RUDBECKIA TRILOBA (BRAINBREED SUSAN)	2'-5'/1'	PERENNIAL WITH YELLOW BLOOMS JUNE-SEPT.; GROWS IN FULL SUN TO PART SHADE
SS	100	PLUGS	SCHIZACHYRIUM SCOPARIUM (LITTLE BLUESTEM)	2'-4'/1.5'-2'	A WARM SEASON ORNAMENTAL GRASS WITH FLUFFY SEED HEADS IN SUMMER AND RED FALL FOLIAGE; GROWS IN FULL SUN
SSG	100	PLUGS	SOLIDAGO SEMPERVIRENS (SEASIDE GOLDENROD)	3'-4'/1.5'	PERENNIAL WITH YELLOW FLOWERS AUG.-SEPT.

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DETAILS
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PREPARED FOR:
CONCORD PUBLIC SCHOOLS
120 MERIAM ROAD CONCORD, MA 01742

COMMONWEALTH OF MASSACHUSETTS
STEVEN VENTRESCA
CIVIL
No. 46572
REGISTERED PROFESSIONAL ENGINEER

REV.	COMMENTS REVISIONS	DATE
2	TOWN'S COMMENTS	09/26/14
1	TOWN'S COMMENTS	08/6/14

NITSCH PROJECT #	10079
FILE:	10079CL0.DWG
SCALE:	NTS
DATE:	07/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

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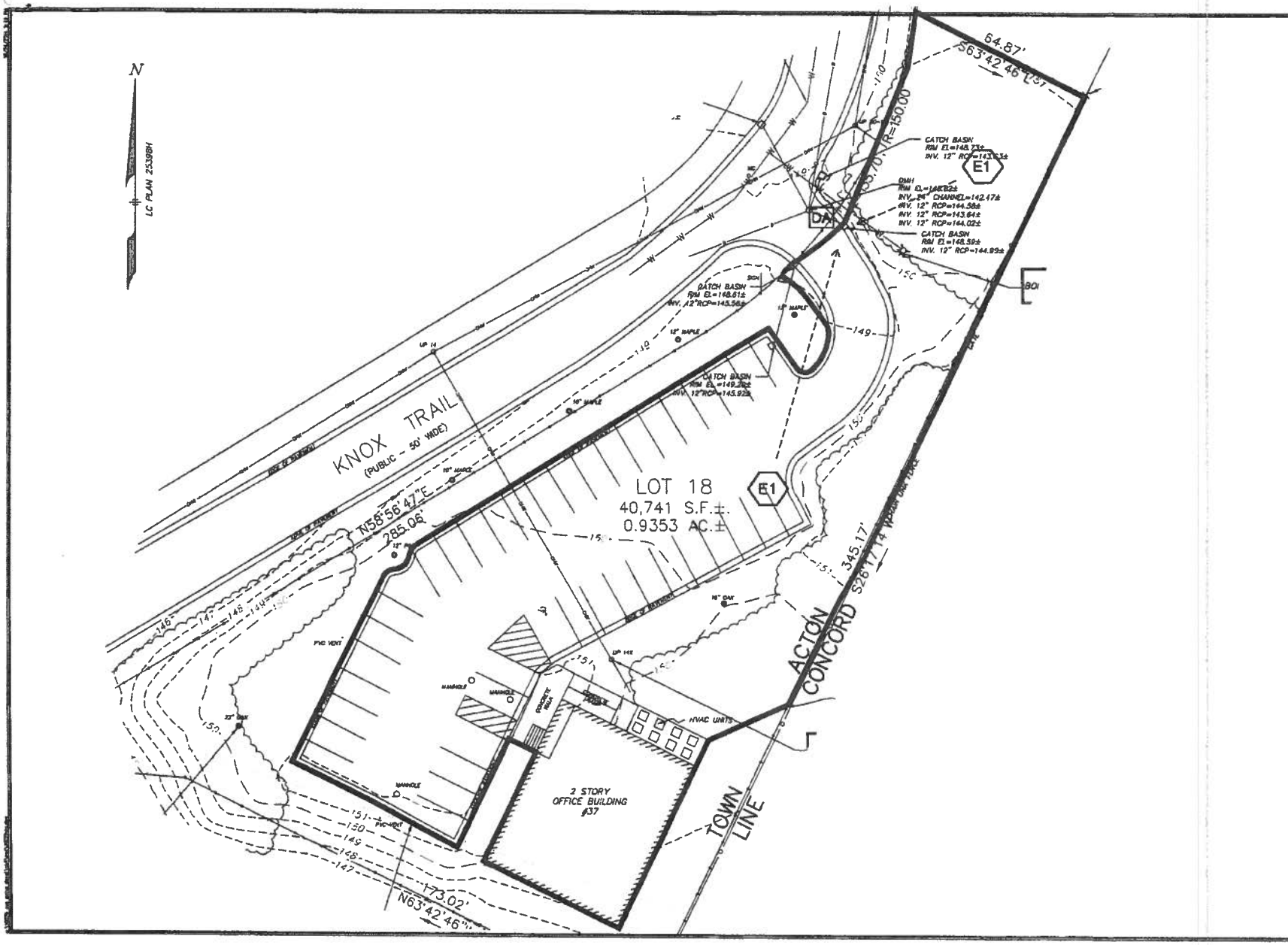

