DEFINITIVE SUBDIVISION APPLICATION

FOR

Ford's Hill Estates
8 Lot Definitive Subdivision

AT

Nixon Road
Framingham, MA

February 12, 2013

OWNER:
Nexum Development Corp.
6 Central Street
Framingham, MA 01701

APPLICANT:
Paul Croft
23 Mill Street
Natick, MA

PREPARED BY:
Connorstone Engineering, Inc.
10 Southwest Cutoff, Suite 7
Northborough, MA 01532
Ph: (508) 393-9727 F: (508) 393-5242

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APPLICATION #: DEFSUB_____

FRAMINGHAM PLANNING BOARD

APPLICATION FOR APPROVAL
DEFINITIVE PLAN

☞INSTRUCTIONS TO OWNER/APPLICANT☜

Please complete this ***entire*** form, including the checklist on page 4 of this form, and submit the original to the Planning Board. The application ***must*** be accompanied by the following:

- Eighteen (18) copies of the application together with one original mylar, ten (10) full size copies of the subdivision plan, and eight (8) halfsize, legible sets of the subdivision plans (with a bar scale) and eighteen (18) copies of all supporting documents accompany the application.
- The Treasurer's Certification that no municipal charges are outstanding (see page 3 of this form).
- A Statement of Communication with residents in the vicinity of the subject property.
- Certification herein, that a Community Notice has been posted on the subject property.
- Designers Certificates – Form 4
- A Certified List of the Abutters - Form 5
- Full payment of Application Fee

When ***all*** information is submitted and deemed complete, the application will be date and time stamped by the Planning Board. Incomplete applications will ***not*** be accepted by the Planning Board. All material must be submitted in electronic version as well as hard copies.

After the application is date/time stamped by the Planning Board, the applicant shall be responsible to file one copy of the application with the Office of the Town Clerk in accordance with the requirements of Section 41 of the Massachusetts General Laws.

Where appropriate, separate paragraphs are used below to indicate alternate provisions. Please select and complete the pertinent paragraph(s). Please read Section VI of the "RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND IN THE TOWN OF FRAMINGHAM" and the attached description of the review process before filing this form.

You or your duly authorized agent will be expected to appear before the Planning Board to answer any questions and/or submit such additional information as the Board may request in connection with this application. You are encouraged to attend the Planning Board meeting that will be scheduled to consider your application and your absence may result in a delay in its review or its disapproval.

Date of Application: February 12, 2013

Owner of Record Title's Name: Nexum Development Corp

Owner/Applicant's Address: 6 Central St, Framingham, MA 01701 Phone Number: _____
(Number and Street, Town or City, State, Zip Code)

Co-Applicant's Name: Paul Croft

Co-Applicant's Address: 23 Mill Street, Natick, MA 01760 Phone Number: 617 694 5645
(Number and Street, Town or City, State, Zip Code)

Project Contact's Name: George Connors, Connorstone Engineering Inc.

Project Contact's Address: 10 S.W. Cutoff, Suite 7, Northborough, MA 01532
(Number and Street, Town or City, State, Zip Code)

Project Contact's Phone Number: 508 393 9727 Project Contact's Fax Number: 508 393 5242

The undersigned applicant being the owner, agent, or representative of the owner of all the land included within a proposed subdivision shown on a plan **entitled** Definitive Plan of Ford's Hill Estates in Framingham, Mass. **prepared by** Connorstone Engineering Inc. and **dated** Jan. 3, 2013, located at (**address**) 45, 43B Nixon Road and shown on Framingham Assessor's Plan Sheet # 421, Block # 1, Lot(s) # 3A and Framingham Assessor's Plan Sheet # 421, Block # 1, Lot(s) # 3B, with number of lots proposed 8 on total acreage of tract (acres/sq.ft.) 21.85 acres,

hereby submits said plan as a Definitive Subdivision Plan in accordance with the Rules and Regulations of the Framingham Planning Board and makes application to the Board for approval of said plan.

The **Owner's title to the land** being subdivided is derived under deed from 1) First Financial Trust, N.A. (#45), 11/14/2000 2) Terrian, LLC (#43B), 5/1/2003, by deed dated see above and recorded in the Middlesex District Registry of Deeds Book #___, Page #___, or under Certificate of Title #_____ registered in the Middlesex Land Registry District, Book#_____, Page#_____. 1) Bk. 1220, Pg 18, 2) Bk. 1267, Pg. 160

Precinct # 1 Current zoning of property: Residence R-4

Current use of property: #45 - residential use, #43B - vacant

Number of Lots Existing: 2 Proposed: 8

Zoning and use of surrounding properties:

	ZONING DESIGNATION	LAND USE
Parcel(s) to the North⇧:	R-4	Residential Use
Parcel(s) to the South⇩:	R-4	Vacant Land
Parcel(s) to the East⇨:	R-4	Vacant Land
Parcel(s) to the West⇦:	R-4	Residential Use

Brief Description of project (e.g.: proposed use of property, number of lots being created, significant features and current condition of the site, attach additional pages as necessary):

The project proposes a 500' cul-de-sac road with 8 residential lots for single family dwellings. The site is primarily wooded. There is an existing dwelling at #45 Nixon, and #43B Nixon is a vacant lot. The land is registered under the land court.

1. ☐Yes ☒No The land within the proposed subdivision is subject to easements and restrictions. If yes, attach documentation and show such easements and restrictions on the Plan, as applicable.

2. ☐Yes ☒No There are easement restrictions over the land of others applicable to the proposed subdivision. If yes, attach documentation and show such easements and restrictions on the Plan, as applicable.

3. ☐Yes ☒No Structures (walls, fences, guardrails, etc.), significant topographical features (wetlands, slopes, ledge, etc.), easements or other conditions are present that could limit or impede access to the proposed subdivision or to individual lots within the subdivision. If yes, please explain.

4. ☐Yes ☒No The owner/co-applicant(s) request waivers for the proposed subdivision. If yes, the waivers requested are listed herein with a justification for each waiver requested.

5. ☐Yes ☒No The owner/co-applicant(s) certify that **no waivers** are being requested for completion of the subdivision.

6. ☒Yes ☐No This Plan **has** been submitted to the Framingham Board of Health. If yes please identify the date of submission. _____. If no, please file two copies of said plan

7. Check as appropriate

a. ☐Yes ☒No A preliminary plan of the proposed subdivision, to which the accompanying plan conforms, has been submitted and was approved by the Planning Board on _____.

b. ☐Yes ☒No A preliminary plan of the proposed subdivision has been submitted and was approved by the Planning Board on _____ with modifications, which modifications have been incorporated in the accompanying plan.

c. ☐Yes ☒No A preliminary plan of the proposed subdivision has not been submitted to the Planning Board.

8. ☐Yes ☐No List all other required permits (local, state and federal) already in hand, or which will be in hand prior to final occupancy and necessary for construction (i.e. NPDES, Conservation Commission,

Board of Health, Public Works, Board of Selectmen, etc.). (1) Notice of Intent – Conservation Commission; (2) Disposal System Construction Permit – B.O.H; (3) Well Construction Permit – B.O.H.; (4) Building Permits – Building Department; (5) NPDES Notice of Intent under General Permit – U.S. EPA.

9. ☒Yes ☐No A Community Notice (min. 2ft. by 2ft.), specifying plans for the property has been posted, as required.

10. ☒Yes ☐No A statement regarding the extent of communications.with residents of the area about the proposed development is included with this application.

11. ☒Yes ☐No The lot is on a Scenic Road? [A list of scenic roads is available in the Planning Board Office]

12. ☒Yes ☐No The project involves alteration or demolition of buildings which are at least 50 years old? If yes, the applicant must obtain a determination of historical or architectural significance from the Framingham Historical Commission in conformance with §17A of Article V. of the Town of Framingham's By-Laws (*See Appendix IX of the Zoning By-Law*).

13. ☐Yes ☒No The lot is located in an Historic District? (*See Article V. §5 of the Town of Framingham's By-Laws and Appendix IX of the Zoning By-Law*)

14. The applicant agrees, if the definitive plan is approved, to perform and complete all work on the ground within the proposed subdivision required by the "RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND IN THE TOWN OF FRAMINGHAM" as in force on the date of this application (or if applicable on the date of an application of a Preliminary Plan) and as modified and supplemented by the specifications and other requirements of the Board set forth in the statements attached hereto.

15. The applicant further agrees to complete all said required work on the ground within two years from the date of the final endorsement of the definitive plan by the Board, unless an application is filed with and approved by the Board extending such time.

16. The applicant further agrees, if the definitive plan is approved, to cause said plan to be endorsed within six (6) months thereafter and to cause said plan to be recorded or registered in the Middlesex South District Registry of Deeds within thirty (30) days after the endorsement and return of said plan to the applicant by the Board, and agrees not to sell, or offer to sell, any of the lots within the subdivision until said plan is so recorded or registered.

17. The applicant further agrees, if the definitive plan is approved, to convey to the Town, promptly, at any time thereafter when requested to do so by the Board, in a form deemed satisfactory by the Board, title to water mains and sewers and the prescribed easements therefor.

18.a. The applicant further agrees, before final approval of the definitive plan, to cause to be filed with the Board a bank passbook solely in the name of the Town, negotiable securities or a bond, in a form deemed satisfactory by the Board, or a deposit of money, conditioned on the completion of all required work on the ground in the time and manner prescribed, in a penal sum sufficient, in the opinion of the Board, to cover the cost of such work. A bond form of security shall be executed by the applicant as principal and an indemnity or surety company authorized to do business in the Commonwealth and satisfactory to the Board as surety, or secured by the deposit with the Town Treasurer of cash or United States Government Bonds in an amount equal to the penal sum of the bond. A bank passbook shall be accompanied by an Agreement in a form to be provided by the Board and executed by the Board, the developer and the bank in which the account is established.

OR

18.b. The applicant requests the Board to approve the definitive plan on condition that no lot in the subdivision shall be sold and no building shall be erected or placed on any lot until the required work on the ground necessary to serve such lot adequately has been completed to the satisfaction of the Board.

19. This application is accompanied by an original drawing of the proposed definitive plan in accordance with the requirements of the "RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND IN THE TOWN OF FRAMINGHAM", designer's certificates and approved cost estimates of all work to be covered by a bond, or bank passbook.

Application Checklist

The following plans, reports and information must be submitted with this application form, in accordance with "RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND IN THE TOWN OF FRAMINGHAM", Section VI. Definitive Plan. Please complete the following checklist☑ to ensure completeness.

☒ Title Block, Lower Right Corner	☒ Subdivision Name and "Definitive Plan" Title	☒ Subdivision Boundaries
☒ Index Sheet	☒ North Point and Scale	☒ Date
☒ Legend of Symbols	☒ Benchmark and Datum	☒ Zoning Classification
☒ Name(s) and address(es) of Owner(s), Applicant(s)	☒ Surveyor's Seal, Name, Address, Signature	☒ Engineer's Name, Address, Signature, Seal
☒ Assessor's Map-Block-Lot(s)	☒ Names of abutters	☒ Halfsize Prints of Plans
☒ Existing and proposed Streets, Ways and Easements	☒ Existing and proposed public or common areas	☒ Consistent space to record Board action on all sheets
☒ Ownership, condition and status of Existing Streets	☒ Street Classification of Proposed Streets	☒ Existing and proposed Lot Boundaries and Dimensions
☒ Front and side setback lines for each lot	☒ Proposed building foot-print and driveways	☒ Location, bearing and length of streets, ways, lots, boundaries
☒ Numerical designation and area of all lots and divisions	☒ Location of all existing and proposed permanent monuments	☒ Location, materials, type of sidewalks, curbs, street signs, lighting and trees
☒ Existing Topography	☒ Proposed Topography	☒ Street Profiles with Note
☒ Storm Drainage Systems, Plans, Elevations	☒ Stormwater Management Documentation	☒ Existing and Proposed Municipal Services/Easements
☒ Hydrological Calculations	☒ Septic & Well Locations	☒ Utility Wiring Plan
☐ Sewerage and Water (1) Distribution Systems	☒ Easements, covenants, restrictions on Land	☐ Decisions on appeal, or (3) applicable variances
☐ Sewer Profiles (1)	☒ Major Site Features	☒ Wetland delineation and upland area calcs. for proposed lots
☐ Off-Site Surface Water (2) Discharge & Written Evidence of Acceptance	☒ A close traverse of the whole subdivision and every street therein	☒ Notation of property confirmed by Mass. Land Court with case numbers, as applicable
☒ Construction Access Routes and hours of operation	☒ Construction details for erosion control measures	☒ Preliminary OSRD Subdivision Plan
☒ Complete Impact Statement	☒ Locus Plan	☒ Evidence of Other Permits
☒ Designers' Certificates	☒ Certified List of Abutters **(Request Form)**	☐ Approval Agreement (4)

Provide an explanation for any information which has not been checked above as included in the application: _____

(1) Municipal Water & Sewer not proposed. (2) The plan does not require a new point discharge directly to an abutter.

(3) There are no pending appeals. (4) Covenant agreement to be provided under separate cover by Applicant.

The Planning Board is entitled to rely on this representation as being the full and complete statement of the owner(s) and applicant. Therefore, the undersigned certifies that the information provided on the plan and this application is a true and accurate representation of facts pertinent to the subject parcel of land.

Signature(s) of Owner(s) (Applicant)

Signature of Co-Applicant

☞The Definitive Plan Review Fee: See Attached Schedule of Fees☜

🔔 NOTE: You will be billed for publication of required public notices.

☞NOTE: In accordance with Article IX of the By-Laws of the Town of Framingham, the Planning Board may withhold permits and approvals in the event that an applicant has neglected to pay local taxes, fees, assessments or other municipal charges. In order to satisfy the objective of this By-Law, please obtain the Town Treasurer's signature below to verify that no such outstanding charges have accrued relative to this application. This application will not be accepted without the following confirmation:

The signature below confirms that the applicant/owner has paid all local taxes, fees, assessments or other municipal charges and has no outstanding obligations due the Town of Framingham.

TOWN TREASURER

DATE OF SIGNATURE

TO BE COMPLETED BY THE FRAMINGHAM PLANNING BOARD

Date application received: _____

Filing Fee of: _____ Paid: _____

Scheduled Hearing Date: _____ Date hearing notice Distributed to Abutters _____

Received by: _____

13.2.3 Schedule of Administrative Fees. The following schedule applies to the types of applications to the Planning Board set forth below. This schedule supersedes all previous schedules as they may have appeared in the Zoning By-Laws, the Rules and Regulations for the Subdivision of Land, and any listings which may have been compiled from time to time for the benefit of applicants.

A. Approval Not Required (ANR) Plans - $200.00.

B. Preliminary Plans - $1000.00.

C. Definitive Plans - $1,500.00, plus $300.00 for each acre;
or $750.00, plus $300.00 for each acre, when a preliminary plan has been filed within the last seven months and the Preliminary Plan fee associated with such filing, as set forth above, was received by the Board.

D. Amend or Modify an Approved Definitive Plan (81W) **or a previously submitted Definitive Plan** - $200.00 plus $100.00 for each building lot affected. In addition, a fee of $50.00 shall be required for the consideration of a modification of a road and a fee of $50.00 shall be required for the modification of a drainage structure. The total fee required shall be the addition of all fees outlined above.

E. Application to Modify A Scenic Way - $250.00.

F. Site Plan Review - Review of Site Plans shall require the following application fees:

1. Major Site Plan - $2,000.00. plus $0.06 per square foot of gross floor area.
2. Minor Site Plan (IV.I.2.a)- $1,000.00. plus $0.03 per square foot of gross floor area.
3. Site Plan Modification - $1,000.00. plus $0.03 per square foot of **new** gross floor area.

G. Special Permits shall require the following application fees, which are in addition to any applicable fees set forth above:

1. Special Permits, including Special Permits for Use, Dimensional Special Permits and Special Permits related to Parking - $500.00 for a single Special Permit application or a first Special Permit application and $200.00 for each concurrent Special Permit application, whether concurrent with a first Special Permit or concurrent with a Site Plan Review application.
2. Modification or extension of Special Permit - $200.00
3. Special Permit for PUD - $5,000.00 + $15.00/unit at Prelim.
   plus - $35.00/unit at Definitive Submittal

H. Repetitive Petition - $200.00.

I. Public Way Access Permit - $200.00

J. Application to Modify Zoning District. - $500.00

K. Application for a Sign Waiver - $250.00

Consultant Review Fees and Procedures

(1) Applicability. The Planning Board, at its sole discretion, may determine that a proposed project's size, scale, complexity, potential impact or use of the land warrants the use of outside consultants (such as engineers, planners, lawyers, hydrogeologists, or others). Such consultants shall assist the Planning Board, for review and comment prior to action by the Planning Board in plan review, impact analysis, inspection or other technical or legal assistance necessary to ensure compliance with all relevant laws and regulations. Such assistance may include, but shall not be limited to, analyzing an application, providing legal counsel for decisions and covenants, and monitoring or inspecting a project or site during construction or post-construction for compliance with the Board's decisions or regulations. Such consultants shall be selected and retained by the Planning Board, with the actual and reasonable costs for their services to be paid by the applicant.

(2) Submittal. Consultant Review Fees shall be submitted upon receipt of notice of estimated consultant review cost (based upon a fee schedule of estimated consultant costs) for deposit in an account established pursuant to Chapter 593 of the Acts of 1989, M.G.L. c. 44, s. 53G (593 Account). Any application filed without this fee shall be deemed incomplete and no review work shall commence until the fee has been paid in full.

(3) Those projects which are deemed by the Planning Board to require review by outside consultants shall be delivered to the selected consultant or consultants, who shall submit a cost for the requested consultant services to the Planning Board. To the extent possible, the Board shall select consultants that are not working for an applicant currently before the Planning Board.

(4) Replenishment. When the balance in an applicant's 593 Account falls below twenty-five percent (25%) of the initial Consultant Review Fee, as imposed above, the Planning Board may require a supplemental Consultant Review Fee to cover the cost of the remaining project review.

(5) Monitoring and Inspection Phase. As a condition of approval of a Definitive Plan or a Special Permit, the Planning Board may require a Supplemental Consultant Review Fee for the purpose of ensuring the availability of funds during the inspection phase of the review process.

(6) Handling of Consultant Review Fees. The Consultant Review Fee is to be deposited into a special account (593 Account) as set forth in G.L. c. 44, s. 53G.

a) Outside consultants retained by the Planning Board to assist in the review of an application shall be paid from this account.

b) Consultant Review Fees shall be turned over to the Town Treasurer by the Planning Board for deposit into a 593 Account.

c) A copy of the latest statement from the banking institution handling the 593 Account shall be forwarded from the office of the Town Treasurer to the Planning Board Office as soon as it is received for timely and accurate accounting.

d) The Town Treasurer shall prepare a report on activity in the 593 Account on an annual basis. This report shall be submitted to the Board of Selectmen and the Town Manager for their review. The final report on the 593 Account shall be printed in the Annual Report of the Town of Framingham.

e) An accounting of an applicant's funds held in the 593 Account may be requested by the applicant. The Planning Board Office, through the Town Treasurer, shall respond to the request in a timely fashion.

(f) Excess consultant review fees in the 593 Account, including any accumulated interest, shall be returned to the applicant, or the applicant's documented successor in interest, at the conclusion of the review process as determined by the Planning Board.

(7) Selection Appeal. The applicant shall be notified of the consultant selection prior to initiation of consultant efforts. As provided in M.G.L. Chapter 44, § 53G, the applicant may administratively appeal the selection of the consultant to the Framingham Board of Selectmen, on grounds that the proposed consultant selected has a conflict

of interest or that the proposed consultant does not possess the minimum required qualifications of an educational degree or three (3) or more years of practice in, or closely related to, the field at issue. Such an appeal may be initiated by the applicant filing notice with the Town Clerk within seven (7) calendar days of notice of the selection. The consultant selection made by the Planning Board shall stand if one (1) month passes without decision by the Board of Selectmen on said appeal. The required time limits for action upon an application by the Planning Board shall be extended by duration of the administrative appeal. This appeal shall not preclude further judicial review, if otherwise permitted by law, on the grounds provided for in this section.

(8) Remedy. Failure of an applicant to pay the consultant review fee determined by the Planning Board, or to replenish the special account when requested, may be grounds for disapproval.

Definitive Plan Submission

Step 1. Definitive Application submitted to Planning Board. Twelve (12) sets (original plus eleven copies) of all application materials be provided by the applicant. The contents of the Definitive Application are described in Section VI. C. of the Town's Subdivision Rules and Regulations. Application must include signature of owner(s) and be accompanied by a certified list of abutters.

Step 2. Applicant submits Application to Board of Health.

Step 3. Applicant pays remaining 50% of fee when the definitive application is submitted

Step 4. Application submitted to Town Treasurer for confirmation of payment of taxes, fees, assessments and other municipal charges.

Step 5. Plans and Applications are time stamped.

Step 6. Prepare distribution cover letter, schedule Planning Board's Public Hearing to occur no later than 90 days from date of the submission of the application, or 135 days for the date of submission where no preliminary plan has been submitted and acted upon.

Step 7. Three weeks prior to date of the Planning Board's Public Hearing send hearing advertisement to the local newspaper (Tab or Middlesex News) to be published two times, 14 and 7 days prior to the Public Hearing (*Cover letter and hearing notice format attached*). Notice of Hearing must be posted in Town Clerk's Office and Planning Board's Bulletin Board. Notice of hearings is distributed to abutters and affected Precinct members.

Step 8. Departments submit review letters within 35 days to Planning Board, copies of all letters are provided to the applicant.

Step 9. A staff meeting is conducted.

Step 10. If necessary applicant submits technical revisions to the Planning Board based on staff comments.

Step 11. Revised plans are re-distributed to all Departments to enable modification of staff review letters.

Step 12. Planning Board holds Public Hearing, renders decision.

Step 13. Immediately following the Public Hearing send notice of the amount due for the publication of legal notices to the applicant for payment.

Step 14. If plan is approved, a draft decision and covenant contract is submitted to the Planning Board review, approval and signature.

Step 15. Approved decision is filed with the Town Clerk.

Step 16. Following appeals period (20 days after date filed with Town Clerk) the Planning Board signs the plans and covenants.

Step 17. Applicant can choose to complete all improvements and then request a release of lots for sale and/or construction or post an improvement security and request such release.

TOWN OF FRAMINGHAM PLANNING BOARD

Designers Certificate

February 12, 2013

(ONE COPY OF THIS FORM, FILLED OUT AND SIGNED BY THE APPLICANT, SHOULD BE SUBMITTED WITH FORM 3.)

2) First Financial Trust, N.A. (#43), 11/14/2000

TO: *The Framingham Planning Board:*

In preparing the plan entitled Definitive Plan of Ford's Hill Estates in Framingham, Mass., and dated January 3, 2013, I hereby certify that the above name definitive subdivision plan and accompanying data is true and correct to the accuracy required by the current ***Subdivision Rules and Regulations*** of the Town of Framingham and required by the Rules of the Massachusetts Registry of Deeds, and my source of information about the location of boundaries shown on said plan were one or more of the following: 1) First Financial Trust, N.A. (#45), 11/14/2000

1. Deed from 2) Terrian, LLC (#43B), 5/1/2003 to Nexum Development Corp. dated see above and recorded in the Middlesex South Registry of Deeds, Book see, Page below. 1) Bk. 1220, Pg 18, 2) Bk. 1267, Pg. 160
2. Actual measures on the ground from a starting point established by On the ground survey performed by Connorstone Engineering Inc.
3. Other deeds, plans, and/or sources, as follows: Plan No. 164 of 1988, Plan No. 1260 of 1986, Plan 1261 of 1986, Plan No. 287 of 2000, Plan No. 423 of 1947, Land Court Plan 2358I, Land Court Plan 42788A, Land Court Plan 2358E, Other misc recorded plans and deeds

Seal of Surveyor

COMMONWEALTH OF MASSACHUSETTS
VAROUJAN H. HAGOPIAN
No. 49665
PROFESSIONAL LAND SURVEYOR

Signed: _____
Massachusetts Registration Number 49665
Name and Address: Varoujan Hagopian, PLS
Connorstone Engineering Inc.
10 S.W. Cutoff, Suite 7, Northborough, MA 01532
Phone Number 508 393 9727

Seal of Professional Engineer

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
CIVIL
No. 47635
REGISTERED PROFESSIONAL ENGINEER

Signed: _____
Massachusetts Registration Number 47635
Name and Address: Vito Colonna, PE
Connorstone Engineering Inc.
10 S.W. Cutoff, Suite 7, Northborough, MA 01532
Phone Number 508 393 9727

NOTE

This form will not be considered submitted until the following endorsement has been completed:

Received this _____ day of _____, 20 _____ as duly submitted under the Subdivision Rules and Regulations.

FRAMINGHAM PLANNING BOARD

by: _____

TOWN OF FRAMINGHAM
TREASURER/COLLECTOR

Please provide our office with the following information:

Date: February 12, 2013

Address of Property Which is the Subject of this Application:

45 & 43B Nixon Road

Property Owner's Name: (As Appears on Assessor's Records)

Nexum Development Corp.

Property Owner's Address: (As Appears on Assessor's Records)

6 Central Street, Framingham, MA

Applicant's Name: (If same as Owner Write: SAME)

Paul Croft

Applicant's Address: (If same as Owner Write: SAME)

23 Mill Street, Natick, MA 01760

Business(s) In Framingham Owned by Property Owner and/or Applicant:

none

Telephone of Property Owner or Applicant:

Name: Paul Croft

Phone Number: 617 694 5645

TOWN OF FRAMINGHAM, MASSACHUSETTS 01702

BOARD OF ASSESSORS
MEMORIAL BUILDING, 150 CONCORD STREET, TEL: (508) 532-5415 FAX: (508) 620-4857

Abutter Request

Please Note

Bring this form to the PLANNING BOARD office to be signed and then submit with the fee to the Assessors Department. The abutter lists are valid for only 90 days from the date completed.

Date: 2/12/13

- Applicant name: Nexum Development Corp
- Applicant address: 6 Central St Framingham MA
- Phone: _____
- Subject property Address: #45 45 & 45B Nixon Road
- Map 42 Block 1 Lot 3A & 3B & 3C
- Radius: 300'
- **Planning Board Authorization Signature:** _____

- **Fee $45.00** to be paid at the Assessing Department
- *Signed under the pains and penalties of perjury*

CONNORSTONE ENGINEERING, INC.
10 SOUTHWEST CUTOFF, SUITE #7
NORTHBOROUGH, MASSACHUSETTS 01532
TEL: (508) 393-9727 • FAX: (508) 393-5242

Framingham Planning Board
150 Concord Street, Room B37
Framingham, MA 01702

January 16, 2013

Subject: **Statement of Communication**

Dear Members of the Board;

In accordance with the Definitive Subdivision submission requirements, Section VI.B, please accept this letter as the required "Statement of Communication" with residents of the area about the proposed development. Discussion and communication regarding the project was offered at the public hearing for the Preliminary Plan. All abutters within 300 feet of the project, as listed on the Certified List of Abutters, were notified prior to the public hearing.

Sincerely,
Connorstone Engineering, Inc.

Vito Colonna, PE
Engineer

Fords Hill Estates, Framingham, MA - Lot Closures

Parcel name: Lot 1

North: 2949995.5341 East : 662733.8652
Line Course: S 43-42-57 E Length: 92.1105
North: 2949928.9589 East : 662797.5211
Line Course: S 75-12-34 E Length: 176.9492
North: 2949883.7861 East : 662968.6072
Line Course: S 86-06-31 E Length: 151.8107
North: 2949873.4835 East : 663120.0679
Line Course: S 66-00-00 E Length: 80.0000
North: 2949840.9445 East : 663193.1515
Line Course: S 54-00-00 W Length: 113.2169
North: 2949774.3973 East : 663101.5571
Line Course: N 89-39-22 W Length: 81.7254
North: 2949774.8878 East : 663019.8332
Line Course: N 77-56-21 W Length: 315.8328
North: 2949840.8811 East : 662710.9720
Line Course: N 51-12-22 W Length: 116.5642
North: 2949913.9110 East : 662620.1213
Line Course: N 54-20-12 E Length: 140.0000
North: 2949995.5340 East : 662733.8652

Perimeter: 1268.2098 Area: 54,120 S.F. 1.24 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0002 Course: S 22-51-19 E
Error North: -0.00015 East : 0.00006
Precision 1: 6,341,048.5000

Parcel name: Lot 2

North: 2950067.5965 East : 662834.2861
Line Course: S 54-39-19 E Length: 180.6635
North: 2949963.0837 East : 662981.6508
Line Course: S 86-06-31 E Length: 228.2052
North: 2949947.5965 East : 663209.3299
Line Course: S 24-22-25 E Length: 78.3820
North: 2949876.2004 East : 663241.6770
Line Course: S 54-00-00 W Length: 59.9809
North: 2949840.9445 East : 663193.1514
Line Course: N 66-00-00 W Length: 80.0000
North: 2949873.4834 East : 663120.0678
Line Course: N 86-06-31 W Length: 151.8107
North: 2949883.7861 East : 662968.6071
Line Course: N 75-12-34 W Length: 176.9492
North: 2949928.9588 East : 662797.5210
Line Course: N 43-42-57 W Length: 92.1105
North: 2949995.5341 East : 662733.8651
Line Course: N 54-20-12 E Length: 123.6016
North: 2950067.5965 East : 662834.2861

Perimeter: 1171.7036 Area: 46,514 S.F. 1.07 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0001 Course: S 38-59-55 W
Error North: -0.00007 East : -0.00006
Precision 1: 11,717,036.0000

Parcel name: Lot 3

North: 2950067.5965 East : 662834.2861
Line Course: S 54-39-19 E Length: 180.6635
North: 2949963.0837 East : 662981.6508
Line Course: S 86-06-31 E Length: 228.2052
North: 2949947.5965 East : 663209.3299
Line Course: N 24-22-25 W Length: 223.8920
North: 2950151.5338 East : 663116.9331
Curve Length: 123.2573 Radius: 450.0000
Delta: 15-41-37 Tangent: 62.0173
Chord: 122.8731 Course: S 84-44-13 W
Course In: S 02-35-02 W Course Out: N 13-06-35 W
RP North: 2949701.9914 East : 663096.6461
End North: 2950140.2632 East : 662994.5787
Line Course: S 57-01-52 W Length: 77.4850
North: 2950098.0972 East : 662929.5714
Curve Length: 88.3851 Radius: 70.0000
Delta: 72-20-39 Tangent: 51.1799
Chord: 82.6297 Course: S 70-29-41 W
Course In: N 55-40-39 W Course Out: S 16-40-00 W
RP North: 2950137.5667 East : 662871.7600
End North: 2950070.5074 East : 662851.6838
Curve Length: 18.2666 Radius: 20.0000
Delta: 52-19-48 Tangent: 9.8261
Chord: 17.6383 Course: S 80-30-06 W
Course In: S 16-40-00 W Course Out: N 35-39-48 W
RP North: 2950051.3476 East : 662845.9477
End North: 2950067.5968 East : 662834.2873

Perimeter: 940.1555 Area: 45,464 S.F. 1.04 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0012 Course: N 78-20-00 E
Error North: 0.00024 East : 0.00116
Precision 1: 783,462.2500

Parcel name: Lot 4

North: 2950190.2756 East : 662917.8214
Line Course: N 28-05-47 E Length: 370.1670
North: 2950516.8208 East : 663092.1538
Line Course: S 53-26-16 E Length: 86.3000
North: 2950465.4123 East : 663161.4709
Line Course: N 84-11-44 E Length: 63.1500

North: 2950471.7989 East : 663224.2971
Line Course: N 45-04-44 E Length: 79.5000
North: 2950527.9364 East : 663280.5894
Line Course: S 27-41-13 W Length: 346.0871
North: 2950221.4765 East : 663119.7834
Line Course: S 02-20-05 W Length: 70.0006
North: 2950151.5340 East : 663116.9318
Curve Length: 123.2573 Radius: 450.0000
Delta: 15-41-37 Tangent: 62.0173
Chord: 122.8731 Course: S 84-44-13 W
Course In: S 02-35-02 W Course Out: N 13-06-35 W
RP North: 2949701.9915 East : 663096.6449
End North: 2950140.2634 East : 662994.5774
Line Course: S 57-01-52 W Length: 77.4850
North: 2950098.0973 East : 662929.5701
Curve Length: 101.6144 Radius: 70.0000
Delta: 83-10-21 Tangent: 62.1189
Chord: 92.9245 Course: N 07-15-49 W
Course In: N 55-40-39 W Course Out: N 41-09-00 E
RP North: 2950137.5668 East : 662871.7587
End North: 2950190.2761 East : 662917.8210

Perimeter: 1317.5621 Area: 63,708 S.F. 1.46 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0006 Course: N 34-14-14 W
Error North: 0.00051 East : -0.00035
Precision 1: 2,195,935.6667

Parcel name: Lot 5

North: 2950190.6093 East : 662826.0813
Line Course: N 00-24-45 E Length: 518.1730
North: 2950708.7689 East : 662829.8118
Line Course: S 53-48-29 E Length: 325.0648
North: 2950516.8206 East : 663092.1532
Line Course: S 28-05-47 W Length: 370.1670
North: 2950190.2754 East : 662917.8207
Curve Length: 100.0394 Radius: 70.0000
Delta: 81-53-00 Tangent: 60.7251
Chord: 91.7407 Course: N 89-47-30 W
Course In: S 41-09-00 W Course Out: N 40-44-00 W
RP North: 2950137.5661 East : 662871.7585
End North: 2950190.6090 East : 662826.0807

Perimeter: 1313.4442 Area: 82,257 S.F. 1.89 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0007 Course: S 60-49-45 W
Error North: -0.00033 East : -0.00058
Precision 1: 1,876,348.8571

Parcel name: Lot 6

North: 2950190.6093 East : 662826.0813
Line Course: N 00-24-45 E Length: 518.1730
North: 2950708.7689 East : 662829.8118
Line Course: N 53-48-29 W Length: 214.8335
North: 2950835.6264 East : 662656.4319
Line Course: S 00-40-39 E Length: 518.9646
North: 2950316.6981 East : 662662.5683
Line Course: S 18-15-32 E Length: 243.6539
North: 2950085.3120 East : 662738.9078
Line Course: N 54-20-12 E Length: 67.1613
North: 2950124.4685 East : 662793.4734
Curve Length: 18.2666 Radius: 20.0000
Delta: 52-19-48 Tangent: 9.8261
Chord: 17.6383 Course: N 28-10-18 E
Course In: N 35-39-48 W Course Out: S 87-59-36 E
RP North: 2950140.7176 East : 662781.8130
End North: 2950140.0173 East : 662801.8007
Curve Length: 57.7390 Radius: 70.0000
Delta: 47-15-36 Tangent: 30.6260
Chord: 56.1163 Course: N 25-38-12 E
Course In: S 87-59-36 E Course Out: N 40-44-00 W
RP North: 2950137.5662 East : 662871.7578
End North: 2950190.6090 East : 662826.0801

Perimeter: 1638.7922 Area: 102,290 S.F. 2.35 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0013 Course: S 77-44-02 W
Error North: -0.00027 East : -0.00123
Precision 1: 1,260,609.1538

Parcel name: Lot 7

North: 2950010.7707 East : 662635.0335
Line Course: N 18-15-32 W Length: 217.4435
North: 2950217.2660 East : 662566.9061
Line Course: N 00-52-54 E Length: 676.2717
North: 2950893.4576 East : 662577.3121
Line Course: S 53-50-16 E Length: 90.6900
North: 2950839.9439 East : 662650.5307
Line Course: S 53-48-29 E Length: 7.3117
North: 2950835.6264 East : 662656.4315
Line Course: S 00-40-39 E Length: 518.9646
North: 2950316.6981 East : 662662.5679
Line Course: S 18-15-32 E Length: 243.6539
North: 2950085.3120 East : 662738.9074
Line Course: S 54-20-12 W Length: 127.8535
North: 2950010.7707 East : 662635.0320

Perimeter: 1882.1890 Area: 80,304 S.F. 1.84 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)

Error Closure: 0.0016 Course: N 89-52-01 W
Error North: 0.00000 East : -0.00159
Precision 1: 1,176,368.0625

Parcel name: Lot 8

North: 2949742.8737 East : 660639.7347
Line Course: S 54-20-12 W Length: 128.4437
North: 2949667.9882 East : 660535.3797
Curve Length: 30.7001 Radius: 20.0000
Delta: 87-56-57 Tangent: 19.2966
Chord: 27.7735 Course: N 81-42-53 W
Course In: N 35-41-22 W Course Out: S 52-15-35 W
RP North: 2949684.2321 East : 660523.7119
End North: 2949671.9904 East : 660507.8960
Line Course: N 36-00-55 W Length: 17.1356
North: 2949685.8507 East : 660497.8202
Line Course: N 01-21-20 W Length: 765.0000
North: 2950450.6366 East : 660479.7229
Line Course: N 01-21-36 W Length: 229.2300
North: 2950679.8020 East : 660474.2823
Line Course: N 89-08-11 E Length: 10.0000
North: 2950679.9528 East : 660484.2811
Line Course: S 76-21-16 E Length: 40.4000
North: 2950670.4218 East : 660523.5408
Line Course: S 52-30-16 E Length: 73.7000
North: 2950625.5606 East : 660582.0144
Line Course: S 00-52-54 W Length: 676.2717
North: 2949949.3690 East : 660571.6084
Line Course: S 18-15-32 E Length: 217.4435
North: 2949742.8736 East : 660639.7358

Perimeter: 2188.3245 Area: 96,563 S.F. 2.22 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0012 Course: S 89-17-08 E
Error North: -0.00001 East : 0.00118
Precision 1: 1,823,603.8333

Parcel name: Parcel A

North: 2950527.9362 East : 663280.5898
Line Course: N 88-08-47 E Length: 98.8500
North: 2950531.1336 East : 663379.3880
Line Course: S 43-07-16 E Length: 58.1500
North: 2950488.6893 East : 663419.1361
Line Course: S 36-48-16 E Length: 100.5700
North: 2950408.1645 East : 663479.3861
Line Course: S 61-00-00 E Length: 153.0900
North: 2950333.9450 East : 663613.2816
Line Course: S 05-10-06 E Length: 140.8600
North: 2950193.6576 East : 663625.9706
Line Course: S 05-58-09 E Length: 149.1600

North: 2950045.3064 East : 663641.4822
Line Course: S 03-44-16 E Length: 170.1700
North: 2949875.4984 East : 663652.5757
Line Course: S 06-11-16 E Length: 132.6500
North: 2949743.6212 East : 663666.8737
Line Course: S 11-44-44 W Length: 112.4500
North: 2949633.5257 East : 663643.9827
Line Course: N 64-28-02 W Length: 369.2900
North: 2949792.6998 East : 663310.7580
Line Course: S 85-00-00 W Length: 210.0000
North: 2949774.3971 East : 663101.5571
Line Course: N 54-00-00 E Length: 173.1978
North: 2949876.2003 East : 663241.6770
Line Course: N 24-22-25 W Length: 302.2739
North: 2950151.5336 East : 663116.9332
Line Course: N 02-20-05 E Length: 70.0006
North: 2950221.4761 East : 663119.7848
Line Course: N 27-41-13 E Length: 346.0871
North: 2950527.9361 East : 663280.5908

Perimeter: 2586.7994 Area: 333,910 S.F. 7.67 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0010 Course: S 82-11-13 E
Error North: -0.00014 East : 0.00103
Precision 1: 2,586,799.4000

Parcel name: Parcel B

North: 2949774.8877 East : 663019.8332
Line Course: S 40-51-41 W Length: 145.0182
North: 2949665.2112 East : 662924.9577
Line Course: S 60-30-00 E Length: 17.0000
North: 2949656.8400 East : 662939.7538
Line Course: N 54-00-00 E Length: 200.0000
North: 2949774.3971 East : 663101.5572
Line Course: N 89-39-22 W Length: 81.7254
North: 2949774.8876 East : 663019.8332

Perimeter: 443.7436 Area: 6,052 S.F. 0.14 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0001 Course: S 33-41-11 E
Error North: -0.00011 East : 0.00007
Precision 1: 4,437,436.0000

Parcel name: Road

North: 2948646.6284 East : 659792.8607
Line Course: N 54-20-12 E Length: 352.6016
North: 2948852.2026 East : 660079.3343
Curve Length: 18.2666 Radius: 20.0000
Delta: 52-19-48 Tangent: 9.8261

Chord: 17.6383 Course: N 80-30-06 E
Course In: S 35-39-48 E Course Out: N 16-40-00 E
RP North: 2948835.9535 East : 660090.9947
End North: 2948855.1133 East : 660096.7308
Curve Length: 347.7778 Radius: 70.0000
Delta: 284-39-36 Tangent: 54.0434
Chord: 85.5556 Course: N 35-39-48 W
Course In: N 16-40-00 E Course Out: N 87-59-36 W
RP North: 2948922.1726 East : 660116.8070
End North: 2948924.6237 East : 660046.8499
Curve Length: 18.2666 Radius: 20.0000
Delta: 52-19-48 Tangent: 9.8261
Chord: 17.6383 Course: S 28-10-18 W
Course In: N 87-59-36 W Course Out: S 35-39-48 E
RP North: 2948925.3240 East : 660026.8622
End North: 2948909.0748 East : 660038.5226
Line Course: S 54-20-12 W Length: 323.4584
North: 2948720.4917 East : 659775.7267
Curve Length: 30.7001 Radius: 20.0000
Delta: 87-56-57 Tangent: 19.2966
Chord: 27.7735 Course: N 81-42-53 W
Course In: N 35-41-22 W Course Out: S 52-15-35 W
RP North: 2948736.7355 East : 659764.0588
End North: 2948724.4938 East : 659748.2430
Line Course: S 21-29-12 E Length: 94.6211
North: 2948636.4486 East : 659782.9012
Line Course: S 11-21-00 E Length: 10.2064
North: 2948626.4418 East : 659784.9099
Curve Length: 22.9316 Radius: 20.0000
Delta: 65-41-39 Tangent: 12.9124
Chord: 21.6959 Course: N 21-29-49 E
Course In: N 78-39-00 E Course Out: N 35-39-21 W
RP North: 2948630.3779 East : 659804.5187
End North: 2948646.6285 East : 659792.8604

Perimeter: 1218.8305 Area: 40,889 S.F. 0.94 ACRES

Mapcheck Closure - (Uses listed courses, radii, and deltas)
Error Closure: 0.0004 Course: N 60-40-44 W
Error North: 0.00017 East : -0.00031
Precision 1: 3,047,075.5000

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

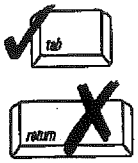
Provided by MassDEP:
158-1269
MassDEP File Number

eDEP Transaction Number

Framingham
City/Town

A. General Information

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



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: Framingham
1. Conservation Commission

2. This Issuance is for (check one):

a. ☒ Order of Resource Area Delineation

b. ☐ Amended Order of Resource Area Delineation

3. Applicant:

Paul
a. First Name

Croft
b. Last Name

PRC Builders, LLC
c. Organization

23 Mill Street
d. Mailing Address

Natick
e. City/Town

Ma
f. State

01760
g. Zip Code

4. Property Owner (if different from applicant):

a. First Name

b. Last Name

Nexum Development Corp.
c. Organization

7 Central Street
d. Mailing Address

Framingham
e. City/Town

Ma
f. State

01701
g. Zip Code

5. Project Location:

45 Nixon Road
a. Street Address

Framingham
b. City/Town

01702
c. Zip Code

421, Block 1
d. Assessors Map/Plat Number

3A
e. Parcel/Lot Number

Latitude and Longitude (in degrees, minutes, seconds):

42.34400
f. Latitude

-71.47503
g. Longitude

6. Dates:

8/1/2012
a. Date ANRAD filed

10/3/2012
b. Date Public Hearing Closed

10/20/2012
c. Date of Issuance

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Existing Conditions Plan of 45 Nixon Road in Framingham Ma
a. Title

July 11, 2012
b. Date

ANRAD Filing with attachments
c. Title

August 1, 2012
d. Date

B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

a. ☒ **Accurate**: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☒ Other resource area(s), specifically:

a. Three Pockets of Isolated Vegetated Wetlands were identified on the plans that are protected under the Framingham Bylaw. These resource areas and associated buffer zones and no alteration zones are accurate

b. ☐ **Modified**: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☐ Other resource area(s), specifically:

a.

c. ☐ **Inaccurate**: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☐ Other resource area(s), specifically:

3. ☐ The boundaries were determined to be inaccurate because:

C. Findings

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

D. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
158-1269
MassDEP File Number

eDEP Transaction Number

Framingham
City/Town

E. Signatures

10/20/2012
Date of Issuance

Please indicate the number of members who will sign this form. 11 Number of Signers

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

This Order is valid for three years from the date of issuance.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on October 20, 2015 unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. ☐ By hand delivery on

a. Date

3. ☒ By certified mail, return receipt requested on 10/19/12

a. Date

Impact Statement

In accordance with the Planning Board Regulations this impact statement is submitted for FORDS HILL ESTATES, a residential subdivision.

a) Describe the subdivision and its relationship to the surrounding area.

This is an 8 lot subdivision with a 500 foot cul-de-sac on land formally comprising the entirety of 45 Nixon Road (15.8 acres) with an existing house and a significant portion of 43B Nixon Road (formally a 7 acre parcel) being vacant land. The house on 45 Nixon Road will be razed to construct the subdivision; thus there are **only 7 new residences** resulting from this project. (See Appendix @ A: Site Locus Maps)

Each lot is a minimum of 1 acre in size with 100 feet of frontage. Lots range in size from 1.04 acres to 2.4 acres. Each lot will support an on-site septic system and individual well, similar to surrounding existing lots-housing in the area. Private utilities will be installed underground.

The roadway takes up 0.9 acres. A future Right-of-Way location is shown on land designated as Parcel A of 7.7 acres abutting other undeveloped land

A drainage easement is provided in the northwest section of the site for stormwater controls and will also provide for an extension of an Open Space trail in the future if the subdivision is extended.

The surrounding area supports lots commensurate with this project, starting at the minimum 1 acre and ranging upwards. The surrounding area is best described in two parts; (1) existing frontage development lots on Nixon Road and (2) a subdivision development of Dartmouth Drive, a long dead end configured roadway.

Conventional developments of single family residential structures with garages typical of the area are proposed.

b) Describe the general physical conditions of the site, including vegetation, topography, geologic, scenic and historical features, trails and open space links, and indigenous wildlife.

From Goddard Consulting (the Wetlands Consultant for the project):
The site is approximately 21.8 acres, encompassing two parcels located on the northern slopes of a large hill, which is over 500 feet in elevation. The majority of the site consists of mature white pine – oak forest, dominated by white pine, red oak and white oak. The sub-canopy is sparse and open, while lowbush blueberry is common in the understory. The southeastern portion of the site contains a large grove of eastern hemlock, which spreads down the northeastern slopes of the hill. The northwestern portion of the site contains three separate wetland areas, including two isolated vegetated wetlands (IVWs) and a portion of bordering vegetated wetland (BVW), which extends offsite to the northwest. The vegetation within and surrounding the wetland areas is dominated by mature red maple, white ash and oak trees, bitternut hickory and American elm saplings, spicebush and arrowood shrubs, non-native invasives including Japanese barberry, and sparse groundcover. The wetlands do not include vernal pool habitat as they lack confined basin depressions which could hold water for significant periods of time.

An existing residence is located near Nixon Road; it is surrounded by tall, dense white pines. An abandoned swimming pool is present northwest of the house. A wide logging road/path meanders through the site up to the top of the hill, beginning north of the house and winding around up the slope to the south. To the north of the site are existing residences located on Dartmouth Drive, and to the west the site abuts Nixon Road and existing residences along Nixon Road. There are no public trails within or adjacent to the site. Two stone walls are present in the eastern portions of the site; no known cellar holes or archaeological sites exist. A large Conservation Restriction parcel (the "Baiting Brook CR") is located offsite to the southwest, and further west is Callahan State Park.

Surficial geology consists of abundant outcrop and shallow bedrock. The southern and eastern portions of the site contain Narragansett-Hollis-Rock outcrop complex soils, ranging from 3 to 15 percent slopes up to 15 to 25 percent slopes on the highest parts of the hillside. Most of the western side consists of Narragansett silt loam soils, ranging from 3 to 25 percent slopes. The northwestern corner, where the wetlands are located, consists of Scarboro mucky sandy loam, 0 to 3 percent slopes.

There are no unique or uncommon wildlife habitat features, however the site likely provides habitat for a variety of common bird, mammal, reptile and amphibian species. Common resident bird species likely include black-capped chickadee, tufted titmouse, white-breasted nuthatch and pine warbler. Deer are likely a regular presence within the site, in addition to gray and red squirrels, chipmunks and numerous mice, voles, voles and shrews. Redback salamanders are likely common in the site's leaf litter and under rotting logs. The site is not mapped as Priority Habitat of Rare Species by the MA Natural Heritage and Endangered Species Program.

(Connorstone)
Open Space-
This project cannot be designed as a functional Open Space subdivision as provided for in the Zoning Bylaw due to the constraints of it being within a Nitrogen Sensitive Area as Designated by Title 5 (310 CMR 10), where both wells and septic systems serve individual lots. The Open Space layout simply shows back sections of the lots as possible open space areas. The project proponent does not seek to build this project as an Open Space Development.

There is no benefit to an Open Space plan were the roadway will be extended in the future thus lesser frontages would not reduce the roadway length. Finally, the roadway construction standards would not reduce the development cost.

Instead, based upon the developers concern for the surrounding Open Space and access to such a vast amount of Open Space parcels in the surrounding vicinity, in particular the SVT lands and the Bay Circuit Trail, the developer proposes an access easement along the north and east property line for a foot trail. This trail may, in the future, connect across abutting land to the east to other Open Space and Bay Circuit Trail parcels. (See appendix @ B: Open Space Locus)

The project proponent also will designate a lot on site pursuant to MGL Ch 41 Section 81U as open space park land.

c) Describe the potential future development of lots in the subdivision and the construction phasing and buildout of the subdivision, which would include the maximum potential gross floor area for commercially zoned land;

This subdivision will provide lots at, or in excess of, the one acre area required by Zoning, and in addition will provide the requisite area under Title 5, the State Sanitary Code for septic system and well placements on each lot, namely 10,000 sf per bedroom. Each lot will support a septic system based upon testing under the auspices of the Framingham Board of Health (see attached soils reports), by Certified Soil Evaluators. (See Appendix @ C: soil reports.)

Each lot has been shown to pass the soil evaluation/percolation test requirements and is therefore buildable. Each lot will have a standard minimum 4 bedrooms residential dwelling with an overall-approximate footprint of 100 X 40 feet. Garages will be provided. Bituminous concrete driveways with on-lot turn-around aprons are proposed.

Development will commence with the construction of the 500 foot cul-de-sac which will necessitate the removal of the existing house on the premises. This phase of work will begin with the installation of the Erosion Control aspect of the work so as to prevent siltation and sedimentation of wetland resources and protect both abutting properties and the town's street. Construction of the Roadway to near completion, except for final paving and curbing and minor landscape features, is expected to take less than 6 months. Thereafter there will be a surety placed for the release of lots and house construction will begin. It is expected that the majority of houses will be built within 18 months.

This project is likely the first phase of a larger subdivision to be processed at a later date.

d) What is the proximity of the site to transportation, shopping, and recreational facilities?

Transportation facilities include the T Commuter Rail at Downtown Framingham. Park n' Ride facilities are on Route 9 at the Framingham-Southborough Town line.

Shopping and recreational facilities abound in the area. Routes 20, 9, 495 and the Massachusetts Turnpike are within 15 minutes of the site during rush hour. Shopping centers dominate the area with the Natick Mall being the major draw, Route 20 in Marlborough and Sudbury provide significant shopping opportunities, and Route 9 in Framingham similarly so. All shopping is within 15 minuets of the site by automobile. (See Appendix @ D: for Shopping Locus Map)

Callahan State Park and hundreds upon hundreds of acres of Open Space are within 5 minutes by car of this site. Numerous of the Towns active recreational areas are within 15 minuets of the site. Ice Skating Rinks are found in Framingham, Natick, Marlborough and Westborough. Private sports facilities exist in Marlborough, and Framingham, and numerous gyms and health clubs are within 15 minuets of the site.

e) How many persons may be expected to inhabit the proposed subdivision? Of these, how many may be expected to be of school age [five (5) to 17 years of age]? Which requirements for additional transportation, classroom space, etc. is this likely to put upon the school system, over what timeframe, and at what cost to the Town? What is the proximity of the site to educational facilities? Describe the pedestrian access to such facilities.

Framingham population is just below 70,000 persons. There are just over 26,000 households, thus the occupancy would be 2.7 persons per household. However in Framingham there are 2.44 persons per household reported in the Census data. We therefore project an average household occupancy for this project of 2.6 persons per house. Total subdivision population is projected at 7 X 2.6 = 18.2: SAY 18 (note the existing house is being replaced thus an 8 lot subdivision is in reality only adding 7 new lots). (See Appendix @ E: Census 2010, Middlesex County Census Data 1)

Framingham Census data show 8,172 pupils in the system. With approximately 26,167 households this translates to .31 school age students per household. Massachusetts School District Profiles data for Framingham shows a total expenditure of $135,581,668 for School Year 2011 and a $15769 per pupil expenditure which translates to 8597 pupils. Thus this data shows 0.33 school age student's pre household. Since there already exists one house on the locus, the net increase is not based upon 8 lots but upon 7 lots and therefore 2 additional students. (See Appendix @ F: Framingham CDP, Massachusetts Quick Facts (US Dept Commerce) Census Data 2)

The Metropolitan Area Planning Council website provides age distribution data which projects approximately 11,000 children in Framingham between the ages of 4 to 19. This translates to 0.42 children per household. The difference likely being their age grouping starts at 4 years and extends to 19 years, and some children attend private schools. (See Appendix @ G: Metro Planning Data)

Framingham reports a per student expenditure of $15,769. Tax revenue from the houses, on a basis of $700,000-$900,000 (using $800,000 as an average the revenue is expected to be $13,536 at a tax rate of $16.92 per thousand). This project would generate 0.33 students per house at a cost of $4500 leaving a net of over $9000 revenue to the town. (See Appendix @ H: Massachusetts School and District Profiles Framingham)

(Note: The $135 Million differs from the Annual Town Meeting Report citing $115 million.) (See Appendix @ I: Town of Framingham Revenue Statement)

Taxes on personal property (automobiles, machines etc) are unquantified, but known to be substantial, especially from upscale housing; for example most occupants have two luxury automobiles and pay higher excise tax. Overall excise tax brings Framingham over $8.5 Million dollars. (See Appendix @ I: Town of Framingham Revenue Statement)

School locations all will require bus service. It is expected the children will wait for the school bus. No sidewalks exist within the area surrounding the project site.

f) What are the estimated additional new service requirements, in time and cost that the proposed subdivision may place upon the Town for solid waste disposal, snow removal? What other impacts might the project have on other municipal and governmental services?

Public Works budget figures are stated in the Annual Town Report to be $78 Million dollars, or about $3000 per household. However a new roadway will not require maintenance for 25 to 30 years. Thus this number is skewed against the project with respect to the new road, and no municipal sewer or water. (See Appendix @ I: Town of Framingham Revenue Statement)

g) What is the proximity of the site to fire, police and other public safety facilities? Are there any impediments to access for public safety vehicles?

Fire stations are shown on the map in the appendix and are generally nearby, especially the Marlborough and Sudbury stations considering Mutual Aid. This new road is designed to accommodate emergency vehicular access. (See Appendix @ J: Fire Station Police Station from Mass GIS Plan)

Public Safety budget figures are stated in the Annual Town Report to be $29 Million dollars, or about $1115 dollars pre household. It is also doubtful higher end housing projects in the rural areas will place this commensurate demand on Public Safety personnel. (See Appendix @ I: Town of Framingham Revenue Statement.)

The nearest fire stations are about 3 miles from the site. Police headquarters is in the downtown area 5-6 miles away.

h) Are the access roads, public or private, by which the proposed subdivision may be reached adequate in width, grades and type of construction to carry, without danger, congestion or confusion, emergency vehicles and the additional traffic that may be generated by the proposed subdivision?

Roads approaching the subdivision are adequate. Nixon Road in particular, a narrow winding road, carries over 3000 vehicles per day. See the attached Sight Distance Measurements report dated January 4, 2013, for more complete details and intersection information. This project with 7 additional lots will generate approximately 70 vehicle trip-ends per day. (See Appendix @ K: Sight Distance Measurement)

i) For subdivisions of 10 or more lots, what is the estimated vehicle traffic flow at peak periods on streets and intersections within 1,000 feet of the subdivision and the nearest major intersections, even if greater than 1,000 feet? Describe the likely traffic circulation patterns, traffic safety, vehicle and pedestrian access, and changes to level of service.

This subdivision proposes only 8 lots, however a house exists at 45 Nixon Road, thus the new lot/house count is 7. Two additional frontage lots exist on Nixon Road. Nixon Road in particular, a narrow winding road carries over 3000 vehicles per day. See the attached Traffic Counts & Sight Distance Measurements for more complete details, intersection information. This project with 7 additional lots will generate approximately 70 vehicle trip-ends per day.

However traffic counts and sight distance measurements were undertaken and are appended hereto. This information shows adequate sight distance at the proposed intersection with:

Stopping Sight Distance of 300 north and 325 south is provided at this location. (See Appendix @ K: Sight Distance Measurement)

j) What is the estimated taxable value of the lots and buildings to be constructed within the proposed subdivision?

It is expected the lots will have a value of $200,000 to $300,000 and the houses will be sold at a minimum of $600,000 to an anticipated high of $900,000.

k) Describe the financial and technical capacity of the applicant to carry out and complete the subdivision improvements in accordance with the approved plan within two years of the Board's endorsement of the Definitive Plan, to minimize long term impacts to the town and abutters.

The builder has constructed numerous houses in the surrounding towns. A project on East Central Street in Natick consisting of 10 duplex housing units (5 buildings) with on-site infrastructure (500 feet of common driveway, new utility connections and replace 1200 feet of town owned drain) is offered for comparison. This project was completed in just about one year.

l) How much new additional water volume will be required by the proposed subdivision? In locations where there is town water, is there adequate main capacity to provide the projected added water volume to the proposed subdivision without detriment to other users, from the standpoint of pressure, fire-flows from hydrants, etc.? If not, what improvements to the water supply and distribution system will be needed and how soon. What cost, if any, will be incurred by the town?

Each house will be designed with 4 or 5 bedrooms. Each bedroom assumes two person occupancy and a flow of 110 gallons per day. However, with the water saver technology this number is now found to be unrealistic as an indicator of actual usage, nevertheless the projections are based upon the full 110 gallons per day per bedroom. 8 houses with an average of 4.5 bedrooms will use approximately 3960 gallons per day. Because the site will rely on subsurface sewage disposal systems the full usage will be returned to the ground.

Each house will rely on a driven well for water. Each house will discharge the equivalent amount of water into the septic system. No net withdrawal will occur on a per site basis, nor will the entire subdivision add or remove water overall.

No municipal water exists in the vicinity. Fire protection will consist of a cistern in accordance with the Planning Board Rules and Regulations. This cistern is located on site and will be piped to the roadway Cul-de-sac as a temporary measure, if and until the subdivision is extended. The location of the cistern is appropriate for the future roadway layout/configuration.

It is not anticipated any changes would be necessary to the Towns water system.

m) Describe the groundwater resource in terms of quantity and quality. Will the density of the proposed subdivision significantly lower the water table in the area, as a result of the expected increased use, at the expense of or detriment to the existing homes?

Groundwater resources for potable water are fully analyzed in the attached report for a 72 bedroom project that superseded this application (said project was denied). Northeast Geoscience Inc., developed a water source well and prepared a "Source Final Report for Bedrock Water Supply Well PW1, Fords Meadow, 45 Nixon Road in June of 2005." A

summary of the results of this report show a 10 inch diameter well drilled through 30 feet of overburden and rock and cased at 6 inches with a grout seal in the annulus. Thereafter the well is a 6 inch rock well to a depth of 1225 feet below ground surface. There was significant water bearing fracture found at 220 feet, and several smaller fractures encountered between 700 and 1225 feet. Fractures were found to be oriented vertically and horizontally. Well production was ultimately determined to be 8.9 gallons per minute, and for a sustained withdrawal of 8640 gallons per day, that which would be required for the 72 bedroom project (leaving margin for the 180 day prolonged drawdown criteria and safety factor of 75%), the well would pump 6 gallons per minute. Water Quality was found to meet all requirements for a Community Water Supply. (See Appendix @ L: Northeast Geosciences Report discussion section) note: this report should be read for its geologic content and not as a Public Water Supply proposal).)

Two wells were installed at 50B and 52A Nixon Road, results are attached. These wells are 600 and 500 feet deep respectively with 5 and 8 gallons per minute respectively. Water Quality was satisfactory for potable water.

It is not expected there would be any difficulties in installing wells on the lots nor impacts on existing wells in the area. (See Appendix @ M: Well-Water supply.)

Groundwater in soils as related to stormwater hydrology is analyzed in the groundwater recharge section of the Stormwater Report. Groundwater recharge has been designed in accordance with MassDEP Standards. Groundwater quality will be protected as per MassDEP Stormwater Standards.

> *n) In locations where a proposed subdivision, or a portion thereof, lies within the watershed or zone of contribution of a freshwater pond, within the watershed or zone of contribution of a public water supply well(s) (either existing or proposed), or within 400 feet radius of a private well, a determinant of nutrient loading shall be required and compared to the carrying capacity of receiving waters, setting forth the probable impact or effect of the proposed subdivision on the receiving waters (ground or surface) over time assuming completion of the subdivision. Said analysis shall be conducted as set forth under Appendix D*

This site lies within the drainage basin catchment area for Gristmill Pond, over 4000 feet away in a direct line. Actual flow patterns are considerably more and flow through various wetland complexes and in a gravel formation from the northwesterly section of the site. Nutrient loadings from septic systems have a presumption under Title 5 to protect the environment.

Nutrients associated with stormwater are found adsorbed to soil and silt particles. These particles are suspended in stormwater runoff and known as Total Suspended Solids (TSS). TSS is removed by detaining waters in various structural components of stormwater collection systems including catch basins, sediment forebays and detention type structures, and allowing for the particles to settle out. DEP Stormwater Guidelines provide criteria for various stormwater collection components with directive removal rates. 80% TSS removal is required to meet DEP Stormwater performance standards. DEP Stormwater Guidelines and Standards provide such standards and presumption:

"Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:
a. Suitable practices for source control and pollution prevention are identified in along-term pollution prevention plan and thereafter are implemented and maintained;
b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with Massachusetts Stormwater Handbook; and
c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook. ***310 CMR 10.05 (6) (o).***

Stormwater Management
A reference to the Department's Stormwater Management Standards has been added to the section on orders of conditions, to ensure that applicants and conservation commissions appropriately apply the standards to projects. The Department's Stormwater Standards, consistently implemented, will greatly reduce wetland and water quality impairments from stormwater runoff.
Massachusetts Wetlands Protection Act Regulations, 310 CMR 10.00 Preface Appendices"

DEP also provides a presumption that properly sited Title 5 conforming septic systems adequately protect the environment. DEP Stormwater Guidelines and Standards provide such standards and an equivalent presumption:

"(3) Presumption Concerning 310 CMR 15.000: Subsurface Disposal of Sanitary Sewage (Title 5). A subsurface sewage disposal system that is to be constructed in compliance with the requirements of 310 CMR 15.000 Subsurface Disposal of Sanitary Sewage (Title 5), or more stringent local board of health requirements, shall be presumed to protect the eight interests identified in M.G.L. c. 131, § 40, but only if none of the components of said system is located within the following resource areas:
(a) Coastal.
coastal bank
coastal beach
coastal dune
salt marsh
(b) Inland.
1. *wet meadows creek*
2. *marsh bordering river*
3. *swamp on any stream*
4. *bog pond lake*

and only if the soil absorption system of said system is set back at least 50 feet horizontally from the boundary of said areas, as required by 310 CMR 15.211 (Title 5), or a greater distance as may be required by more stringent local ordinance, by-law or regulation. To protect wildlife habitat within riverfront areas, the soil absorption system shall not be located within 100 feet of the mean annual high-water line unless there is no alternative location on the lot which conforms to 310 CMR 15.000 without requiring a variance as determined by the local Board of Health, with less adverse effects on resource areas."

Connorstone has evaluated, by a mass-balance model, the nutrient loading contributed by the proposed project. Both pre-development and post-development calculations provide a comparative analysis. In addition there is a calculation for a

typical surrounding lot for which to contrast the impact of the project to the currently built environment.

In a natural environment the actual amount of pollutants generated and the rates at which they can be mitigated vary widely depending on many factors. This analysis is intended to provide a quantitative comparison.

On a given site, nutrients, primarily nitrogen and phosphorus, have their origin from several different sources including atmospheric deposition, rainfall, pollutants from vehicles, animal waste, fertilizer, and septic system effluent. These nutrients are transferred off-site both in the stormwater runoff and in the groundwater regime.

The attached mass-balance analysis sums the total weight of nutrients from various sources. On-site reduction of nutrients is also evaluated. Nutrient transport is mitigated by treatment in the stormwater system for runoff, principally from adsorption of the nutrients to suspended solids and the subsequent removal of the suspended solids, known as TSS removal, septic systems (for discharges to groundwater) and uptake by vegetation in on-site wetlands (for both surface water and groundwater).

The following tabulation shows the quantity, in pounds, of nutrients (N= nitrogen, P= phosphorous) for the existing site (EX), the proposed site (PR), and a typical surrounding existing neighborhood lot, of 1 acre, that is currently developed. All rely upon on-site wells and septic systems.

	Total nutrients		Nutrients per acre		Typical surrounding lot	
	N	P	N	P	N	P
EX. SITE	108	3.8	5	0.175	30	0.8
PR. SITE	241	7.9	11	0.364		

The result of the analysis shows that there will be an increase in the amount of nutrients generated on the site after development; however the quantity is just 1/3 to 1/2 (N = 5 vs. 30, and P= 0.364 vs. 0.8 for development lots vs. existing lots) of the quantity expected from any of the existing surrounding single family houses.

It should also be noted that these results represent the total nutrients being generated on the site. This flow is to the Gristmill Pond via a drainage channel flowing essentially north which flows through several wetland complexes. Substantial additional reduction of nutrients is likely to occur before nutrients generated on this site are discharged to the pond. It should be noted that Hagar Pond which contributes flow to Gristmill Pond has an excessive nutrient contribution from a sewage treatment plant discharge of treated effluent in Marlborough.

(See also Appendix @ N: Nutrient Loadings)

The entire area surrounding the site is dependant on private wells on individual lots.

o) How much additional sewerage load will be created by the proposed subdivision? If the subdivision has access to a public sewerage system, is the capacity of such system (pipe sizes, treatment works, etc.) adequate to handle the additional load created by the subdivision? If not, what improvements to such public sewerage system will be needed, and how soon? What cost, if any, will be incurred by the town?

No additional sewage load to the municipal system will be created by the proposed subdivision. The public sewer system is not near the site and will not be extended to it. No improvements to the public system would be required.

p) In locations without access to the public sewerage system, what are the expected environmental affects of on-site sewage disposal? What is the permeability of the underlying soil? Will proposed individual or collective sewage disposal systems endanger, in the foreseeable future, wells for potable water of dwellings either within or outside of the proposed subdivision or will it endanger any public or private water supply source or any swamp, bog, pond, stream or other body of water by introducing therein excessive nutrients, dangerous chemical substances or pathological organisms?

Each lot will rely upon an individual subsurface sewage disposal system. Design flows will range from 440 (4 bedrooms) to 550 (5 bedrooms) gallons per day per Title 5. Actual flows will be less due to the new water saver technologies/fixtures. Each lot has been shown to have passed the percolation test in accordance with the Framingham Planning Board Rules and Regulations. Test results range from 2 minutes per inch to 40 minuets per inch. Thus the underlying soils are demonstrated to be suitable for subsurface sewage disposal. Title 5 provides a presumption that subsurface sewage disposal systems in compliance with 310 CMR 15.000 protect the environment: (See Appendix @ N: Nutrient Loadings)

Soil permeability varies from very high north and west of the roadway in sands/gravel material, to moderate east of the roadway in sandy till material.

Title 5 at 310 CMR *15.003: Coordination with Local Approving Authorities*

(1) In general, full compliance with the provisions of 310 CMR 15.000 is presumed by the Department to be protective of the public health, safety, welfare and the environment. Specific site or design conditions, however, may require that additional criteria be met in order to achieve the purpose or intent of 310 CMR 15.000.

The Wetlands Protection Act Regulations at 310 CMR 10.03 provides a presumption that properly designed and sited septic systems protect the wetland resources.

(3) Presumption Concerning 310 CMR 15.000: Subsurface Disposal of Sanitary Sewage (Title 5). A subsurface sewage disposal system that is to be constructed in compliance with the requirements of 310 CMR 15.000 Subsurface Disposal of Sanitary Sewage (Title 5), or more stringent local board of health requirements, shall be presumed to protect the eight interests identified in M.G.L. c. 131, § 40, but only if none of the components of said system is located within the following resource areas:
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coastal bank
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coastal dune

salt marsh
(b) Inland.

5. *wet meadows creek*
6. *marsh bordering river*
7. *swamp on any stream*
8. *bog pond lake*

and only if the soil absorption system of said system is set back at least 50 feet horizontally from the boundary of said areas, as required by 310 CMR 15.211 (Title 5), or a greater distance as may be required by more stringent local ordinance, by-law or regulation. To protect wildlife habitat within riverfront areas, the soil absorption system shall not be located within 100 feet of the mean annual high-water line unless there is no alternative location on the lot which conforms to 310 CMR 15.000 without requiring a variance as determined by the local Board of Health, with less adverse effects on resource areas.

q) Describe the extent and type of existing surface drainage, water and wetland resource areas, and the proposed stormwater drainage system and control of quantity and quality of stormwater runoff from the site. Will the drainage runoff from the systems of roads within the proposed subdivision likely be directed toward adjoining property? Will it overload or silt up or contaminate any wetland or waterbody? Will it endanger any public or private potable water supply?

Rainfall-runoff drainage over the site emanates from the top of the drumlin and flows peripherally outward in all directions except south. Water collects in the northwest corner of the site in some microtopographical depressions which have, over the years, manifested themselves as vegetated wetland pockets. Some quantity of runoff makes it to Nixon Road in the existing condition.

Proposed drainage pathways will be to direct all disturbed areas to the proposed roadway drainage system and a proposed on-site stormwater management system. All stormwater will be controlled, and cleansed through the proposed stormwater basins. The proposed plan will not increase flow rates to receiving waters, abutting properties, or abutting roadways will result.

The stormwater basin will function to remove sediment during construction (as temporary basin), and then be commissioned afterward to act to provide long term sediment removal under an appropriate Operations and Management plan in accordance with the Stormwater Regulations promulgated by the Massachusetts DEP.

Additional description of the stormwater management system and detailed calculations documenting compliance with MassDEP Standards can be found in Appendix O: Stormwater Report.

r) Describe the earthwork required to develop the subdivision with details on the extent of earthmoving, cuts and fill. What erosion and sedimentation control measures will be undertaken during construction? Will any proposed filling, cutting or other alteration of the topography or any devegetating operations within the subdivision tend to alter existing natural drainage patterns so as to create problems within or outside of the subdivision?

This site consists of two distinct topographic regimes; (1) a steeply sloping drumlin on the easterly side and (2) a less steeply sloping transitional plain on the western side. The roadway is proposed to be along the interface. Grading for the roadway will consist of a

approximately 4 feet for the first 200 feet and thereafter, due to the cross slope a fill on the westerly side of the road of 4-5 feet and a cut on the easterly side of 1-3 feet. Road grades consider the possible future extension of the proposed roadway into abutting land.

Under the 4:1 side slope requirements significant side slopes are required and will extend beyond the 70 foot right-of-way limits by up to 100 feet on portions of each side of the roadway layout.

Overall drainage patterns run from east to west down the slope of the site to a wetland complex near the westerly edge of the property. Just above this wetland complex a detention basin will be installed. This detention basin will serve as a sediment basin during roadway and lot development earthwork. Upon completion of all earthwork and site stabilization it will be re-commissioned as a stormwater basin (water quality swale). Due to the location of the detention basin it will be able to capture all stormwater from the project and protect downstream resources from sediment. The roadway drainage will be captured and transmitted to the detention basins from the intersection of Nixon Road as well. All temporary controls have been sized in accordance with the Massachusetts Sediment and Erosion Control Guidelines.

The drainage catchments will remain the same. Stormwater detention will mitigate peak flow rates. Thus there will be no alterations to the existing drainage patterns.

3. In reviewing this statement, the Planning Board shall consider, but shall not be limited to:

a) the mitigation of impacts on streets and services;

Overall Budget considerations show the project will have no impact on streets or services: See School, DPW, fire and police, discussion, above at sections e, f, and g.

b) the mitigation of stormwater run-off;

The hydrologic analysis shows no impacts to downstream receiving waters. This design does in fact show compliance with the Stormwater, Wetlands Protection Act and Local Wetlands Bylaw, in addition to Planning Board Rules and Regulations, and good engineering practices, and demonstrates the peak rates of flow mimic existing conditions.

c) the maintenance and improvement of the flow and quality of surface water;

The flow and quality of water complies with the above referenced standards all in conformance with the cited technical standards. Beyond that the uncontained drainage running out to Nixon Road is being captured and managed to eliminate any problems on Nixon Road.

d) the extent to which the proposed subdivision is consistent with the policies of the Town's Comprehensive Plan and the Affordable Housing Regulations of the Planning Board. Such development of housing, including those proposed under a special permit process pursuant to G. L. 40A sec. 9, and those proposed under the Subdivision Control Law G. L. c. 41 sec. 81K to 81GG inclusive, including divisions of land that do not require subdivision approval, shall require a special permit from the Planning Board, as set forth under Section IV.O. Affordable Housing.)and the Town's Open Space Plan;"

This project creates only 7 new lots. Thus there is no requirement for compliance with Section 1. B.,which is implicated at 10 dwelling units per:

> ***"(B. PURPOSE***
> *The purpose of this By-Law is to establish such regulations for the uses of premises, as will protect and promote life, health, safety, morals, convenience and general welfare of the townspeople. In their interpretation and application, the provisions of this By-Law shall be held to be minimum requirements, adopted for the promotion of the public*

OPEN SPACE

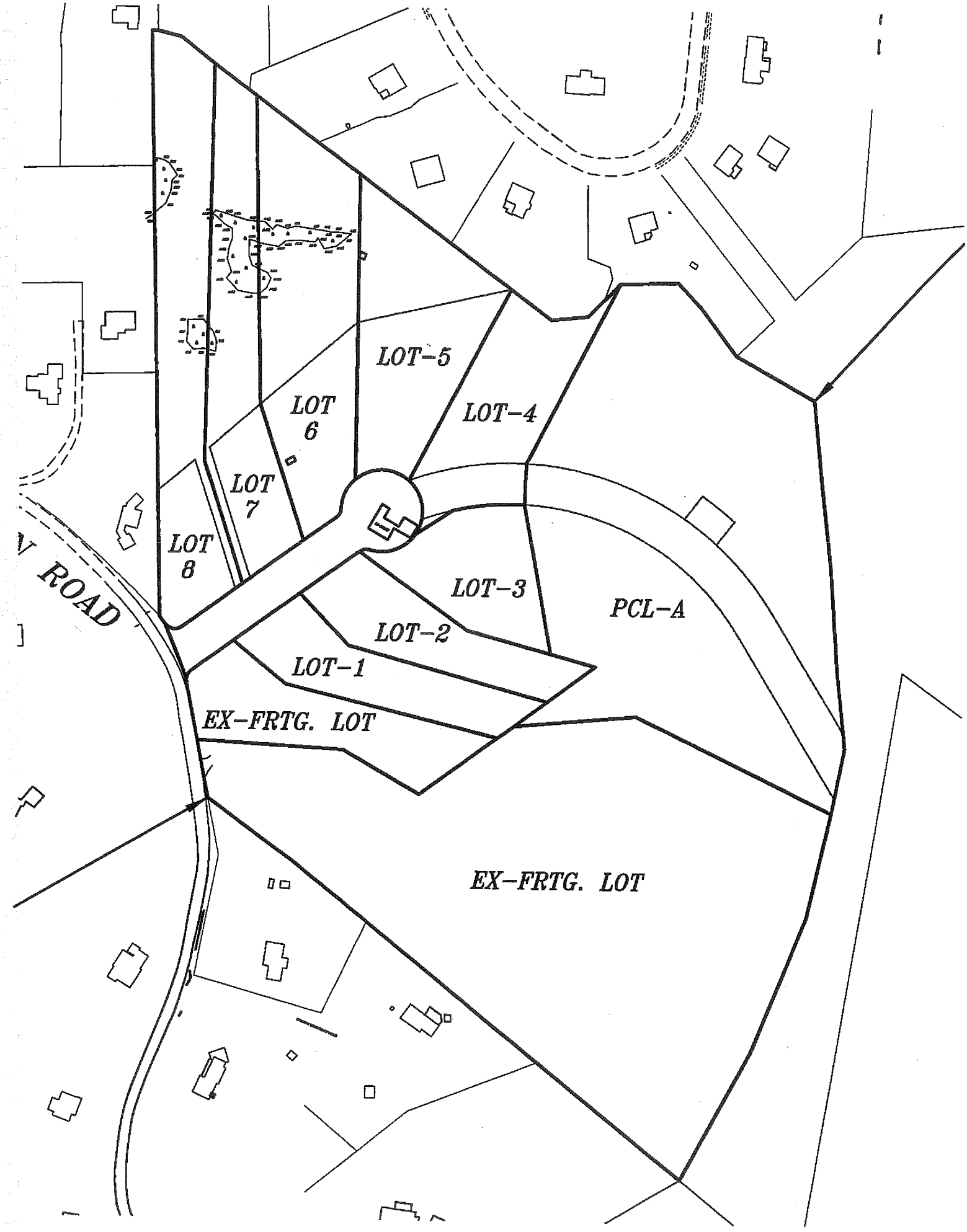
This project can not be designed as a functional Open Space subdivision as provided for in the Zoning Bylaw due to the constraints of it being within a Nitrogen Sensitive Area as Designated by Title 5 (310 CMR 10), where both wells and septic systems serve individual lots. The Open Space layout simply shows back sections of the lots as possible open space areas. The project proponent does not seek to build this project as an Open Space Development.

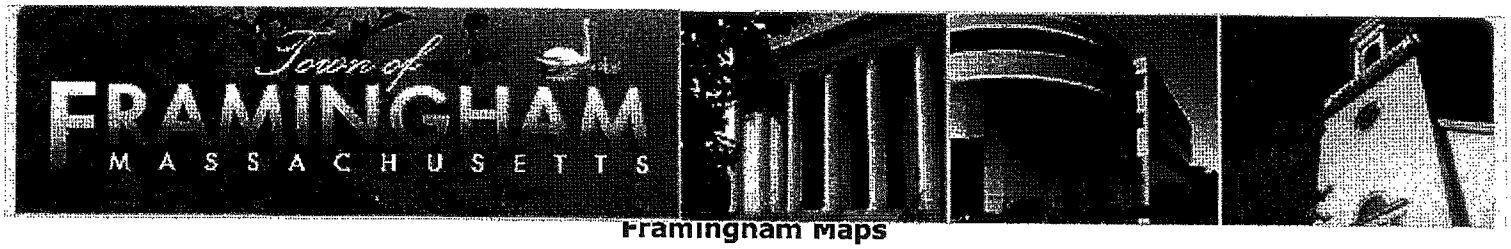
There is no benefit to an Open Space plan were the roadway will be extended in the future thus lesser frontages would not reduce the roadway length. Finally, the roadway construction standards would not reduce the development cost.

Instead, based upon the developers concern for the surrounding Open Space and access to such a vast amount of Open Space parcels in the surrounding vicinity, in particular the SVT lands and the Bay Circuit Trail, the developer proposes an access easement along the north and east property line for a foot trail. This trail may, in the future, connect across abutting land to the east to other Open Space and Bay Circuit Trail parcels.

The project proponent also will designate a lot on site pursuant to MGL Ch 41 Section 81U as open space park land.

Appendix A - Site Locus Maps


LOT-5
LOT 6
LOT-4
LOT 7
LOT 8
ROAD
LOT-3
PCL-A
LOT-2
LOT-1
EX-FRTG. LOT
EX-FRTG. LOT

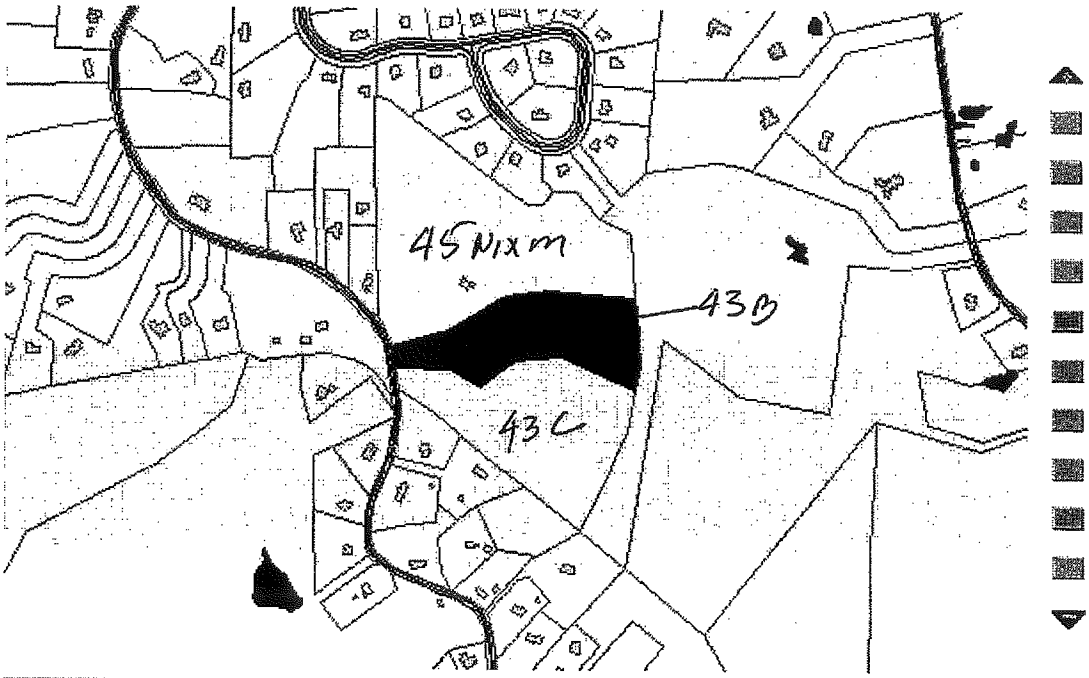


Framingham Maps

43 NIXON RD

Click on map to select property

Search:



Select Additional Information

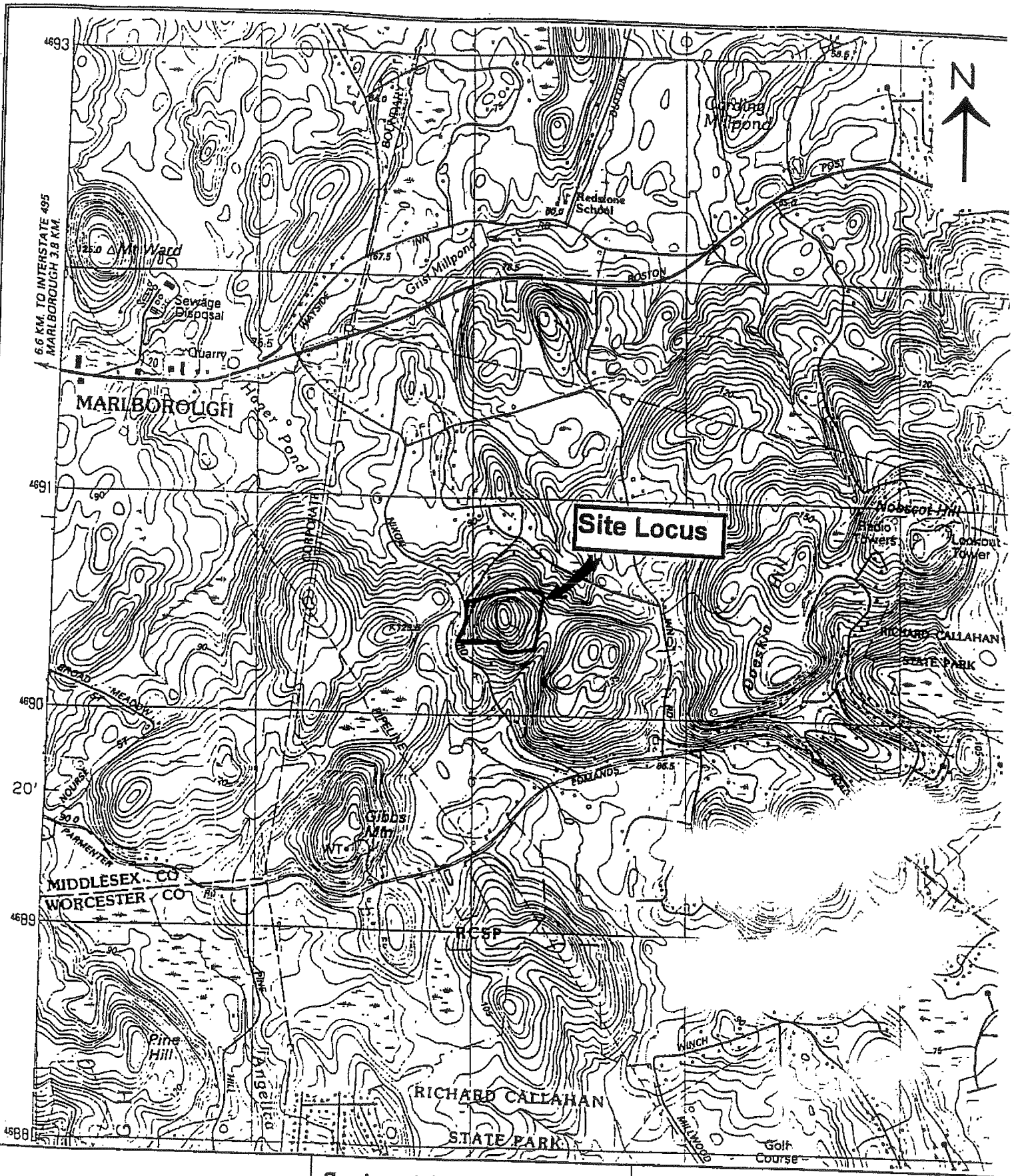
Scale Factor 1 : 10,000

Address | Mapping | Help | About

SITE LOCUS MAP

Locus consists of:

45 in its Entirety (w/house)
Part of 43B



45 Nixon Road
Framingham, MA

Scale: 1:25,000
Source: USGS Quadrangle
Framingham, 1987

SITE LOCUS MAP

Appendix B - Open Space Locus

- Parking
- Private
- Roadside Parking
- Information
- Bridge
- Trails
- SVT Biking Allowed
- Bay Circuit Trail
- Perennial Stream
- Intermittent Stream
- Pond/Lake
- Wetland
- Sudbury Valley Trustees
- Callahan State Park
- Sudbury Valley Trustees CR
- Municipal

Sudbury Valley Trustees in Northwest Framingham

0 0.25 0.5 Miles

SUDBURY VALLEY TRUSTEES

OPEN SPACE/Recreation Lands

Appendix C - Soils Reports

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415B, 415C, 416D, 106C (Soil Map Unit)

   NARRAGANSETT SILT
   Soil Name

   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published) (Publication Scale) (Map Unit)

   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No

   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map (Map Unit) (Name)

   Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

LOT 1

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-12 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

Estimated Depth to High Groundwater: > 108" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-12

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12"	Ap	10 YR 3/2				SL					
12-34	Bw	10 YR 6/8				LS					
34-108	C	10 YR 5/4				SAND & GRAVEL					

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 108"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-13 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 117" inches | elevation

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

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-13

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10 YR 3/2				SL					
10-27	Bw	10YR 6/8				LS					
27-58	C1	10 YR 6/4				FINE SAND					
58-117	C2	10 YR 5/4				SAND &	GRAVEL				

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 117"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-12	DTH-13
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. NONE inches	B. NONE inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2.