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EXISTING DRAINAGE AREAS

37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:

CONCORD PUBLIC SCHOOLS

120 MERIAM ROAD CONCORD, MA 01742

REV	COMMENTS	DATE
2	TOWN'S COMMENTS	[illegible]
1	TOWN'S COMMENTS	[illegible]

REVISIONS

NITSCH PROJECT #	[illegible]
FILE	[illegible]
SCALE	NTS
DATE	[illegible]
PROJECT MANAGER:	SV
SURVEYOR	
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EX

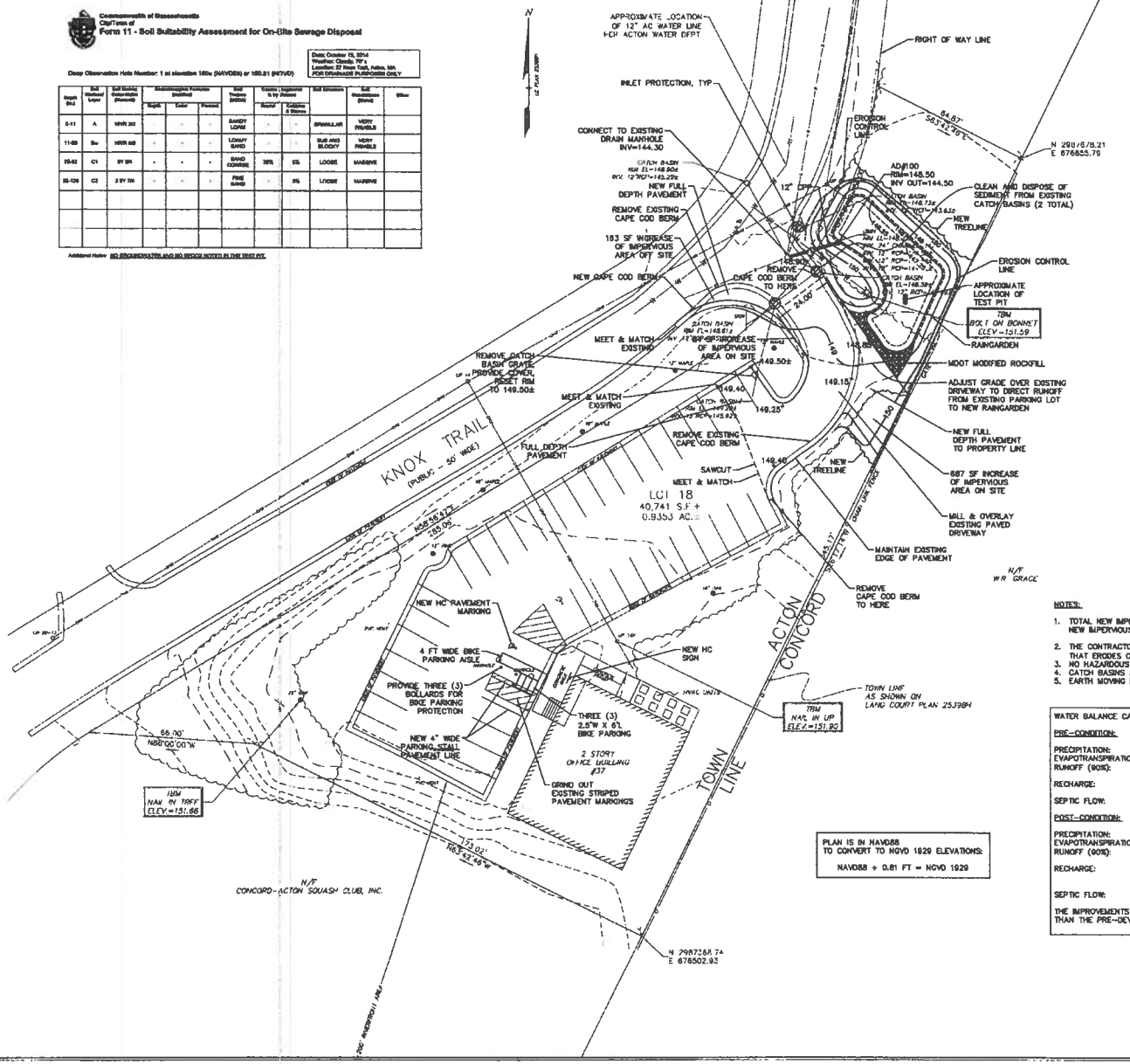
Commonwealth of Massachusetts
City/Town of
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Date: October 15, 2014
Weather: Cloudy, 70's
Location: 37 Knox Trail, Acton, MA