Index Well Number	Reading Date	Index Well Level
Adjustment Factor	Adjusted Groundwater Level	

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

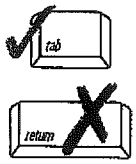
	Upper boundary:	Lower boundary:
DTH-12	12"	108"
DTH-13	10"	117"

inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	3-6-12 (Date)	9:30 (Time)	3-6-12 (Date)	9:30 (Time)
Observation Hole #	PT-L		PT-M	
Depth of Perc	60"		65"	
Start Pre-Soak	9:32		9:53	
End Pre-Soak	9:47		10:08	
Time at 12"	9:47		10:08	
Time at 9"	9:50		10:15	
Time at 6"	9:55		10:26	
Time (9"-6")	5		11	
Rate (Min./Inch)	2 MPI		4 MPI	
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☒ Test Failed: ☐	

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415 B, 415 C, 416 D, 106 C (Soil Map Unit)

   NARRAGANSETT SILT
   Soil Name

   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: Year Published / Publication Scale / Map Unit

   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No

   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map — Map Unit / Name

   Wetlands Conservancy Program Map — Map Unit / Name

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

Lot 2

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-14 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 37" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-14

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	Ap	10YR 3/2				SL					
8-32	Bw	10YR 6/8				LS					
32-104	C	10YR 5/4	37"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-15 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 49" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-15

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	Ap	10 YR 3/2				SL					
7-29	Bw	10 YR 6/8				LS					
29-118	C	10 YR 6/4	29"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-14	DTH-15
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☐ Depth to soil redoximorphic features (mottles)	A. 37" inches	B. 49" inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-14	8" inches	104" inches
DTH-15	7" inches	118" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-16 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 43" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-16

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8"	Ap	10 YR 3/2				LS					
8-27"	Bw	10 YR 6/8				SL					
27-114"	C_1	10 YR 5/4	43"			LS					

Additional Notes:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

DTH-16

☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 43" inches	B. _____ inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

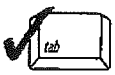
   ☒ Yes ☐ No

   b. If yes, at what depth was it observed? Upper boundary: 8" inches Lower boundary: 114" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM
City/Town

MA
State

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	3-6-12 Date / Time	3-6-12 Date / Time
Observation Hole #	PT-N	PT-"O"
Depth of Perc	63"	54"
Start Pre-Soak	10:45	12:31
End Pre-Soak	11:00	12:46
Time at 12"	11:00	12:46
Time at 9"	12:02	1:12
Time at 6"	1:17	1:43
Time (9"-6")	75	31
Rate (Min./Inch)	25 MPI	11 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

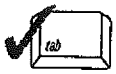
KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	Date / Time	Date / Time
	3-6-12 / 11:30	
Observation Hole #	PT-P	
Depth of Perc	58"	
Start Pre-Soak	11:48	
End Pre-Soak	12:03	
Time at 12"	12:03	
Time at 9"	1:21	
Time at 6"	3:37	
Time (9"-6")	136	
Rate (Min./Inch)	46 MPI	
Test Passed: ☒ / Test Failed: ☐		Test Passed: ☒ / Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH 4/3-5 4/3/12 (Date) 8:00 (Time) FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.); LIMITED (Surface Stones); 2-8% (Slope (%))
WOODS (Vegetation); GROUND MORANE (Landform); Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: Depth Weeping from Pit; Depth Standing Water in Hole

Estimated Depth to High Groundwater: 51" inches elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-5	Ap	10YR 3/2				SL					
5-28	Bw	10YR 6/8				LS					
28-90	C	10YR 5/4	51"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH 4/3-6 | 4/3/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 46" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Ap	10 YR 3/2				SL					
6-27	Bw	10 YR 6/8				LS					
27-65	C	10 YR 5/4	46"			SL					

Additional Notes:

NO WATER

REFUSAL @ 65"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

		DTH 4/3-5	DTH 4/3-6
☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 51" inches	B. 46" inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH 4/3-5	5" inches	90" inches
DTH 4/3-6	6" inches	65" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-7

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Ap	10YR3/2				SL					
6-37	Bw	10YR 6/8				LS					
37-109	C	10YR 5/4	54"			SL					

Additional Notes:

No WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH 4/3-7 | 4/3/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 54" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-8

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	Ap	10 YR 3/2				SL					
7-29	Bw	10 YR 6/8				LS					
29-84	C	10 YR 5/4	42"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH 4/3-8 | 4/3/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 42" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH 4/3-7	DTH 4/3-8
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 54" inches	B. 42" inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH 4/3-7	6" inches	109" inches
DTH 4/3-8	7" inches	84" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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

A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM | MA | Zip Code
City/Town | State

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	4-3-12	1:00	4-3-12	1:30
	Date	Time	Date	Time
Observation Hole #	PT 4/3-C		PT 4/3-D	
Depth of Perc	58"		56"	
Start Pre-Soak	1:11		1:55	
End Pre-Soak	1:26		2:10	
Time at 12"	1:26		2:10	
Time at 9"	1:52		2:42	
Time at 6"	2:18		3:39	
Time (9"-6")	26		57	
Rate (Min./Inch)	9 MPI		19 MPI	
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☒ Test Failed: ☐	

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415 B, 415 C, 416 D, 106 C (Soil Map Unit)
   NARRAGANSETT SILT
   Soil Name
   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: Year Published / Publication Scale / Map Unit
   Geologic Material
   Landform

4. Flood Rate Insurance Map
   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No
   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map — Map Unit / Name
   Wetlands Conservancy Program Map — Map Unit / Name

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

LOT 2

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-17 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

Estimated Depth to High Groundwater: 47" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-17

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	Ap	10YR3/2				SL					
7-28	Bw	10YR6/8				LS					
28-121	C	10YR5/4	47"			SL					

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-18 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 46" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-18

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	Ap	10 YR 3/2				SL					
8-30	Bw	10 YR 6/8				LS					
30-110	C	10 YR 5/4	46"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-17	DTH-18
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 47" inches	B. 46" inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-17	7"	121"
DTH-18	8"	110"
	inches	inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-19 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))

   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	____ feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 51" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-19

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9"	Ap	10YR 3/2				SL					
9-31	Bw	10YR 6/8				LS					
31-105	C	10 YR 5/4	51"			SL					

Additional Notes:

No WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-22 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 25" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-22

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Ap	10 YR 3/2				SL					
6-32	Bw	10 YR 6/8	25"			LS					
32-130	C1	10 YR 5/4				SL					

Additional Notes:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

		DTH-19	DTH-22
☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 51" inches	B. 25" inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-19	9" inches	105" inches
DTH-22	6" inches	130" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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

A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	3-6-12 (Date) 2:20 (Time)	3-6-12 (Date) 10:30 (Time)
Observation Hole #	PT-S	PT-V
Depth of Perc	64"	58"
Start Pre-Soak	2:29	10:50
End Pre-Soak	2:44	11:05
Time at 12"	2:44	11:05
Time at 9"	3:22	12:58
Time at 6"	4:24	2:38
Time (9"-6")	62	100
Rate (Min./Inch)	21 MPI	34 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415B, 415C, 416D, 106C (Soil Map Unit)
   NARRAGANSETT SILT
   Soil Name
   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: Year Published / Publication Scale / Map Unit
   Geologic Material
   Landform

4. Flood Rate Insurance Map
   Above the 500-year flood boundary? ☒ Yes ☐ No
   Within the 100-year flood boundary? ☐ Yes ☒ No
   Within the 500-year flood boundary? ☐ Yes ☒ No
   Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map — Map Unit / Name
   Wetlands Conservancy Program Map — Map Unit / Name

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

Lot 4

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-20 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
WOODS (Vegetation) | GROUND MORANE (Landform) | (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: (Depth Weeping from Pit) (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: 63" (inches) (elevation)

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-20

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9"	Ap	10YR3/2				SL					
9-32"	Bw	10YR6/8				LS					
32-102	C	10YR5/4	63"			SL					

Additional Notes:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: 4/3-1, 4/3-2, 4/3-3, 4/3-4

1. Location — Date: 4-3-12 — Time: 8:00 — Weather: FAIR

   Ground Elevation at Surface of Hole: - — Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) — Surface Stones: LIMITED — Slope (%): 2-8%

   Vegetation: WOODS — Landform: GROUND MORANE — Position on Landscape (attach sheet):

3. Distances from: Open Water Body: >100' feet — Drainage Way: >100' feet — Possible Wet Area: >100' feet

   Property Line: >50' feet — Drinking Water Well: >100' feet — Other: ____ feet

4. Parent Material: TILL (SANDY LOAM) — Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No — If yes: Depth Weeping from Pit ____ — Depth Standing Water in Hole ____

   Estimated Depth to High Groundwater: ____ inches ____ elevation

4/3-1	42"
4/3-2	39"
4/3-3	32"
4/3-4	38"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	Ap	10YR 3/2				SL					
7-36	Bw	10YR 6/8				LS					
36-108	C	10YR 5/4	42"			SL					

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Ap	10YR 3/2				SL					
6-29	Bw	10YR 6/8				LS					
29-109	C	10YR 6/4	39"			SL					

Additional Notes:

No WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Ap	10 YR 3/2				SL					
6-32	Bw	10YR 6/8	32"			LS					
32-121	C	10 YR 5/4				SL					

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH 4/3-4

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	Ap	10YR 3/2				SL					
8-31	Bw	10YR 6/8				LS					
31-110	C	10YR 5/4	38"			SL					

Additional Notes:

NO WATER

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

		DTH-20	DTH 4/3-1
☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 63" inches	B. 42" inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-20	9" inches	102" inches
DTH-4/3-1	7" inches	108" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

		A.	B.
☐	Depth observed standing water in observation hole	DTH 4/3-2 A. ____ inches	DTH 4/3-3 B. ____ inches
☐	Depth weeping from side of observation hole	A. ____ inches	B. ____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 39" inches	B. 32" inches
☐	Groundwater adjustment (USGS methodology)	A. ____ inches	B. ____ inches

2. ____ Index Well Number ____ Reading Date ____ Index Well Level

____ Adjustment Factor ____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☒ Yes ☐ No

b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH 4/3-2	6" inches	109" inches
DTH 4/3-3	6" inches	121" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used: DTH 4/3-4

	A.	B.
☐ Depth observed standing water in observation hole	A. ____ inches	B. ____ inches
☐ Depth weeping from side of observation hole	A. ____ inches	B. ____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 38" inches	B. ____ inches
☐ Groundwater adjustment (USGS methodology)	A. ____ inches	B. ____ inches

2. ____ Index Well Number ____ Reading Date ____ Index Well Level

____ Adjustment Factor ____ Adjusted Groundwater Level

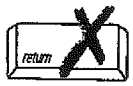
E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?
      ☒ Yes ☐ No
   b. If yes, at what depth was it observed? Upper boundary: 8" inches Lower boundary: 110" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	4-3-12 Date, 9:00 Time	4-3-12 Date, 3:00 Time
Observation Hole #	PT 4/3-A	PT 4/3-E
Depth of Perc	60"	83"
Start Pre-Soak	9:20	3:15
End Pre-Soak	9:35	3:30
Time at 12"	9:35	3:30
Time at 9"	10:12	4:13
Time at 6"	10:54	4:50
Time (9"-6")	42	37
Rate (Min./Inch)	14 MPI	13 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415B, 415C, 416D, 106C (Soil Map Unit)

   NARRAGANSETT SILT
   Soil Name

   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published) (Publication Scale) (Map Unit)

   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No

   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map (Map Unit) (Name)

   Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

Lot 5

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-10 / DTH-11 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 84" inches | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	Ap	10YR3/2				SL					
7-25	Bw	10YR6/8				LS					
25-84	C	10YR5/4				SL					

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 84"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-11

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9	Ap	10 YR 3/2				SL					
9-28	Bw	10 YR 6/8				LS					
28-108	C	10 YR 5/4				LS					

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 108"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-10	DTH-11
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☐ Depth to soil redoximorphic features (mottles)	A. NONE inches	B. NONE inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2.

Index Well Number	Reading Date	Index Well Level
Adjustment Factor	Adjusted Groundwater Level	

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-10	7" inches	84" inches
DTH-11	9" inches	108" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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

A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	3-5-12 Date / 2:30 Time	3-5-12 Date / 3:00 Time
Observation Hole #	PT-J	PT-K
Depth of Perc	60"	56"
Start Pre-Soak	2:52	3:11
End Pre-Soak	3:07	3:26
Time at 12"	3:07	3:26
Time at 9"	3:40	3:32
Time at 6"	4:13	3:38
Time (9"-6")	33	6
Rate (Min./Inch)	11 MPI	2 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415 B, 415 C, 416 D, 106 C (Soil Map Unit)

   NARRAGANSETT SILT
   Soil Name

   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: Year Published / Publication Scale / Map Unit

   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No

   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map — Map Unit / Name

   Wetlands Conservancy Program Map — Map Unit / Name

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

Lot 6

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH 8 / DTH 9 — 3/5-6/12 (Date) — 8:00 (Time) — FAIR (Weather)

1. Location — Ground Elevation at Surface of Hole: - — Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) — LIMITED (Surface Stones) — 2-8% (Slope (%))
   WOODS (Vegetation) — GROUND MORANE (Landform) — (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) — Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No — If yes: Depth Weeping from Pit — Depth Standing Water in Hole

   Estimated Depth to High Groundwater: > 117" inches — elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-8

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-11	Ap	10 YR 3/2				SL					
11-26	Bw	10 YR 6/8				LS					
26-104	C1	10 YR 5/4				SL					

Additional Notes:

NO WATER OR MOTTLES

NO REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-9

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10 YR 3/2				SL					
10-47	Bw	10 YR 6/8				LS					
47-117	C	10 YR 5/4				LS					

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 117"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-8	DTH-9
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. NONE inches	B. NONE inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-8	11" inches	104" inches
DTH-9	10" inches	117" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

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

A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM
City/Town

MA
State

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	3-5-12 Date / 1:30 Time	3-5-12 Date / 2:00 Time
Observation Hole #	PT-H	PT-I
Depth of Perc	58"	60"
Start Pre-Soak	1:38	2:11
End Pre-Soak	1:53	2:26
Time at 12"	1:53	2:26
Time at 9"	3:05	2:31
Time at 6"	4:30	2:38
Time (9"-6")	85	7
Rate (Min./Inch)	29 MPI	3 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415 B, 415 C, 416 D, 106 C (Soil Map Unit)
   NARRAGANSETT SILT
   Soil Name
   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published) (Publication Scale) (Map Unit)
   Geologic Material
   Landform

4. Flood Rate Insurance Map
   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No
   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map (Map Unit) (Name)
   Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

1 of 1

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: DTH-5 / DTH-6 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))
   Vegetation: WOODS | Landform: GROUND MORANE | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 84" (inches) DTH-5 | elevation

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-13	Ap	10YR 3/2				SL					
13-32	Bw	10YR 6/8				LS					
32-90	C_1	10YR 6/4	84			FINE SAND					
90-116	C_2	10YR 5/4				SAND & GRAVEL					

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-11	Ap	10YR3/2				SL					
11-28	Bw	10YR6/8				LS					
28-142	C1	10YR6/4	112			SAND &	GRAVEL				

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-5	DTH-6
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 84" inches	B. 112" inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2.

Index Well Number	Reading Date	Index Well Level
Adjustment Factor	Adjusted Groundwater Level	

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

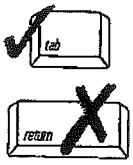
   b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-5	13" inches	116" inches
DTH-6	11" inches	142" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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



A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	3-5-12 Date / 11:00 Time	3-5-12 Date / Time
Observation Hole #	PT-E	PT-F
Depth of Perc	71"	52"
Start Pre-Soak	11:16	11:17
End Pre-Soak	11:31	11:32
Time at 12"	11:31	11:32
Time at 9"	11:36	11:38
Time at 6"	11:42	11:44
Time (9"-6")	6	6
Rate (Min./Inch)	2 MPI	2 MPI
Test Passed: ☒ / Test Failed: ☐		Test Passed: ☒ / Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address

Map/Lot #

FRAMINGHAM
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☒ Yes ☐ No If yes: ON LINE (Year Published) - (Publication Scale) 415B, 415C, 416D, 106C (Soil Map Unit)

   NARRAGANSETT SILT
   Soil Name

   -
   Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published) (Publication Scale) (Map Unit)

   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☒ No

   Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: National Wetland Inventory Map (Map Unit) (Name)

   Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): 2/2012 (Month/Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

7. Other references reviewed:

Lot 8

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: PTH-5 / PTH-6 | 3/5-6/12 (Date) | 8:00 (Time) | FAIR (Weather)

1. Location

   Ground Elevation at Surface of Hole: - | Location (identify on plan): -

2. Land Use: RESIDENTIAL (e.g., woodland, agricultural field, vacant lot, etc.) | LIMITED (Surface Stones) | 2-8% (Slope (%))

   WOODS (Vegetation) | GROUND MORANE (Landform) | Position on Landscape (attach sheet)

3. Distances from:

Open Water Body	>100' feet	Drainage Way	>100' feet	Possible Wet Area	>100' feet
Property Line	>50' feet	Drinking Water Well	>100' feet	Other	feet

4. Parent Material: TILL (SANDY LOAM) | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: Depth Weeping from Pit | Depth Standing Water in Hole

   Estimated Depth to High Groundwater: 76" (inches) PTH-4 (elevation)

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9"	Ap	10YR3/2				SL					
9-27"	Bw	10YR6/8				LS					
27-54"	C1	10YR5/4				SAND &	GRAVEL				
54-90	C2	10YR5/6				SL					

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 90"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-4

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-15	Ap	10YR 3/2				SL					
15-36	Bw	10YR 6/8				LS					
36-76	C_1	10YR 6/4				FINE SAND					
76-122	C_2	10YR 5/4	76"			SAND & GRAVEL					

Additional Notes:

NO WATER OR REFUSAL

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: DTH-7

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10YR3/2				SL					
10-27	Bw	10YR6/8				LS					
27-88	C	10YR5/4				SAND &	GRAVEL				

Additional Notes:

NO WATER OR MOTTLES

REFUSAL @ 88"

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	DTH-3	DTH-4
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. NONE inches	B. 76" inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number; _____ Reading Date; _____ Index Well Level

_____ Adjustment Factor; _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☒ Yes ☐ No

b. If yes, at what depth was it observed?

	Upper boundary:	Lower boundary:
DTH-3	9"	90"
DTH-4	15"	122"
DTH-7	16"	88"

inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

DTH-7

	A.	B.
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒ Depth to soil redoximorphic features (mottles)	A. NONE inches	B. _____ inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2.

Index Well Number	Reading Date	Index Well Level
Adjustment Factor	Adjusted Groundwater Level	

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

      ☒ Yes ☐ No

   b. If yes, at what depth was it observed? Upper boundary: 10" inches Lower boundary: 88" inches

Commonwealth of Massachusetts
City/Town of FRAMINGHAM
Percolation Test
Form 12

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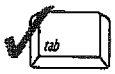

A. Site Information

NEXUM DEVELOPMENT CORP.
Owner Name

45 NIXON ROAD
Street Address or Lot #

FRAMINGHAM — City/Town
MA — State
Zip Code

Contact Person (if different from Owner)
Telephone Number

B. Test Results

	3-5-12 Date / 11:00 Time	3-5-12 Date / 12:30 Time
Observation Hole #	PT-D	PT-G
Depth of Perc	73"	70"
Start Pre-Soak	11:05	12:49
End Pre-Soak	11:20	1:04
Time at 12"	11:20	1:04
Time at 9"	11:27	1:20
Time at 6"	11:36	1:35
Time (9"-6")	9	15
Rate (Min./Inch)	3 MPI	5 MPI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

MICHAEL SULLIVAN
Test Performed By:

KELLY PAWLUCZONEK
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of FRAMINGHAM

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

3/6/12
Date

MICHAEL SULLIVAN #2374
Typed or Printed Name of Soil Evaluator / License #

11/94
Date of Soil Evaluator Exam

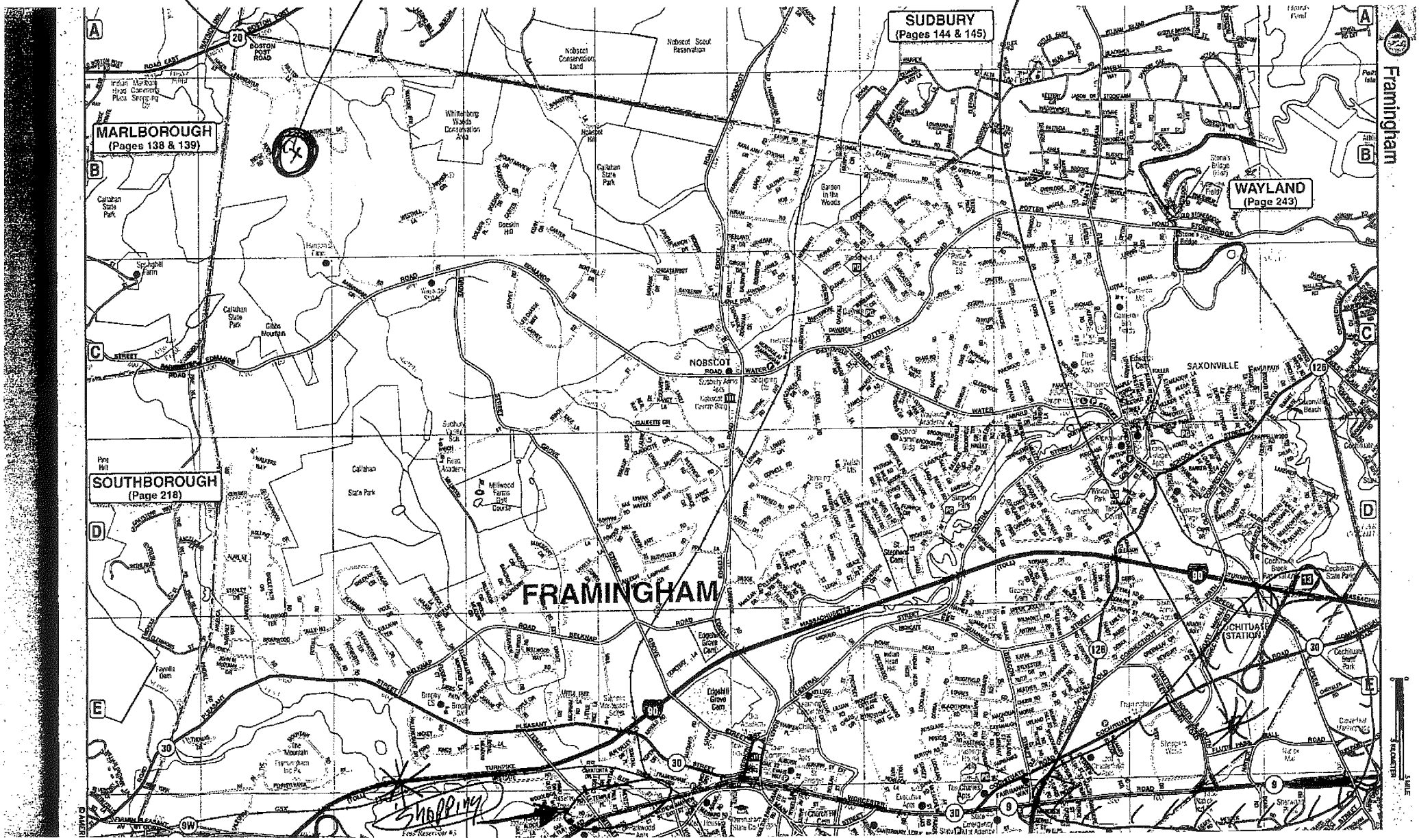
KELLY PAWLUCZONEK
Name of Board of Health Witness

FRAMINGHAM
Board of Health

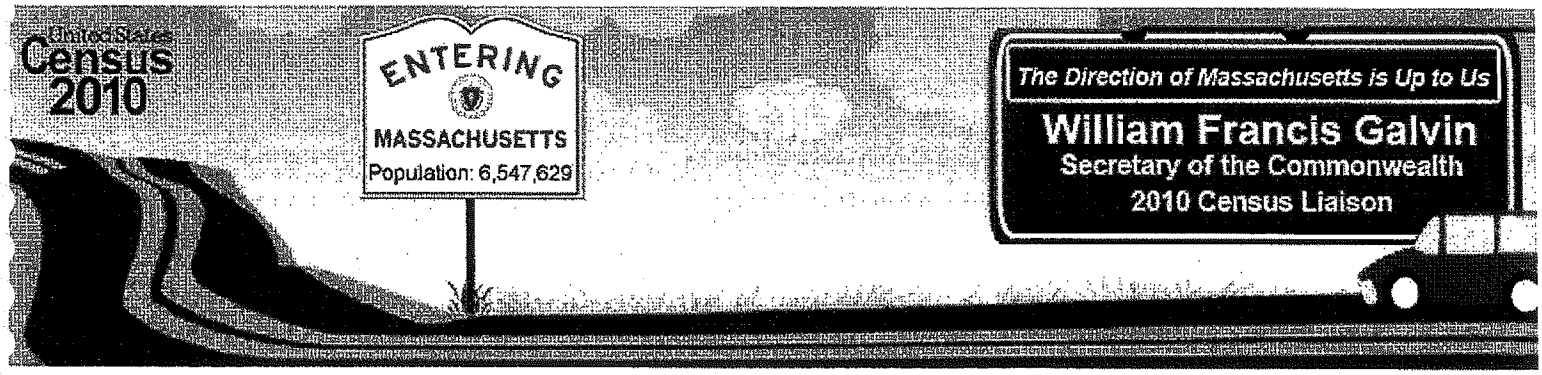
Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Appendix D - Shopping Mall Locus Map

Ford's Hill Estates
Nixon Road, Framingham, MA


Shopping Locus
Shopping/Recreation
Locus
Shopping + More
MARLBOROUGH
(Pages 138 & 139)
SUDBURY
(Pages 144 & 145)
WAYLAND
(Page 243)
SOUTHBOROUGH
(Page 218)
FRAMINGHAM
NOBSCOT
SAXONVILLE
CHITUATE STATION
Framingham
Shopping

Appendix E - Census 2012, Middlesex County Census Data 1



RELATED LINKS

U.S. Census...

Current Surveys
Website
Boston Regional Office
News Release
Other Census Data

American Community Survey ACS

Office of the Secretary of the Commonwealth of Massachusetts

Middlesex County

Note: Cities appear in all capital letters. Towns are in upper/lower case letters.

City or Town	2000	2010	% Change
Acton	20,331	21,924	7.84
Arlington	42,389	42,844	1.07
Ashby	2,845	3,074	8.05
Ashland	14,674	16,593	13.08
Ayer	7,287	7,427	1.92
Bedford	12,595	13,320	5.76
Belmont	24,194	24,729	2.21
Billerica	38,981	40,243	3.24
Boxborough	4,868	4,996	2.63
Burlington	22,876	24,498	7.09
CAMBRIDGE	101,355	105,162	3.76
Carlisle	4,717	4,852	2.86
Chelmsford	33,858	33,802	-0.17
Concord	16,993	17,668	3.97
Dracut	28,562	29,457	3.13
Dunstable	2,829	3,179	12.37
EVERETT	38,037	41,667	9.54
Framingham	66,910	68,318	2.10
Groton	9,547	10,646	11.51
Holliston	13,801	13,547	-1.84
Hopkinton	13,346	14,925	11.83
Hudson	18,113	19,063	5.24
Lexington	30,355	31,394	3.42
Lincoln	8,056	6,362	-21.03
Littleton	8,184	8,924	9.04
LOWELL	105,167	106,519	1.29
MALDEN	56,340	59,450	5.52
MARLBOROUGH	36,255	38,499	6.19
Maynard	10,433	10,106	-3.13

CENSUS DATA 1

Appendix F - Framingham CDP, Massachusetts Quick Facts Census Data 2

Framingham CDP, Massachusetts

People QuickFacts	Framingham CDP	Massachusetts
Population, 2011 estimate	X	6,587,536
Population, 2010 (April 1) estimates base	X	6,547,629
Population, percent change, April 1, 2010 to July 1, 2011	X	0.6%
Population, 2010	68,318	6,547,629
Persons under 5 years, percent, 2010	6.7%	5.6%
Persons under 18 years, percent, 2010	20.9%	21.7%
Persons 65 years and over, percent, 2010	13.6%	13.8%
Female persons, percent, 2010	51.7%	51.6%
White persons, percent, 2010 (a)	71.9%	80.4%
Black persons, percent, 2010 (a)	5.8%	6.6%
American Indian and Alaska Native persons, percent, 2010 (a)	0.3%	0.3%
Asian persons, percent, 2010 (a)	6.3%	5.3%
Native Hawaiian and Other Pacific Islander, percent, 2010 (a)	0.1%	0.0%
Persons reporting two or more races, percent, 2010	4.6%	2.6%
Persons of Hispanic or Latino origin, percent, 2010 (b)	13.4%	9.6%
White persons not Hispanic, percent, 2010	65.3%	76.1%
Living in same house 1 year & over, percent, 2007 -2011	83.1%	86.5%
Foreign born persons, percent, 2007-2011	26.1%	14.7%
Language other than English spoken at home, percent age 5+, 2007-2011	35.0%	21.4%
High school graduate or higher, percent of persons age 25+, 2007-2011	89.9%	88.9%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	43.8%	38.7%
Veterans, 2007-2011	3,059	412,617
Mean travel time to work (minutes), workers age 16+, 2007-2011	27.3	27.5
Homeownership rate, 2007-2011	57.1%	63.6%
Housing units in multi-unit structures, percent, 2007-2011	47.5%	41.8%
Median value of owner-occupied housing units, 2007-2011	$358,000	$343,500
Households, 2007-2011	26,167	2,522,409
Persons per household, 2007-2011	2.44	2.49
Per capita money income in the past 12 months (2011 dollars), 2007-2011	$33,665	$35,051
Median household income, 2007-2011	$66,047	$65,981
Persons below poverty level, percent, 2007-2011	9.1%	10.7%

Business QuickFacts	Framingham CDP	Massachusetts
Total number of firms, 2007	F	596,790
Black-owned firms, percent, 2007	F	3.4%
American Indian- and Alaska Native-owned firms, percent, 2007	F	0.4%
Asian-owned firms, percent, 2007	F	4.5%

CENSUS DATA 2

Appendix G - Metro Planning Data

Data taken from Metropolitan Area Planning Council website

Current Trends Regional Population by Municipality and Age
MetroFuture Modeling Region (164 Municipalities)
January 31, 2006

	Ages					
Framingham	00-04	4,201	4,324	4,277	4,307	4,443
Framingham	05-09	3,307	4,059	3,999	3,858	4,017
Framingham	10-14	3,155	3,825	3,403	3,229	3,245
Framingham	15-19	4,168	3,724	4,012	3,568	3,361
Framingham	20-24	6,288	4,410	5,009	4,693	4,431
Framingham	25-29	7,129	5,310	5,199	5,784	5,386
Framingham	30-34	6,055	6,312	5,391	5,854	5,718
Framingham	35-39	5,163	6,036	5,140	4,703	5,321
Framingham	40-44	4,794	5,426	4,928	4,084	4,287
Framingham	45-49	3,771	4,714	5,151	4,311	3,924
Framingham	50-54	3,105	4,305	4,804	4,557	3,843
Framingham	55-59	2,929	3,278	4,450	5,115	4,412
Framingham	60-64	2,932	2,496	3,905	4,675	4,527
Framingham	65-69	2,484	2,207	2,919	4,020	4,690
Framingham	70-74	1,874	2,130	2,183	3,440	4,203
Framingham	75-79	1,473	1,793	1,621	2,020	2,817
Framingham	80-85	1,045	1,208	1,296	1,203	1,893
Framingham	85+	1,116	1,353	1,374	1,320	1,488

Analysis by Connorstone

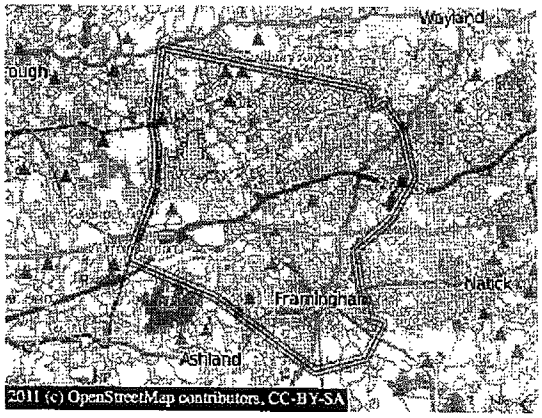
Children ages	**1990**	**2000**	**2010**	**2020**	**2030**
05-09	3,307	4,059	3,999	3,858	4,017
10-14	3,155	3,825	3,403	3,229	3,245
15-19	4,168	3,724	4,012	3,568	3,361
Sum =	**10,630**	**11,608**	**11,054**	**10,655**	**10,623**
Children/ house (26,000 houses)	**0.4**	**0.45**	**0.42**	**0.41**	**0.41**

Appendix H - Massachusetts School and District Profiles Framingham

Framingham

Framingham is categorized by MAPC as a Subregional Urban Center. These communities are characterized by an urban-scale downtown core surrounded by residential neighborhoods with a mix of housing. Many are home to sizeable immigrant, low-income, and minority communities. New growth takes the form of redevelopment in downtown or industrial areas, and greenfield development on the periphery.

VIEW PRINTER-FRIENDLY PAGE

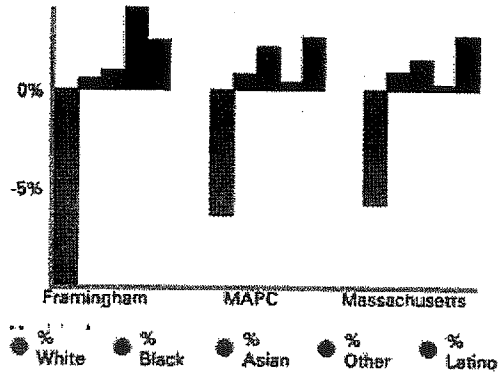


See another City or Town

Demographics View All

Change in Racial/Ethnic Share

Year(s): 2000,2010 • Source: Census



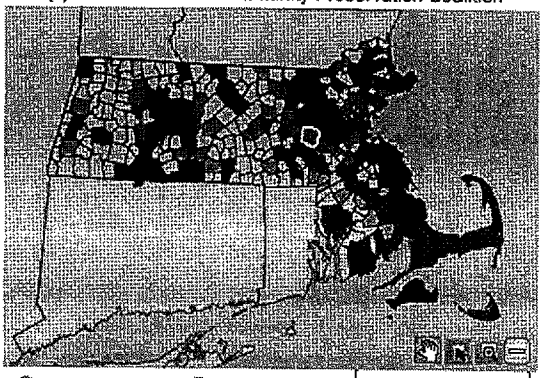
Click image for interactive Weave Visualization.

Choose Visualization

Civic Vitality & Governance View All

Community Preservation Act Votes

Year(s): 2011 • Source: Community Preservation Coalition



Click image for interactive Weave Visualization.

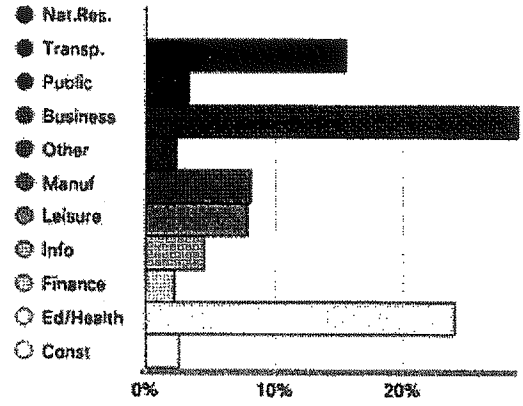
Choose Visualization

Economy View All

Education View All

Employment by Sectors

Year(s): 2010 • Source: MA EOLWD ES-202

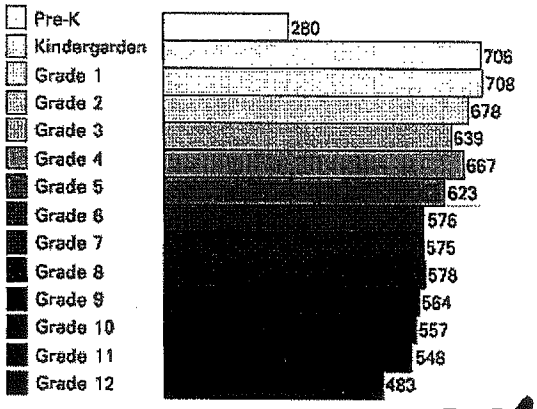


Click image for interactive Weave Visualization.

Choose Visualization

Enrollment by Grade

Year(s): 2010-11 • Source: DESE



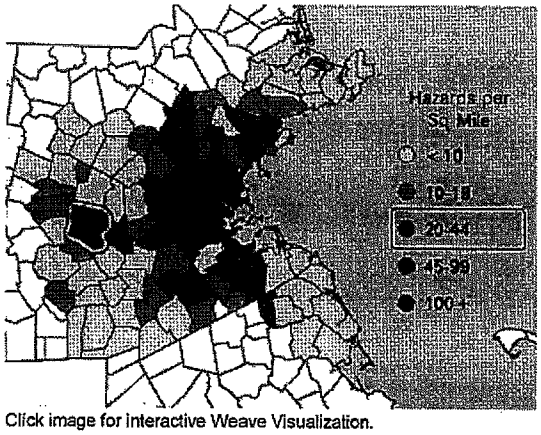
Enrollment by Grade

TOTAL = 8182

Environment & Energy View All

Environmental Hazards

Year(s): 1990-2004 • Source: Northeastern



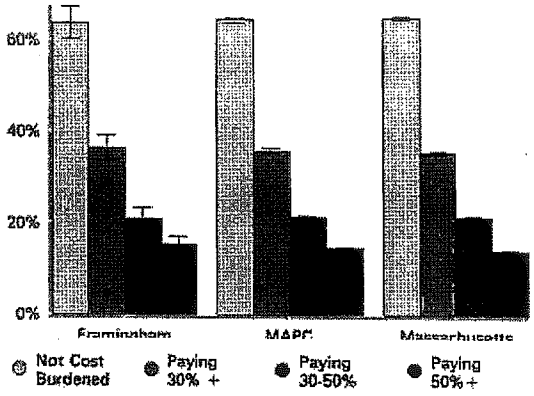
Click image for interactive Weave Visualization.

Choose Visualization

Housing View All

Owners Housing Cost Burden

Year(s): 5yr Avg 2007-11 • Source: ACS



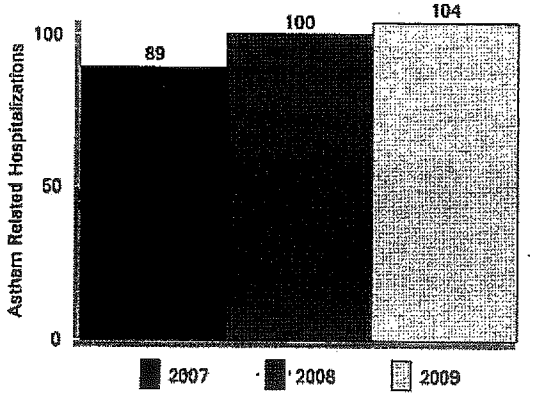
Click image for interactive Weave Visualization.

Choose Visualization

Public Health View All

Asthma Related Hospitalizations

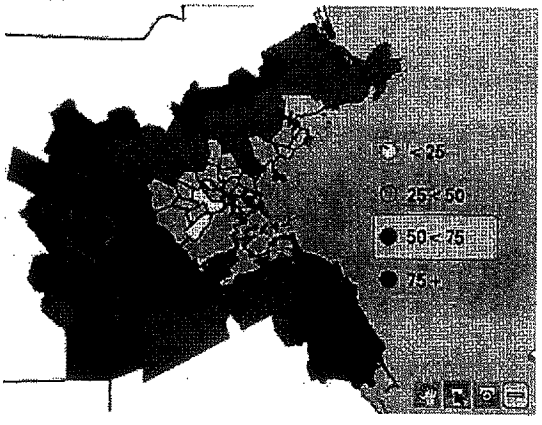
Year(s): 2007-09 • Source: MA DPH



Transportation View All

Daily Vehicle Miles

Year(s): 2005-07 • Source: MassGIS

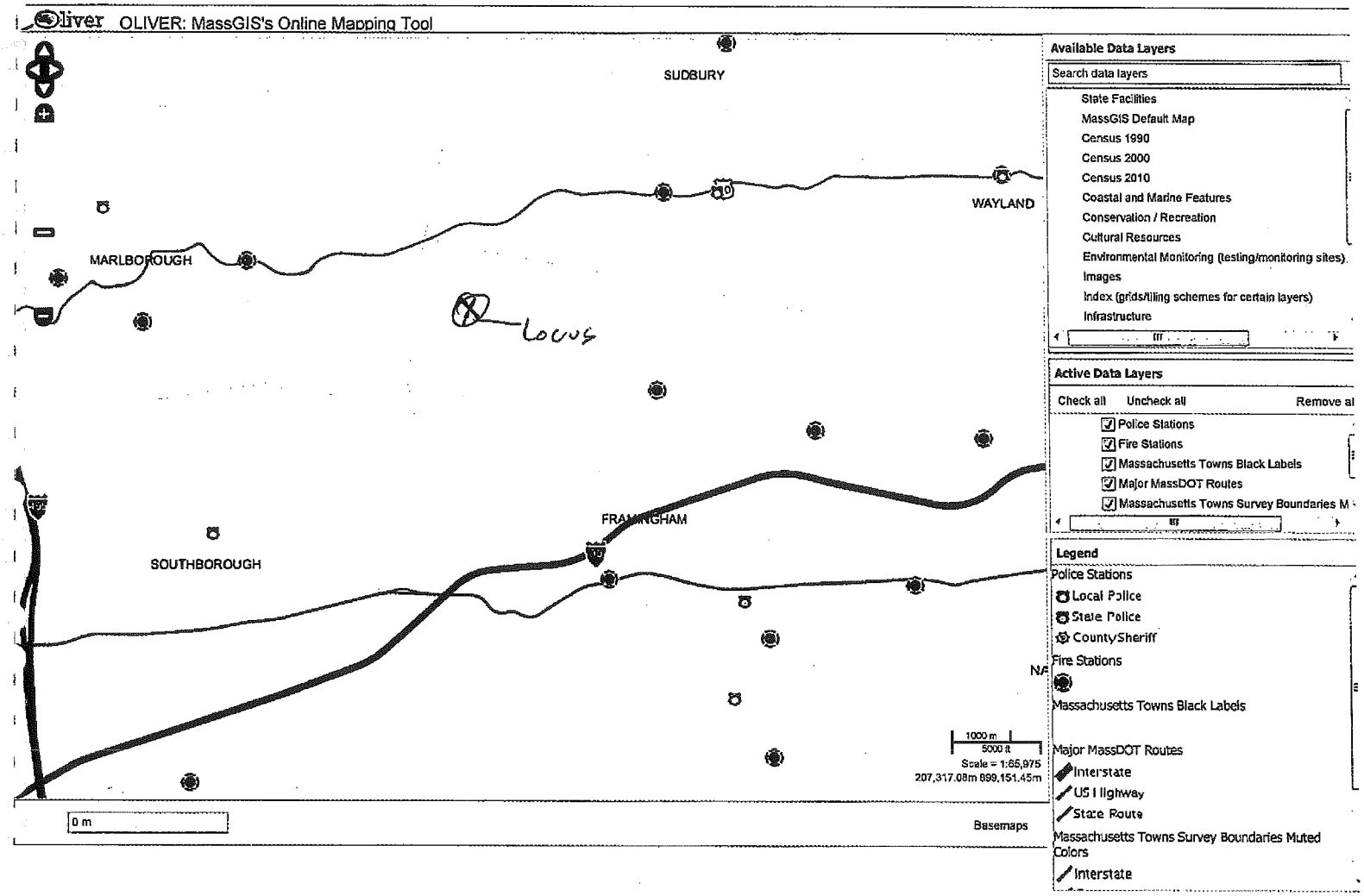


Appendix I - Town of Framingham revenue Statement

Town of Framingham
Combined Statement of Revenues, Expenditures, and Changes in Fund Balance
All Governmental Fund Types and Expendable Trust Funds
Fund Basis Statement for Free Cash Certification
For the Fiscal Year Ended June 30, 2011
Unaudited

	General	Special Revenue	Capital Projects	EnterpriseCapital Projects	Enterprise Funds	Health Ins Trust Fund	Trusts	Total (Memo)
Revenues								
Property taxes	$ 156,690,050	$ -	$ -	$ -	$ -	$ -	$ -	$ 156,690,050.00
Excise	8,612,521	-	-	-	-	-	-	8,612,521
Penalties, interest and other taxes	1,587,783	-	-	2,701	-	-	-	1,590,484
Intergovernmental	33,314,710	14,855,209	1,519,337	8,517,681			-	58,206,937
Fees	470,649	-	-	228,655	294,962	-	-	994,266
Licenses & Permits	1,974,226	50,124	-	-	-	-	-	2,024,350
Charges for services	1,766,608	2,072,930	-	-	33,292,816	-	3,911,491	41,043,845
Investment Earnings	1,071,236	6,470	-	-	1,350,911	101,291	566,507	3,096,415
Fines and forfeitures	476,903	3,750	-	-	-	-	-	480,653
Miscellaneous	128,758	1,500	41,350	-	5,027	-	-	176,635
Contributions	35,000	5,085,052	65,345	31,468	25,268	44,139,310	715,780	50,097,223
Total Revenue	206,128,444	22,075,035	1,626,032	8,780,505	34,968,984	44,240,601	5,193,778	323,013,379
Expenditures								
General Government	7,012,137	2,243,257	1,215,642	-	-	-	187,147	10,658,183
Public Safety	23,315,860	857,555	1,542,906	-	-	-	3,520,789	29,237,110
Education	97,181,336	15,628,945	2,019,008	-	-	-	-	114,829,289
Public Works	12,286,317	86,913	3,585,376	37,038,786	24,666,284	-	385,307	78,048,983
Human Services	1,177,391	116,282	-	-	-	-	-	1,293,673
Culture and Recreation	5,195,095	693,718	2,019,763	4,797	-	-	7,416	7,920,789
Miscellaneous	47,859,343	-	-	-	-	44,500,601	-	92,359,944
Debt Service	8,723,809	-	20,736	434,076	4,487,384	-	-	13,666,005
Intergovernmental	3,730,333	-	-	-	-	-	393,287	4,123,620
Total Expenditures	206,481,621	19,626,670	10,403,431	37,477,659	29,153,668	44,500,601	4,493,946	352,137,596
Excess (deficiency) of revenues over expenditures	(353,177)	2,448,365	(8,777,399)	(28,697,154)	5,815,316	(260,000)	699,832	(29,124,217)
Other Financing Sources (Uses)								
Proceeds of Bonds	-	-	17,815,426	37,406,234	-		-	55,221,660
Proceeds of Notes	-	-	-		-		-	-
Operating transfers in	2,923,639	18,261	316,575	425,255	191,577	97,329	1,461,086	5,433,622
Change in Agency Accounts	35	-	20,736	-	-		(289,767)	(268,996)
Operating transfers out	(1,461,086)	(403,445)	(91,723)	(617,184)	(2,563,897)	(97,329)	(198,958)	(5,433,622)
Total other financing sources (uses)	1,462,488	(385,184)	18,061,014	37,214,305	(2,372,320)	-	972,361	54,952,664
Excess of Revenues and other sources over (under) expenditures and other uses	1,109,311	2,063,181	9,283,615	8,517,151	3,442,996	(260,000)	1,672,193	25,828,447
Fund Balance, June 30, 2010	9,231,866	6,895,752	(9,482,068)	(30,953,439)	7,144,763	405,811	8,554,463	(8,202,852)
Fund Balance, June 30, 2011	$ 10,341,177	$ 8,958,933	$ (198,453)	$ (22,436,288)	$ 10,587,759	$ 145,811	$ 10,226,656	$ 17,625,595

Appendix J - Fire Station Police Station from MassGIS Plan



FROM
MASS GIS
FIRE STATIONS
POLICE STATIONS

Appendix K – Sight Distance Measurement

BRISTOL TRAFFIC
&
TRANSPORTATION CONSULTING LLC

Traffic Studies, Roadway Designs, Intersection Improvements, Site Designs

BTTC No. 21200107

January 4, 2013

Vito Colonna P.E.
Connorstone Engineering, Inc.
10 Southwest Cutoff
Northborough, MA 01748

Subject: **Sight Distance Measurement**
Subdivision Estates Residential Subdivision
Nixon Road, Framingham, MA

Dear Mr. Colonna:

Pursuant to your recent verbal authorization, Bristol Traffic & Transportation Consulting LLC (BTTC) conducted a site investigation to measure the available sight distance along Nixon Road at the proposed subdivision access roadway intersection. At that location there is a small embankment with brush and minor trees growing on the side of Nixon Road between the stone wall and the edge of pavement. It is noted that the construction of the access roadway will include a moderate amount of clearing and excavation to bring the existing embankment down to road level, thus clearing existing vegetation from the sight lines for exiting drivers. After clearing and excavation is complete, a field review will indicate whether any additional brush / vegetation removal along the project frontage would further improve intersectional sight lines.

Nixon Road is posted for a speed limit of 25 MPH. The profile of Nixon Road in the vicinity of the site roadway is relatively flat with no sight line restrictions due to elevation changes. To the north from the proposed subdivision roadway, Nixon Road curves to the west (left) and to the south, Nixon Road also curves to the west (right). A road alignment that curves away from the project side of the street provides better sightlines since drivers stopped waiting to exit the site can see across the pavement surface with no nearby vegetation blocking the view, as can be the case when a road curves toward the project.

Available sight distances at intersecting roadways or driveways are an important factor in the safety of both an exiting vehicle and an approaching vehicle. BTTC has measured in the field the available sight distances at the location of the proposed site roadway on Nixon Road following the methodologies utilized by the Massachusetts Department of Transportation - Highway Division. MDOT follows the methods recommended by the American Association of State Highway and Transportation Officials (AASHTO) for measuring available Stopping Sight Distance (SSD). SSD is the minimum sight distance recommended by AASHTO for safety, for drivers to anticipate and avoid collisions and is based on the time it takes an approaching vehicle to come to a complete stop once the driver has perceived a conflict.

The minimum sight distance requirements are set forth in the AASHTO publication titled A Policy on Geometric Design of Highways and Streets, 2011. For a 25 mph speed limit, the stopping sight distance recommended for oncoming traffic to safely stop is 155 feet. The Framingham regulations require SSD for the posted speed plus an added 10 MPH or 35 MPH in the Nixon Road case. The recommended SSD for 35 MPH, as listed by AASHTO, is 250 feet. This SSD is measured from an approaching vehicle driver eye height of 3.5 feet to an object located in the roadway that is 2 feet high. To the north on the west side of Nixon Road there is overhanging vegetation along other property currently owned by this

subdivisions applicant. That vegetation will be cleared by the developer thus increasing the available SSD in that direction to greater than 300 feet during summer when the foliage may otherwise reduce the sightline.

The Table below compares the 35 MPH recommended minimum stopping sight distance and the actual field measurements.

Summary of Sight Distance Analysis

Location		Stopping Sight Distance (Feet) - 35MPH		
		AASHTO Criteria	Measured Distance	SSD Criteria Satisfied?
Site Roadway at Nixon Road		**SSD**	SSD	
	North	**250**	>300	Yes
	South	**250**	>325	Yes

As indicated by the measurements, the required minimum safe stopping sight distance measured at the proposed site roadway exceeds the criteria set forth by AASHTO for 35 MPH.

A second sightline measurement AASHTO recommends that is not included in the Framingham regulations is called Intersection Sight Distance (ISD). This sight line is measured from the side street location of an exiting vehicle looking in both directions along the main road from a drivers eye height of 3.5 feet to an oncoming vehicle height of 3.5 feet. ISD is the distance for a driver leaving an intersection or driveway to judge when an acceptable gap in through traffic exists to anticipate and avoid potential conflicts without making the oncoming vehicle slow unreasonably. ISD aides in the efficiency of the intersection operation, whereas SSD provides for safety at the intersection. AASHTO recommends an ISD of 390 feet for 35 MPH. To the north on the west side of Nixon Road there is overhanging vegetation along other property currently owned by this subdivisions applicant. That vegetation will be cleared by the developer thus increasing the available ISD and SSD in that direction so the ISD at the proposed subdivision roadway intersection exceeds 400 feet in both directions along Nixon Road, thus satisfying the recommended ISD in both directions.

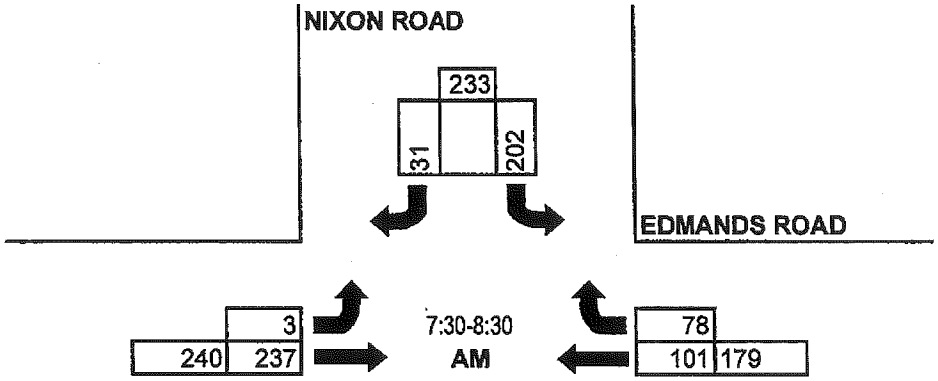
Should you have any questions regarding the above information, please do not hesitate to call.

Sincerely,
Bristol Traffic & Transportation Consulting LLC

Lloyd G. Bristol P.E., Manager

Peak Hour Turning Movement Count

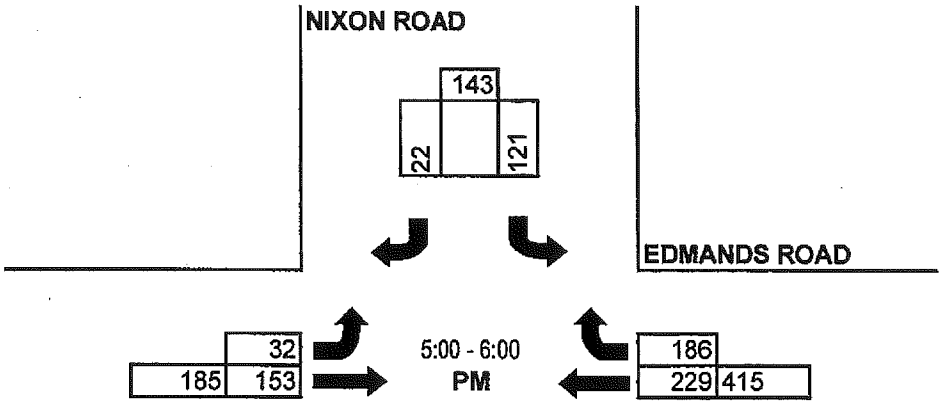
Framingham, MA - Nixon Road / Edmands Road
Turning Movements in One hour Starting with 7:30 AM
June 12, 2012 Tuesday



EDMANDS ROAD

Total Hour
Volume= 652

Turning Movements in One hour Starting with 5:00 PM
June 12, 2012 Tuesday



EDMANDS ROAD

Total Hour
Volume= 743

BTTC

Compiled By:
Bristol Traffic and Transportation Consulting LLC

N: Nixon Road
E/W: Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 122929 C
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Nixon Road From North			Edmands Road From East			Edmands Road From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
06:00 AM	0	9	0	0	3	0	5	0	0	17
06:15 AM	1	24	0	16	6	0	15	2	0	64
06:30 AM	0	22	0	8	11	0	19	1	0	61
06:45 AM	4	30	0	10	15	0	25	0	0	84
Total	5	85	0	34	35	0	64	3	0	226
07:00 AM	2	39	0	17	9	0	35	1	0	103
07:15 AM	3	49	0	15	16	0	45	0	0	128
07:30 AM	5	67	0	21	19	0	56	1	0	169
07:45 AM	7	58	0	20	27	0	68	0	0	180
Total	17	213	0	73	71	0	204	2	0	580
08:00 AM	7	43	0	20	23	0	62	2	0	157
08:15 AM	12	34	0	17	32	0	51	0	0	146
Grand Total	41	375	0	144	161	0	381	7	0	1109
Apprch %	9.9	90.1	0	47.2	52.8	0	98.2	1.8	0	
Total %	3.7	33.8	0	13	14.5	0	34.4	0.6	0	
Cars	40	364	0	141	159	0	377	7	0	1088
% Cars	97.6	97.1	0	97.9	98.8	0	99	100	0	98.1
Heavy Vehicles	1	11	0	3	2	0	4	0	0	21
% Heavy Vehicles	2.4	2.9	0	2.1	1.2	0	1	0	0	1.9

	Nixon Road From North				Edmands Road From East				Edmands Road From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	5	67	0	72	21	19	0	40	56	1	0	57	169
07:45 AM	7	58	0	65	20	27	0	47	68	0	0	68	180
08:00 AM	7	43	0	50	20	23	0	43	62	2	0	64	157
08:15 AM	12	34	0	46	17	32	0	49	51	0	0	51	146
Total Volume	31	202	0	233	78	101	0	179	237	3	0	240	652
% App. Total	13.3	86.7	0		43.6	56.4	0		98.8	1.2	0		
PHF	.646	.754	.000	.809	.929	.789	.000	.913	.871	.375	.000	.882	.906
Cars	30	196	0	226	77	101	0	178	235	3	0	238	642
% Cars	96.8	97.0	0	97.0	98.7	100	0	99.4	99.2	100	0	99.2	98.5
Heavy Vehicles	1	6	0	7	1	0	0	1	2	0	0	2	10
% Heavy Vehicles	3.2	3.0	0	3.0	1.3	0	0	0.6	0.8	0	0	0.8	1.5

N: Nixon Road
E/W: Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O.Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 122929 CC
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

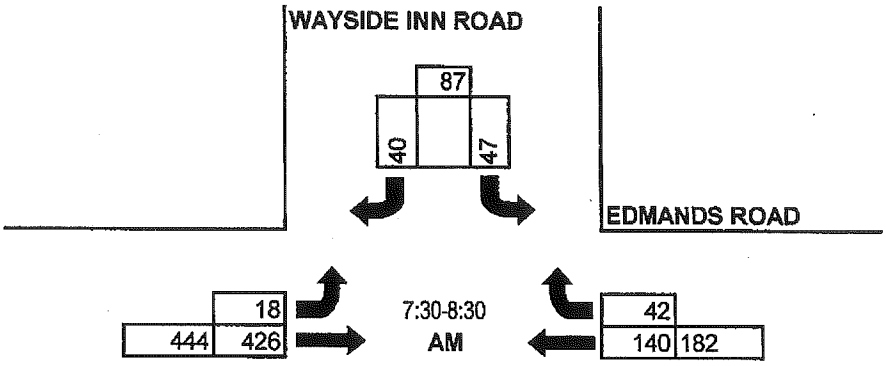
Groups Printed- Cars - Heavy Vehicles

	Nixon Road From North			Edmands Road From East			Edmands Road From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	4	19	0	21	40	0	26	4	0	114
04:15 PM	1	14	0	38	55	0	20	4	0	132
04:30 PM	3	25	0	43	35	0	21	8	0	135
04:45 PM	2	31	0	38	51	0	29	2	0	153
Total	10	89	0	140	181	0	96	18	0	534
05:00 PM	7	34	0	41	59	0	25	6	0	172
05:15 PM	4	33	0	43	75	0	44	13	0	212
05:30 PM	4	28	0	49	53	0	44	5	0	183
05:45 PM	7	26	0	53	42	0	40	8	0	176
Total	22	121	0	186	229	0	153	32	0	743
06:00 PM	5	26	0	44	45	0	28	2	0	150
06:15 PM	5	26	0	44	27	0	23	0	0	125
Grand Total	42	262	0	414	482	0	300	52	0	1552
Apprch %	13.8	86.2	0	46.2	53.8	0	85.2	14.8	0	
Total %	2.7	16.9	0	26.7	31.1	0	19.3	3.4	0	
Cars	41	260	0	412	472	0	296	52	0	1533
% Cars	97.6	99.2	0	99.5	97.9	0	98.7	100	0	98.8
Heavy Vehicles	1	2	0	2	10	0	4	0	0	19
% Heavy Vehicles	2.4	0.8	0	0.5	2.1	0	1.3	0	0	1.2

	Nixon Road From North				Edmands Road From East				Edmands Road From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	7	34	0	41	41	59	0	100	25	6	0	31	172
05:15 PM	4	33	0	37	43	75	0	118	44	13	0	57	212
05:30 PM	4	28	0	32	49	53	0	102	44	5	0	49	183
05:45 PM	7	26	0	33	53	42	0	95	40	8	0	48	176
Total Volume	22	121	0	143	186	229	0	415	153	32	0	185	743
% App. Total	15.4	84.6	0		44.8	55.2	0		82.7	17.3	0		
PHF	.786	.890	.000	.872	.877	.763	.000	.879	.869	.615	.000	.811	.876
Cars	21	120	0	141	185	223	0	408	153	32	0	185	734
% Cars	95.5	99.2	0	98.6	99.5	97.4	0	98.3	100	100	0	100	98.8
Heavy Vehicles	1	1	0	2	1	6	0	7	0	0	0	0	9
% Heavy Vehicles	4.5	0.8	0	1.4	0.5	2.6	0	1.7	0	0	0	0	1.2

Peak Hour Turning Movement Count

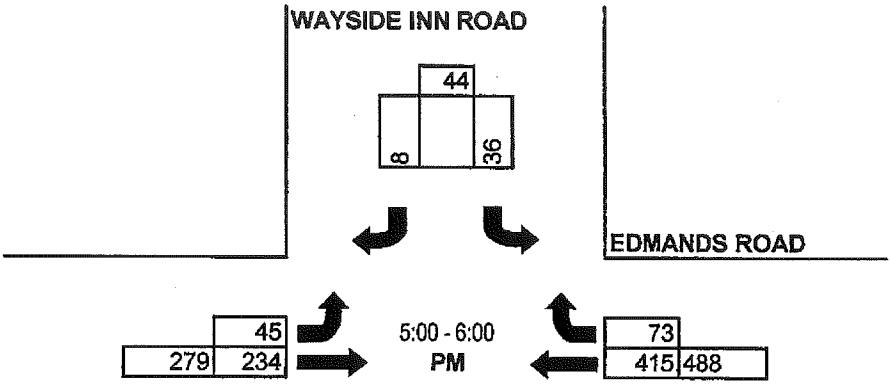
Framingham, MA - Wayside Inn Road / Edmands Road
Turning Movements in One hour Starting with 7:30 AM
June 12, 2012 Tuesday



EDMANDS ROAD

Total Hour
Volume= 713

Turning Movements in One hour Starting with 6:00 PM
June 12, 2012 Tuesday



EDMANDS ROAD

Total Hour
Volume= 811

BTTC

Compiled By:
Bristol Traffic and Transportation Consulting LLC

N: Wayside Inn Road
E/W: Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 122929 B
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Wayside Inn Road From North			Edmands Road From East			Edmands Road From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
06:00 AM	0	1	0	3	3	0	12	2	0	21
06:15 AM	2	4	0	6	22	0	36	2	0	72
06:30 AM	2	8	0	3	16	0	44	0	0	73
06:45 AM	5	7	0	7	20	0	54	1	0	94
Total	9	20	0	19	61	0	146	5	0	260
07:00 AM	4	11	0	5	24	0	74	1	0	119
07:15 AM	4	13	0	12	22	0	92	1	0	144
07:30 AM	6	14	0	10	33	0	121	5	0	189
07:45 AM	15	12	0	6	32	0	124	4	0	193
Total	29	50	0	33	111	0	411	11	0	645
08:00 AM	5	9	0	11	38	0	95	5	0	163
08:15 AM	14	12	0	15	37	1	86	4	0	169
Grand Total	57	91	0	78	247	1	738	25	0	1237
Apprch %	38.5	61.5	0	23.9	75.8	0.3	96.7	3.3	0	
Total %	4.6	7.4	0	6.3	20	0.1	59.7	2	0	
Cars	57	88	0	71	241	1	726	25	0	1209
% Cars	100	96.7	0	91	97.6	100	98.4	100	0	97.7
Heavy Vehicles	0	3	0	7	6	0	12	0	0	28
% Heavy Vehicles	0	3.3	0	9	2.4	0	1.6	0	0	2.3

	Wayside Inn Road From North				Edmands Road From East				Edmands Road From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	6	14	0	20	10	33	0	43	121	5	0	126	189
07:45 AM	15	12	0	27	6	32	0	38	124	4	0	128	193
08:00 AM	5	9	0	14	11	38	0	49	95	5	0	100	163
08:15 AM	14	12	0	26	15	37	1	53	86	4	0	90	169
Total Volume	40	47	0	87	42	140	1	183	426	18	0	444	714
% App. Total	46	54	0		23	76.5	0.5		95.9	4.1	0		
PHF	.667	.839	.000	.806	.700	.921	.250	.863	.859	.900	.000	.867	.925
Cars	40	46	0	86	37	139	1	177	417	18	0	435	698
% Cars	100	97.9	0	98.9	88.1	99.3	100	96.7	97.9	100	0	98.0	97.8
Heavy Vehicles	0	1	0	1	5	1	0	6	9	0	0	9	16
% Heavy Vehicles	0	2.1	0	1.1	11.9	0.7	0	3.3	2.1	0	0	2.0	2.2

N: Wayside Inn Road
E/W: Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O.Box 301 Berlin,MA 01503
Office:508.481.3999 Fax:508.545.1234
Email: datarequests@pdillc.com

File Name : 122929 BB
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

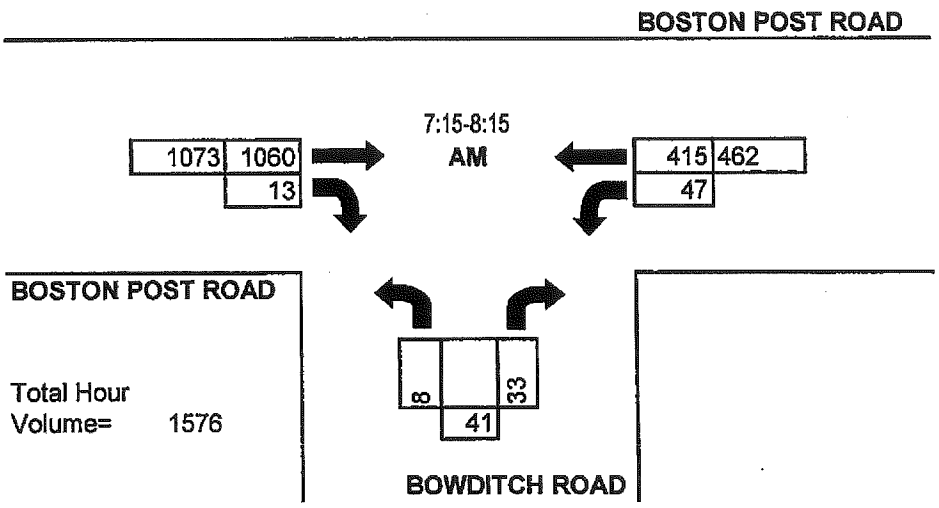
Groups Printed- Cars - Heavy Vehicles

	Wayside Inn Road From North			Edmands Road From East			Edmands Road From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	4	6	0	8	64	0	42	3	0	127
04:15 PM	5	6	0	10	89	0	32	2	0	144
04:30 PM	2	5	0	10	80	0	44	7	0	148
04:45 PM	3	11	0	17	85	0	49	11	0	176
Total	14	28	0	45	318	0	167	23	0	595
05:00 PM	3	8	0	19	100	0	49	6	0	185
05:15 PM	2	9	0	17	113	0	67	11	0	219
05:30 PM	2	8	0	16	108	0	54	18	0	206
05:45 PM	1	11	0	21	94	0	64	10	0	201
Total	8	36	0	73	415	0	234	45	0	811
06:00 PM	7	14	0	9	89	0	49	5	0	173
06:15 PM	3	11	0	9	61	0	42	8	0	134
Grand Total	32	89	0	136	883	0	492	81	0	1713
Apprch %	26.4	73.6	0	13.3	86.7	0	85.9	14.1	0	
Total %	1.9	5.2	0	7.9	51.5	0	28.7	4.7	0	
Cars	31	88	0	132	873	0	489	81	0	1694
% Cars	96.9	98.9	0	97.1	98.9	0	99.4	100	0	98.9
Heavy Vehicles	1	1	0	4	10	0	3	0	0	19
% Heavy Vehicles	3.1	1.1	0	2.9	1.1	0	0.6	0	0	1.1

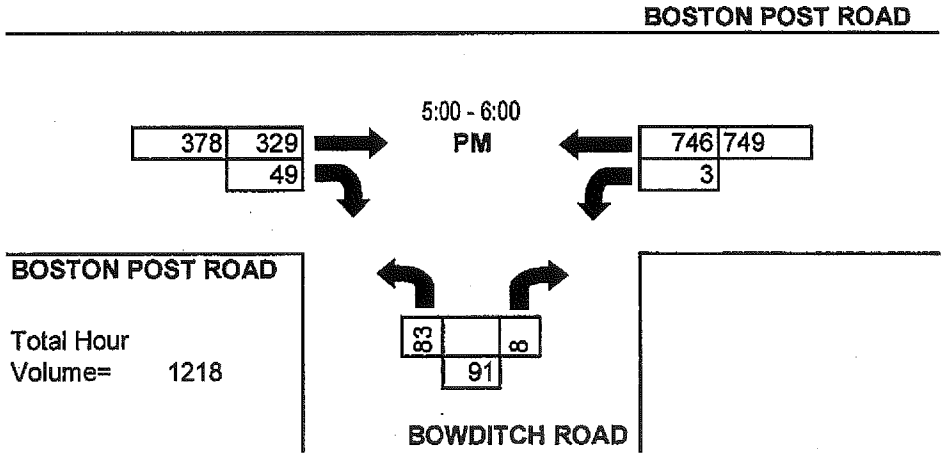
	Wayside Inn Road From North				Edmands Road From East				Edmands Road From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	3	8	0	11	19	100	0	119	49	6	0	55	185
05:15 PM	2	9	0	11	17	113	0	130	67	11	0	78	219
05:30 PM	2	8	0	10	16	108	0	124	54	18	0	72	206
05:45 PM	1	11	0	12	21	94	0	115	64	10	0	74	201
Total Volume	8	36	0	44	73	415	0	488	234	45	0	279	811
% App. Total	18.2	81.8	0		15	85	0		83.9	16.1	0		
PHF	.667	.818	.000	.917	.869	.918	.000	.938	.873	.625	.000	.894	.926
Cars	8	36	0	44	71	409	0	480	234	45	0	279	803
% Cars	100	100	0	100	97.3	98.6	0	98.4	100	100	0	100	99.0
Heavy Vehicles	0	0	0	0	2	6	0	8	0	0	0	0	8
% Heavy Vehicles	0	0	0	0	2.7	1.4	0	1.6	0	0	0	0	1.0

Peak Hour Turning Movement Count

Sudbury, MA - Boston Post Road (Rte20) / Bowditch Road
Turning Movements in One hour Starting with 7:15 AM
June 12, 2012 Tuesday



Turning Movements in One hour Starting with 5:00 PM
June 12, 2012 Tuesday



BTTC

Compiled By:
Bristol Traffic and Transportation Consulting LLC

N/S: Bowditch Road
E/W: Boston Post Road (Route 20)
City, State: Sudbury, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O.Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 122929 A
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Boston Post Road (Route 20) From East			Bowditch Road From South			Boston Post Road (Route 20) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
06:00 AM	23	2	0	5	1	0	0	131	0	162
06:15 AM	41	3	0	4	3	0	0	222	0	273
06:30 AM	50	3	0	6	1	0	4	275	0	339
06:45 AM	84	2	0	9	1	0	1	253	0	350
Total	198	10	0	24	6	0	5	881	0	1124
07:00 AM	71	9	0	4	1	0	3	238	0	326
07:15 AM	99	9	0	4	0	0	5	289	0	406
07:30 AM	118	12	0	14	3	0	2	267	0	416
07:45 AM	88	19	0	8	2	0	2	264	0	383
Total	376	49	0	30	6	0	12	1058	0	1531
08:00 AM	110	7	0	7	3	0	4	240	0	371
08:15 AM	100	25	0	15	4	0	3	253	0	400
Grand Total	784	91	0	76	19	0	24	2432	0	3426
Apprch %	89.6	10.4	0	80	20	0	1	99	0	
Total %	22.9	2.7	0	2.2	0.6	0	0.7	71	0	
Cars	738	90	0	75	19	0	21	2372	0	3315
% Cars	94.1	98.9	0	98.7	100	0	87.5	97.5	0	96.8
Heavy Vehicles	46	1	0	1	0	0	3	60	0	111
% Heavy Vehicles	5.9	1.1	0	1.3	0	0	12.5	2.5	0	3.2

	Boston Post Road (Route 20) From East				Bowditch Road From South				Boston Post Road (Route 20) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	99	9	0	108	4	0	0	4	5	289	0	294	406
07:30 AM	118	12	0	130	14	3	0	17	2	267	0	269	416
07:45 AM	88	19	0	107	8	2	0	10	2	264	0	266	383
08:00 AM	110	7	0	117	7	3	0	10	4	240	0	244	371
Total Volume	415	47	0	462	33	8	0	41	13	1060	0	1073	1576
% App. Total	89.8	10.2	0		80.5	19.5	0		1.2	98.8	0		
PHF	.879	.618	.000	.888	.589	.667	.000	.603	.650	.917	.000	.912	.947
Cars	390	47	0	437	32	8	0	40	10	1030	0	1040	1517
% Cars	94.0	100	0	94.6	97.0	100	0	97.6	76.9	97.2	0	96.9	96.3
Heavy Vehicles	25	0	0	25	1	0	0	1	3	30	0	33	59
% Heavy Vehicles	6.0	0	0	5.4	3.0	0	0	2.4	23.1	2.8	0	3.1	3.7

N/S: Bowditch Road
E/W: Boston Post Road (Route 20)
City, State: Sudbury, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 122929 AA
Site Code : 21200107
Start Date : 6/12/2012
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Boston Post Road (Route 20) From East			Bowditch Road From South			Boston Post Road (Route 20) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	187	7	0	5	1	0	1	119	0	320
04:15 PM	204	6	0	8	3	0	1	136	0	358
04:30 PM	175	6	0	9	3	0	1	121	0	315
04:45 PM	218	9	0	13	1	0	3	144	0	388
Total	784	28	0	35	8	0	6	520	0	1381
05:00 PM	223	10	0	12	2	0	3	132	0	382
05:15 PM	226	10	0	13	2	0	0	153	0	404
05:30 PM	223	7	0	21	8	0	2	146	0	407
05:45 PM	213	7	0	19	2	0	4	168	0	413
Total	885	34	0	65	14	0	9	599	0	1606
06:00 PM	197	17	0	13	2	0	4	107	0	340
06:15 PM	183	13	0	10	0	0	3	98	0	307
Grand Total	2049	92	0	123	24	0	22	1324	0	3634
Apprch %	95.7	4.3	0	83.7	16.3	0	1.6	98.4	0	
Total %	56.4	2.5	0	3.4	0.7	0	0.6	36.4	0	
Cars	2018	90	0	123	21	0	22	1308	0	3582
% Cars	98.5	97.8	0	100	87.5	0	100	98.8	0	98.6
Heavy Vehicles	31	2	0	0	3	0	0	16	0	52
% Heavy Vehicles	1.5	2.2	0	0	12.5	0	0	1.2	0	1.4

	Boston Post Road (Route 20) From East				Bowditch Road From South				Boston Post Road (Route 20) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	223	10	0	233	12	2	0	14	3	132	0	135	382
05:15 PM	226	10	0	236	13	2	0	15	0	153	0	153	404
05:30 PM	223	7	0	230	21	8	0	29	2	146	0	148	407
05:45 PM	213	7	0	220	19	2	0	21	4	168	0	172	413
Total Volume	885	34	0	919	65	14	0	79	9	599	0	608	1606
% App. Total	96.3	3.7	0		82.3	17.7	0		1.5	98.5	0		
PHF	.979	.850	.000	.974	.774	.438	.000	.681	.563	.891	.000	.884	.972
Cars	874	34	0	908	65	12	0	77	9	594	0	603	1588
% Cars	98.8	100	0	98.8	100	85.7	0	97.5	100	99.2	0	99.2	98.9
Heavy Vehicles	11	0	0	11	0	2	0	2	0	5	0	5	18
% Heavy Vehicles	1.2	0	0	1.2	0	14.3	0	2.5	0	0.8	0	0.8	1.1

Nixon Road
north of Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O.Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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122929 A Volume
Site Code: 21200107

Start Time	SB A.M.		SB P.M.		NB A.M.		NB P.M.		Combined A.M.		Combined P.M.		12-Jun-12 Tue
12:00	1		14		3		18		4		32		
12:15	1		25		3		17		4		42		
12:30	3		16		4		14		7		30		
12:45	0	5	20	75	0	10	20	69	0	15	40	144	
01:00	1		16		0		11		1		27		
01:15	0		14		0		26		0		40		
01:30	1		20		0		13		1		33		
01:45	0	2	23	73	0	0	25	75	0	2	48	148	
02:00	0		22		0		27		0		49		
02:15	3		22		0		27		3		49		
02:30	1		28		0		29		1		57		
02:45	0	4	19	91	0	0	21	104	0	4	40	195	
03:00	1		25		0		32		1		57		
03:15	1		20		0		31		1		51		
03:30	1		17		3		31		4		48		
03:45	1	4	25	87	0	3	36	130	1	7	61	217	
04:00	1		27		0		28		1		55		
04:15	2		13		0		43		2		56		
04:30	1		27		1		37		2		64		
04:45	4	8	37	104	1	2	42	150	5	10	79	254	
05:00	2		38		1		37		3		75		
05:15	4		38		1		56		5		94		
05:30	5		25		1		54		6		79		
05:45	10	21	32	133	3	6	62	209	13	27	94	342	
06:00	10		34		7		47		17		81		
06:15	19		30		14		44		33		74		
06:30	24		17		10		38		34		55		
06:45	31	84	21	102	10	41	34	163	41	125	55	265	
07:00	37		21		10		36		47		57		
07:15	50		18		18		35		68		53		
07:30	67		11		29		24		96		35		
07:45	57	211	11	61	20	77	23	118	77	288	34	179	
08:00	55		13		23		19		78		32		
08:15	54		17		19		19		73		36		
08:30	47		11		14		17		61		28		
08:45	50	206	8	49	21	77	14	69	71	283	22	118	
09:00	21		9		15		12		36		21		
09:15	32		18		16		10		48		28		
09:30	24		7		6		12		30		19		
09:45	20	97	6	40	18	55	6	40	38	152	12	80	
10:00	16		7		18		15		34		22		
10:15	19		5		19		8		38		13		
10:30	13		8		17		6		30		14		
10:45	23	71	5	25	8	62	2	31	31	133	7	56	
11:00	24		2		7		6		31		8		
11:15	27		2		17		4		44		6		
11:30	12		0		16		9		28		9		
11:45	14	77	1	5	22	62	10	29	36	139	11	34	
Total	790		845		395		1187		1185		2032		
Percent	66.7%		41.6%		33.3%		58.4%						
Day Total		1635				1582				3217			
Peak	07:30		04:30		07:30		05:15		07:30		05:15		
Vol.	233		140		91		219		324		348		
P.H.F.	0.869		0.921		0.784		0.883		0.844		0.926		

Nixon Road
north of Edmands Road
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
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122929 A Volume
Site Code: 21200107

Start Time	SB A.M.		SB P.M.		NB A.M.		NB P.M.		Combined A.M.		Combined P.M.		13-Jun-12 Wed
12:00	6		7		5		6		11		13		
12:15	4		23		3		17		7		40		
12:30	3		17		3		16		6		33		
12:45	1	14	20	67	0	11	21	60	1	25	41	127	
01:00	1		23		2		22		3		45		
01:15	2		11		0		16		2		27		
01:30	1		13		1		22		2		35		
01:45	0	4	14	61	0	3	18	78	0	7	32	139	
02:00	0		13		0		18		0		31		
02:15	0		28		0		15		0		43		
02:30	1		15		1		16		2		31		
02:45	1	2	21	77	0	1	26	75	1	3	47	152	
03:00	1		26		1		23		2		49		
03:15	0		22		0		24		0		46		
03:30	0		22		1		27		1		49		
03:45	2	3	19	89	2	4	39	113	4	7	58	202	
04:00	0		23		0		39		0		62		
04:15	4		23		0		37		4		60		
04:30	1		24		0		38		1		62		
04:45	2	7	28	98	2	2	46	160	4	9	74	258	
05:00	6		26		1		41		7		67		
05:15	4		28		0		49		4		77		
05:30	5		24		2		61		7		85		
05:45	7	22	25	103	4	7	48	199	11	29	73	302	
06:00	7		28		6		46		13		74		
06:15	15		16		9		41		24		57		
06:30	28		27		13		26		41		53		
06:45	23	73	27	98	2	30	30	143	25	103	57	241	
07:00	30		17		11		27		41		44		
07:15	51		26		18		25		69		51		
07:30	65		11		16		30		81		41		
07:45	58	204	17	71	29	74	20	102	87	278	37	173	
08:00	58		9		14		21		72		30		
08:15	44		14		28		20		72		34		
08:30	58		11		21		19		79		30		
08:45	48	208	10	44	16	79	16	76	64	287	26	120	
09:00	32		5		19		27		51		32		
09:15	23		5		16		16		39		21		
09:30	24		10		15		10		39		20		
09:45	20	99	11	31	14	64	14	67	34	163	25	98	
10:00	17		7		11		13		28		20		
10:15	11		8		17		13		28		21		
10:30	22		7		18		12		40		19		
10:45	23	73	7	29	17	63	4	42	40	136	11	71	
11:00	21		5		16		2		37		7		
11:15	21		4		19		1		40		5		
11:30	22		2		19		6		41		8		
11:45	20	84	0	11	14	68	4	13	34	152	4	24	
Total	793		779		406		1128		1199		1907		
Percent	66.1%		40.8%		33.9%		59.2%						
Day Total			1572				1534				3106		
Peak	07:15		04:30		07:45		05:15		07:30		05:15		
Vol.	232		106		92		204		312		309		
P.H.F.	0.892		0.946		0.793		0.836		0.897		0.909		

Wayside Inn Road
north of Wayside Circle
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
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INDUSTRIES, LLC
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122929 B Volume
Site Code: 21200107

Start Time	SB A.M.		SB P.M.		NB A.M.		NB P.M.		Combined A.M.		Combined P.M.	12-Jun-12 Tue
12:00	0		8		3		16		3		24	
12:15	0		7		2		8		2		15	
12:30	0		10		1		7		1		17	
12:45	0	0	12	37	0	6	6	37	0	6	18	74
01:00	0		7		0		4		0		11	
01:15	0		5		2		6		2		11	
01:30	0		12		0		12		0		24	
01:45	0	0	8	32	0	2	11	33	0	2	19	65
02:00	0		9		0		17		0		26	
02:15	0		14		0		16		0		30	
02:30	0		9		0		9		0		18	
02:45	3	3	7	39	0	0	17	59	3	3	24	98
03:00	0		17		0		9		0		26	
03:15	0		15		0		27		0		42	
03:30	2		15		0		12		2		27	
03:45	2	4	12	59	4	4	11	59	6	8	23	118
04:00	1		13		2		15		3		28	
04:15	0		7		0		10		0		17	
04:30	3		8		1		19		4		27	
04:45	3	7	14	42	0	3	21	65	3	10	35	107
05:00	0		12		0		27		0		39	
05:15	1		11		1		28		2		39	
05:30	1		7		4		32		5		39	
05:45	3	5	12	42	2	7	34	121	5	12	46	163
06:00	0		21		5		12		5		33	
06:15	4		12		7		14		11		26	
06:30	10		8		5		26		15		34	
06:45	14	28	3	44	9	26	14	66	23	54	17	110
07:00	14		7		6		10		20		17	
07:15	21		8		10		12		31		20	
07:30	17		8		17		14		34		22	
07:45	26	78	10	33	9	42	5	41	35	120	15	74
08:00	14		5		17		7		31		12	
08:15	28		4		17		13		45		17	
08:30	26		4		14		4		40		8	
08:45	27	95	2	15	20	68	4	28	47	163	6	43
09:00	14		2		13		5		27		7	
09:15	19		3		11		10		30		13	
09:30	9		4		9		10		18		14	
09:45	8	50	2	11	6	39	1	26	14	89	3	37
10:00	6		2		6		3		12		5	
10:15	15		2		5		0		20		2	
10:30	12		2		7		3		19		5	
10:45	10	43	2	8	6	24	2	8	16	67	4	16
11:00	3		0		10		0		13		0	
11:15	12		2		12		0		24		2	
11:30	11		3		9		0		20		3	
11:45	7	33	0	5	13	44	3	3	20	77	3	8
Total	346		367		265		546		611		913	
Percent	56.6%		40.2%		43.4%		59.8%					
Day Total			713				811				1524	
Peak	08:00		03:00		08:00		05:00		08:00		05:00	
Vol.	95		59		68		121		163		163	
P.H.F.	0.848		0.868		0.850		0.890		0.867		0.886	

Wayside Inn Road
north of Wayside Circle
City, State: Framingham, MA
Client: BTTC/ L. Bristol

PRECISION
D A T A
INDUSTRIES, LLC
P.O.Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

122929 B Volume
Site Code: 21200107

Start		SB			NB				Combined			13-Jun-12
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.	Wed
12:00	0		4		0		6		0		10	
12:15	1		8		1		9		2		17	
12:30	0		6		1		6		1		12	
12:45	3	4	6	24	0	2	6	27	3	6	12	51
01:00	2		8		0		8		2		16	
01:15	0		7		0		12		0		19	
01:30	0		7		1		7		1		14	
01:45	0	2	7	29	1	2	6	33	1	4	13	62
02:00	0		5		0		12		0		17	
02:15	2		6		0		3		2		9	
02:30	1		7		2		16		3		23	
02:45	1	4	9	27	0	2	5	36	1	6	14	63
03:00	1		11		0		13		1		24	
03:15	0		3		0		14		0		17	
03:30	1		9		0		14		1		23	
03:45	1	3	10	33	3	3	11	52	4	6	21	85
04:00	1		11		2		10		3		21	
04:15	3		15		1		9		4		24	
04:30	0		16		0		21		0		37	
04:45	1	5	6	48	0	3	26	66	1	8	32	114
05:00	4		8		0		11		4		19	
05:15	0		8		1		21		1		29	
05:30	4		9		1		20		5		29	
05:45	1	9	7	32	2	4	25	77	3	13	32	109
06:00	0		5		5		17		5		22	
06:15	5		12		7		29		12		41	
06:30	7		9		4		13		11		22	
06:45	15	27	11	37	6	22	15	74	21	49	26	111
07:00	10		8		5		11		15		19	
07:15	14		8		7		12		21		20	
07:30	25		2		15		6		40		8	
07:45	19	68	5	23	12	39	7	36	31	107	12	59
08:00	19		8		9		8		28		16	
08:15	17		5		17		5		34		10	
08:30	22		7		17		8		39		15	
08:45	23	81	4	24	17	60	6	27	40	141	10	51
09:00	15		3		14		6		29		9	
09:15	9		0		5		12		14		12	
09:30	11		1		2		3		13		4	
09:45	15	50	4	8	1	22	7	28	16	72	11	36
10:00	9		2		10		6		19		8	
10:15	11		1		7		2		18		3	
10:30	10		1		5		3		15		4	
10:45	6	36	3	7	7	29	1	12	13	65	4	19
11:00	8		0		2		0		10		0	
11:15	15		0		9		0		24		0	
11:30	8		2		7		2		15		4	
11:45	6	37	1	3	9	27	0	2	15	64	1	5
Total	326		295		215		470		541		765	
Percent	60.3%		38.6%		39.7%		61.4%					
Day Total		621				685				1306		
Peak	08:00		03:45		08:15		05:30		08:15		05:30	
Vol.	81		52		65		91		142		124	
P.H.F.	0.880		0.813		0.956		0.784		0.888		0.756	

Appendix L - Northeast Geosciences Report Discussion Section

1.0 INTRODUCTION

Northeast Geoscience Incorporated (NGI) has been contracted by Nexum Development Corporation to permit a bedrock well (PW-1) to serve as a Community Public Water Supply for a proposed housing development at 45 Nixon Road in Framingham, Massachusetts. (see Figure 1 – Appendix A). The proposed development consists of 24 housing units including a total of 78 bedrooms and has a proposed total Title V design flow estimate of 8,640 gallons per day (gpd).

The purpose of this report is to document conditions of the well site and surrounding area, detail the installation and construction of bedrock well PW-1, summarize the results of the pump testing and water quality analyses performed on the well, and request Massachusetts Department of Environmental Protection (DEP) approval of this site as a Public Water Supply. Activities documented in this report were conducted in accordance with the DEP Drinking Water Program Guidelines and Policies for Public Water Systems (2001) (Guidelines) Section 4.2.3 as well as the letter from DEP dated December 8, 2008 approving the pump test proposal (BRP WS 13, Transmittal #W045448) submitted to DEP by NGI on October 28, 2003. A copy of the DEP pump test approval letter is included in Appendix B. This report was also developed in accordance to the above referenced documents and is accompanied by DEP Permit Application BRP WS 15 submitted under DEP Transmittal Form #047118. A check in the amount of $1,290 for the permit application fee has been forwarded to DEP along with the transmittal form.

2.0 SITE DESCRIPTION

Well PW-1 is located approximately 500 feet east of Nixon Road and approximately 2,500 feet west of Wayside Inn Road (see Figure 1) on property consisting of 33 acres of undeveloped land listed as parcels 65-30-0368 (45 Nixon Road), 64-39-1805 (43B Nixon Road), and 64-39-1309 (43C Nixon Road) in the Town of Framingham GIS database. There is one existing residence located on the property at 45 Nixon Road. The site boundary, proposed parcels, abutting property boundaries, as well as the location of bedrock well PW-1 are all shown on Figure 2 (Appendix A). The proposed development will add an additional 24 parcels on 12 of the 33 acres. The proposed project is located on land zoned by the Town of Framingham as R-4 Residential including single-family residences (see Figure 3 – Appendix A). According to the Town of Framingham Engineering Department, the area within ½-mile of the well site is not currently served by a public sewer system or public water distribution system and it is assumed every

residence located with ½-mile of well PW-1 has a private well and septic system. On October 17, 2003, NGI personnel conducted a land use survey of the area within ½-mile of the well site. NGI observed that land within ½-mile of the well location is used for either residential or agricultural purposes. Residences located within ½-mile of the proposed site include parcels located on Nixon Road to the west, Dartmouth Drive to the north, Wayside Inn Road to the east, and Edmands Road and Barnbridge Circle to the south. The closest residential well is located approximately 480 feet to the northwest and currently serves the property at 45 Nixon Road (see Figure 2).

NGI personnel conducted research of environmental resources located within ½-mile of well PW-1 with available data obtained from MassGIS (2004 and 2005) (see Figure 4). According to MassGIS, there are areas of Protected Openspace located approximately 1,100 feet west, approximately 1,500 feet south, approximately 900 feet northeast, and approximately 1,500 feet southeast of the site (see Figure 4). As can be seen on Figure 4, there are wetland areas located approximately 1,700 feet southwest and approximately 1,100 feet northeast of the site. Surface water bodies located within ½-mile of the well site include two un-named streams and an un-named pond northeast of the site that drain north toward Grist Mill Pond, and three un-named ponds southwest of the well site associated with Baiting Brook that drains to the southeast (see Figure 4). The well site is located within the Concord River Basin. According to MassGIS (2005) there is one NHESP Certified Vernal Pool (1999-2003) (CVP) located with ½-mile of the wells site. As can be seen on Figure 3, the CVP is situated approximately 2,000 feet east of the site in an area designated as Openspace. According to DEP there are no registered water withdrawals exceeding 100,000 gallons per day located with ½-mile of the well site. According to MassGIS (2004 and 2005), there are no other mapped environmental resources or sensitive receptors located within ½-mile of the well site (see Figure 4).

As shown on Figure 4, there is a Tennessee Gas Pipeline located approximately 2,600 feet southwest of the site. No other transmission lines are located within ½-mile of the site. Research of the MADEP Searchable Site List (http://www.state.ma.us/dep/bwsc/sites/report.htm) showed that as of February 28, 2005, there are no sites listed for a documented release of oil, hazardous material or both listed on the Massachusetts DEP Bureau of Waste Site Cleanup Site List located within ½-mile of the well site. There are also no landfills or other potential sources of

contamination located within ½-mile of well PW-1 according to information available from MassGIS (see Figure 4).

3.0 SITE GEOLOGY

Nelson (1975) mapped the bedrock in the vicinity of well PW-1 as the Claypit Hill Formation (PzpCch) (see Figure 5 – Appendix A). As noted by Nelson (1975), the Claypit Hill is a unit of Lower Paleozoic? to Pre-Cambrian Z in age, medium to dark gray fine to medium grained biotite-sericitized plagioclase-quartz gneiss containing porphyro-blasts of pink microcline and is estimated to be about 600 meters thick.

Samples collected by NGI personnel during drilling operations confirmed the bedrock lithology described by Nelson. Rock samples collected during well installation were logged as primarily biotite plagioclase quartz gneiss with epidote and microcline porphyro-blasts. A large vein of pink microcline and epidote was encountered at a depth of 225 feet below ground surface. Samples collected at depths below 800 feet reveal alternating amphibolite and gneiss formations

Nelson (1974) mapped the surficial deposits in the vicinity of well PW-1 as quaternary glacial till (Qt) (see Figure 6 – Appendix A). According to Nelson (1974), these materials consist of a light gray to greenish gray non-stratified and poorly sorted heterogeneous mixture of boulders, cobbles, pebbles, sand, silt, and clay-sized materials. As can be seen on Figure 6, Nelson (1974) also maps closely spaced outcrops where surficial deposits are 10 feet or less in thickness in the immediate vicinity of the well site.

In a discussion with personnel from Carr Research Laboratories Inc. (CRL) of Natick, Massachusetts, it was noted that soil evaluation and soil sampling conducted at different locations in the vicinity of the well site by CRL confirmed the presence of gravelly sand to a depth of approximately 7-14 feet below ground surface and glacial till at depths greater than 10 to 14 feet below ground surface with an observed maximum depth of unconsolidated deposits of 25 feet below ground surface. NGI personnel confirmed the presence of glacial till and shallow bedrock on site and noted approximately 2 feet of glacial till overlying bedrock at the well site during drilling operations.

Based on the information obtained during the review of available bedrock and surficial geologic information for the area around the well site, it is considered infeasible to install and permit an unconsolidated aquifer well to supply the proposed Ford's Meadow project. Instead, a bedrock well site is being pursued for this proposed development's water supply needs.

4.0 WELL INSTALLATION

Viera Artesian Wells of Georgetown, Massachusetts (Viera) was contracted to install a 6-inch diameter bedrock well (PW-1) to serve as the community water supply for the proposed Ford's Meadow project. On June 27, 2003, Viera advanced a 10-inch diameter open borehole to 30 feet below ground surface (approximately 28 feet into competent bedrock) and installed a 6-inch diameter steel casing within the 10-inch diameter boring. The entire annular space between the 10-inch diameter open hole and 6-inch diameter casing was then tremie grouted using a neat cement/bentonite mixture to form a sanitary well seal. The well seal was allowed to cure for approximately 72 hours to ensure the integrity of the grout. From June 30, 2003 to July 2, 2003 Viera advanced a 6-inch diameter open hole through the Claypit Hill Formation using an air hammer to a depth of 1,225 feet below ground surface. A significant water bearing fracture was encountered at a depth of 220 feet below ground surface, and smaller water producing fractures were intercepted intermittently between 700 and 1,225 feet below ground surface. A total well yield of approximately 10 gallons per minute (gpm) was estimated upon completion of the well.