FOR DRAINAGE PURPOSES ONLY

Deep Observation Hole Number: 1 at elevation 160± (NAVD88) or 160.81 (NGVD)

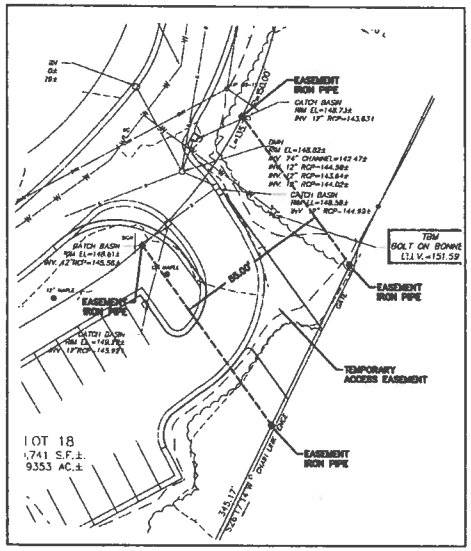
Depth (in.)	Soil Horizon/ Layer	Soil Matrix Color-Moist (Munsell)	Mottlingcolor Abundance (Munsell)			Soil Texture (USDA)	Coarse Fragments by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-11	A	10YR 2/2	-	-	-	SANDY LOAM	-	-	GRANULAR	VERY FRIABLE	
11-60	Bw	10YR 5/6	-	-	-	LOAMY SAND	-	-	SUB AND BLOCKY	VERY FRIABLE	
60-82	C1	2Y 5/4	-	-	-	SAND CORSE	30%	5%	LOOSE	MASSIVE	
82-126	C2	2.5Y 7/4	-	-	-	FINE SAND	-	5%	LOOSE	MASSIVE	

Additional Notes: NO EROUSIONWATER AND NO REDOX NOTED IN THE TEST PIT.



PLAN IS IN NAVD88
TO CONVERT TO NGVD 1929 ELEVATIONS:

NAVD88 + 0.81 FT = NGVD 1929



EASEMENT LAYOUT

NOTES:

1. TOTAL NEW IMPERVIOUS PROPOSED AT 37 KNOX TRAIL 687 SF + 84 SF = 771± SF NEW IMPERVIOUS
   NEW IMPERVIOUS OUTSIDE 37 KNOX TRAIL 183 SF → TOTAL NEW IMPERVIOUS AREA: 934 SF
2. THE CONTRACTOR IS RESPONSIBLE TO PROPERLY CLEAN AND DISPOSE OF ANY SAND, DIRT OR DEBRIS THAT ERODES OFF THE SITE ONTO KNOX TRAIL OR PRIVATE/ABUTTING PROPERTY.
3. NO HAZARDOUS FILL MATERIAL IS ALLOWED ON THE SITE.
4. CATCH BASINS AND RAINGARDEN SHALL BE MAINTAINED ANNUALLY PER DEP STANDARDS.
5. EARTH MOVING IS RESTRICTED FROM THE SITE BETWEEN THE HOURS OF 9 AM AND 4 PM.

WATER BALANCE CALCULATIONS

PRE-CONDITION:

PRECIPITATION:	43.78 INCHES PER YEAR
EVAPOTRANSPIRATION:	50.13 INCHES PER YEAR
RUNOFF (90%):	0 INCHES PER YEAR FOR STORM EVENTS OF 1.25 INCHES OR LESS THIS IS 90% OF ALL STORMS OVER A YEAR
RECHARGE:	STORM EVENTS OF 1.25 INCHES OR SMALLER IN LANDSCAPED AREAS REMAIN ON THE SITE.
SEPTIC FLOW:	0 INCHES AS BUILDING IS NOT BEING USED

POST-CONDITION:

PRECIPITATION:	43.78 INCHES PER YEAR
EVAPOTRANSPIRATION:	50.13 INCHES PER YEAR
RUNOFF (90%):	0 INCHES PER YEAR FOR STORM EVENTS OF 1.25 INCHES OR LESS THIS IS 90% OF ALL STORMS OVER A YEAR
RECHARGE:	STORM EVENTS OF 1.25 INCHES OR SMALLER IN LANDSCAPED AREAS ARE RECHARGED ON THE SITE. RUNOFF FROM PROPOSED WORK IS RECHARGED BY THE RAIN GARDEN UP TO THE 10-YEAR STORM EVENT (1,040± S.F.)
SEPTIC FLOW:	0 INCHES AS BUILDING IS NOT BEING USED

THE IMPROVEMENTS TO THE STORMWATER SYSTEM WILL PROVIDE MORE RECHARGE IN THE POST-DEVELOPMENT CONDITION THAN THE PRE-DEVELOPMENT CONDITION.

SCALE:
1" = 20'
20 10 0 20 40

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SITE PLAN
37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:
CONCORD PUBLIC SCHOOLS
120 MERIAM ROAD CONCORD, MA 01742

COMMONWEALTH OF MASSACHUSETTS
STEVEN VENTRESCA
CIVIL
No. 49572
10/15/2014

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	10/21/14
1	TOWN'S COMMENTS	10/16/14

REVISIONS

NITSCH PROJECT #	10079
FILE:	10079CL0.DWG
SCALE:	1" = 20'
DATE:	07/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