Northeast Water Production of Sterling, Massachusetts (Northeast Water) was contracted to conduct zone hydro fracturing of well PW-1 in an attempt to increase the yield of the well. On July 24, 2003, Northeast Water photo-logged PW-1 to a depth of approximately 500 feet below the top of the well casing (TOC) in order to locate zones of structural weakness in the bedrock. Zones of weakness identified during the photo-log include a vertical seam at 121 ft below TOC, horizontal fractures at 189 and 217 ft below TOC, and holes at 395 to 400 and 470 feet below TOC. On August 11, 2003, Northeast Water zone hydro fractured PW-1 at 100-foot intervals from 1,100 ft to 105 ft below TOC. The zone hydro fracturing resulted in a marginal increase of yield in PW-1.

A well completion report from Viera as well as a schematic well construction diagram including a summary of bedrock lithology and fracture locations, and a summary of the video-logging and zone hydro fracturing is included in Appendix C.

5.0 PRELIMINARY PUMP TEST AND WATER QUALITY

5.1 PRELIMINARY PUMP TEST

NGI personnel conducted a preliminary pump test on well PW-1 on September 9, 2003. PW-1 was pumped at varying rates for a total of 406 minutes. During the preliminary pump test, the pump was set at approximately 420 feet below TOC and was run at an initial rate of 20 gallons per minute (gpm). The rate was increased to approximately 23 gpm after 65 minutes of pumping and was then cut back to approximately 12 gpm after 70 minutes when the water level was observed to be drawn to within approximately 37 feet above the pump intake. The well was then pumped at an average rate of approximately 11.6 gpm for the remainder of the test (336 minutes) and water level was observed to stabilize between 401 and 403 feet below TOC (approximately 311 and 313 feet of drawdown). A linear graph and log of the water level data collected during the preliminary pump test is included in Appendix D.

5.2 PRELIMINARY WATER QUALITY

NGI personnel collected water samples for both field and laboratory water quality analyses during the preliminary pump test conducted on PW-1. Field water quality parameters analyzed during the preliminary test included pH, specific conductance, and temperature. NGI personnel collected field water quality samples at a total of 7 intervals during the preliminary pump test. A table summarizing the results of the field water quality analyses conducted on water samples collected from well PW-1 during the preliminary pump test is included in Appendix E. As can be seen on this table, pH increased from 6.92 to 7.75, and specific conductance increased from 154.3 microsiemens per centimeter (uS/cm) to 185 uS/cm over the course of the preliminary pump test.

NGI personnel collected laboratory water quality samples at the end of the preliminary pump test. Samples were delivered to Alpha Analytical Laboratories in Westborough, Massachusetts (Alpha) for analysis of alkalinity, sulfate, hardness, total arsenic, total barium, total cadmium, total chromium, total copper, total iron, total lead, total manganese, total mercury, volatile organic compounds (VOCs) via EPA Method 524.2, and radon. Radon analysis was subcontracted to Hazen Research Inc. of Golden, Colorado. A Table summarizing the results of the laboratory water quality analyses conducted on water samples collected from well PW-1 during the preliminary pump test as well as the certificates of analysis from Alpha and Hazen are included in Appendix E. As can be seen on the table, barium was detected at a concentration of 0.01 milligrams per liter (mg/L), below the Massachusetts Maximum Contaminant Level (MMCL) of 2 mg/L, manganese was detected at a concentration of 0.03 mg/L, below the Massachusetts Secondary Maximum Contaminant Level (MSMCL) of 0.05 mg/L, and iron was detected at a concentration of 0.79 mg/L, above the MSMCL of 0.3 mg/L.

VOCs detected during the preliminary pump test include toluene at a concentration of 1.4 micrograms per liter (ug/L), below the MMCL of 1,000 ug/L and chloroform at a concentration of 8.2 ug/L, below the Massachusetts DEP Office of Research and Standards Drinking Water Guideline (MADEP Guideline) for chloroform of 70 ug/L. Chloroform is a byproduct of chlorine disinfection and the presence of this compound in the sample collected during the preliminary pump test is most likely due to shock chlorination of the well performed after setting the pump. The concentration of chloroform should decrease with time during the prolonged pump test and is not considered a threat to water quality.

Radon was detected in the water sample collected from PW-1 at a concentration of 710(+/-40) picocurries per liter (pCi/L), below the current MADEP Guideline for radon of 10,000 pCi/L.

6.0 PROLONGED PUMP TEST

A prolonged pumping test was performed on the proposed bedrock well site PW-1 in accordance with both the DEP Guidelines and the letter from the DEP Northeast Regional Office dated

December 8, 2003 approving the site examination and pump test proposal for PW-1 (see Appendix B). The prolonged pump test was conducted for a total of approximately 93.8 hours (3.9 days) from 11:45 am on December 15, 2003 to 9:30 am on December 19, 2003, followed by a total of 95.6 hours (approximately 4 days) of water level recovery monitoring. Water pumped from PW-1 was discharged to a downgradient point located approximately 250 feet west of the well site (see Figure 2). The duration of the pump test was extended beyond the required 48 hours due to flow rate fluctuations that occurred during the early portions of the test.

6.1 ANTECEDENT WATER LEVELS

Antecedent water level readings were recorded in well PW-1 for 10 days prior to the start of the pump test (December 7, 2003 to December 15, 2003) using an electronic water level indicator accurate to +/- 0.01 feet. Table 1 in Appendix A summarizes the antecedent water level data collected prior to the pump test. As can be seen on this table, water level in well PW-1 showed a maximum fluctuation of 8.65 feet with a depth to water ranging from a maximum 75.55 feet below the top of the casing to a minimum 66.90 feet below the top of the casing. Figure 7 (Appendix A) is a linear chart showing the depth to water in well PW-1 in feet below the top of casing over a 10-day antecedent period. As can be seen on Figure 7, the water level in well PW-1 shows an increasing trend starting on December 11, 2003 until test startup of December 15, 2003. This trend can be attributed to recharge from precipitation and melting snow pack in the vicinity of the well.

6.2 PUMP TEST PERFORMANCE

Bedrock well PW-1 was equipped with a 3 horsepower pump set at a depth of 609 feet below the top of casing. Discharge was measured with a direct read inline rotometer graduated with 0.5 gpm increments and estimated to the nearest 0.1 gpm. The flow rate was controlled with a 2-inch diameter ball valve located on the main discharge line and a 1-inch diameter gate valve located on the rotometer.

Based on the data available from the preliminary pumping test, well PW-1 was pumped at an initial rate of 11 gpm. The flow rate decreased to a rate of 10.6 gpm at

approximately 1,365 minutes and to 10.3 gpm at 1,425 minutes. Well PW-1 was allowed to maintain a flow rate of 10.3 until approximately 1,635 minutes into the test when the gate valve was closed to allow for flow meter maintenance. A flow rate of 10.3 gpm was achieved at approximately 1,695 minutes and was maintained until approximately 1,755 minutes. At this point, well PW-1experienced another rate decrease to 10 gpm due to head loss. At approximately 2,235 minutes, the main valve was opened completely and the submersible pump was allowed to operate at its maximum capacity under existing head conditions, achieving a flow rate of 8.9 gpm. This rate was maintained within 10% for the minimum 36 hours from 2,235 minutes (1:00 on 12/17/2003) to 4,395 minutes (13:00 on 12/18/2003) required to achieve the stability criteria in accordance with Section 4.2.3.V.D.b of the Guidelines. Flow rate and water level stabilization is considered to have occurred at 4,395 minutes (73.25 hours of pumping), however the test was allowed to continue for an additional 1,230 minutes (20.5 hours) in an attempt to further evaluate long term well yield.

The flow rate was observed to be 9.0 gpm at shut down indicating that well PW-1 had received some recharge during the pump test. Recharge contributing to well PW-1 is possibly from snowmelt and/or a precipitation event occurring on December 18, 2003.

Bedrock well PW-1 recovered to approximately 95% of the static water level within approximately 4,800 minutes (3.3 days) after pump shut down. A graph of water level data recorded during the prolonged pump test performance is shown on Figure 8 (Appendix A).

6.3 PUMP TEST DATA ANALYSIS

A semi-log plot of water level data recorded during the prolonged pumping test is presented as Figure 9 (Appendix A). As can be seen on Figure 9, well PW-1 achieved water level stabilization between the depths of 570 and 575 feet below the top of the well casing starting at approximately 2,775 minutes.

Figure 9 also displays the projected 180-day water level for PW-1. When pumped at a rate of 8.9 gpm the water level in well PW-1 draws down to approximately 575 feet below the top of the well casing after 180 days. As can be seen on Figure 9, this water level corresponds to a water column approximately 34 feet above the pump setting at 609 feet below the top of the well casing. This projected water level does not meet the required 10% of the static water column above the pump in accordance with the stabilization criteria in Section 4.2.3.VII.D.1. which is calculated to be a minimum 54 feet above the pump. To meet this criterion, NGI recommends adjusting the final pump setting to 650 feet below the top of casing, leaving the projected 180-day water level drawdown at approximately 75 feet above the pump while pumping at a rate of 8.9 gpm. This results of the prolonged pump test conducted on well PW-1 indicate the well is capable of efficiently producing 8.9 gpm, corresponding to a DEP approvable yield of approximately 6.7 gpm after applying the 75% safety factor. To be conservative, NGI is requesting an approval for a well yield of 6.0 gpm or 8,640 gallons per day for well PW-1. A log of the data collected during the prolonged pump test is included in Appendix F.

Barometric pressure measurements were collected along with water level readings during the prolonged pump test in order to quantify water table fluctuations during pumping. Figure 10 is a chart of barometric pressure in inches of mercury (inHg) versus water level in feet below the top of the well casing. As can be seen on Figure 10, barometric pressure correlates poorly to water level, indicating that water level fluctuations in well PW-1 are not directly dependent upon changes in barometric pressure under pumping conditions.

6.4 ZONE I PROTECTIVE RADIUS AND INTERIM WELLHEAD PROTECTION AREA

A Zone I Protective Radius (Zone I) was calculated to be approximately 240 feet for well PW-1 using a flow rate of 8,640 gallons per day. The Zone I was calculated using the equation in Appendix D of the Guidelines:

Zone I Radius in Feet = [150 x log of pumping rate (in gallons per day)] – 350

= [150 x log (8,640 gpd)] – 350 = 240 feet

Existing land conditions within the proposed 240 ft Zone I Protective Radius include undeveloped wooded areas. An existing unpaved cart path that provides access to the wells is also located within the proposed Zone I. The 240 ft Zone I Protective Radius is shown on Figure 2 (Appendix A).

An Interim Wellhead Protection Area (IWPA) for well PW-1 was calculated to be approximately 592 feet for a flow rate of 6.0 gpm. The IWPA was calculated using the equation in Appendix D of the Guidelines:

IWPA Radius in Feet = [32 x pumping rate (in gallons per minute)] + 400

= [32 x 607] + 400 = 592 feet

Existing land conditions within the proposed 592 ft IWPA include undeveloped wooded areas, residential parcels and structures, and a portion of Nixon Road. The 592 ft IWPA is shown on Figure 2 (Appendix A).

7.0 WATER QUALITY

During the prolonged pump test, NGI personnel collected a series of water quality samples to evaluate the chemical characteristics of the water derived from well PW-1. Samples collected and analyses performed as part of the pump testing activities were completed in accordance with the DEP Guidelines Section 4.2.3.VII.H, Appendix A of the Guidelines, and the DEP letter dated December 8, 2003 approving the proposed pump test (Appendix B). Water quality samples were chilled, preserved and delivered to Alpha under a chain of custody for analysis. Analysis for all parameters was conducted by Alpha with the exception of Synthetic Organic Compounds (SOCs) and Radionuclides. Samples for SOCs analysis were submitted by Alpha to Environmental Health Laboratories of South Bend, Indiana and samples for Radionuclide analysis were submitted by Alpha to Hazen of Golden, Colorado.

Samples for analysis of Secondary Contaminants were collected at 1 hour, 24 hours, and 48 hours after test startup, and again after flow rate stabilization had been achieved (approximately 74 hours). Samples for total coliform were collected 24 hours after test startup and again at 74 hours. Samples for Inorganic Compounds, SOCs, Volatile Organic Compounds (VOCs), and Radionuclides were collected at 74 hours. Field-testing was also performed at 1 hour, 24 hours,

and 48 hours after test startup, and again at 74 hours for pH, specific conductance, and temperature. Samples for field and laboratory water quality analysis collected at 74 hours are considered endpoint samples for this pump test. It is important to note that it was necessary to partially close the gate valve and temporarily reduce the flow rate to get back pressure required to derive flow from the sample tap. Table 2 in Appendix A summarizes the results of the laboratory and field analyses. Laboratory certificates of analysis for all analyses conducted on samples collected from well PW-1 during the prolonged pump test are included in Appendix G.

As can be seen on Table 2, water derived from PW-1 is considered to be of drinking water quality with respect to all of the endpoint water quality parameters analyzed. None of the analyzed parameters exceeded their respective MCLs or Guidelines in endpoint samples collected during the prolonged pump test. As indicated on the water quality table in Appendix A, both iron and aluminum concentrations exceed their respective MCLs in the initial samples collected during the prolonged pump test. However, during endpoint sampling, concentrations of these analytes fell below applicable standards.

As expected, the toluene concentration detected in a water sample collected from well PW-1 during the preliminary pump test was not detected in the endpoint sample collected from well PW-1 during the prolonged pump test. Also, the concentration of chloroform dropped from 8.2 ug/L in water collected during the preliminary test to 1.1 ug/L in samples collected at the end of the prolonged test indicating that its presence is most likely as a residual byproduct of well disinfection with chlorine.

Di(2-ethylhexyl)phthalate was detected at a concentration of 1.7 ug/L in the end point sample collected from PW-1. This concentration is below the MMCL set for this compound of 6 ug/L. The laboratory narrative provided by Environmental Health Laboratories (January 2, 2004) states that phthalates can appear in variable quantities in laboratory and field reagent blanks, and generally cannot be accurately measured at levels below about 2 ug/L, citing Method 525.2 Section 13.2.4. The Agency for Toxic Substances and Disease Registry notes that Di(2-ethylhexy)phthalate (CAS# 117-81-7) is a manufactured chemical that is commonly added to plastics, and does not dissolved in water easily.

Analysis of field water quality samples collected from well PW-1 during the prolonged pump test shows that pH increased from 6.16 to 7.67 from the beginning to end of the pump test, specific conductance increased from 115 uS/cm to 185 uS/cm over the first 48 hours of the pump test, then decreased to 163 uS/cm in the endpoint sample, and carbon dioxide ranged from 12 mg/L to 24 mg/L over the course of the pump test.

8.0 WATER DISTRIBUTION SYSTEM DESIGN AND BUSINESS PLAN

The water system design is included in Appendix H. The system includes a submersible well pump, a 20,000-gallon atmospheric water storage tank, three finished water pumps and a hydro-pneumatic water storage tank. The water will be disinfected with sodium hypochlorite, and will include a chlorine analyzer with fail-safes to disable the chemical feed system in the event of a high chlorine concentration. The system will be equipped with auxiliary power in the event of a power failure, and the Framingham Board of Health has required that the road be paved and maintained for year round access, and that a spare submersible pump be purchased to facilitate pump replacement in a timely manner.

9.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information provided herein, NGI concludes that PW-1 is capable of producing water at a sustained rate of 8.9 gpm, and that the water is of drinking water quality. NGI requests an approved pumping rate of 6.0 gpm corresponding to a daily flow of 8,640 gpd (the Title 5 flow estimate for the project) and approval for well PW-1 to supply the proposed development at 45 Nixon Road in Framingham, Massachusetts under DEP Permit Application BRP WS 15 and Transmittal Form #W047118. A DEP Water Supply Business Plan is included in Appendix I.

10.0 REFERENCES

Nelson, Arthur E. 1974. Surficial Geologic Map of the Framingham Quadrangle, Middlesex and Worcester Counties, Massachusetts. Geologic Quadrangle Map GQ-1176. United States Geological Survey, Reston, VA.

Nelson, Arthur E. 1975. Bedrock Geologic Map of the Framingham Quadrangle Middlesex and Worcester Counties, Massachusetts. Geologic Quadrangle Map GQ-1274. United States Geological Survey, Reston, VA.

Appendix M - Well Water Supply

Massachusetts Department of Environmental Protection
Bureau of Resource Protection

WELL DRILLER

Please specify work performed:
New Well

Please specify well type:
Domestic

Number Of Wells:

Well Location

In public right-of-way:
○ Yes ○ No

Subdivision/Property/Description:

Property Owner:
METROWEST HOLDINGS

Engineering Firm:

Address at well location:

Street Number:	Street Name:
52 A	NIXON
Building Lot#:	**Assessor's Map #:**
Assessor's Lot#:	**ZIP Code:**
	~~01719~~ 01701

City/Town:
FRAMINGHAM

GPS

North:	West:
42.20595	71.28754

Mailing Address:
☐ click here if same as well location address

Street Number:	Street Name:
23	MILL
City/Town:	**State:**
NATICK	MASSACHUSETTS
ZIP Code:	
01760	

Board of health permit obtained:
◉ Yes ○ Not Required

Permit Number:	Date Issued:
2013031V	9/25/2012

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(General)

Well Driller - General Well Form

DRILLING METHOD

Overburden	Bedrock
Air Hammer	Air Hammer

WELL LOG OVERBURDEN LITHOLOGY

From (ft)	To(ft)	Code	Color	Comment	Drop in drill stem	Extra fast or slow drill rate	Loss or addition of fluid
0	10	Silt	Brown		Yes	Fast / Slow	Loss / Addition
10	20	Silty Sand And Gravel	Brown		Yes	Fast / Slow	Loss / Addition
20	23	Silty Sand And Gravel	Brown		Yes	Fast / Slow	Loss / Addition

WELL LOG BEDROCK LITHOLOGY

From (ft)	To(ft)	Code	Comment	Drop in drill stem	Extra fast or slow drill rate	Loss or addition of fluid	Visible Rust Staining	Extra Large Chips
23	100	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
100	200	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
200	300	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
300	400	Granite	325' WATER 1/4 GALLON PER MIN	Yes	Fast / Slow	Loss / Addition	Yes	Yes
400	500	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes

ADDITIONAL WELL INFORMATION

Developed: Yes / No

Disinfected: Yes / No

Total Well Depth: 500

Depth to Bedrock: 23

Surface Seal Type: None

Fracture Enhancement: Yes / No

CASING Is Casing above ground? From: 2 To: 0

From	To	Type	Thickness	Diameter	Driveshoe
0	38	Steel	Schedule 40	6.58	Yes

SCREEN No Screen

From	To	Type	Slot Size	Diameter
		--- Choose Screen Type ---		

WATER-BEARING ZONES DRY WELL

From	To	Yield (gpm)
300	400	0.25

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(General)

PERMANENT PUMP (IF AVAILABLE)

Pump Description	--- Choose Pump Description ---	Horsepower	--- Choose Horsepower ---
Pump Intake Depth (ft)		Nominal Pump Capacity (gpm)	

ANNULAR SEAL / FILTER PACK

From	To	Material 1	Weight	Material 2	Weight	Water (gal)	Batches	Method Of Placement
		Choose Material		Choose Material				-- Choose One --

WELL TEST DATA

Date	Method	Yield (gpm)	Time Pumped (HH:MM)	Pumping Level (ft BGS)	Time To Recover (HH:MM)	Recovery (ft BGS)
11/1/2012	Air Blow With Drill Stem	1	1.00	495	00:00	490

WATER LEVEL

Date Measured	Static Depth BGS (ft)	Flowing Rate (gpm)
11/2/2012	75	1

COMMENTS

WELL TO BE HYDROFRACKED NOVEMBER 7TH

WELL DRILLERS STATEMENT

This well was drilled or altered under my direct supervision, according to the applicable rules and regulations, and this report is complete a knowledge.

Driller	DAN MARBLE	Registration #	323	Monitoring [M]	Supervising Drill
Firm	WELLTECH CORP	Rig Permit #	219		Date Job Compl

NOTE: Well Completion Reports must be filed by the registered well driller within 30 days of well completion.

WELLTECH CORPORATION

WELL & PUMP SUPPLIES
16 LEGATE HILL ROAD
STERLING, MA 01564
Phone: 978-422-7471 Fax: 978-422-3408

Date: 11-8-12

PUMP TEST REPORT

WELL LOCATION 52A Nixon Rd Framingham Ma

STATIC LEVEL BEFORE PUMPING WELL: 11'

START TIME: 10:30

TIME :			GPM:	
30 MIN	106	FT	8	GPM
1:00 HR	148	FT	8	GPM
1:30 MIN	155	FT	8	GPM
2:00 HR	171	FT	8	GPM
2:30 MIN:	190	FT	8	GPM
3:00 HR	199	FT	8	GPM
3:30 MIN	207	FT	8	GPM
4:00 HR	211	FT	8	GPM
4:30 MIN	215	FT	8	GPM

RECOVERY LEVEL AFTER 24 HRS./MIN. IS: 24 FT

THIS WELL IS PRODUCING APPROXIMATELY 8 _GPM.

TEST PERFORMED BY: Rick

Nashoba Analytical, LLC Tel: 978-391-4428 Fax: 978-391-4643
31A Willow Road, Ayer MA 01432 Website: http://www.NashobaAnalytical.com

LabNumber: **132974**

Use this number with all correspondence

Client:
Welltech Corporation
16 Legate Hill Road
Sterling, MA 01564

ReportDate: 11/14/2012

Certificate of Analysis

52A Nixon Rd. Framingham MA

Parameter	Method		Result	MCL	MRL	Date of Analysis	Analyst
- Well Head							
Sampled: 11/8/2012 3:30:00 PM by Rick							
Total Coliform Bacteria, /100ML	MF-SM9222B		0	0/Absent	0	11/9/2012 10:00:00 AM	M-MA1118
Arsenic, Total, MG/L	SM 3113B		0.002	0.01	0.001	11/12/2012	M-MA1118
Calcium, MG/L	EPA 200.7		22.2	Not Spec	1	11/14/2012	M-MA1118
Copper, MG/L	EPA 200.7		ND	1.3	0.01	11/14/2012	M-MA1118
Iron, MG/L	EPA 200.7	#	0.36	0.3	0.01	11/14/2012	M-MA1118
Lead, MG/L	SM 3113B		ND	0.015	0.001	11/13/2012	M-MA1118
Magnesium, MG/L	EPA 200.7		2.6	Not Spec	1	11/14/2012	M-MA1118
Manganese, MG/L	EPA 200.7		0.01	0.05	0.005	11/14/2012	M-MA1118
Potassium, MG/L	EPA 200.7		ND	Not Spec	1	11/14/2012	M-MA1118
Sodium, MG/L	EPA 200.7		3.4	See Note	1	11/14/2012	M-MA1118
Alkalinity, MG/L	SM 2320B		54	Not Spec	1	11/9/2012	M-MA1118
Ammonia, MG/L	SM 4500-NH3-D		ND	Not Spec	0.1	11/9/2012	M-MA1118
Chloride, MG/L	EPA 300.0		6.3	250	1	11/9/2012	M-MA1118
Chlorine, Free Residual, MG/L	SM 4500-CL-G		ND	Not Spec	0.02	11/9/2012	M-MA1118
Color Apparent, CU	SM 2120B		15	15	1	11/9/2012	M-MA1118
Conductivity, UMHOS/CM	SM 2510B		180	Not Spec	1	11/9/2012	M-MA1118
Fluoride, MG/L	EPA 300.0		ND	4	0.1	11/9/2012	M-MA1118
Hardness, Total, MG/L	SM 2340B		66	Not Spec	2	11/14/2012	M-MA1118
Nitrate as N, MG/L	EPA 300.0		0.22	10	0.05	11/9/2012	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.01	11/9/2012	M-MA1118
Odor, TON	SM 2150B		0	3	0	11/9/2012	PN
pH, PH AT 25C	SM 4500-H-B		7.7	6.5 - 8.5	NA	11/9/2012	M-MA1118
Sediment, pos/neg	----------		POS	-----	NEG	11/9/2012	PN
Sulfate, MG/L	EPA 300.0		12.8	250	1	11/9/2012	M-MA1118
Turbidity, NTU	EPA 180.1		6	Not Spec	0.1	11/9/2012	M-MA1118

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250, # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #MA1118

David L. Knowlton
Laboratory Director

Massachusetts Department of Environmental Protection
Bureau of Resource Protection

WELL DRILLER

Please specify work performed:
New Well

Please specify well type:
Domestic

Number Of Wells:

Well Location

In public right-of-way:
○ Yes ○ No

Subdivision/Property/Description:

Property Owner:
METROWEST HOLDINGS

Engineering Firm:

Address at well location:

Street Number:	Street Name:
50 B	NIXON
Building Lot#:	**Assessor's Map #:**
Assessor's Lot#:	**ZIP Code:**
	01701

City/Town:
FRAMINGHAM

GPS

North:	West:
42.20542	71.28602

Mailing Address:
☐ click here if same as well location address

Street Number:	Street Name:
23	MILL
City/Town:	**State:**
NATICK	MASSACHUSETTS

ZIP Code:
01760

Board of health permit obtained:
◉ Yes ○ Not Required

Permit Number:	Date Issued:
201205	10/19/2012

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(General)

Well Driller - General Well Form

DRILLING METHOD

Overburden	Bedrock
Air Hammer	Air Hammer

WELL LOG OVERBURDEN LITHOLOGY

From (ft)	To(ft)	Code	Color	Comment	Drop in drill stem	Extra fast or slow drill rate	Loss or addition of fluid
0	6	Silt	Brown		Yes	Fast / Slow	Loss / Addition
6	12	Silty Sand And Gravel	Brown		Yes	Fast / Slow	Loss / Addition

WELL LOG BEDROCK LITHOLOGY

From (ft)	To(ft)	Code	Comment	Drop in drill stem	Extra fast or slow drill rate	Loss or addition of fluid	Visible Rust Staining	Extra Large Chips
12	100	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
100	200	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
200	300	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes
300	400	Granite	340' WATER 1/2 GALLON P/M	Yes	Fast / Slow	Loss / Addition	Yes	Yes
400	500	Granite	423/ WATER 1/2 GALLON P/M	Yes	Fast / Slow	Loss / Addition	Yes	Yes
500	600	Granite		Yes	Fast / Slow	Loss / Addition	Yes	Yes

ADDITIONAL WELL INFORMATION

Developed: Yes / No

Disinfected: Yes / No

Total Well Depth: 600

Depth to Bedrock: 12

Surface Seal Type: None

Fracture Enhancement: Yes / No

CASING Is Casing above ground? From: 2 To: 0

From	To	Type	Thickness	Diameter	Driveshoe
0	28	Steel	Schedule 40	6.56	Yes

SCREEN No Screen

From	To	Type	Slot Size	Diameter
		--- Choose Screen Type ---		

WATER-BEARING ZONES DRY WELL

From	To	Yield (gpm)
400	500	05

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(General)

PERMANENT PUMP (IF AVAILABLE)

Pump Description	--- Choose Pump Description ---	Horsepower	--- Choose Horsepower ---
Pump Intake Depth (ft)		Nominal Pump Capacity (gpm)	

ANNULAR SEAL / FILTER PACK

From	To	Material 1	Weight	Material 2	Weight	Water (gal)	Batches	Method Of Placement
		Choose Material		Choose Material				-- Choose One --

WELL TEST DATA

Date	Method	Yield (gpm)	Time Pumped (HH:MM)	Pumping Level (ft BGS)	Time To Recover (HH:MM)	Recovery (ft BGS)
10/28/2012	Air Blow With Drill Stem	0 75	1:00	595	2:00	585

WATER LEVEL

Date Measured	Static Depth BGS (ft)	Flowing Rate (gpm)
11/2/2012	20	075

COMMENTS

WELL TO BE HYDROFRACKED NOVEMBER 7TH

WELL DRILLERS STATEMENT

This well was drilled or altered under my direct supervision, according to the applicable rules and regulations, and this report is complete a knowledge.

Driller	DAN MARBLE	Registration #	323	Monitoring [M]	Supervising Drill
Firm	WELLTECH CORP	Rig Permit #	219		Date Job Compl

NOTE: Well Completion Reports must be filed by the registered well driller within 30 days of well completion.

WELLTECH CORPORATION

WELL & PUMP SUPPLIES
16 LEGATE HILL ROAD
STERLING, MA 01564
Phone: 978-422-7471 Fax: 978-422-3408

Date: 11-13-12

PUMP TEST REPORT

WELL LOCATION 50 B. Nixon Rd. Framingham, MA.

STATIC LEVEL BEFORE PUMPING WELL: 35' ft

START TIME: 12:30 pm

TIME:		GPM:	
1:00 pm	30 MIN 110' FT	5 gpm	GPM
1:30	1:00 HR 192' FT	5 gpm	GPM
2:00	1:30 MIN 269' FT	5 gpm	GPM
2:30	2:00 HR 328' FT	5 gpm	GPM
3:00	2:30 MIN: 402' FT	5 gpm	GPM
3:30	3:00 HR 450' FT	5 gpm	GPM
4:00	3:30 MIN 491' FT	5 gpm	GPM
4:30	4:00 HR 532' FT	5 gpm	GPM
	4:30 MIN FT		GPM

RECOVERY LEVEL AFTER 24 HRS./MIN. IS: 50 FT

THIS WELL IS PRODUCING APPROXIMATELY 5 GPM.

TEST PERFORMED BY: Rick

Nashoba Analytical, LLC Tel: 978-391-4428 Fax: 978-391-4643
31A Willow Road, Ayer MA 01432 Website: http://www.NashobaAnalytical.com

LabNumber: **133078**

Use this number with all correspondence

Client:
Welltech Corporation
16 Legate Hill Road
Sterling, MA 01564

ReportDate: 11/16/2012

Certificate of Analysis

50B Nixon Road, Framingham MA

Parameter	Method		Result	MCL	MRL	Date of Analysis	Analyst
- Wellhead							
Sampled: 11/13/2012 4:30:00 PM by Rick							
E. coli, /100ml	ENZ. SUB. SM9223		Absent	Absent	Absent	11/14/2012 12:15:00 PM	M-MA1118
Total Coliform Bacteria, /100ml	ENZ. SUB. SM9223	#	Present	Absent	Absent	11/14/2012 10:20:00 AM	M-MA1118
Arsenic, Total, MG/L	SM 3113B		0.006	0.01	0.001	11/15/2012	M-MA1118
Calcium, MG/L	EPA 200.7		69.6	Not Spec	1	11/15/2012	M-MA1118
Copper, MG/L	EPA 200.7		ND	1.3	0.01	11/15/2012	M-MA1118
Iron, MG/L	EPA 200.7	#	1.9	0.3	0.01	11/15/2012	M-MA1118
Lead, MG/L	SM 3113B		ND	0.015	0.001	11/15/2012	M-MA1118
Magnesium, MG/L	EPA 200.7		9.9	Not Spec	1	11/15/2012	M-MA1118
Manganese, MG/L	EPA 200.7	#	0.077	0.05	0.005	11/15/2012	M-MA1118
Potassium, MG/L	EPA 200.7		5.6	Not Spec	1	11/15/2012	M-MA1118
Sodium, MG/L	EPA 200.7		14.4	See Note	1	11/15/2012	M-MA1118
Alkalinity, MG/L	SM 2320B		88	Not Spec	1	11/14/2012	M-MA1118
Ammonia, MG/L	SM 4500-NH3-D		ND	Not Spec	0.1	11/14/2012	M-MA1118
Chloride, MG/L	EPA 300.0		130	250	1	11/14/2012	M-MA1118
Chlorine, Free Residual, MG/L	SM 4500-CL-G		ND	Not Spec	0.02	11/14/2012	M-MA1118
Color Apparent, CU	SM 2120B	#	25	15	1	11/14/2012	M-MA1118
Conductivity, UMHOS/CM	SM 2510B		620	Not Spec	1	11/14/2012	M-MA1118
Fluoride, MG/L	EPA 300.0		0.1	4	0.1	11/14/2012	M-MA1118
Hardness, Total, MG/L	SM 2340B		214	Not Spec	2	11/15/2012	M-MA1118
Nitrate as N, MG/L	EPA 300.0		0.2	10	0.05	11/14/2012	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.01	11/14/2012	M-MA1118
Odor, TON	SM 2150B		0	3	0	11/14/2012	PN
pH, PH AT 25C	SM 4500-H-B		7.5	6.5 - 8.5	NA	11/14/2012	M-MA1118
Sediment, pos/neg	----------		POS	----	NEG	11/14/2012	PN
Sulfate, MG/L	EPA 300.0		10.7	250	1	11/14/2012	M-MA1118
Turbidity, NTU	EPA 180.1		16.8	Not Spec	0.1	11/14/2012	M-MA1118

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250. # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #MA1118

David L. Knowlton
Laboratory Director

Appendix N - Nutrient Loadings

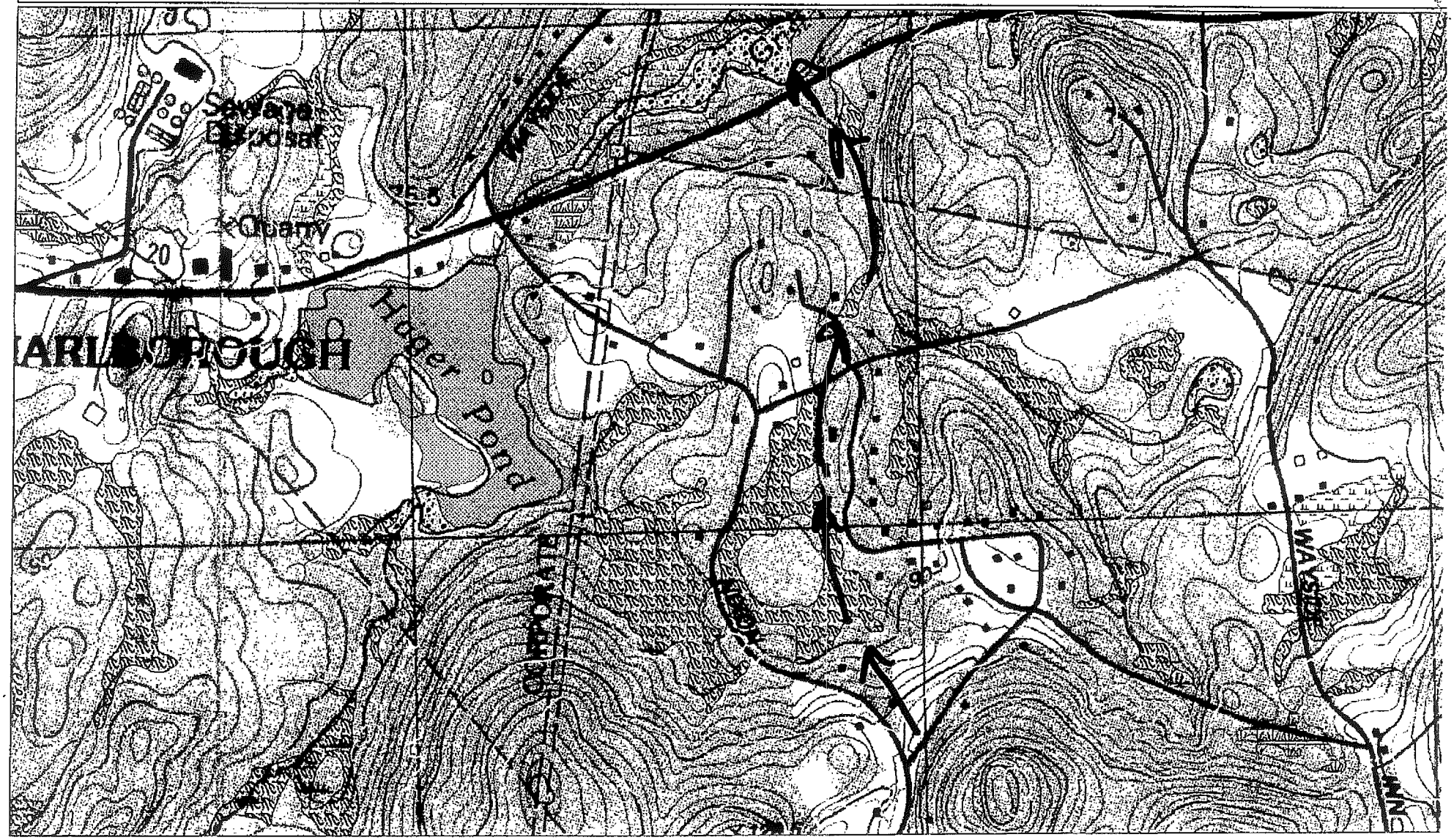
FORD'S HILL ESTATES
RESIDENTIAL SUBDIVISION
FRAMINGHAM, MASSACHUSETTS

1/15/2013

	EXISTING			PROPOSED			TYPICAL EXISTING LOT SURROUNDING SITE		
NUTRIENT LOADING									
WITH REDUCTION	NITROGEN		PHOSPHORUS	NITROGEN		PHOSPHORUS	NITROGEN		PHOSPHORUS
ANNUAL RAINFALL	45 inches	<=INPUT	45 inches	45 inches		45 inches	45 inches		45 inches
SITE AREA	21.80 acres	<=INPUT	21.80 acres	21.80 acres		21.80 acres	1.00 acres		1.00 acres
FERTILIZED LAWN AREA	1.26 acres	<=INPUT 54885.6 s.f.	1.26 acres	6.80 acres	<=INPUT 296208 s.f.	6.80 acres	0.90 acres	<=INPUT 39204 s.f.	0.90 acres
IMPERVIOUS AREA	0.34 acres	<=INPUT	0.34 acres	1.23 acres	<=INPUT	1.23 acres	0.10 acres	<=INPUT	0.10 acres
UNFERTILIZED RECHARGE AREA	19.86 acres		19.86 acres	13.43 acres		13.43 acres	0.00 acres		0.00 acres
WETLAND AREA	0.34 acres	<=INPUT	0.34 acres	0.34 acres		0.34 acres	0.00 acres		0.00 acres
AVERAGE CN	71	<=INPUT	71	73	<=INPUT	73	76	<=INPUT	76
AVERAGE DEPTH OF RUNOFF	1.67 in./year		1.67 in./year	2.37 in./year		2.37 in./year	3.50 in./year		3.50 in./year
RAIN TO RUNOFF	3.7%		3.7%	5.3%		5.3%	7.8%		7.8%
NUTRIENT CONC. IN RAINFALL	0.3 mg/l	<=INPUT	0.01 mg/l <=INPUT	0.3 mg/l		0.01 mg/l <=INPUT	0.3 mg/l		0.01 mg/l <=INPUT
VOLUME OF RAINFALL	26636504 gallons		26636504 gallons	26636504 gallons		26636504 gallons	1221858 gallons		1221858 gallons
WEIGHT OF NUTRIENT IN RAINFALL	66.64 lbs		2.22 lbs	66.64 lbs		2.22 lbs	3.06 lbs		0.10 lbs
ANNUAL NUTRIENT TO RUNOFF FROM RAIN	2.5 lbs		0.1 lbs	3.5 lbs		0.1 lbs	0.2 lbs		0.0 lbs
ANNUAL NUTRIENT TO GROUNDWATER	64.2 lbs		2.1 lbs	63.1 lbs		2.1 lbs	2.8 lbs		0.1 lbs
APPLICATION RATE OF FERTILIZER ANNUALLY	3 lbs.1000 s.f	<=INPUT	1 lbs.1000 s <=INPUT	3 lbs.1000 s.f.		1 lbs.1000 s.f.	3 lbs.1000 s.f.		1 lbs.1000 s.f.
WEIGHT OF NUTRIENT IN FERTILZED AREA	164.7 lbs		54.9 lbs	888.6 lbs		296.2 lbs	117.6 lbs		39.2 lbs
PERCENT OF EXCESS NUTRIENTS IN FERTILIZER	15.0%	<=INPUT	1.2% <=INPUT	15.0%		1.2%	15.0%		1.2%
WEIGHT OF FERTILIZER NUTRIENT IN RUNOFF (RAIN	24.70 lbs		0.66 lbs	133.29 lbs		3.55 lbs	17.64 lbs		0.47 lbs
WEIGHT OF FERTILIZER NUTRIENT IN RUNOFF (FERT	2.47 lbs		0.08 lbs	3.52 lbs		0.12 lbs	0.24 lbs		0.01 lbs
WEIGHT OF NUTRIENT IN RUNOFF	27.17 lbs		0.74 lbs	136.81 lbs		3.67 lbs	17.88 lbs		0.48 lbs
MITIGATION IN DRAINAGE SYSTEM	0%		0%	45%		55%	45%		55%
WEIGHT OF NUTRIENT FROM DRAINAGE SYSTEM	27.2 lbs		0.7 lbs	1.58 lbs		0.06 lbs	0.11 lbs		0.00 lbs
ANNUAL N PER PERSON	5 lbs	<=INPUT	1 lbs <=INPUT	5 lbs		1 lbs <=INPUT	5 lbs		1 lbs <=INPUT
DAILY WATER USE PER PERSON	55 gpcd	<=INPUT	55 gpcd	55 gpcd		55 gpcd	55 gpcd		55 gpcd
NUMBER OF PEOPLE PER RESIDENCE	2.44 people	<=INPUT	2.44 people	2.44 people	<=INPUT	2.44 people	2.44 people	<=INPUT	2.44 people
NUMBER OF HOMES	1 homes	<=INPUT	1 homes	9 homes	<=INPUT	9 homes	1 homes	<=INPUT	1 homes
WEIGHT OF NUTRIENT FROM HOUSE	12.2 lbs		2.44 lbs	109.8 lbs		21.96 lbs	12.2 lbs		2.44 lbs
% REDUCTION OF NUTRIENT IN SEPTIC SYSTEM	25.0%	<=INPUT	90.0% <=INPUT	25.0%	<=INPUT	90.0%	25.0%	<=INPUT	90.0%
WEIGHT OF NUTRIENT IN SEPTIC EFFLUENT	9.15 lbs		0.244 lbs	82.35 lbs		2.196 lbs	9.15 lbs		0.244 lbs
TOTAL NUTRIENT TO RECEIVING WETLAND	127.66 lbs		3.87 lbs	283.87 lbs		8.04 lbs	29.96 lbs		0.82 lbs
REDUCTION IN WETLAND	15%		1%	15%		1%			
TOTAL NUTRIENT LEAVING SITE	108.5 lbs		3.8 lbs	241.3 lbs		7.9 lbs			
WEIGHT OF NUTRIENT PER ACRE	5.0 lbs		0.175 lbs	11.068 lbs		0.364 lbs			

Connorstone Engineering
276 West Main Street
Northborough, MA 01532

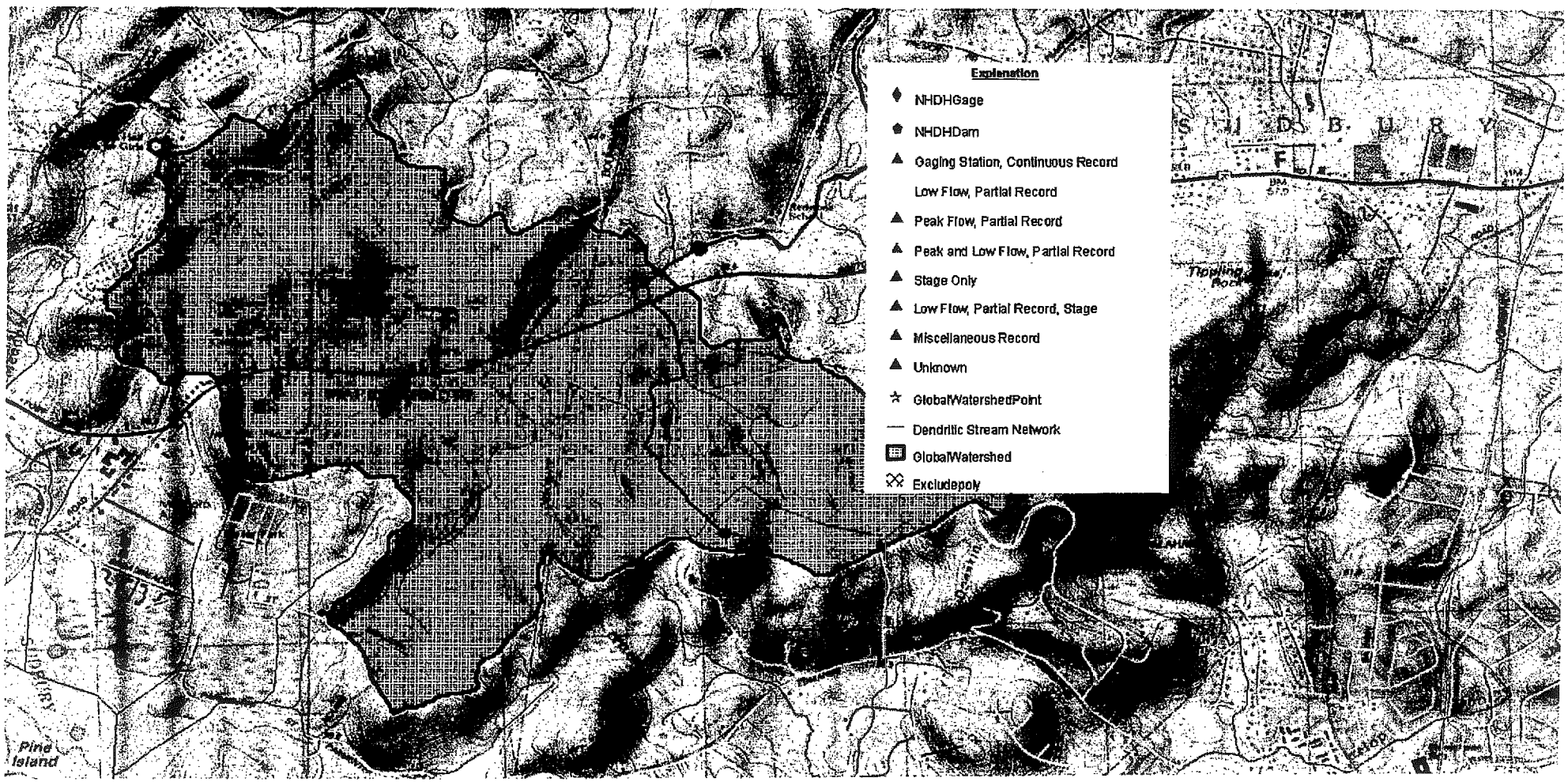
USGS



Flow Path

USGS
Massachusetts StreamStats

Ford's hill Estates



1/15/2013 12:32:18 PM

Appendix O - Stormwater Report

Ford's Hill Estates
Nixon Road, Framingham, MA

STORMWATER REPORT

FOR

Ford's Hill Estates
8 Lot Definitive Subdivision

AT

Nixon Road
Framingham, MA

January 10, 2013

PREPARED BY:
Connorstone Engineering, Inc.
10 Southwest Cutoff, Suite 7
Northborough, MA 01532
Ph: (508) 393-9727 F: (508) 393-5242

TABLE OF CONTENTS

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

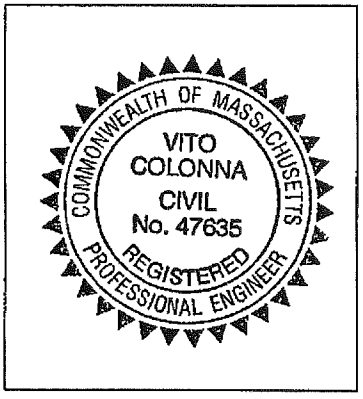
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date 1/10/13

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☒ An Illicit Discharge Compliance Statement is attached;

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

Stormwater Narrative

Existing Conditions:
The site consists of a 22 acre +/- parcel located on the east side of Nixon Road (#45 Nixon Road). The site topography ranges from elevation 502 to 282 sloping in a northwesterly direction. The existing site is currently developed as a single family residential dwelling. The developed portion of the site is generally located at the base of the hill and includes a dwelling, in ground swimming pool, driveway, outbuildings, and landscaping. The southern portion of the site, generally located on the upper portions of the hill, is undeveloped and wooded. Wetland resources areas exist on the site including three wetland areas located on the north portion of the site and the bottom of the hill. These wetlands flow off-site to the northwest.