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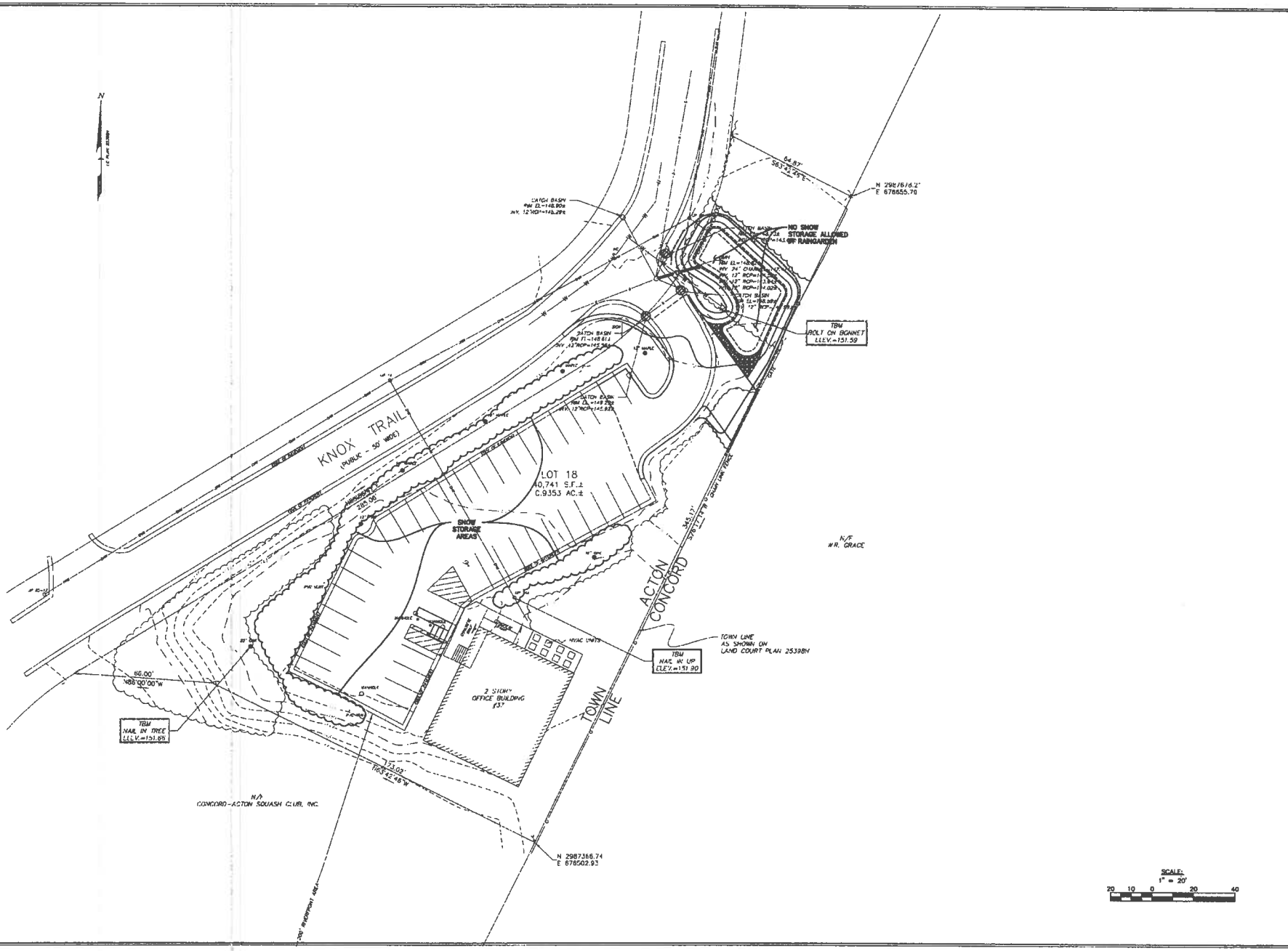

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SNOW STORAGE

37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:

CONCORD PUBLIC SCHOOLS

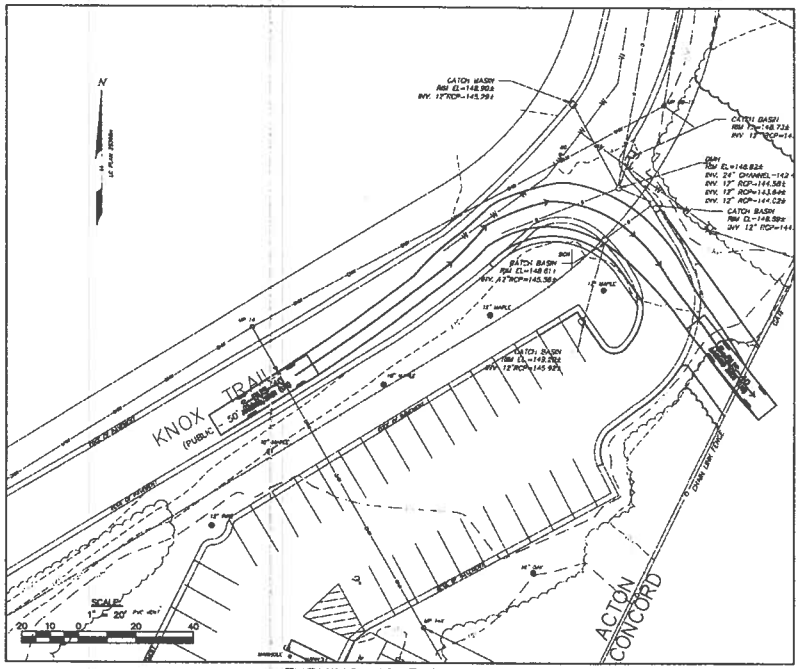
120 MERIAM ROAD CONCORD, MA 01742

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	08/31/16
1	TOWN'S COMMENTS	08/16/16

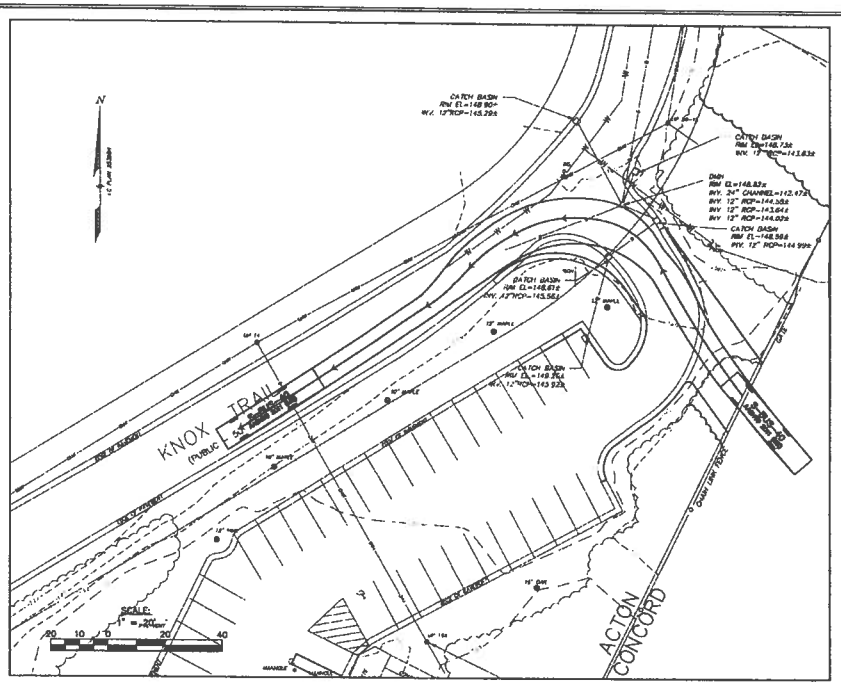
REVISIONS

NITSCH PROJECT #	10079
FILE:	10079CL0.DWG
SCALE:	1" = 20'
DATE:	07/03/2016
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

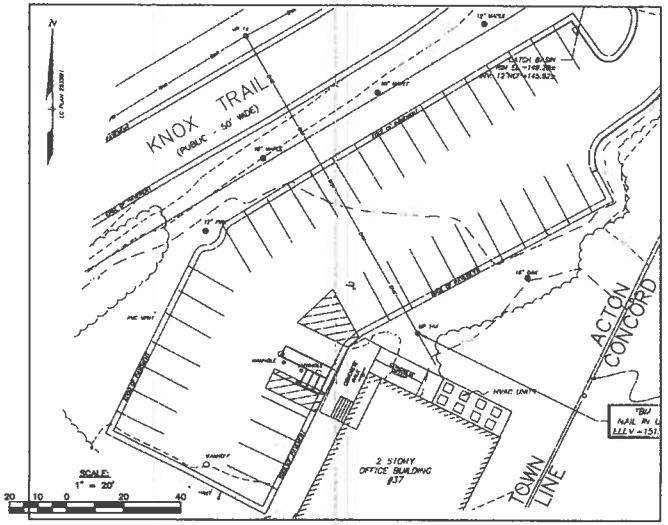
C4.0



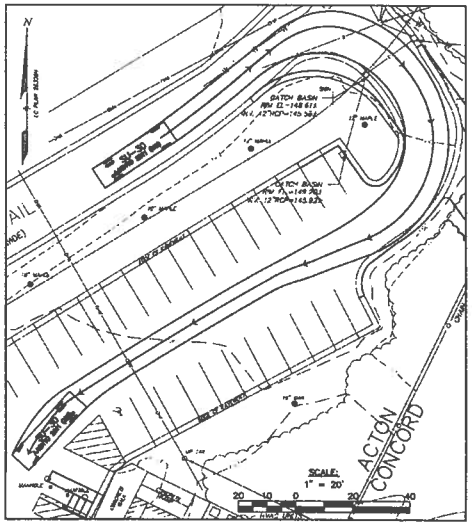
TURNING MOVEMENT IN



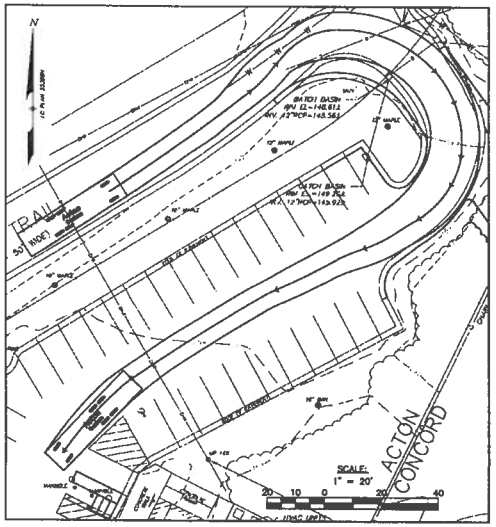
TURNING MOVEMENT OUT



EXISTING PARKING TO REMAIN



W/SU-30 VEHICLE



LADDER TRUCK (FIRE)

BASED ON INFORMATION PROVIDED BY THE ACTON FIRE DEPARTMENT ON OCTOBER 15, 2014

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TURNING MOVEMENTS

37 KNOX TRAIL ACTON, MA 01720

PREPARED FOR:

CONCORD PUBLIC SCHOOLS

120 MERIAM ROAD CONCORD, MA 01742

COMMONWEALTH OF MASSACHUSETTS
STEVEN VENTRESCA
CIVIL
No. 49072
10/24/14

REV.	COMMENTS	DATE
2	TOWN'S COMMENTS	6/25/14
1	TOWN'S COMMENTS	10/24/14

REVISIONS

NITSCH PROJECT #	K0079
FILE:	K0079CLO.DWG
SCALE:	1" = 20'
DATE:	01/03/2014
PROJECT MANAGER:	SV
SURVEYOR:	
DRAFTED BY:	NGG
CHECKED BY:	SV

C2.0