Existing and proposed surface runoff generated from the developed portion of the site generally flows to the on-site wetlands in the north portion of the site. This wetland flows to the northwest and ultimately discharges to Hagar Pond.

The proposed project is not located in an Estimated or Priority Habitat of Rare Wildlife as indicated on the
2008 Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)

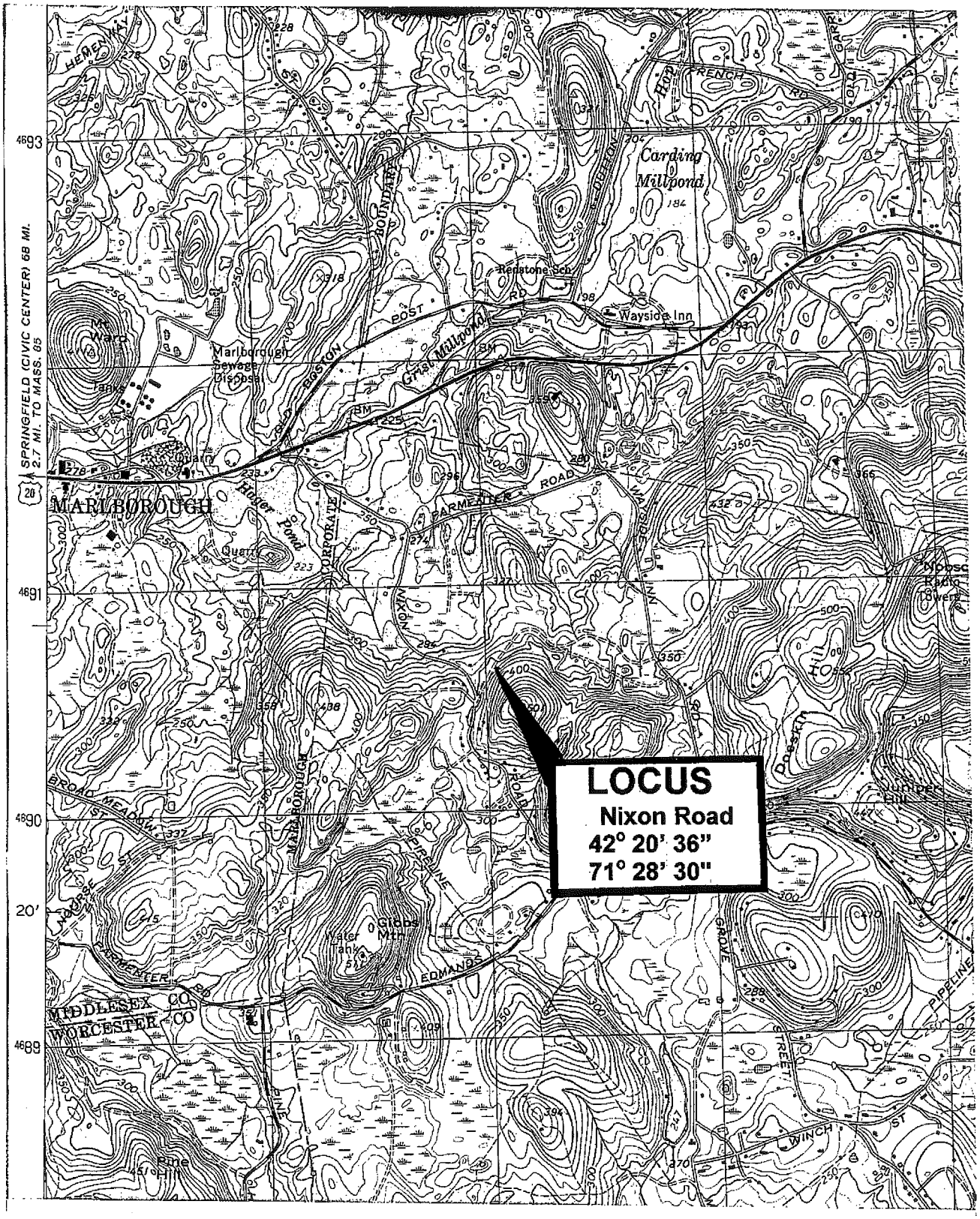
Proposed Development
The proposed development includes the construction of a 500 foot long cul-de-sac designed to allow for the creation of 8 new lots. The proposed work will also include earthwork, drainage (described below), underground utilities, fire protection cistern, and lot development. All of the proposed lots will be serviced by individual on-site wells and septic systems.

The proposed post development stormwater management system is designed to comply with all of the MassDEP Stormwater Management Standards including recharge, treatment and mitigation of peak flow rates.

The proposed roadway drainage system includes a typical catch basin to drain manhole collection system. This collection system will provide the initial pretreatment through the use of deep sump catch basins providing 25% total suspended solids (TSS) removal. Stormwater will then flow to a diversion structure where the first flush water quality volume (0.5 inches over the impervious area) will be diverted to an infiltration basin for both recharge to groundwater and treatment (80% TSS removal). Overflow from the diversion structure and the infiltration basin will then flow to a wet water quality swale to provide further treatment (additional 70% TSS removal) and mitigation of peak flows. The outlet from this structure will discharge to a stabilized upland area, which then ultimately flows to the on-site wetland area at a rate and flow pattern closely matching the existing conditions. The remainder of the site including undeveloped wooded areas and pervious areas will flow uncollected overland to the existing discharge locations.

Additional information and detailed description for each of the MassDEP Stormwater Standards has been provided in this report. The attached Hydrologic Analysis of the site demonstrates the proposed development will not cause an increase in the peak rate of runoff from the site.

LOCUS MAP


LOCUS
Nixon Road
42° 20' 36"
71° 28' 30"
MARLBOROUGH
SPRINGFIELD (CIVIC CENTER) 68 MI.
2.7 MI. TO MASS. 85
Carding Millpond
Wayside Inn
Hudson Pond
Gibbs Mtn.
Juniper Hill
Pine
MIDDLESEX CO
WORCESTER CO
PARMENTER ROAD
BROAD MEADOW ST
PIPELINE
4693
4691
4690
4689
20'

LOCUS MAP (MassDEP Mapping)

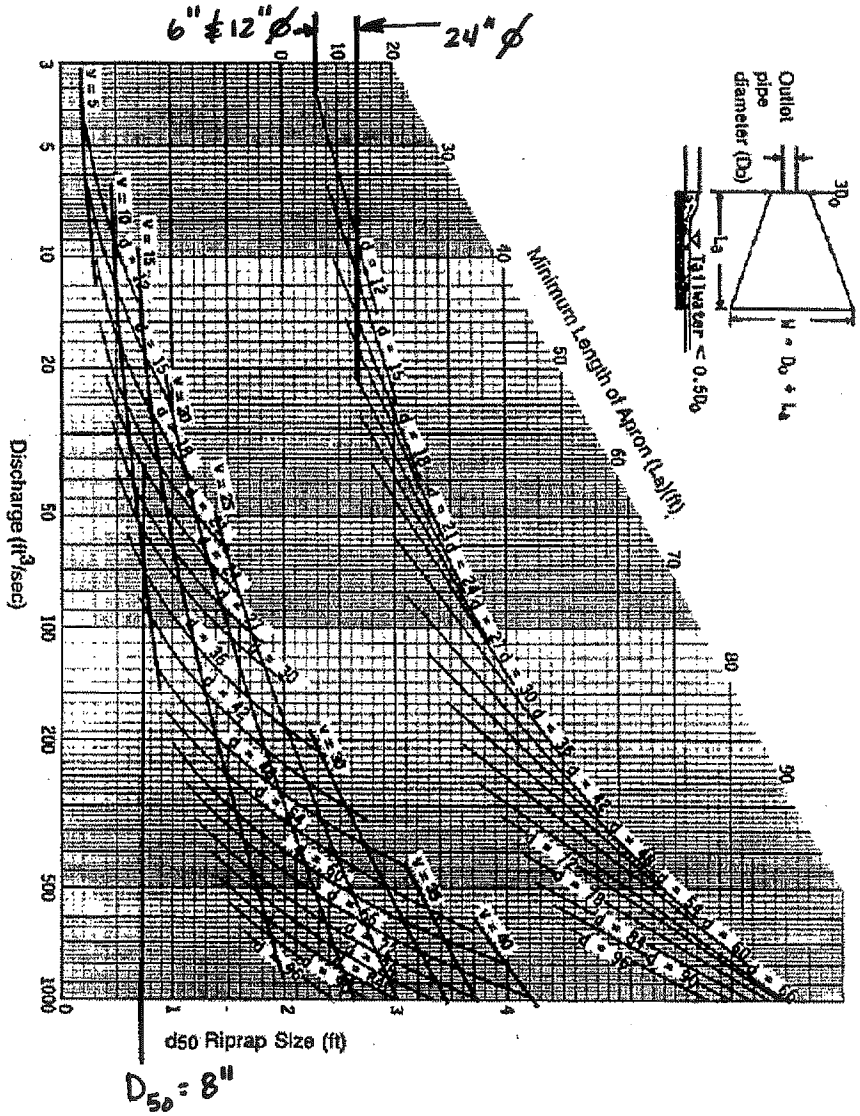
MA D.E.P. STORMWATER STANDARDS

Standard 1: No New Untreated Discharges

1. There are no new untreated discharges to any wetland resource area. The discharge locations are shown on the plans as FE-xx. These outlets have been provided with riprap aprons for energy dissipation and scour protection.

2. Stormwater Discharge Velocity: (100-year Storm)
   FE-1: Q= 2.5 cfs / V= 6.9 fps (12-inch HDPE)
   FE-2: Q= 1.5 cfs / V= 7.7 fps (6-inch PVC)
   FE-4: Q= 19.7 cfs / V= 11.4 fps (24-inch HDPE)
   FE-5: Q= 12.8 cfs / V= 8.2 fps (24-inch HDPE)

3. Riprap sizing: Use: Riprap Size: use 6-12" min. riprap
   Length= 24" diameter pipe L = 16 feet min.
   Less Than 24" diameter pipe L = 10 feet.



Standard 2: Peak Rate Attenuation

An analysis was performed to determine the peak rate of stormwater runoff leaving the site, and design a stormwater management system in accordance with the Massachusetts Department of Environmental Protection Stormwater Management Standard 2. Existing conditions were compared to proposed conditions to ensure that the proposed design will not increase the rate of runoff from the site and/or result in downstream impacts.

Mitigation of peak flow rates was accomplished through use of a proposed water quality swale. A summary of the results is as follows:

Calculation Methods:

1. HydroCAD 9.10 Stormwater modeling Software
2. Data/Equation Source: Soil Conservation Service (SCS) Technical Release No. 20 (TR-20) and SCS Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds.

Storm Event:

1. Rainfall Distribution: Type III, 24-hour storm
2. Rainfall frequency and intensity:
   2-year 3.2 in/hr 100- year: 7.0 in/hr
   10-year 4.8 in/hr
3. Data Source: National Weather Service Technical Paper 40

Soil Classification / Information:

1. Soil Classification: Narragansett (B), Scaboro (D), & Hollis-Rock Outcrop-Charlton Complex (D)
2. Hydrologic Group: B & D
3. Depth to Groundwater: 50" to 65" within basin areas
5. Data Source: a.) NRCS / USDA Soil Survey
   b.) On-Site soil testing (deep hole test pits)

*See report for soils mapping and additional soil description.

Analysis Points

AP-1. Flow to land N/F of Vatcher (northwest corner of site)
AP-2. Flow to land N/F of Shay (west of site)
AP-3. Flow to Nixon Road
AP-4. Flow to east property line
AP-5. Flow toward Dartmouth Drive
AP-6. Flow to land N/F of Skura (north corner of site)

Summary:

The following table presents the pre- and post- development analysis for the 2-, 10-, and 100-year storm events.

Table 1: PEAK RATE of Runoff Summary

Analysis Point - AP	2-Year Storm Existing (Proposed)	10-Year Storm Existing (Proposed)	100-Year Storm Existing (Proposed)
1	1.87 cfs (1.49 cfs)	8.53 cfs (7.51 cfs)	21.37 cfs (20.05 cfs)
2	0.29 cfs (0.28 cfs)	1.44 cfs (0.77 cfs)	3.35 cfs (1.55 cfs)
3	0.09 cfs (0.08 cfs)	0.51 cfs (0.23 cfs)	1.37 cfs (0.50 cfs)
4	0.85 cfs (0.84 cfs)	4.24 cfs (4.05 cfs)	10.81 cfs (10.17 cfs)
5	0.75 cfs (0.71 cfs)	4.32 cfs (3.89 cfs)	11.85 cfs (10.35 cfs)
6	0.66 cfs (0.66 cfs)	1.69 cfs (1.65 cfs)	3.34 cfs (3.34 cfs)

Detailed calculations and hydrologic model results have been attached with this report

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater in excess of that required by Standard 3. Recharge has been provided through two proposed Infiltration Basins.

Required Recharge Volume:

Post development impervious area = 53,505 S.F. (Roadway 19,105 + Lot Development 34,400)
Hydrologic soil group within proposed impervious area = B (0.35 inches /impervious area)
(Rv) = Required Volume = 53,505 S.F. x 0.35 / 12 inches = 1,560 Cubic Feet
Impervious Area to the Infiltration Systems =36,455 S.F.
Capture Ratio = 53,505 / 36,455 = 1.47
Adjusted Required Infiltration Volume = 1.47 x 1,560 C.F. = **2,294 Cubic Feet**

Proposed Recharge Volume: (Static Method)

Available volume within Infiltration basin below outlet = **2,464 Cubic Feet**

Pretreatment

Pretreatment has been provided prior to discharge to the basins through deep sump hooded catch basins (25% TSS) and a sediment forebay (25% TSS).

Separation to Groundwater

Soil testing performed in the vicinity of the infiltration has shown seasonal high groundwater to be greater than 2 feet below the bottom of basin. DTH-110 has shown groundwater elevation 50 inches below grade, and DTH-111 with groundwater 65 inches below grade. The proposed bottom of basin is 24 inches below existing grade.

Draw Down Time (maximum 72 hours allowable):

Volume = 2,950 C.F.
(2,464 cubic feet) / (1.02 in/hr * 1/12 * 600 sq. ft.) = 48 hours
Rawles rate for HSG B = 1.02 in/hr.

Diversion Structure Sizing:

The diversion structure was sized in accordance the following formula for converting a water quality volume to an equivalent water quality flow rate:

WQF = (qu)(A)(WQV)

Where: qu = unit peak discharge (cfs/mi^2/watershed inches), per figure 2.
A = impervious area in square miles
WQV = water quality volume (0.5 inches)

WQF = (700)(0.0012 sq mi)(0.5 inches) = 0.42 cfs

The diversion structure has been sized to convey 0.47 cfs prior to bypass.

Stage-Discharge for Pond S1: DMH-C - Diversion Structure

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
321.00	0.00	0.00	0.00
321.05	0.01	0.00	0.01
321.10	0.03	0.00	0.03
321.15	0.07	0.00	0.07
321.20	0.11	0.00	0.11
321.25	0.17	0.00	0.17
321.30	0.23	0.00	0.23
321.35	0.30	0.00	0.30
321.40	0.36	0.00	0.36
321.45	0.43	0.00	0.43
321.50	0.47	0.00	0.47
321.55	0.53	0.02	0.52
321.60	0.62	0.06	0.56
321.65	0.74	0.14	0.60
321.70	0.88	0.25	0.63
321.75	1.05	0.39	0.67
321.80	1.25	0.55	0.70
321.85	1.48	0.74	0.73
321.90	1.73	0.96	0.76
321.95	2.00	1.21	0.79
322.00	2.30	1.48	0.82
322.05	2.62	1.77	0.85
322.10	2.96	2.09	0.87
322.15	3.33	2.43	0.90
322.20	3.71	2.79	0.92
322.25	4.12	3.17	0.95
322.30	4.54	3.57	0.97
322.35	4.98	3.99	0.99
322.40	5.44	4.43	1.01
322.45	5.92	4.88	1.04
322.50	6.41	5.35	1.06
322.55	6.91	5.83	1.08
322.60	7.42	6.32	1.10
322.65	7.95	6.83	1.12
322.70	8.48	7.34	1.14
322.75	9.02	7.86	1.16
322.80	9.57	8.39	1.18
322.85	10.12	8.93	1.20
322.90	10.68	9.46	1.21
322.95	11.23	10.00	1.23
323.00	11.79	10.54	1.25
323.05	12.34	11.07	1.27
323.10	12.89	11.60	1.29
323.15	13.43	12.12	1.30
323.20	13.95	12.63	1.32
323.25	14.47	13.13	1.34
323.30	14.96	13.60	1.35
323.35	15.42	14.05	1.37
323.40	15.85	14.47	1.39
323.45	16.24	14.84	1.40
323.50	16.54	15.13	1.42
323.55	16.93	15.50	1.43
323.60	17.31	15.87	1.45
323.65	17.69	16.22	1.46
323.70	18.05	16.57	1.48

WQF Prior to Bypass Flow

Tc (Hours)	qu (csm/in)
0.01	835
0.03	835
0.05	831
0.067	814
0.083	795
0.1	774
0.116	755
0.133	736
0.15	717
0.167	700
0.183	685
0.2	669
0.217	654
0.233	641
0.25	628
0.3	593
0.333	572
0.35	563
0.4	536
0.416	528
0.5	491
0.583	460
0.6	454
0.667	433
0.7	424
0.8	398
0.9	376
1	356
1.1	339
1.2	323
1.3	309
1.4	296
1.5	285
1.6	274
1.7	264
1.8	255
1.9	247
2	239
2.1	232
2.2	225
2.3	219
2.4	213
2.5	207
2.6	202

$T_c = 10$ MIN

Tc (Hours)	qu (csm/in)
2.7	197
2.8	192
2.9	187
3	183
3.1	179
3.2	175
3.3	171
3.4	168
3.5	164
3.6	161
3.7	158
3.8	155
3.9	152
4	149
4.1	146
4.2	144
4.3	141
4.4	139
4.5	137
4.6	134
4.7	132
4.8	130
4.9	128
5	126
5.1	124
5.2	122
5.3	120
5.4	119
5.5	117
5.6	115
5.7	114
5.8	112
5.9	111
6	109
6.1	108
6.2	106
6.3	105
6.4	104
6.5	102
6.6	101
6.7	100
6.8	99
6.9	98
7	96

Tc (Hours)	qu (csm/in)
7.1	95
7.2	94
7.3	93
7.4	92
7.5	91
7.6	90
7.7	89
7.8	88
7.9	87
8	86
8.1	85
8.2	84
8.3	84
8.4	83
8.5	82
8.6	81
8.7	80
8.8	79
8.9	79
9	78
9.1	77
9.2	76
9.3	76
9.4	75
9.5	74
9.6	74
9.7	73
9.8	72
9.9	72
10	71

Figure 2: Table of qu values for Ia/P Curve = 0.034, listed by tc, for Type III Storm Distribution

Standard 4: Water Quality

The proposed project has been designed to provide greater than 80% removal of the average annual post construction load of total suspended solids through use of deep sump catch basins, an infiltration basin, and a wet water quality swale. The stormwater management and treatment system has been designed to treat a water quality volume of 0.5 inches times the proposed impervious area. A long-term pollution prevention plan is provided as part of the attached Operation and Maintenance Plan.

TSS Removal Calculation:

1 **BMP**	2 **TSS removal**	3 **Starting TSS** (5 from previous BMP)	4 **TSS Removal** **(2 * 3)**	5 **Remaining TSS** **(3 - 4)**
Deep Sump Catch Basins	25%	100%	25%	75%
Infiltration Basin	80%	75%	60%	15%
Wet Water Quality Swale	70%	15%	10%	5%
		Total TSS Removal =	95%	

Infiltration Basin Design

Required WQV = 53,505 s.f. x 0.5" / 12 = 2,230 C.F.
Proposed WQV = 2,464 C.F. (volume below outlet / elev. 318 to 320)
Pretreatment = 44%TSS removal (deep sump CB and sediment forebay)
Required forebay volume = 53,505 s.f. x 0.1" / 12 = 445 C.F.
Proposed forebay volume = 475 C.F.
GW separation: 2 feet

Water Quality Swale Design

Required WQV = 53,505 s.f. x 0.5" / 12 = 2,230 C.F.
Proposed WQV = 2,600 C.F. (volume below top of 12" check dam / elev. 309 to 310)
Pretreatment = 85% TSS removal (deep sump Cb and infiltration basin)
Wet swale bottom to be seeded with wetland seed mix.

Basin storage volume tables are presented on the following page

Stage-Area-Storage for Pond B1: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
318.00	600	600	0
318.10	651	651	63
318.20	703	705	130
318.30	758	760	203
318.40	815	818	282
318.50	873	877	366
318.60	934	939	457
318.70	997	1,003	553
318.80	1,062	1,069	656
318.90	1,129	1,137	766
319.00	1,198	1,207	882
319.10	1,269	1,279	1,005
319.20	1,342	1,353	1,136
319.30	1,417	1,429	1,274
319.40	1,494	1,508	1,419
319.50	1,573	1,588	1,572
319.60	1,655	1,671	1,734
319.70	1,738	1,755	1,903
319.80	1,823	1,842	2,081
319.90	1,911	1,931	2,268
320.00	2,000	2,021	2,464
320.10	2,053	2,077	2,666
320.20	2,107	2,133	2,874
320.30	2,162	2,191	3,088
320.40	2,218	2,248	3,307
320.50	2,274	2,307	3,531
320.60	2,331	2,366	3,762
320.70	2,388	2,426	3,997
320.80	2,446	2,487	4,239
320.90	2,505	2,549	4,487
321.00	2,565	2,611	4,740
321.10	2,625	2,674	5,000
321.20	2,686	2,738	5,265
321.30	2,748	2,802	5,537
321.40	2,811	2,867	5,815
321.50	2,874	2,933	6,099
321.60	2,938	3,000	6,390
321.70	3,002	3,067	6,687
321.80	3,067	3,135	6,990
321.90	3,133	3,204	7,300
322.00	**3,200**	**3,274**	**7,617**

STORAGE VOLUME BELOW OUTLET (12" ϕ @ 320.0)

Stage-Area-Storage for Pond B2: Water Quality Swale

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
309.00	2,000	0
309.10	2,114	206
309.20	2,231	423
309.30	2,351	652
309.40	2,474	893
309.50	2,600	1,147
309.60	2,751	1,414
309.70	2,907	1,697
309.80	3,067	1,996
309.90	3,231	2,311
310.00	3,400	2,642
310.10	3,528	2,989
310.20	3,658	3,348
310.30	3,790	3,720
310.40	3,925	4,106
310.50	4,062	4,505
310.60	4,201	4,918
310.70	4,343	5,346
310.80	4,487	5,787
310.90	4,634	6,243
311.00	4,782	6,714
311.10	4,934	7,200
311.20	5,087	7,701
311.30	5,243	8,217
311.40	5,401	8,749
311.50	5,562	9,297
311.60	5,725	9,862
311.70	5,890	10,442
311.80	6,058	11,040
311.90	6,228	11,654
312.00	6,400	12,285
312.10	6,536	12,932
312.20	6,674	13,593
312.30	6,813	14,267
312.40	6,954	14,955
312.50	7,096	15,658
312.60	7,240	16,375
312.70	7,385	17,106
312.80	7,531	17,852
312.90	7,679	18,612
313.00	7,828	19,388
313.10	7,979	20,178
313.20	8,131	20,983
313.30	8,285	21,804
313.40	8,440	22,640
313.50	8,596	23,492
313.60	8,754	24,360
313.70	8,913	25,243
313.80	9,074	26,142
313.90	9,236	27,058
314.00	9,400	27,990
314.10	9,554	28,937
314.20	9,710	29,901
314.30	9,867	30,879
314.40	10,025	31,874
314.50	10,184	32,884
314.60	10,345	33,911
314.70	10,507	34,953
314.80	10,670	36,012
314.90	10,834	37,087
315.00	**11,000**	**38,179**

STORAGE VOL. BELOW CHECK DAMS. (

Standard 5: Land Uses With Higher pollutant Loads

Not applicable - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

Not applicable - The proposed use does not discharge to a critical area.

Standard 7: Redevelopment

Not applicable - The proposed use is not classified as a redevelopment.

Standard 8: Construction Period Controls

1. A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan have been attached with this report.

2. The temporary sediment basin has been sized to provide 1,800 cubic feet of storage per acre drained.

   Temp. Basin 1 (at future wet swale)
   Drainage Area = 9.8 acres +/-
   Required Volume = 17,640 cubic feet
   Volume provided = elev. 319.5 to 314 = 26,000 cubic feet +/-

3. The project is covered by the NPDES General Construction Permit, and a SWPPP is required prior to construction.

Standard 9: Operation and Maintenance Plan

An Operation and Maintenance Plan has been attached with this report.

Standard 10: Illicit Discharges

Based upon site observations, no illicit discharges have been observed on the site.

All proposed sewerage flow will discharged to an on-site subsurface sewerage disposal system designed in accordance with MassDEP permits and regulations.

DRAIN PIPE SIZING CALCULATIONS

The street drainage system has been designed from calculations based upon the 25-year design storm. Storm intensities were determined from Appendix B of the Framingham Subdivision Rules and Regulations. The resulting analysis was performed using the Rational Method of determining peak storm flows. All storm sewer pipe sizes were determined using Manning's Equation for pipes flowing full.

The following table presents the hydraulic calculations performed for sizing the site drainage system. The structure references refer to those as shown on the site plan submitted with this report.

DRAIN PIPE SIZING CALCULATIONS

PROJECT Fords Hill Estates LOCATION Nixon Road, Framingham BY: VC n= 0.012

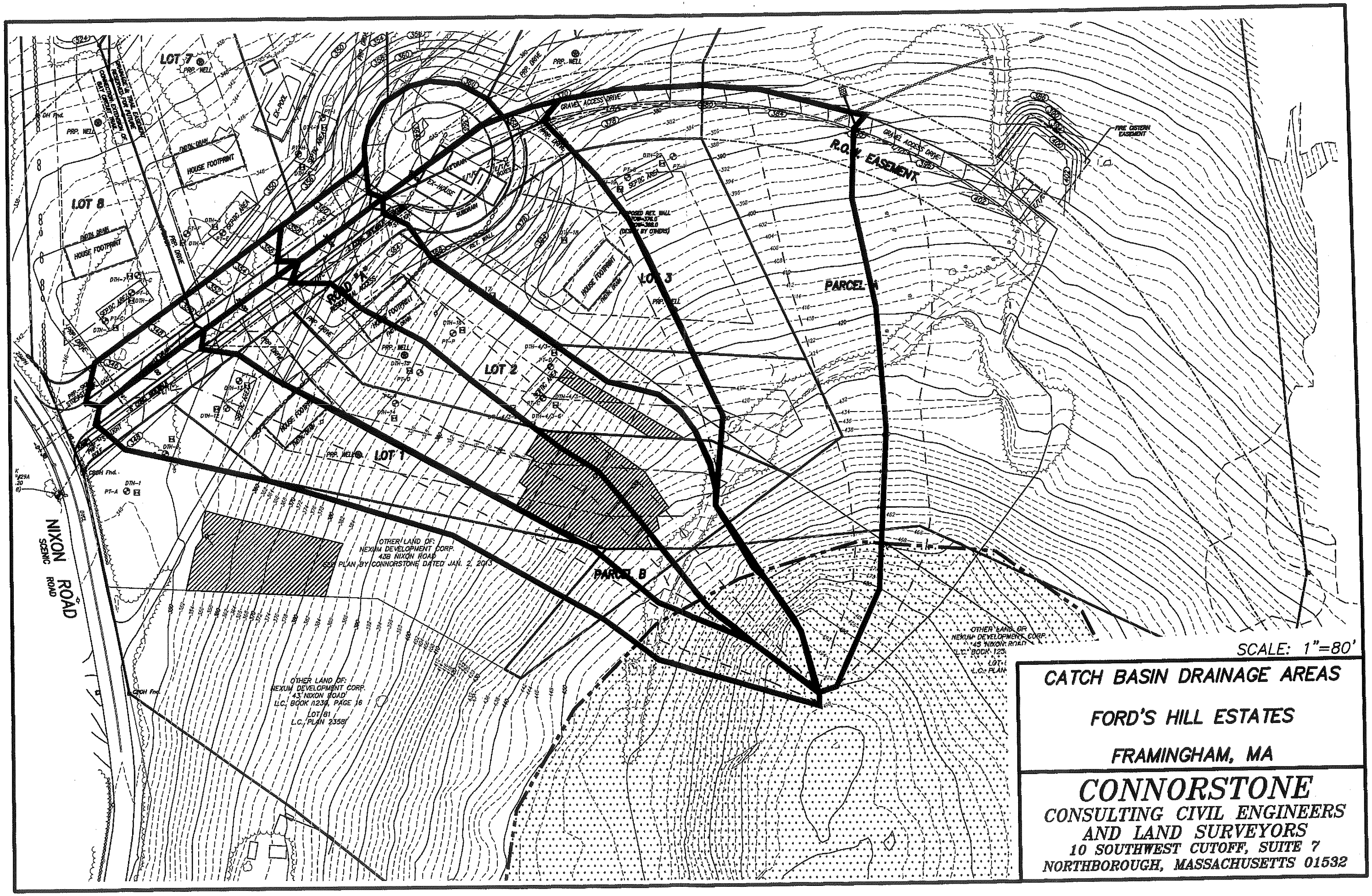
Definitive Subdivision SHEET 1 OF 1 DATE: 1/9/2012 RETURN PERIOD **25 YEAR**

Line		Area	C	CA	Ci	Tc	rain	Inlet flow Q	Pipe flow Qd	Pipe Size	Pipe Length	Slope	flowing full		Rim (feet)		Inv. El.	
FROM	TO	ac				min.	in/hr	cfs	cfs	in	ft	ft/ft	Qf	Vf	Upper	Lower	Upper	Lower
DI-1	HW-1	1.3	0.20	0.26	1.1	10	5.2	1.50	**1.50**	12	30	0.033	**7.05**	9.0	389.00	387.00	385.00	384.00
DI-2	DMH 3+48	2.1	0.20	0.41	1.1	10.8	5.1	2.28	**2.28**	12	180	0.050	**8.63**	11.0	370.00	361.45	366.00	357.00
CB 3+58 RT	DMH 3+48	0.9	0.35	0.32	1.1	8.5	5.6	1.93	**1.93**	12	10	0.030	**6.69**	8.5	361.50	361.45	357.50	357.20
CB 3+58 LT	DMH 3+48	0.20	0.58	0.12	1.1	5.0	6.7	0.85	**0.85**	12	10	0.030	**6.69**	8.5	361.50	361.45	357.50	357.20
DMH 3+48	DMH 2+40			0.84	1.1	11.1	5.0		**4.64**	12	104	0.060	**9.47**	12.1	361.45	354.95	356.75	350.50
CB 2+50 RT	DMH 2+40	0.9	0.35	0.32	1.1	9.7	5.3	1.83	**1.83**	12	10	0.030	**6.69**	8.5	355.20	354.95	351.20	350.90
CB 2+50 LT	DMH 2+40	0.10	0.58	0.06	1.1	5.0	6.7	0.43	**0.43**	12	10	0.030	**6.69**	8.5	355.20	354.95	351.20	350.90
DMH 2+40	DMH 1+58			1.21	1.1	11.2	5.0		**6.65**	15	78	0.056	**16.63**	13.6	354.95	349.64	350.00	345.60
CB 1+48 RT	DMH 1+58	0.90	0.35	0.32	1.1	8.1	5.7	1.97	**1.97**	12	10	0.030	**6.69**	8.5	348.65	349.64	344.65	344.35
DMH 1+58	DMH 1+53			1.53	1.1	11.3	5.0		**8.35**	15	6	0.050	**15.66**	12.8	349.64	349.15	342.10	341.80
CB 0+29 RT	DMH 0+39	1.00	0.35	0.35	1.1	10.5	5.1	1.97	**1.97**	12	20	0.013	**4.32**	5.5	344.60	344.90	340.35	340.10
CB 0+29 LT	DMH 0+39	0.20	0.58	0.12	1.1	5	6.7	0.85	**0.85**	12	10	0.025	**6.11**	7.8	344.35	344.90	340.35	340.10
DMH 0+39	DMH 1+53			0.47	1.1	10.6	5.1		**2.62**	12	111	0.011	**4.02**	5.1	344.90	349.15	340.00	338.80
DMH 1+53	DMH-A			2.00	1.1	11.3	5.0		**10.89**	24	200	0.036	**46.53**	14.8	349.15	337.00	338.30	331.10
DMH-A	DMH-B			2.00	1.1	11.5	4.9		**10.80**	24	30	0.035	**45.88**	14.6	337.00	332.00	327.60	326.55
DMH-B	DMH-C			2.00	1.1	11.6	4.9		**10.78**	24	30	0.035	**45.88**	14.6	332.00	327.00	323.05	322.00
DMH-C	DMH-D			2.00	1.1	11.6	4.9		**10.77**	24	48	0.035	**46.15**	14.7	327.00	325.00	321.50	319.80
DMH-D	HW-4			2.00	1.1	11.7	4.9		**10.75**	24	95	0.031	**42.85**	13.6	325.00	316.00	316.30	313.40

Rainfall intensity = 38/(Tc+7)^.07, per Appedix B pg ii

C (Residential) = 20% impervious = (20% x .95)+ (80% x .20) = 0.35, per FSR&R pg 29 - use for CB 3+58 RT, 2+50 RT, 1+48 RT, 0+29 RT

C (Right of Way) = 50% impervious = (50% x .95)+ (50% x .20) = 0.58, use for CB 3+58 LT, 2+50 LT, 0+29 LT



SCALE: 1"=80'

CATCH BASIN DRAINAGE AREAS

FORD'S HILL ESTATES

FRAMINGHAM, MA

CONNORSTONE
CONSULTING CIVIL ENGINEERS
AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532

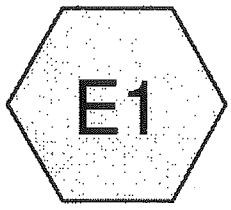
HYDROLOGIC CALCULATIONS

EXISTING CONDITION
2 Year, 10 Year
& 100 Year Storm
Calculation Sheets

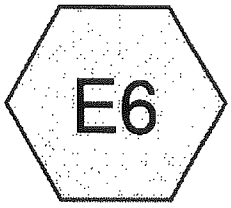
AND

PROPOSED CONDITION
2 Year, 10 Year
& 100 Year Storm
Calculation Sheets

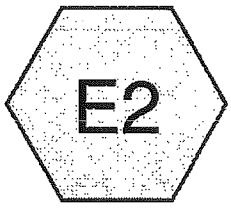
Ford's Hill Estates
Nixon Road, Framingham, MA



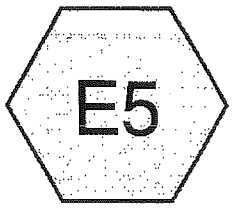
AP-1 to N/F Vatcher



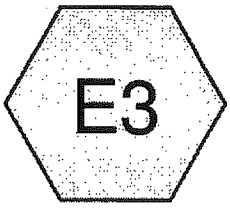
AP-6 To N/F Skura



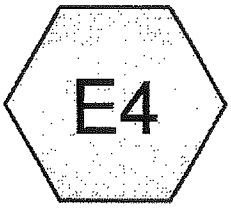
AP-2 To N/F Shay



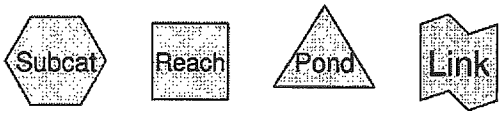
AP-5 To Dartmouth Road



AP-3 To Nixon Road



AP-4 To East Property Line



Drainage Diagram for 45 NIXON ROAD CURRENT
Prepared by CONNORSTONE ENGINEERING, INC.}, Printed 1/11/2013
HydroCAD® 9.10 s/n 01413 © 2010 HydroCAD Software Solutions LLC

Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: AP-1 to N/F Vatcher Runoff Area=441,740 sf 2.74% Impervious Runoff Depth=0.37"
Flow Length=1,380' Tc=15.4 min CN=59 Runoff=1.87 cfs 0.316 af

Subcatchment E2: AP-2 To N/F Shay Runoff Area=67,800 sf 2.80% Impervious Runoff Depth=0.37"
Flow Length=810' Tc=11.4 min CN=59 Runoff=0.29 cfs 0.048 af

Subcatchment E3: AP-3 To Nixon Road Runoff Area=25,270 sf 3.56% Impervious Runoff Depth=0.31"
Flow Length=550' Slope=0.2000 '/' Tc=8.6 min CN=57 Runoff=0.09 cfs 0.015 af

Subcatchment E4: AP-4 To East Property Line Runoff Area=207,000 sf 0.00% Impervious Runoff Depth=0.36"
Flow Length=775' Tc=11.9 min CN=59 Runoff=0.85 cfs 0.142 af

Subcatchment E5: AP-5 To Dartmouth Road Runoff Area=251,100 sf 0.00% Impervious Runoff Depth=0.30"
Flow Length=860' Tc=12.0 min CN=57 Runoff=0.75 cfs 0.142 af

Subcatchment E6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=0.80"
Flow Length=425' Tc=13.5 min CN=69 Runoff=0.66 cfs 0.068 af

Summary for Subcatchment E1: AP-1 to N/F Vatcher

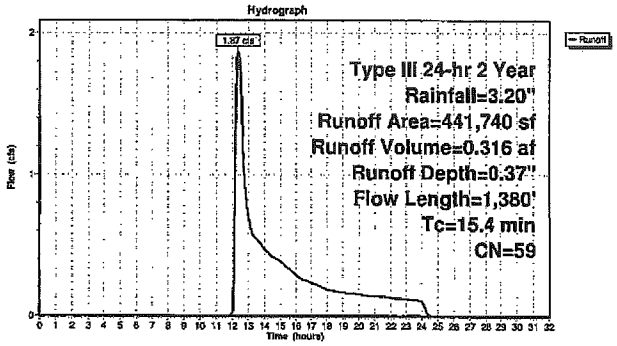
Runoff = 1.87 cfs @ 12.37 hrs, Volume= 0.316 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
7,560	98	Paved parking, HSG B
4,560	98	Roofs, HSG B
45,150	61	>75% Grass cover, Good, HSG B
43,950	77	Woods, Good, HSG D
339,520	55	Woods, Good, HSG B
441,740	59	Weighted Average
429,620		97.26% Pervious Area
12,120		2.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.3300	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
11.4	1,330	0.1500	1.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	1,380	Total			

Subcatchment E1: AP-1 to N/F Vatcher



Summary for Subcatchment E2: AP-2 To N/F Shay

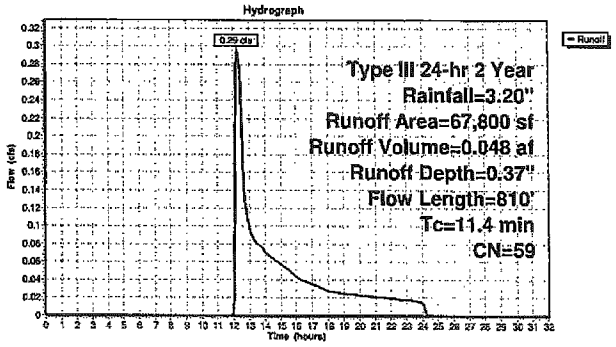
Runoff = 0.29 cfs @ 12.28 hrs, Volume= 0.048 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
1,900	98	Paved parking, HSG B
6,400	61	>75% Grass cover, Good, HSG B
6,370	77	Woods, Good, HSG D
53,130	55	Woods, Good, HSG B
67,800	59	Weighted Average
65,900		97.20% Pervious Area
1,900		2.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.1800	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.4	620	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.8	50	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	90	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	810	Total			

Subcatchment E2: AP-2 To N/F Shay



Summary for Subcatchment E3: AP-3 To Nixon Road

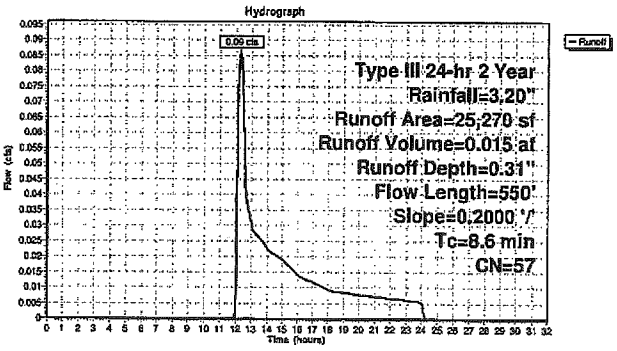
Runoff = 0.09 cfs @ 12.32 hrs, Volume= 0.015 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
900	98	Paved parking, HSG B
2,550	61	>75% Grass cover, Good, HSG B
21,820	55	Woods, Good, HSG B
25,270	57	Weighted Average
24,370		96.44% Pervious Area
900		3.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.2000	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.7	500	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.6	550	Total			

Subcatchment E3: AP-3 To Nixon Road



Summary for Subcatchment E4: AP-4 To East Property Line

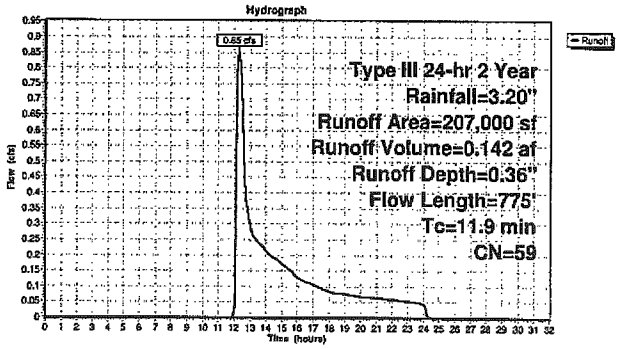
Runoff = 0.85 cfs @ 12.31 hrs, Volume= 0.142 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
173,600	55	Woods, Good, HSG B
207,000	59	Weighted Average
207,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment E4: AP-4 To East Property Line



Summary for Subcatchment E5: AP-5 To Dartmouth Road

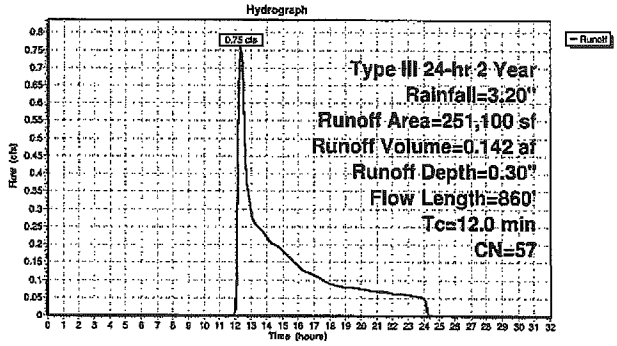
Runoff = 0.75 cfs @ 12.39 hrs, Volume= 0.142 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
12,470	77	Woods, Good, HSG D
201,630	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
251,100	57	Weighted Average
251,100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment E5: AP-5 To Dartmouth Road



Summary for Subcatchment E6: AP-6 To N/F Skura

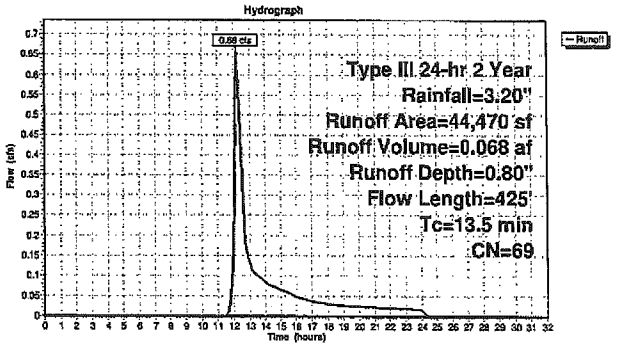
Runoff = 0.66 cfs @ 12.21 hrs, Volume= 0.068 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment E6: AP-6 To N/F Skura



Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: AP-1 to N/F Vatcher Runoff Area=441,740 sf 2.74% Impervious Runoff Depth=2.51"
Flow Length=1,380' Tc=15.4 min CN=59 Runoff=21.37 cfs 2.117 af

Subcatchment E2: AP-2 To N/F Shay Runoff Area=67,800 sf 2.80% Impervious Runoff Depth=2.49"
Flow Length=810' Tc=11.4 min CN=59 Runoff=3.64 cfs 0.323 af

Subcatchment E3: AP-3 To Nixon Road Runoff Area=25,270 sf 3.56% Impervious Runoff Depth=2.33"
Flow Length=550' Slope=0.2000 '/' Tc=8.6 min CN=57 Runoff=1.37 cfs 0.112 af

Subcatchment E4: AP-4 To East Property Line Runoff Area=207,000 sf 0.00% Impervious Runoff Depth=2.46"
Flow Length=775' Tc=11.9 min CN=59 Runoff=10.81 cfs 0.975 af

Subcatchment E5: AP-5 To Dartmouth Road Runoff Area=251,100 sf 0.00% Impervious Runoff Depth=2.27"
Flow Length=860' Tc=12.0 min CN=57 Runoff=11.85 cfs 1.090 af

Subcatchment E6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=3.56"
Flow Length=425' Tc=13.5 min CN=69 Runoff=3.34 cfs 0.302 af

Summary for Subcatchment E1: AP-1 to N/F Vatcher

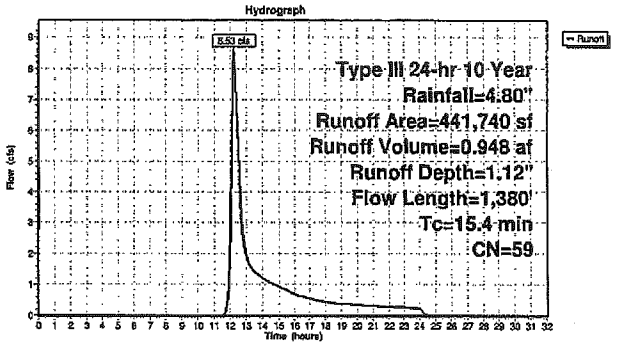
Runoff = 8.53 cfs @ 12.24 hrs, Volume= 0.948 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
7,560	98	Paved parking, HSG B
4,560	98	Roofs, HSG B
46,150	61	>75% Grass cover, Good, HSG B
43,950	77	Woods, Good, HSG D
339,520	55	Woods, Good, HSG B
441,740	59	Weighted Average
429,620		97.26% Pervious Area
12,120		2.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.3300	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
11.4	1,330	0.1500	1.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	1,380	Total			

Subcatchment E1: AP-1 to N/F Vatcher



Summary for Subcatchment E2: AP-2 To N/F Shay

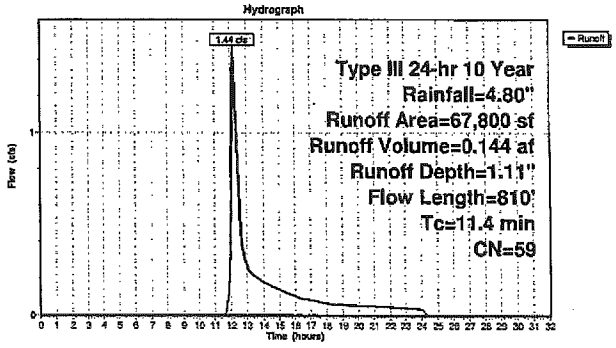
Runoff = 1.44 cfs @ 12.18 hrs, Volume= 0.144 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
1,900	98	Paved parking, HSG B
6,400	61	>75% Grass cover, Good, HSG B
6,370	77	Woods, Good, HSG D
53,130	55	Woods, Good, HSG B
67,800	59	Weighted Average
65,900		97.20% Pervious Area
1,900		2.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.1800	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.4	620	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.8	50	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	90	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	810	Total			

Subcatchment E2: AP-2 To N/F Shay



Summary for Subcatchment E3: AP-3 To Nixon Road

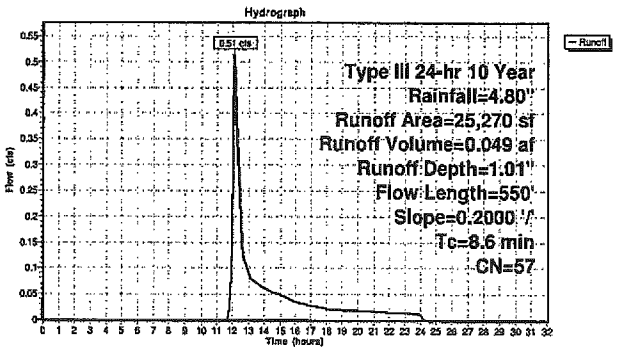
Runoff = 0.51 cfs @ 12.14 hrs, Volume= 0.049 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
900	98	Paved parking, HSG B
2,550	61	>75% Grass cover, Good, HSG B
21,820	55	Woods, Good, HSG B
25,270	57	Weighted Average
24,370		96.44% Pervious Area
900		3.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.2000	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.7	500	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.6	550	Total			

Subcatchment E3: AP-3 To Nixon Road



Summary for Subcatchment E4: AP-4 To East Property Line

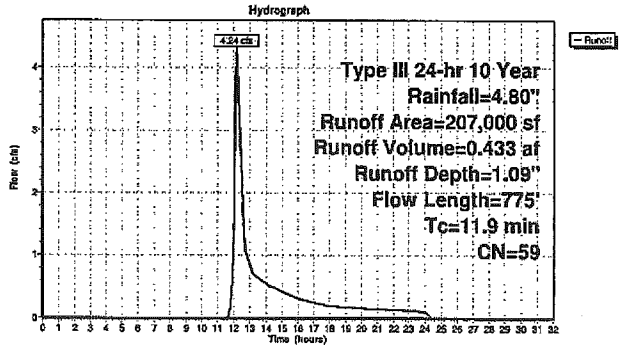
Runoff = 4.24 cfs @ 12.19 hrs, Volume= 0.433 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
173,600	55	Woods, Good, HSG B
207,000	59	Weighted Average
207,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment E4: AP-4 To East Property Line



Summary for Subcatchment E5: AP-5 To Dartmouth Road

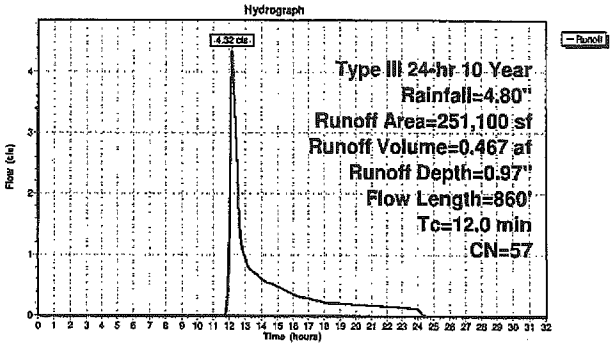
Runoff = 4.32 cfs @ 12.20 hrs, Volume= 0.467 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
12,470	77	Woods, Good, HSG D
201,630	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
251,100	57	Weighted Average
251,100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment E5: AP-5 To Dartmouth Road



Summary for Subcatchment E6: AP-6 To N/F Skura

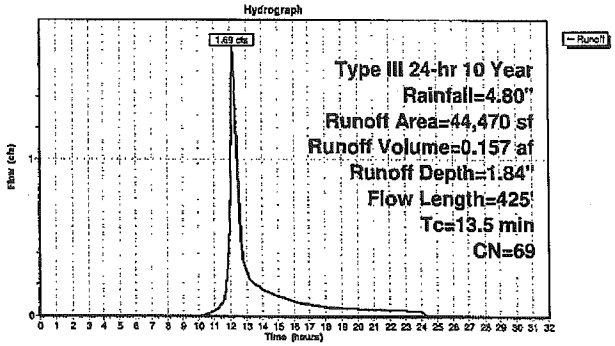
Runoff = 1.69 cfs @ 12.19 hrs, Volume= 0.157 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment E6: AP-6 To N/F Skura



Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: AP-1 to N/F Vatcher Runoff Area=441,740 sf 2.74% Impervious Runoff Depth=1.12"
Flow Length=1,380' Tc=15.4 min CN=59 Runoff=8.53 cfs 0.948 af

Subcatchment E2: AP-2 To N/F Shay Runoff Area=67,800 sf 2.80% Impervious Runoff Depth=1.11"
Flow Length=810' Tc=11.4 min CN=59 Runoff=1.44 cfs 0.144 af

Subcatchment E3: AP-3 To Nixon Road Runoff Area=25,270 sf 3.56% Impervious Runoff Depth=1.01"
Flow Length=550' Slope=0.2000 '/' Tc=8.6 min CN=57 Runoff=0.51 cfs 0.049 af

Subcatchment E4: AP-4 To East Property Line Runoff Area=207,000 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=775' Tc=11.9 min CN=59 Runoff=4.24 cfs 0.433 af

Subcatchment E5: AP-5 To Dartmouth Road Runoff Area=251,100 sf 0.00% Impervious Runoff Depth=0.97"
Flow Length=860' Tc=12.0 min CN=57 Runoff=4.32 cfs 0.467 af

Subcatchment E6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=1.84"
Flow Length=425' Tc=13.5 min CN=69 Runoff=1.69 cfs 0.157 af

Summary for Subcatchment E1: AP-1 to N/F Vatcher

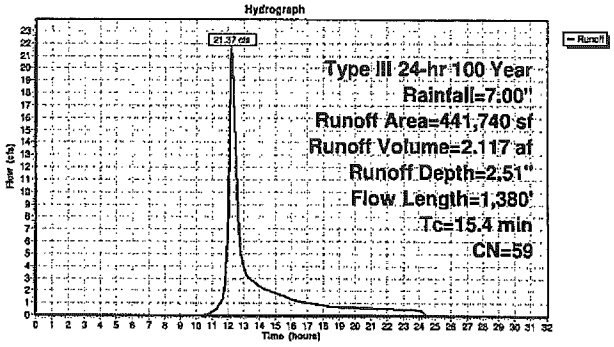
Runoff = 21.37 cfs @ 12.23 hrs, Volume= 2.117 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
7,560	98	Paved parking, HSG B
4,560	98	Roofs, HSG B
46,150	61	>75% Grass cover, Good, HSG B
43,950	77	Woods, Good, HSG D
339,520	55	Woods, Good, HSG B
441,740	59	Weighted Average
429,620		97.26% Pervious Area
12,120		2.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.3300	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
11.4	1,330	0.1500	1.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	1,380	Total			

Subcatchment E1: AP-1 to N/F Vatcher



Summary for Subcatchment E2: AP-2 To N/F Shay

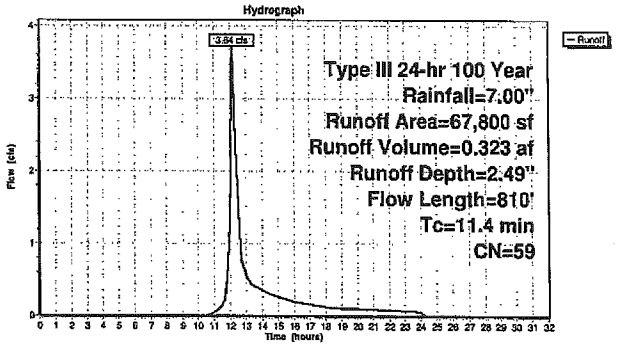
Runoff = 3.64 cfs @ 12.17 hrs, Volume= 0.323 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
1,900	98	Paved parking, HSG B
6,400	61	>75% Grass cover, Good, HSG B
6,370	77	Woods, Good, HSG D
53,130	55	Woods, Good, HSG B
67,800	59	Weighted Average
65,900		97.20% Pervious Area
1,900		2.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.1800	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.4	620	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.8	50	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	90	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	810	Total			

Subcatchment E2: AP-2 To N/F Shay



Summary for Subcatchment E3: AP-3 To Nixon Road

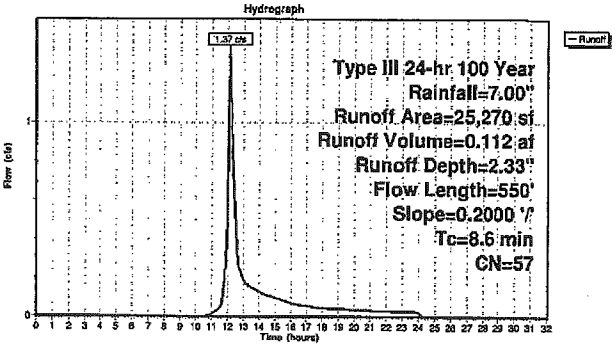
Runoff = 1.37 cfs @ 12.13 hrs, Volume= 0.112 af, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
900	98	Paved parking, HSG B
2,550	61	>75% Grass cover, Good, HSG B
21,820	55	Woods, Good, HSG B
25,270	57	Weighted Average
24,370		96.44% Pervious Area
900		3.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.2000	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.7	500	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.6	550	Total			

Subcatchment E3: AP-3 To Nixon Road



Summary for Subcatchment E4: AP-4 To East Property Line

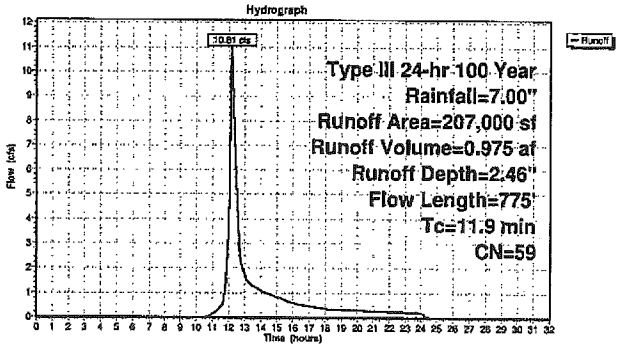
Runoff = 10.81 cfs @ 12.18 hrs, Volume= 0.975 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
173,600	55	Woods, Good, HSG B
207,000	59	Weighted Average
207,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment E4: AP-4 To East Property Line



Summary for Subcatchment E5: AP-5 To Dartmouth Road

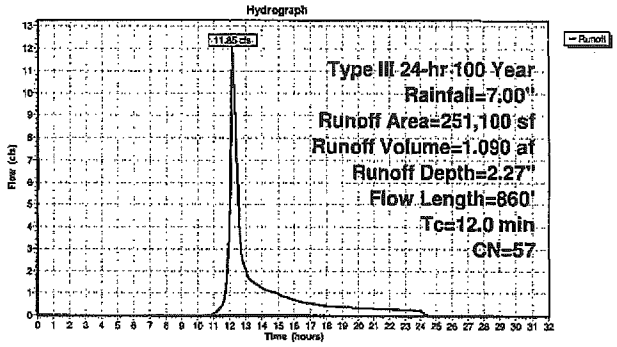
Runoff = 11.85 cfs @ 12.18 hrs, Volume= 1.090 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
12,470	77	Woods, Good, HSG D
201,630	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
251,100	57	Weighted Average
251,100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment E5: AP-5 To Dartmouth Road



Summary for Subcatchment E6: AP-6 To N/F Skura

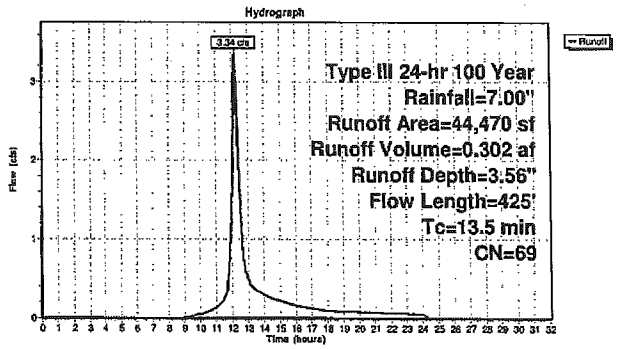
Runoff = 3.34 cfs @ 12.19 hrs, Volume= 0.302 af, Depth= 3.56"

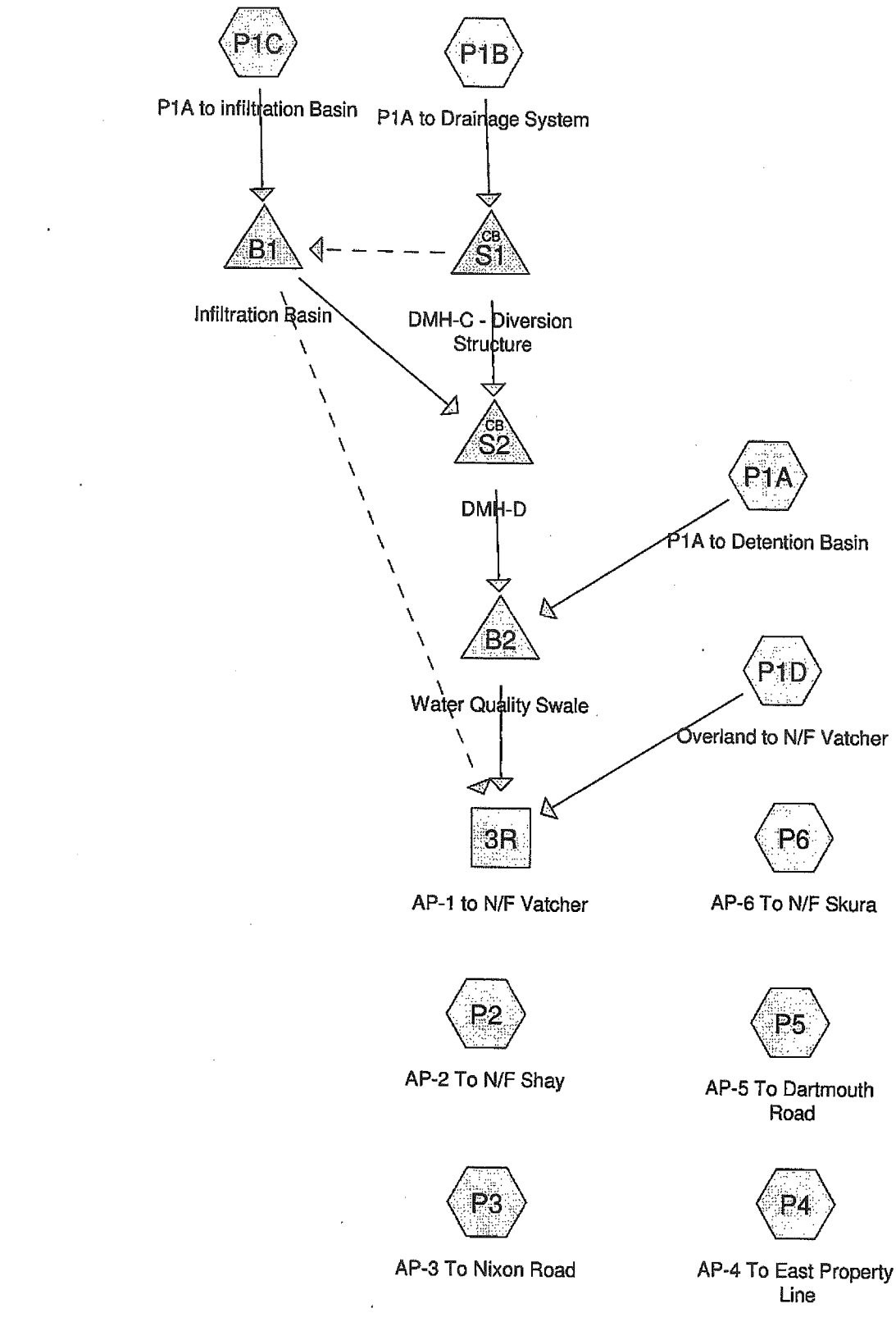
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment E6: AP-6 To N/F Skura





Drainage Diagram for 45 NIXON ROAD CURRENT
Prepared by CONNORSTONE ENGINEERING, INC.}, Printed 1/11/2013
HydroCAD® 9.10 s/n 01413 © 2010 HydroCAD Software Solutions LLC

Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1A: P1A to Detention Basin Runoff Area=115,900 sf 13.20% Impervious Runoff Depth=0.64"
Flow Length=250' Tc=4.1 min CN=66 Runoff=1.72 cfs 0.141 af

Subcatchment P1B: P1A to Drainage System Runoff Area=266,550 sf 11.43% Impervious Runoff Depth=0.57"
Flow Length=735' Tc=10.8 min CN=64 Runoff=2.59 cfs 0.290 af

Subcatchment P1C: P1A to infiltration Basin Runoff Area=52,250 sf 10.91% Impervious Runoff Depth=0.60"
Flow Length=260' Tc=4.4 min CN=65 Runoff=0.70 cfs 0.060 af

Subcatchment P1D: Overland to N/F Vatcher Runoff Area=133,180 sf 0.00% Impervious Runoff Depth=0.45"
Flow Length=460' Tc=13.1 min CN=61 Runoff=0.81 cfs 0.115 af

Subcatchment P2: AP-2 To N/F Shay Runoff Area=17,600 sf 18.75% Impervious Runoff Depth=0.73"
Flow Length=145' Tc=7.0 min CN=68 Runoff=0.28 cfs 0.025 af

Subcatchment P3: AP-3 To Nixon Road Runoff Area=6,160 sf 17.05% Impervious Runoff Depth=0.61"
Flow Length=130' Tc=6.9 min CN=65 Runoff=0.08 cfs 0.007 af

Subcatchment P4: AP-4 To East Property Line Runoff Area=190,500 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=775' Tc=11.9 min CN=59 Runoff=0.84 cfs 0.137 af

Subcatchment P5: AP-5 To Dartmouth Road Runoff Area=210,770 sf 0.43% Impervious Runoff Depth=0.32"
Flow Length=860' Tc=12.0 min CN=57 Runoff=0.71 cfs 0.129 af

Subcatchment P6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=0.80"
Flow Length=425' Tc=13.5 min CN=69 Runoff=0.66 cfs 0.068 af

Reach 3R: AP-1 to N/F Vatcher Inflow=1.49 cfs 0.494 af
Outflow=1.49 cfs 0.494 af

Pond B1: Infiltration Basin Peak Elev=320.36' Storage=3,220 cf Inflow=1.47 cfs 0.294 af
Discarded=0.05 cfs 0.078 af Primary=0.52 cfs 0.183 af Secondary=0.00 cfs 0.000 af Outflow=0.57 cfs 0.261 af

Pond B2: Water Quality Swale Peak Elev=310.48' Storage=3,261 cf Inflow=2.90 cfs 0.381 af
Outflow=0.81 cfs 0.380 af

Pond S1: DMH-C - Diversion Structure Peak Elev=322.05' Inflow=2.59 cfs 0.290 af
Primary=1.75 cfs 0.056 af Secondary=0.84 cfs 0.234 af Outflow=2.59 cfs 0.290 af

Pond S2: DMH-D Peak Elev=316.85' Inflow=1.75 cfs 0.240 af
24.0" Round Culvert n=0.012 L=95.0' S=0.0305 '/' Outflow=1.75 cfs 0.240 af

Total Runoff Area = 23.815 ac Runoff Volume = 0.971 af Average Runoff Depth = 0.49"
94.53% Pervious = 22.513 ac 5.47% Impervious = 1.302 ac

Summary for Subcatchment P1A: P1A to Detention Basin

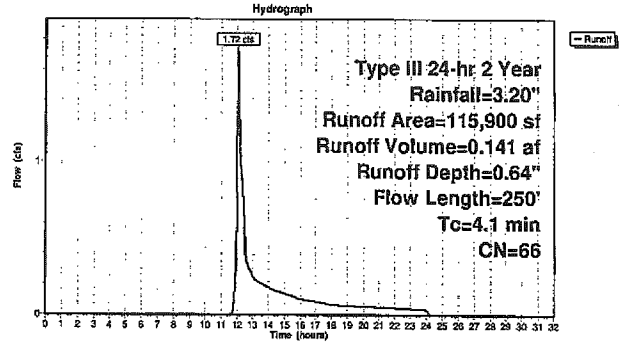
Runoff = 1.72 cfs @ 12.08 hrs, Volume= 0.141 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
* 12,700	98	Roofs/Drives
100,600	61	>75% Grass cover, Good, HSG B
* 2,600	98	Basin Bottom
115,900	66	Weighted Average
100,600		86.80% Pervious Area
15,300		13.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.1	200	0.1800	2.97		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.1	250	Total			

Subcatchment P1A: P1A to Detention Basin



Summary for Subcatchment P1B: P1A to Drainage System

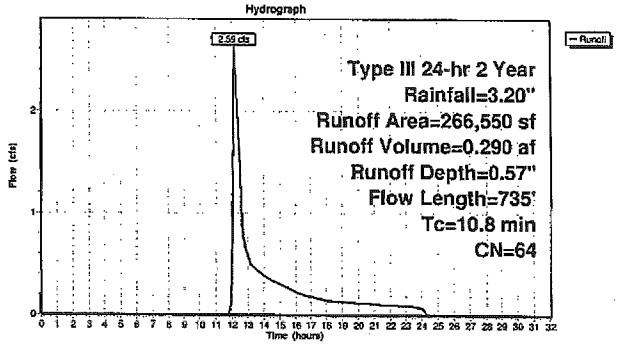
Runoff = 2.59 cfs @ 12.18 hrs, Volume= 0.290 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
18,055	98	Paved roads w/curbs & sewers, HSG B
* 12,400	98	Roofs, driveways
105,305	61	>75% Grass cover, Good, HSG B
17,890	77	Woods, Good, HSG D
103,700	55	Woods, Good, HSG B
4,200	85	Gravel roads, HSG B
266,550	64	Weighted Average
236,095		88.57% Pervious Area
30,455		11.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	505	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	180	0.0660	4.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.8	735	Total			

Subcatchment P1B: P1A to Drainage System



Summary for Subcatchment P1C: P1A to Infiltration Basin

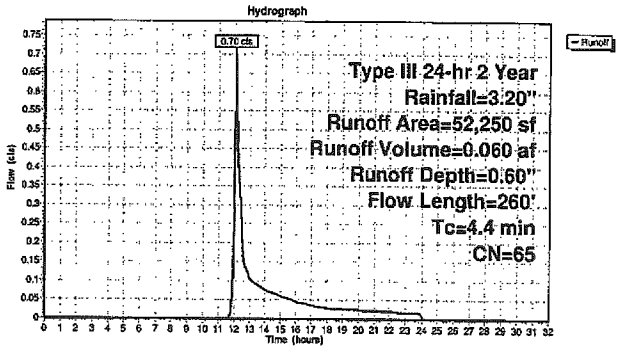
Runoff = 0.70 cfs @ 12.08 hrs, Volume= 0.060 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
* 5,100	98	Roofs, driveways
46,550	61	>75% Grass cover, Good, HSG B
* 600	98	Basin Bottom
52,250	65	Weighted Average
46,550		89.09% Pervious Area
5,700		10.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.4	210	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.4	260	Total			

Subcatchment P1C: P1A to Infiltration Basin



Summary for Subcatchment P1D: Overland to N/F Vatcher

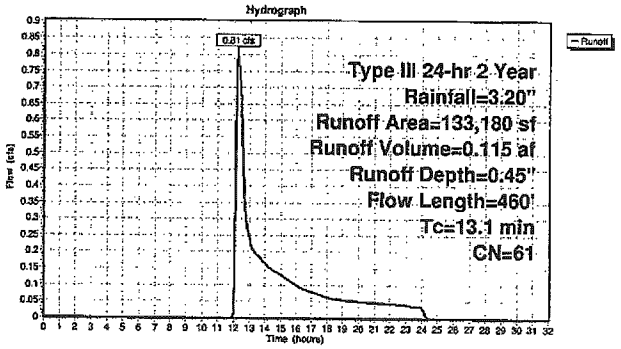
Runoff = 0.81 cfs @ 12.25 hrs, Volume= 0.115 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
1,200	61	>75% Grass cover, Good, HSG B
36,900	77	Woods, Good, HSG D
95,080	55	Woods, Good, HSG B
133,180	61	Weighted Average
133,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	410	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.1	460	Total			

Subcatchment P1D: Overland to N/F Vatcher



Summary for Subcatchment P2: AP-2 To N/F Shay

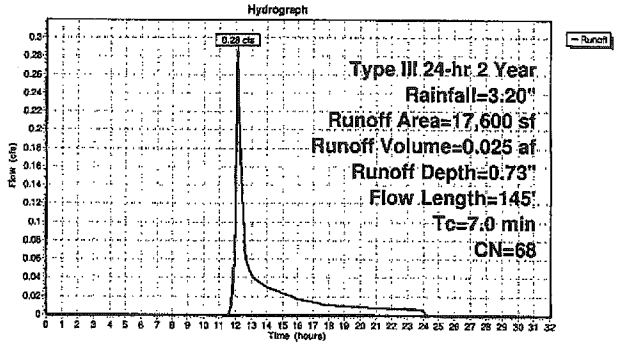
Runoff = 0.28 cfs @ 12.12 hrs, Volume= 0.025 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
* 3,300	98	driveway / roof
14,300	61	>75% Grass cover, Good, HSG B
17,600	68	Weighted Average
14,300		81.25% Pervious Area
3,300		18.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0400	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.3	25	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	145	Total			

Subcatchment P2: AP-2 To N/F Shay



Summary for Subcatchment P3: AP-3 To Nixon Road

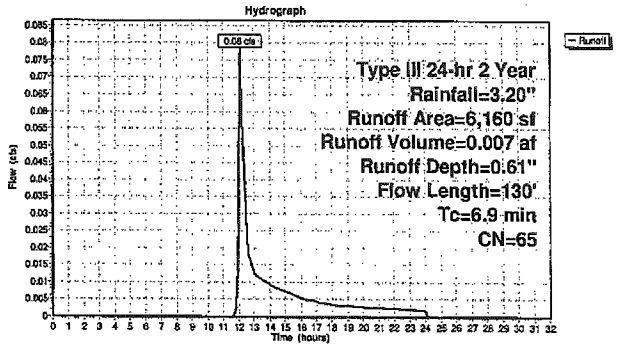
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 0.007 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
1,050	98	Paved parking, HSG B
3,000	61	>75% Grass cover, Good, HSG B
2,110	55	Woods, Good, HSG B
6,160	65	Weighted Average
5,110		82.95% Pervious Area
1,050		17.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	80	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	130	Total			

Subcatchment P3: AP-3 To Nixon Road



Summary for Subcatchment P4: AP-4 To East Property Line

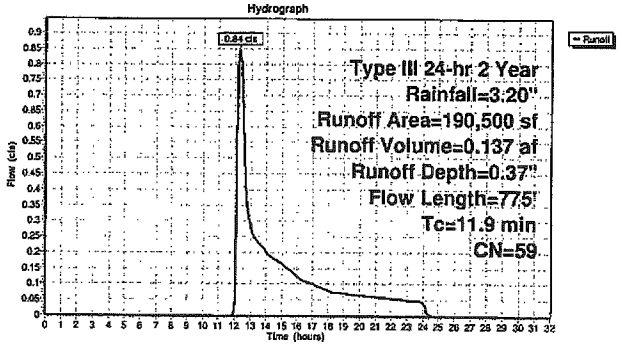
Runoff = 0.84 cfs @ 12.28 hrs, Volume= 0.137 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
152,100	55	Woods, Good, HSG B
5,000	61	>75% Grass cover, Good, HSG B
190,500	59	Weighted Average
190,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment P4: AP-4 To East Property Line



Summary for Subcatchment P5: AP-5 To Dartmouth Road

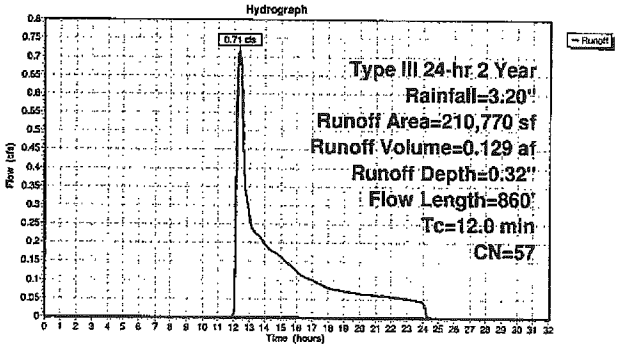
Runoff = 0.71 cfs @ 12.36 hrs, Volume= 0.129 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
900	98	Roofs, HSG B
145,770	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
2,100	85	Gravel roads, HSG B
8,000	77	Woods, Good, HSG D
210,770	57	Weighted Average
209,870		99.57% Pervious Area
900		0.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment P5: AP-5 To Dartmouth Road



Summary for Subcatchment P6: AP-6 To N/F Skura

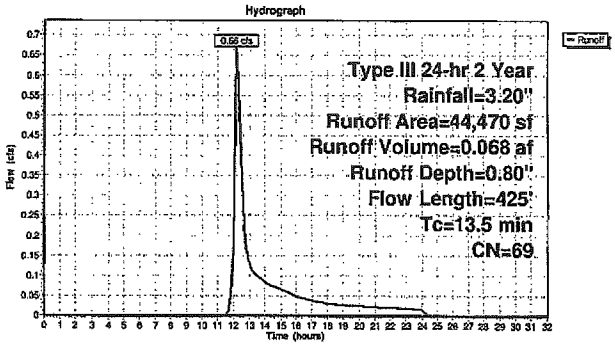
Runoff = 0.66 cfs @ 12.21 hrs, Volume= 0.068 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment P6: AP-6 To N/F Skura

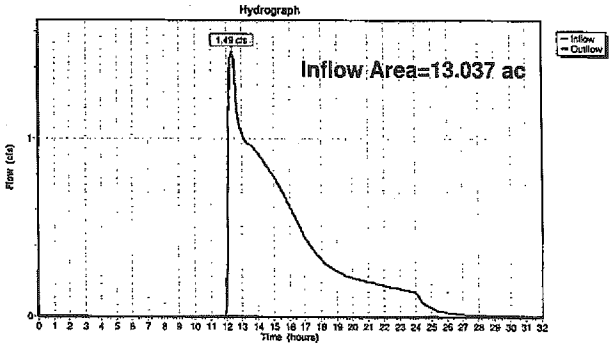


Summary for Reach 3R: AP-1 to N/F Vatcher

Inflow Area = 13.037 ac, 9.06% Impervious, Inflow Depth > 0.46" for 2 Year event
Inflow = 1.49 cfs @ 12.36 hrs, Volume= 0.494 af
Outflow = 1.49 cfs @ 12.36 hrs, Volume= 0.494 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs

Reach 3R: AP-1 to N/F Vatcher



Summary for Pond B1: Infiltration Basin

Inflow Area = 1.199 ac, 10.91% Impervious, Inflow Depth = 2.94" for 2 Year event
Inflow = 1.47 cfs @ 12.10 hrs, Volume= 0.294 af
Outflow = 0.57 cfs @ 13.29 hrs, Volume= 0.261 af, Atten= 61%, Lag= 71.3 min
Discarded = 0.05 cfs @ 13.29 hrs, Volume= 0.078 af
Primary = 0.52 cfs @ 13.29 hrs, Volume= 0.183 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 320.36' @ 13.29 hrs Surf.Area= 2,196 sf Storage= 3,220 cf

Plug-Flow detention time= 189.6 min calculated for 0.261 af (89% of inflow)
Center-of-Mass det. time= 138.5 min (1,071.2 - 932.6)

Volume	Invert	Avail.Storage	Storage Description
#1	318.00'	7,617 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.00	600	0	0	600
320.00	2,000	2,464	2,464	2,021
322.00	3,200	5,153	7,617	3,274

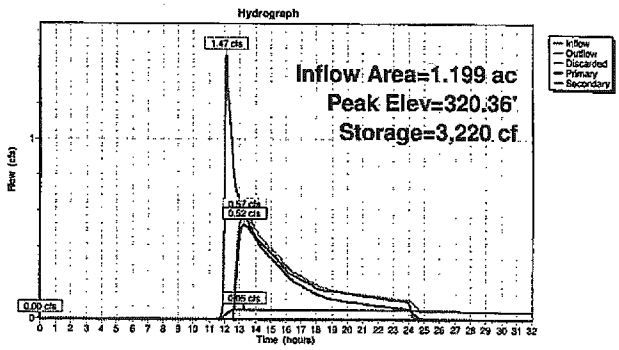
Device	Routing	Invert	Outlet Devices
#1	Discarded	318.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	320.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 320.00' / 319.70' S= 0.0300 '/' Cc= 0.900 n= 0.012
#3	Secondary	321.00'	8.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.58 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 13.29 hrs HW=320.35' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.52 cfs @ 13.29 hrs HW=320.35' (Free Discharge)
└2=Culvert (Inlet Controls 0.52 cfs @ 2.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=318.00' (Free Discharge)
└3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B1: Infiltration Basin



Summary for Pond B2: Water Quality Swale

Inflow Area = 9.979 ac, 11.84% Impervious, Inflow Depth = 0.46" for 2 Year event
Inflow = 2.90 cfs @ 12.14 hrs, Volume= 0.381 af
Outflow = 0.81 cfs @ 12.59 hrs, Volume= 0.380 af, Atten= 72%, Lag= 26.7 min
Primary = 0.81 cfs @ 12.59 hrs, Volume= 0.380 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 310.48' @ 12.59 hrs Surf.Area= 4,028 sf Storage= 3,261 cf

Plug-Flow detention time= 64.2 min calculated for 0.380 af (100% of inflow)
Center-of-Mass det. time= 62.5 min (972.2 - 909.7)

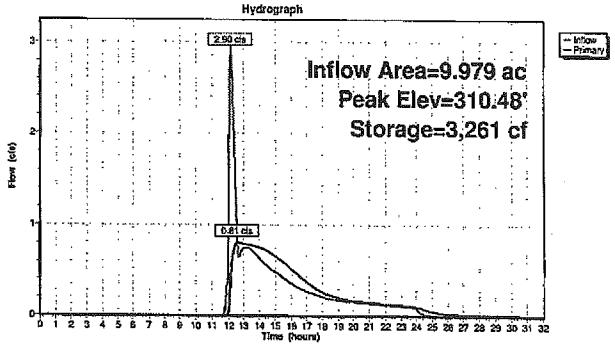
Volume	Invert	Avail.Storage	Storage Description
#1	309.50'	37,032 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.50	2,600	0	0	2,600
310.00	3,400	1,496	1,496	3,408
312.00	6,400	9,643	11,139	6,446
314.00	9,400	15,704	26,843	9,511
315.00	11,000	10,190	37,032	11,150

Device	Routing	Invert	Outlet Devices
#1	Device 5	309.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Device 5	310.50'	12.0" Vert. Orifice/Grate C= 0.600
#3	Device 5	311.75'	12.0" Vert. Orifice/Grate C= 0.600
#4	Device 5	314.00'	24.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	309.25'	24.0" Round Culvert L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 309.25' / 308.25' S= 0.0167 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.81 cfs @ 12.59 hrs HW=310.48' (Free Discharge)
└5=Culvert (Passes 0.81 cfs of 7.61 cfs potential flow)
  ├1=Orifice/Grate (Orifice Controls 0.81 cfs @ 4.10 fps)
  ├2=Orifice/Grate (Controls 0.00 cfs)
  ├3=Orifice/Grate (Controls 0.00 cfs)
  └4=Orifice/Grate (Controls 0.00 cfs)

Pond B2: Water Quality Swale



Summary for Pond S1: DMH-C - Diversion Structure

Inflow Area = 6.119 ac, 11.43% Impervious, Inflow Depth = 0.57" for 2 Year event
Inflow = 2.59 cfs @ 12.18 hrs, Volume= 0.290 af
Outflow = 2.59 cfs @ 12.18 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min
Primary = 1.75 cfs @ 12.18 hrs, Volume= 0.056 af
Secondary = 0.84 cfs @ 12.18 hrs, Volume= 0.234 af

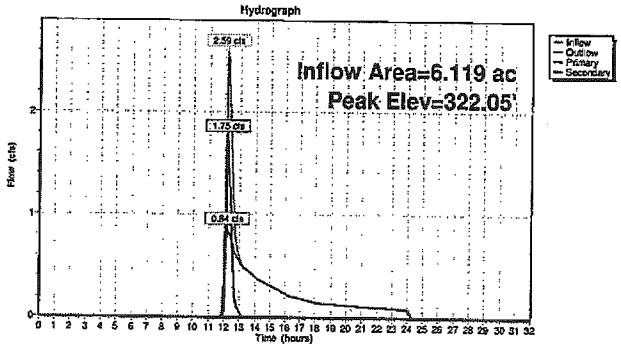
Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 322.05' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	321.00'	6.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 321.00' / 320.50' S= 0.0250 '/' Cc= 0.900 n= 0.011
#2	Primary	321.50'	24.0" Round Culvert L= 48.0' Ke= 0.500 Inlet / Outlet Invert= 321.50' / 319.60' S= 0.0354 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.74 cfs @ 12.18 hrs HW=322.05' (Free Discharge)
└2=Culvert (Inlet Controls 1.74 cfs @ 2.51 fps)

Secondary OutFlow Max=0.84 cfs @ 12.18 hrs HW=322.05' (Free Discharge)
└1=Culvert (Inlet Controls 0.84 cfs @ 4.29 fps)

Pond S1: DMH-C - Diversion Structure



Summary for Pond S2: DMH-D

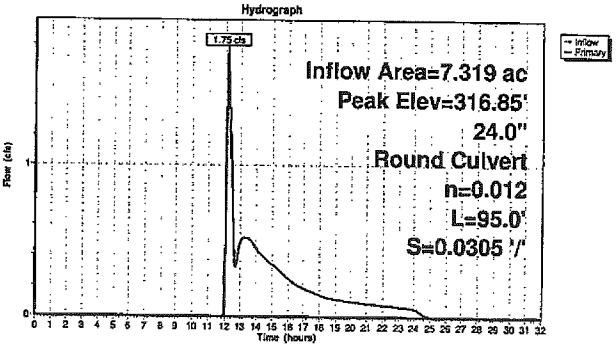
Inflow Area = 7.319 ac, 11.34% Impervious, Inflow Depth = 0.39" for 2 Year event
Inflow = 1.75 cfs @ 12.18 hrs, Volume= 0.240 af
Outflow = 1.75 cfs @ 12.18 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min
Primary = 1.75 cfs @ 12.18 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 316.85' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	316.30'	24.0" Round Culvert L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 316.30' / 313.40' S= 0.0305 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.74 cfs @ 12.18 hrs HW=316.85' (Free Discharge)
└1=Culvert (Inlet Controls 1.74 cfs @ 2.51 fps)

Pond S2: DMH-D



Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1A: P1A to Detention Basin Runoff Area=115,900 sf 13.20% Impervious Runoff Depth=1.58"
Flow Length=250' Tc=4.1 min CN=66 Runoff=5.04 cfs 0.351 af

Subcatchment P1B: P1A to Drainage System Runoff Area=266,550 sf 11.43% Impervious Runoff Depth=1.47"
Flow Length=735' Tc=10.8 min CN=64 Runoff=8.34 cfs 0.749 af

Subcatchment P1C: P1A to infiltration Basin Runoff Area=52,250 sf 10.91% Impervious Runoff Depth=1.52"
Flow Length=260' Tc=4.4 min CN=65 Runoff=2.15 cfs 0.152 af

Subcatchment P1D: Overland to N/F Vatcher Runoff Area=133,180 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=460' Tc=13.1 min CN=61 Runoff=3.20 cfs 0.321 af

Subcatchment P2: AP-2 To N/F Shay Runoff Area=17,600 sf 18.75% Impervious Runoff Depth=1.73"
Flow Length=145' Tc=7.0 min CN=68 Runoff=0.77 cfs 0.058 af

Subcatchment P3: AP-3 To Nixon Road Runoff Area=6,160 sf 17.05% Impervious Runoff Depth=1.54"
Flow Length=130' Tc=6.9 min CN=65 Runoff=0.23 cfs 0.018 af

Subcatchment P4: AP-4 To East Property Line Runoff Area=190,500 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=775' Tc=11.9 min CN=59 Runoff=4.05 cfs 0.409 af

Subcatchment P5: AP-5 To Dartmouth Road Runoff Area=210,770 sf 0.43% Impervious Runoff Depth=1.02"
Flow Length=860' Tc=12.0 min CN=57 Runoff=3.89 cfs 0.411 af

Subcatchment P6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=1.84"
Flow Length=425' Tc=13.5 min CN=69 Runoff=1.69 cfs 0.157 af

Reach 3R: AP-1 to N/F Vatcher Inflow=7.51 cfs 1.456 af
Outflow=7.51 cfs 1.456 af

Pond B1: Infiltration Basin Peak Elev=320.69' Storage=3,967 cf Inflow=3.18 cfs 0.583 af
Discarded=0.06 cfs 0.082 af Primary=1.62 cfs 0.467 af Secondary=0.00 cfs 0.000 af Outflow=1.68 cfs 0.549 af

Pond B2: Water Quality Swale Peak Elev=312.01' Storage=11,191 cf Inflow=11.16 cfs 1.137 af
Outflow=5.50 cfs 1.135 af

Pond S1: DMH-C - Diversion Structure Peak Elev=322.69' Inflow=8.34 cfs 0.749 af
Primary=7.21 cfs 0.318 af Secondary=1.13 cfs 0.431 af Outflow=8.34 cfs 0.749 af

Pond S2: DMH-D Peak Elev=317.56' Inflow=8.01 cfs 0.785 af
24.0" Round Culvert n=0.012 L=95.0' S=0.0305 '/' Outflow=8.01 cfs 0.785 af

Total Runoff Area = 23.815 ac Runoff Volume = 2.627 af Average Runoff Depth = 1.32"
94.53% Pervious = 22.513 ac 5.47% Impervious = 1.302 ac

Summary for Subcatchment P1A: P1A to Detention Basin

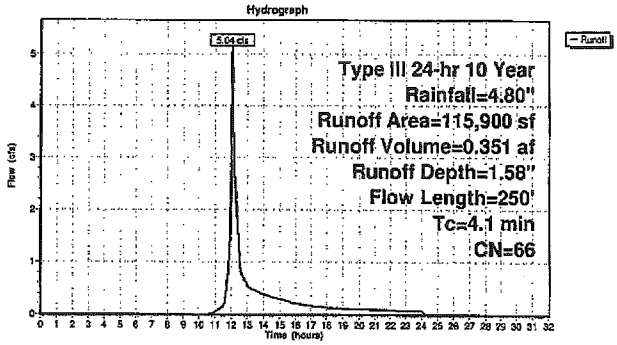
Runoff = 5.04 cfs @ 12.07 hrs, Volume= 0.351 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

	Area (sf)	CN	Description
*	12,700	98	Roofs/Drives
	100,600	61	>75% Grass cover, Good, HSG B
*	2,600	98	Basin Bottom
	115,900	66	Weighted Average
	100,600		86.80% Pervious Area
	15,300		13.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.1	200	0.1600	2.97		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.1	250	Total			

Subcatchment P1A: P1A to Detention Basin



Summary for Subcatchment P1B: P1A to Drainage System

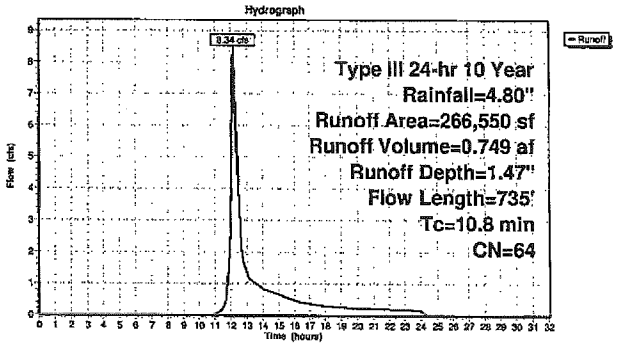
Runoff = 8.34 cfs @ 12.16 hrs, Volume= 0.749 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

	Area (sf)	CN	Description
	18,055	98	Paved roads w/curbs & sewers, HSG B
*	12,400	98	Roofs, driveways
	105,305	61	>75% Grass cover, Good, HSG B
	17,890	77	Woods, Good, HSG D
	108,700	55	Woods, Good, HSG B
	4,200	85	Gravel roads, HSG B
	266,550	64	Weighted Average
	236,095		88.57% Pervious Area
	30,455		11.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	505	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	180	0.0660	4.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.8	735	Total			

Subcatchment P1B: P1A to Drainage System



Summary for Subcatchment P1C: P1A to Infiltration Basin

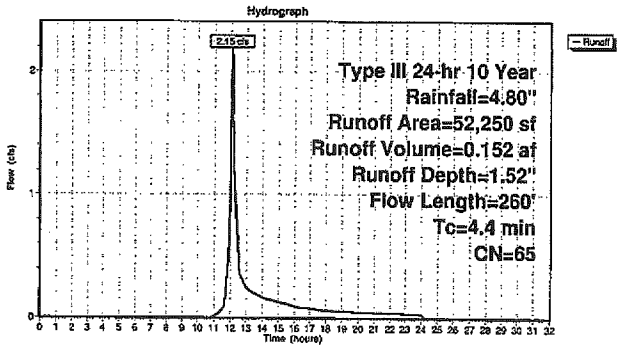
Runoff = 2.15 cfs @ 12.07 hrs, Volume= 0.152 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

	Area (sf)	CN	Description
*	5,100	98	Roofs, driveways
	46,550	61	>75% Grass cover, Good, HSG B
*	600	98	Basin Bottom
	52,250	65	Weighted Average
	46,550		89.09% Pervious Area
	5,700		10.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.4	210	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.4	260	Total			

Subcatchment P1C: P1A to Infiltration Basin



Summary for Subcatchment P1D: Overland to N/F Vatcher

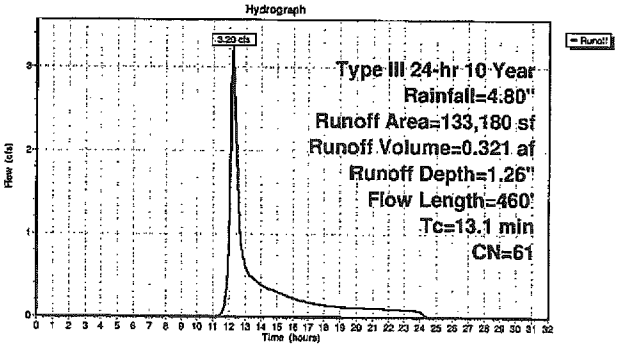
Runoff = 3.20 cfs @ 12.20 hrs, Volume= 0.321 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
1,200	61	>75% Grass cover, Good, HSG B
36,900	77	Woods, Good, HSG D
95,080	55	Woods, Good, HSG B
133,180	61	Weighted Average
133,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	410	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.1	460	Total			

Subcatchment P1D: Overland to N/F Vatcher



Summary for Subcatchment P2: AP-2 To N/F Shay

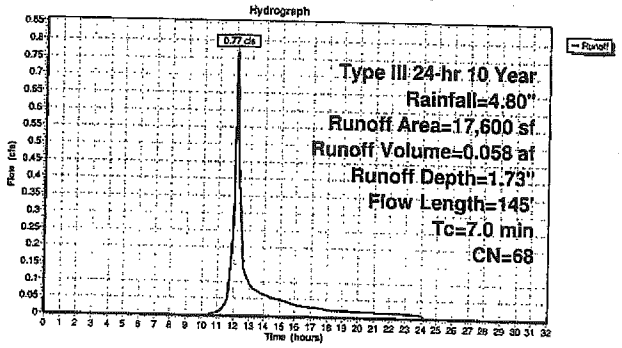
Runoff = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
3,300	98	driveway / roof
14,300	61	>75% Grass cover, Good, HSG B
17,600	68	Weighted Average
14,300		81.25% Pervious Area
3,300		18.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0400	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.3	25	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	145	Total			

Subcatchment P2: AP-2 To N/F Shay



Summary for Subcatchment P3: AP-3 To Nixon Road

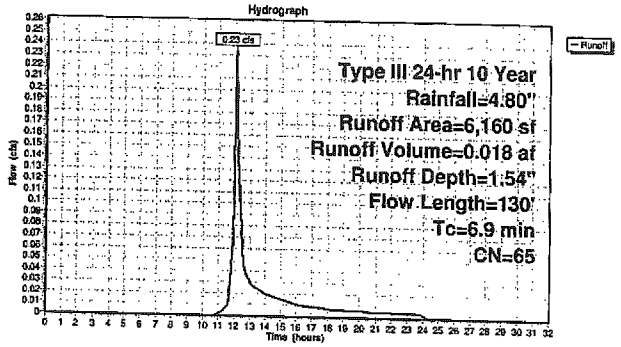
Runoff = 0.23 cfs @ 12.11 hrs, Volume= 0.018 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
1,050	98	Paved parking, HSG B
3,000	61	>75% Grass cover, Good, HSG B
2,110	55	Woods, Good, HSG B
6,160	65	Weighted Average
5,110		82.95% Pervious Area
1,050		17.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	80	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	130	Total			

Subcatchment P3: AP-3 To Nixon Road



Summary for Subcatchment P4: AP-4 To East Property Line

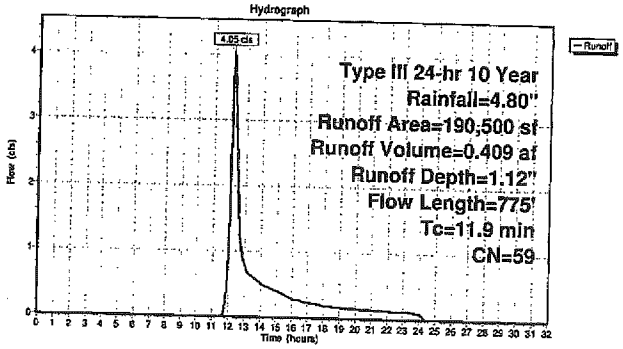
Runoff = 4.05 cfs @ 12.16 hrs, Volume= 0.409 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
152,100	55	Woods, Good, HSG B
5,000	61	>75% Grass cover, Good, HSG B
190,500	59	Weighted Average
190,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment P4: AP-4 To East Property Line



Summary for Subcatchment P5: AP-5 To Dartmouth Road

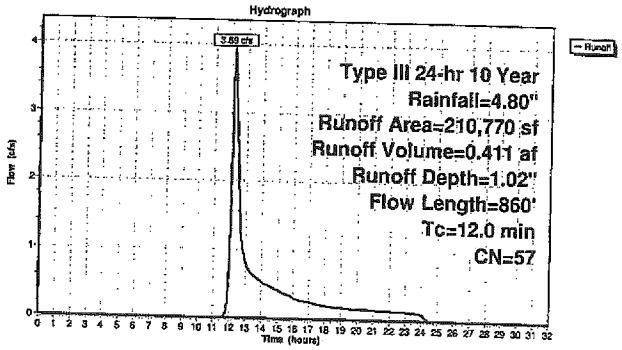
Runoff = 3.69 cfs @ 12.19 hrs, Volume= 0.411 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
900	98	Roofs, HSG B
145,770	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
2,100	85	Gravel roads, HSG B
8,000	77	Woods, Good, HSG D
210,770	57	Weighted Average
209,870		99.57% Pervious Area
900		0.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment P5: AP-5 To Dartmouth Road



Summary for Subcatchment P6: AP-6 To N/F Skura

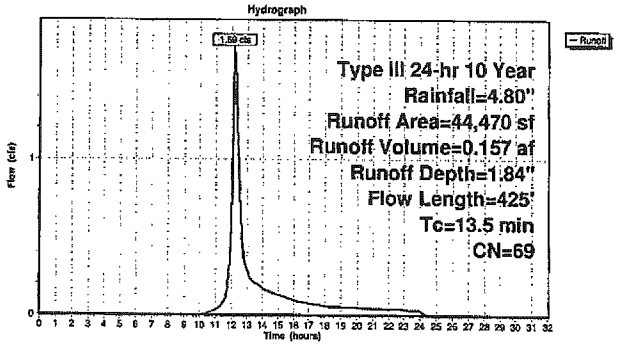
Runoff = 1.69 cfs @ 12.19 hrs, Volume= 0.157 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment P6: AP-6 To N/F Skura

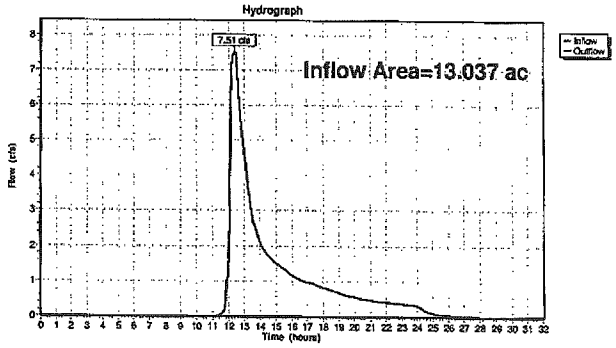


Summary for Reach 3R: AP-1 to N/F Vatcher

Inflow Area = 13.037 ac, 9.06% Impervious, Inflow Depth > 1.34" for 10 Year event
Inflow = 7.51 cfs @ 12.39 hrs, Volume= 1.456 af
Outflow = 7.51 cfs @ 12.39 hrs, Volume= 1.456 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs

Reach 3R: AP-1 to N/F Vatcher



Summary for Pond B1: Infiltration Basin

Inflow Area = 1.199 ac, 10.91% Impervious, Inflow Depth = 5.83" for 10 Year event
Inflow = 3.18 cfs @ 12.06 hrs, Volume= 0.583 af
Outflow = 1.68 cfs @ 12.42 hrs, Volume= 0.549 af, Atten= 47%, Lag= 20.5 min
Discarded = 0.06 cfs @ 12.42 hrs, Volume= 0.082 af
Primary = 1.62 cfs @ 12.42 hrs, Volume= 0.467 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 320.69' @ 12.42 hrs Surf.Area= 2,381 sf Storage= 3,967 cf

Plug-Flow detention time= 104.6 min calculated for 0.549 af (94% of inflow)
Center-of-Mass det. time= 76.4 min (1,009.0 - 932.6)

Volume	Invert	Avail.Storage	Storage Description
#1	318.00'	7,617 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.00	600	0	0	600
320.00	2,000	2,464	2,464	2,021
322.00	3,200	5,153	7,617	3,274

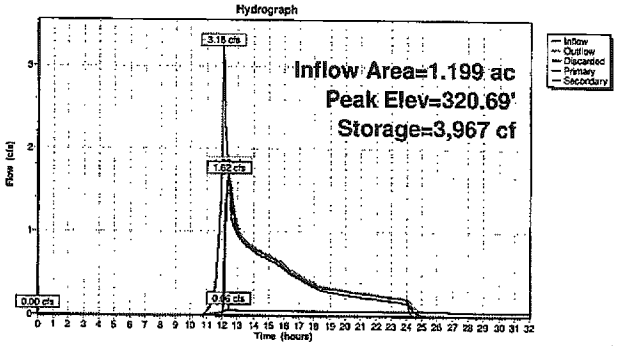
Device	Routing	Invert	Outlet Devices
#1	Discarded	318.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	320.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 320.00' / 319.70' S= 0.0300 '/' Cc= 0.900 n= 0.012
#3	Secondary	321.00'	8.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.06 cfs @ 12.42 hrs HW=320.69' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.62 cfs @ 12.42 hrs HW=320.69' (Free Discharge)
└2=Culvert (Inlet Controls 1.62 cfs @ 2.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=318.00' (Free Discharge)
└3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B1: Infiltration Basin



Summary for Pond B2: Water Quality Swale

Inflow Area = 9.979 ac, 11.84% Impervious, Inflow Depth = 1.37" for 10 Year event
Inflow = 11.16 cfs @ 12.13 hrs, Volume= 1.137 af
Outflow = 5.50 cfs @ 12.50 hrs, Volume= 1.135 af, Atten= 51%, Lag= 22.0 min
Primary = 5.50 cfs @ 12.50 hrs, Volume= 1.135 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 312.01' @ 12.50 hrs Surf.Area= 6,411 sf Storage= 11,191 cf

Plug-Flow detention time= 49.1 min calculated for 1.135 af (100% of inflow)
Center-of-Mass det. time= 48.5 min (920.1 - 871.6)

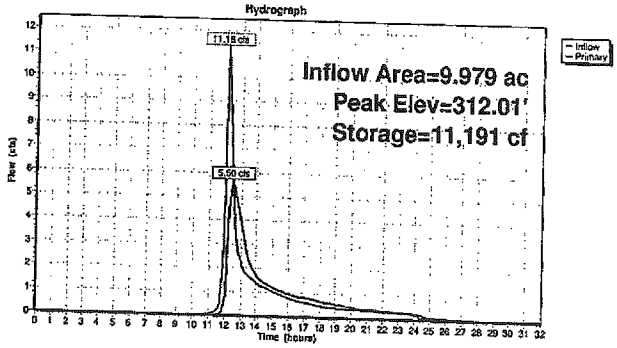
Volume	Invert	Avail.Storage	Storage Description
#1	309.50'	37,032 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.50	2,600	0	0	2,600
310.00	3,400	1,496	1,496	3,406
312.00	6,400	9,643	11,139	6,446
314.00	9,400	15,704	26,843	9,511
315.00	11,000	10,190	37,032	11,150

Device	Routing	Invert	Outlet Devices
#1	Device 5	309.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Device 5	310.50'	12.0" Vert. Orifice/Grate C= 0.600
#3	Device 5	311.75'	12.0" Vert. Orifice/Grate C= 0.600
#4	Device 5	314.00'	24.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	309.25'	24.0" Round Culvert L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 309.25' / 308.25' S= 0.0167 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.50 cfs @ 12.50 hrs HW=312.01' (Free Discharge)
└5=Culvert (Passes 5.50 cfs of 20.06 cfs potential flow)
├1=Orifice/Grate (Orifice Controls 1.42 cfs @ 7.24 fps)
├2=Orifice/Grate (Orifice Controls 3.80 cfs @ 4.83 fps)
├3=Orifice/Grate (Orifice Controls 0.28 cfs @ 1.73 fps)
└4=Orifice/Grate (Controls 0.00 cfs)

Pond B2: Water Quality Swale



Summary for Pond S1: DMH-C - Diversion Structure

Inflow Area = 6.119 ac, 11.43% Impervious, Inflow Depth = 1.47" for 10 Year event
Inflow = 8.34 cfs @ 12.16 hrs, Volume= 0.749 af
Outflow = 8.34 cfs @ 12.16 hrs, Volume= 0.749 af, Atten= 0%, Lag= 0.0 min
Primary = 7.21 cfs @ 12.16 hrs, Volume= 0.318 af
Secondary = 1.13 cfs @ 12.16 hrs, Volume= 0.431 af

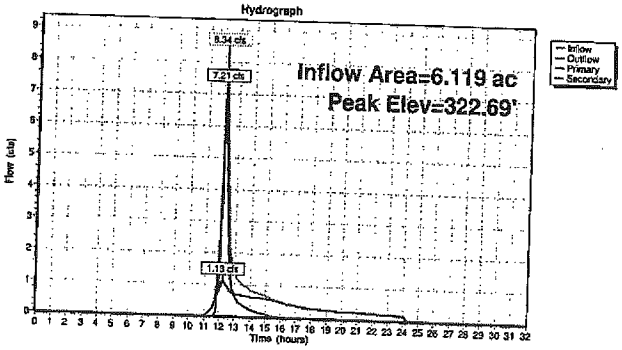
Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 322.69' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	321.00'	6.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 321.00' / 320.50' S= 0.0250 '/' Cc= 0.900 n= 0.011
#2	Primary	321.50'	24.0" Round Culvert L= 48.0' Ke= 0.500 Inlet / Outlet Invert= 321.50' / 319.80' S= 0.0354 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=7.20 cfs @ 12.16 hrs HW=322.69' (Free Discharge)
└2=Culvert (Inlet Controls 7.20 cfs @ 3.71 fps)

Secondary OutFlow Max=1.13 cfs @ 12.16 hrs HW=322.69' (Free Discharge)
└1=Culvert (Inlet Controls 1.13 cfs @ 5.77 fps)

Pond S1: DMH-C - Diversion Structure



Summary for Pond S2: DMH-D

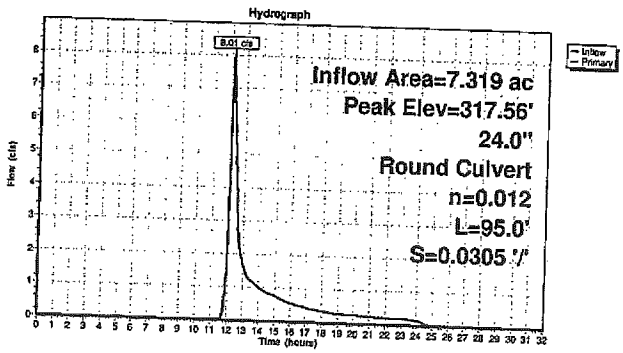
Inflow Area = 7.319 ac, 11.34% Impervious, Inflow Depth = 1.29" for 10 Year event
Inflow = 8.01 cfs @ 12.18 hrs, Volume= 0.785 af
Outflow = 8.01 cfs @ 12.18 hrs, Volume= 0.785 af, Atten= 0%, Lag= 0.0 min
Primary = 8.01 cfs @ 12.18 hrs, Volume= 0.785 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 317.56' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	316.30'	24.0" Round Culvert L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 316.30' / 313.40' S= 0.0305 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=8.00 cfs @ 12.18 hrs HW=317.56' (Free Discharge)
└1=Culvert (Inlet Controls 8.00 cfs @ 3.83 fps)

Pond S2: DMH-D



Time span=0.00-32.00 hrs, dt=0.01 hrs, 3201 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1A: P1A to Detention Basin Runoff Area=115,900 sf 13.20% Impervious Runoff Depth=3.19"
Flow Length=250' Tc=4.1 min CN=66 Runoff=10.60 cfs 0.708 af

Subcatchment P1B: P1A to Drainage System Runoff Area=266,550 sf 11.43% Impervious Runoff Depth=3.02"
Flow Length=735' Tc=10.8 min CN=64 Runoff=18.23 cfs 1.542 af

Subcatchment P1C: P1A to infiltration Basin Runoff Area=52,250 sf 10.91% Impervious Runoff Depth=3.11"
Flow Length=260' Tc=4.4 min CN=65 Runoff=4.59 cfs 0.310 af

Subcatchment P1D: Overland to N/F Vatcher Runoff Area=133,180 sf 0.00% Impervious Runoff Depth=2.72"
Flow Length=460' Tc=13.1 min CN=61 Runoff=7.53 cfs 0.692 af

Subcatchment P2: AP-2 To N/F Shay Runoff Area=17,600 sf 18.75% Impervious Runoff Depth=3.40"
Flow Length=145' Tc=7.0 min CN=68 Runoff=1.55 cfs 0.115 af

Subcatchment P3: AP-3 To Nixon Road Runoff Area=6,160 sf 17.05% Impervious Runoff Depth=3.13"
Flow Length=130' Tc=6.9 min CN=65 Runoff=0.50 cfs 0.037 af

Subcatchment P4: AP-4 To East Property Line Runoff Area=190,500 sf 0.00% Impervious Runoff Depth=2.51"
Flow Length=775' Tc=11.9 min CN=59 Runoff=10.17 cfs 0.914 af

Subcatchment P5: AP-5 To Dartmouth Road Runoff Area=210,770 sf 0.43% Impervious Runoff Depth=2.34"
Flow Length=860' Tc=12.0 min CN=57 Runoff=10.35 cfs 0.945 af

Subcatchment P6: AP-6 To N/F Skura Runoff Area=44,470 sf 0.00% Impervious Runoff Depth=3.56"
Flow Length=425' Tc=13.5 min CN=69 Runoff=3.34 cfs 0.302 af

Reach 3R: AP-1 to N/F Vatcher Inflow=20.05 cfs 3.129 af
Outflow=20.05 cfs 3.129 af

Pond B1: Infiltration Basin Peak Elev=321.18' Storage=5,222 cf Inflow=5.88 cfs 0.962 af
Discarded=0.06 cfs 0.088 af Primary=3.13 cfs 0.815 af Secondary=1.58 cfs 0.024 af Outflow=4.77 cfs 0.928 af

Pond B2: Water Quality Swale Peak Elev=313.81' Storage=25,052 cf Inflow=27.31 cfs 2.414 af
Outflow=12.96 cfs 2.412 af

Pond S1: DMH-C - Diversion Structure Peak Elev=323.72' Inflow=18.23 cfs 1.542 af
Primary=16.74 cfs 0.890 af Secondary=1.49 cfs 0.652 af Outflow=18.23 cfs 1.542 af

Pond S2: DMH-D Peak Elev=319.02' Inflow=19.85 cfs 1.706 af
24.0" Round Culvert n=0.012 L=95.0' S=0.0305 '/' Outflow=19.85 cfs 1.706 af

Total Runoff Area = 23.815 ac Runoff Volume = 5.566 af Average Runoff Depth = 2.80"
94.53% Pervious = 22.513 ac 5.47% Impervious = 1.302 ac

Summary for Subcatchment P1A: P1A to Detention Basin

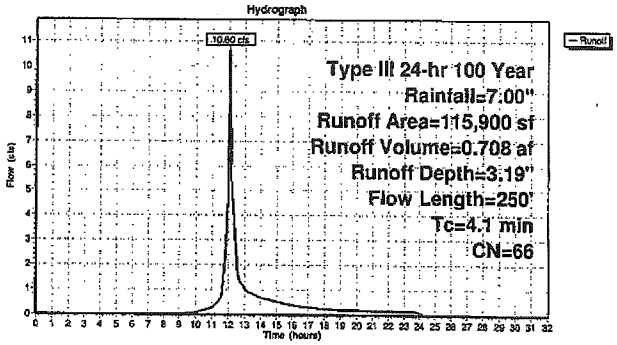
Runoff = 10.60 cfs @ 12.06 hrs, Volume= 0.708 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

	Area (sf)	CN	Description
*	12,700	98	Roofs/Drives
	100,600	61	>75% Grass cover, Good, HSG B
*	2,600	98	Basin Bottom
	115,900	66	Weighted Average
	100,600		86.80% Pervious Area
	15,300		13.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.1	200	0.1800	2.97		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.1	250	Total			

Subcatchment P1A: P1A to Detention Basin



Summary for Subcatchment P1B: P1A to Drainage System

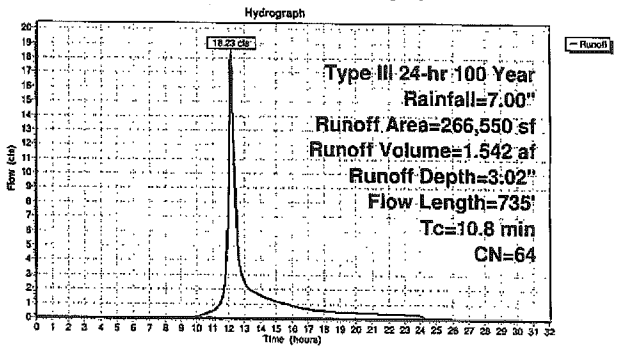
Runoff = 18.23 cfs @ 12.16 hrs, Volume= 1.542 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

	Area (sf)	CN	Description
	18,055	96	Paved roads w/curbs & sewers, HSG B
*	12,400	98	Roofs, driveways
	105,305	61	>75% Grass cover, Good, HSG B
	17,890	77	Woods, Good, HSG D
	108,700	55	Woods, Good, HSG B
	4,200	85	Gravel roads, HSG B
	266,550	64	Weighted Average
	236,095		88.57% Pervious Area
	30,455		11.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	505	0.2200	2.35		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	180	0.0660	4.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.8	735	Total			

Subcatchment P1B: P1A to Drainage System



Summary for Subcatchment P1C: P1A to Infiltration Basin

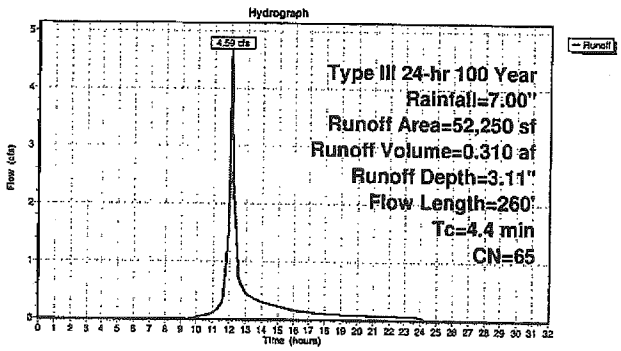
Runoff = 4.59 cfs @ 12.07 hrs, Volume= 0.310 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

	Area (sf)	CN	Description
*	5,100	98	Roofs, driveways
	46,550	61	>75% Grass cover, Good, HSG B
*	600	98	Basin Bottom
	52,250	65	Weighted Average
	46,550		89.09% Pervious Area
	5,700		10.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.2500	0.28		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.4	210	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.4	260	Total			

Subcatchment P1C: P1A to Infiltration Basin



Summary for Subcatchment P1D: Overland to N/F Vatcher

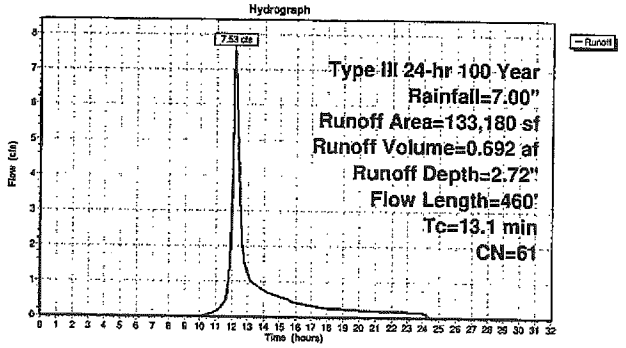
Runoff = 7.53 cfs @ 12.19 hrs, Volume= 0.692 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
1,200	61	>75% Grass cover, Good, HSG B
36,900	77	Woods, Good, HSG D
95,080	55	Woods, Good, HSG B
133,180	61	Weighted Average
133,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	410	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.1	460	Total			

Subcatchment P1D: Overland to N/F Vatcher



Summary for Subcatchment P2: AP-2 To N/F Shay

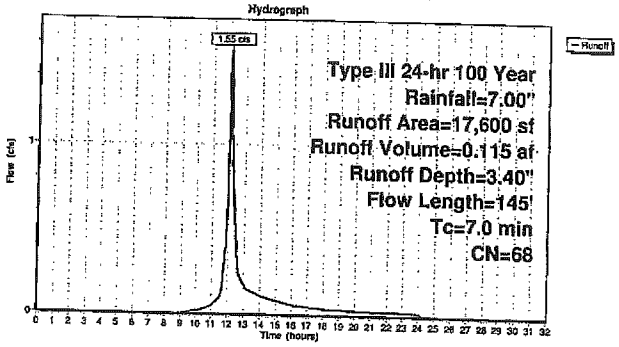
Runoff = 1.55 cfs @ 12.10 hrs, Volume= 0.115 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
3,300	98	driveway / roof
14,300	61	>75% Grass cover, Good, HSG B
17,600	68	Weighted Average
14,300		81.25% Pervious Area
3,300		18.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0400	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.3	25	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	30	0.0200	2.67		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	145	Total			

Subcatchment P2: AP-2 To N/F Shay



Summary for Subcatchment P3: AP-3 To Nixon Road

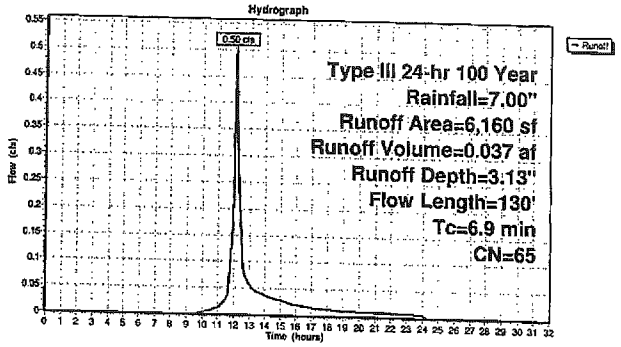
Runoff = 0.50 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
1,050	98	Paved parking, HSG B
3,000	61	>75% Grass cover, Good, HSG B
2,110	55	Woods, Good, HSG B
6,160	65	Weighted Average
5,110		82.95% Pervious Area
1,050		17.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.9	80	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	130	Total			

Subcatchment P3: AP-3 To Nixon Road



Summary for Subcatchment P4: AP-4 To East Property Line

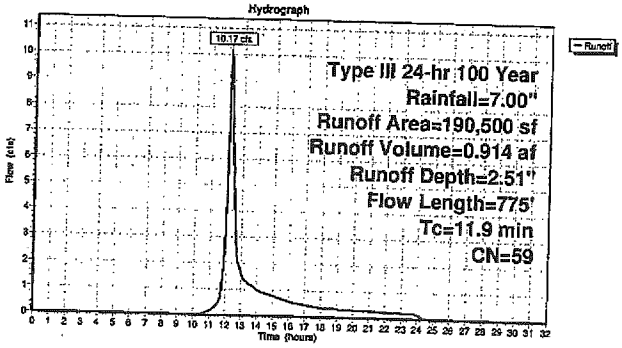
Runoff = 10.17 cfs @ 12.18 hrs, Volume= 0.914 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
33,400	77	Woods, Good, HSG D
152,100	55	Woods, Good, HSG B
5,000	61	>75% Grass cover, Good, HSG B
190,500	59	Weighted Average
190,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
5.4	725	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.9	775	Total			

Subcatchment P4: AP-4 To East Property Line



Summary for Subcatchment P5: AP-5 To Dartmouth Road

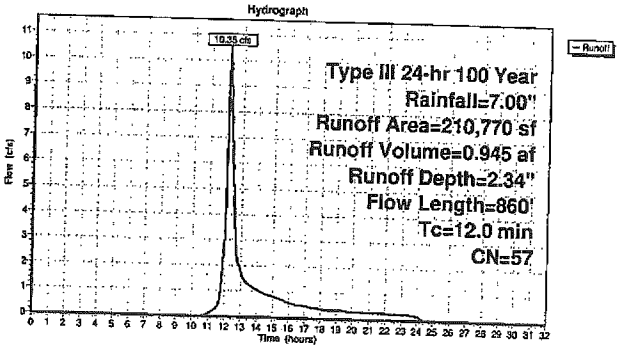
Runoff = 10.35 cfs @ 12.18 hrs, Volume= 0.945 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
900	98	Roofs, HSG B
145,770	55	Woods, Good, HSG B
37,000	58	Woods/grass comb., Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
2,100	85	Gravel roads, HSG B
8,000	77	Woods, Good, HSG D
210,770	57	Weighted Average
209,870		99.57% Pervious Area
900		0.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.0	810	0.2000	2.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.0	860	Total			

Subcatchment P5: AP-5 To Dartmouth Road



Summary for Subcatchment P6: AP-6 To N/F Skura

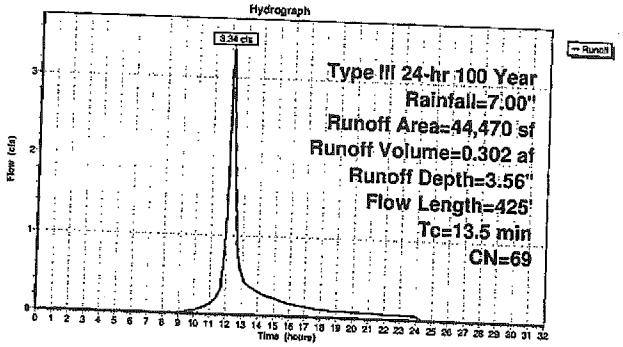
Runoff = 3.34 cfs @ 12.19 hrs, Volume= 0.302 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=7.00"

Area (sf)	CN	Description
29,100	77	Woods, Good, HSG D
15,370	55	Woods, Good, HSG B
44,470	69	Weighted Average
44,470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.2	375	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	425	Total			

Subcatchment P6: AP-6 To N/F Skura

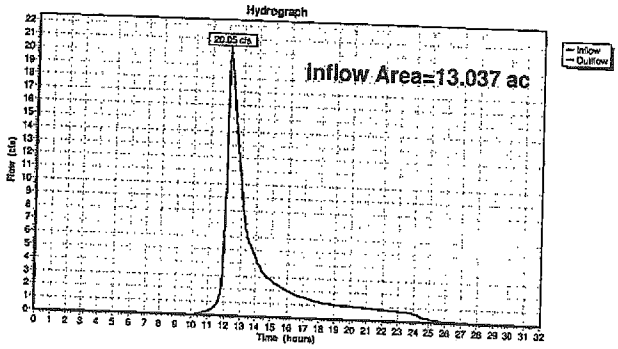


Summary for Reach 3R: AP-1 to N/F Vatcher

Inflow Area = 13.037 ac, 9.05% Impervious, Inflow Depth > 2.88" for 100 Year event
Inflow = 20.05 cfs @ 12.21 hrs, Volume= 3.129 af
Outflow = 20.05 cfs @ 12.21 hrs, Volume= 3.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs

Reach 3R: AP-1 to N/F Vatcher



Summary for Pond B1: Infiltration Basin

Inflow Area = 1.199 ac, 10.91% Impervious, Inflow Depth = 9.63" for 100 Year event
Inflow = 5.88 cfs @ 12.07 hrs, Volume= 0.962 af
Outflow = 4.77 cfs @ 12.14 hrs, Volume= 0.928 af, Atten= 19%, Lag= 4.0 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 0.088 af
Primary = 3.13 cfs @ 12.14 hrs, Volume= 0.815 af
Secondary = 1.58 cfs @ 12.14 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 321.18' @ 12.14 hrs Surf.Area= 2,676 sf Storage= 5,222 cf

Plug-Flow detention time= 71.4 min calculated for 0.928 af (96% of inflow)
Center-of-Mass det. time= 53.4 min (977.5 - 924.1)

Volume	Invert	Avail.Storage	Storage Description
#1	318.00'	7,617 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.00	600	0	0	600
320.00	2,000	2,464	2,464	2,021
322.00	3,200	5,153	7,617	3,274

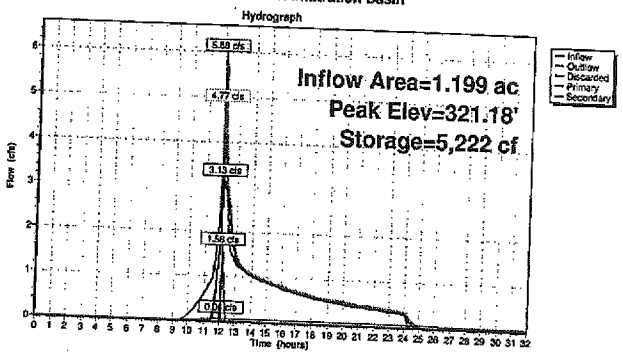
Device	Routing	Invert	Outlet Devices
#1	Discarded	318.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	320.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 320.00' / 319.70' S= 0.0300 '/' Cc= 0.900 n= 0.012
#3	Secondary	321.00'	8.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.06 cfs @ 12.14 hrs HW=321.18' (Free Discharge)
└1=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=3.13 cfs @ 12.14 hrs HW=321.18' (Free Discharge)
└2=Culvert (Inlet Controls 3.13 cfs @ 3.98 fps)

Secondary OutFlow Max=1.57 cfs @ 12.14 hrs HW=321.18' (Free Discharge)
└3=Broad-Crested Rectangular Weir (Weir Controls 1.57 cfs @ 1.07 fps)

Pond B1: Infiltration Basin



Summary for Pond B2: Water Quality Swale

Inflow Area = 9.979 ac, 11.84% Impervious, Inflow Depth = 2.90" for 100 Year event
Inflow = 27.31 cfs @ 12.12 hrs, Volume= 2.414 af
Outflow = 12.96 cfs @ 12.44 hrs, Volume= 2.412 af, Atten= 53%, Lag= 19.6 min
Primary = 12.96 cfs @ 12.44 hrs, Volume= 2.412 af

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 313.81' @ 12.44 hrs Surf.Area= 9,084 sf Storage= 25,052 cf

Plug-Flow detention time= 41.7 min calculated for 2.412 af (100% of inflow)
Center-of-Mass det. time= 41.3 min (891.3 - 850.7)

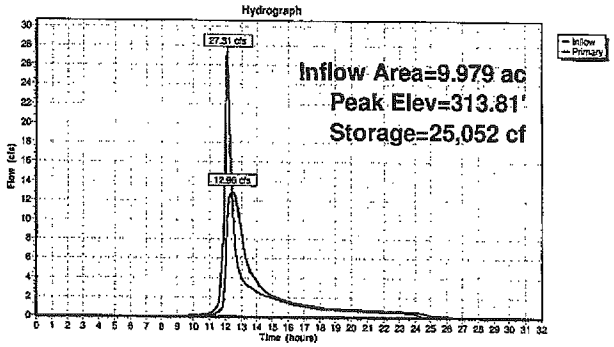
Volume	Invert	Avail.Storage	Storage Description
#1	309.50'	37,032 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.50	2,600	0	0	2,600
310.00	3,400	1,496	1,496	3,406
312.00	6,400	9,643	11,139	6,446
314.00	9,400	15,704	26,843	9,511
315.00	11,000	10,190	37,032	11,150

Device	Routing	Invert	Outlet Devices
#1	Device 5	309.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Device 5	310.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Device 5	311.75'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Device 5	314.00'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	309.25'	**24.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 309.25' / 308.25' S= 0.0167 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=12.96 cfs @ 12.44 hrs HW=313.81' (Free Discharge)
└5=Culvert (Passes 12.96 cfs of 28.53 cfs potential flow)
├1=Orifice/Grate (Orifice Controls 1.90 cfs @ 9.70 fps)
├2=Orifice/Grate (Orifice Controls 6.33 cfs @ 8.07 fps)
├3=Orifice/Grate (Orifice Controls 4.72 cfs @ 6.01 fps)
└4=Orifice/Grate (Controls 0.00 cfs)

Pond B2: Water Quality Swale



Summary for Pond S1: DMH-C - Diversion Structure

Inflow Area = 6.119 ac, 11.43% Impervious, Inflow Depth = 3.02" for 100 Year event
Inflow = 18.23 cfs @ 12.16 hrs, Volume= 1.542 af
Outflow = 18.23 cfs @ 12.16 hrs, Volume= 1.542 af, Atten= 0%, Lag= 0.0 min
Primary = 16.74 cfs @ 12.16 hrs, Volume= 0.890 af
Secondary = 1.49 cfs @ 12.16 hrs, Volume= 0.652 af

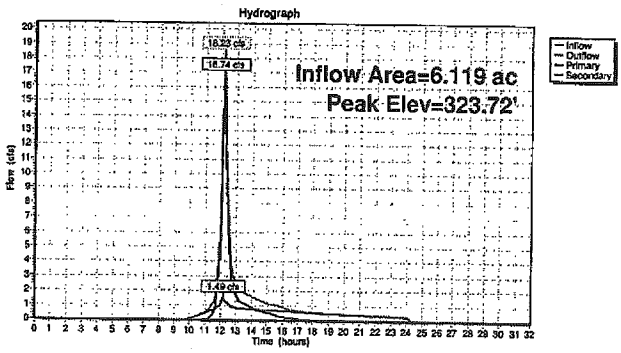
Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 323.72' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	321.00'	**8.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 321.00' / 320.50' S= 0.0250 '/' Cc= 0.900 n= 0.011
#2	Primary	321.50'	**24.0" Round Culvert** L= 48.0' Ke= 0.500 Inlet / Outlet Invert= 321.50' / 319.80' S= 0.0354 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=16.72 cfs @ 12.16 hrs HW=323.72' (Free Discharge)
└2=Culvert (Inlet Controls 16.72 cfs @ 5.32 fps)

Secondary OutFlow Max=1.49 cfs @ 12.16 hrs HW=323.72' (Free Discharge)
└1=Culvert (Inlet Controls 1.49 cfs @ 7.57 fps)

Pond S1: DMH-C - Diversion Structure



Summary for Pond S2: DMH-D

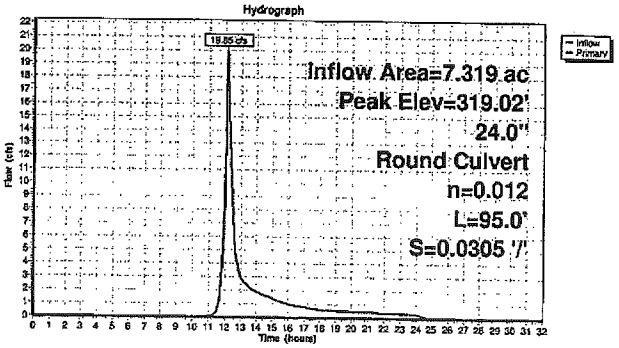
Inflow Area = 7.319 ac, 11.34% Impervious, Inflow Depth = 2.80" for 100 Year event
Inflow = 19.85 cfs @ 12.15 hrs, Volume= 1.706 af
Outflow = 19.85 cfs @ 12.15 hrs, Volume= 1.706 af, Atten= 0%, Lag= 0.0 min
Primary = 19.85 cfs @ 12.15 hrs, Volume= 1.706 af

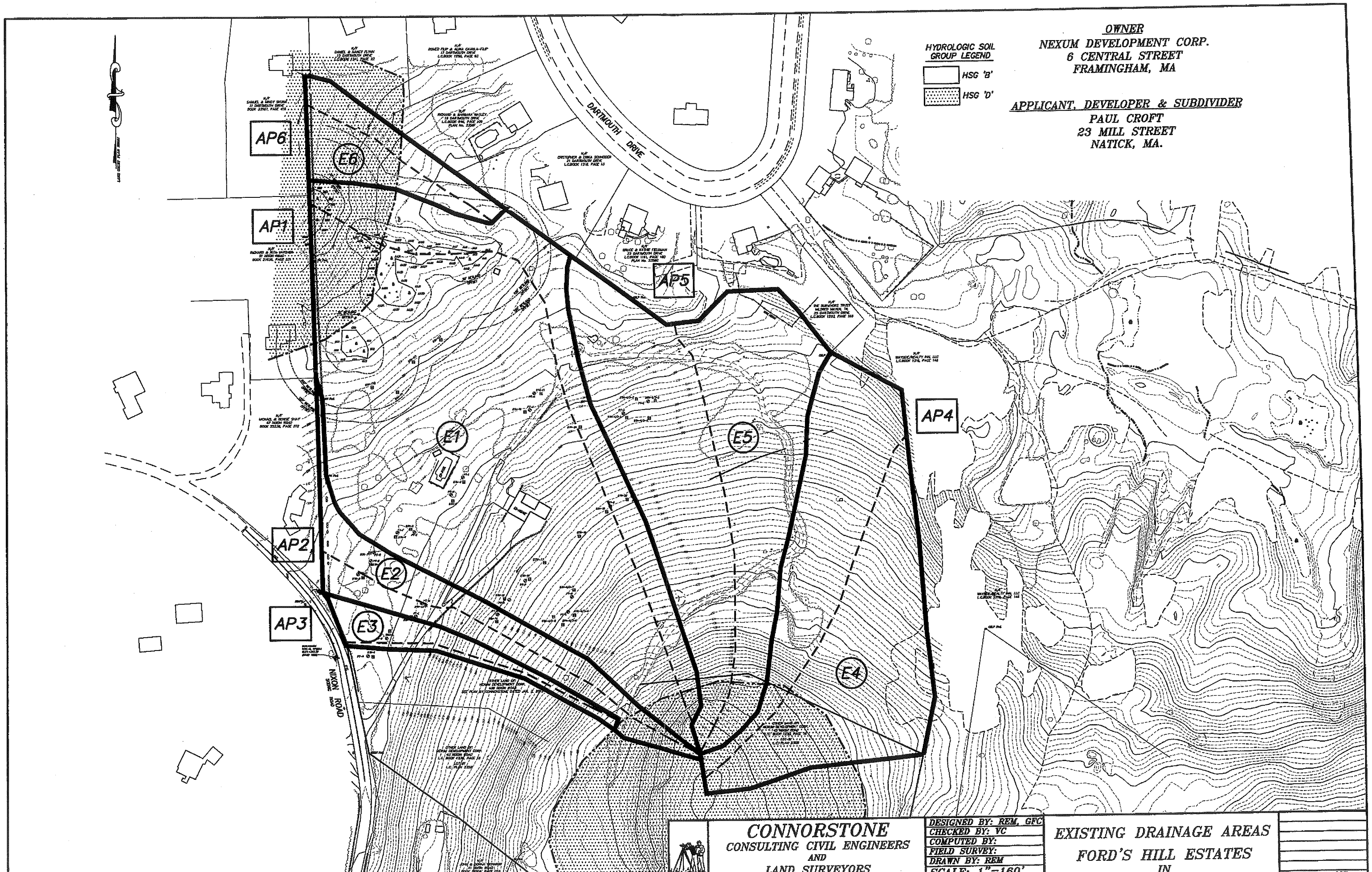
Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 319.02' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	316.30'	**24.0" Round Culvert** L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 316.30' / 313.40' S= 0.0305 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=19.84 cfs @ 12.15 hrs HW=319.02' (Free Discharge)
└1=Culvert (Inlet Controls 19.84 cfs @ 6.31 fps)

Pond S2: DMH-D





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NEXUM DEVELOPMENT CORP.
6 CENTRAL STREET
FRAMINGHAM, MA

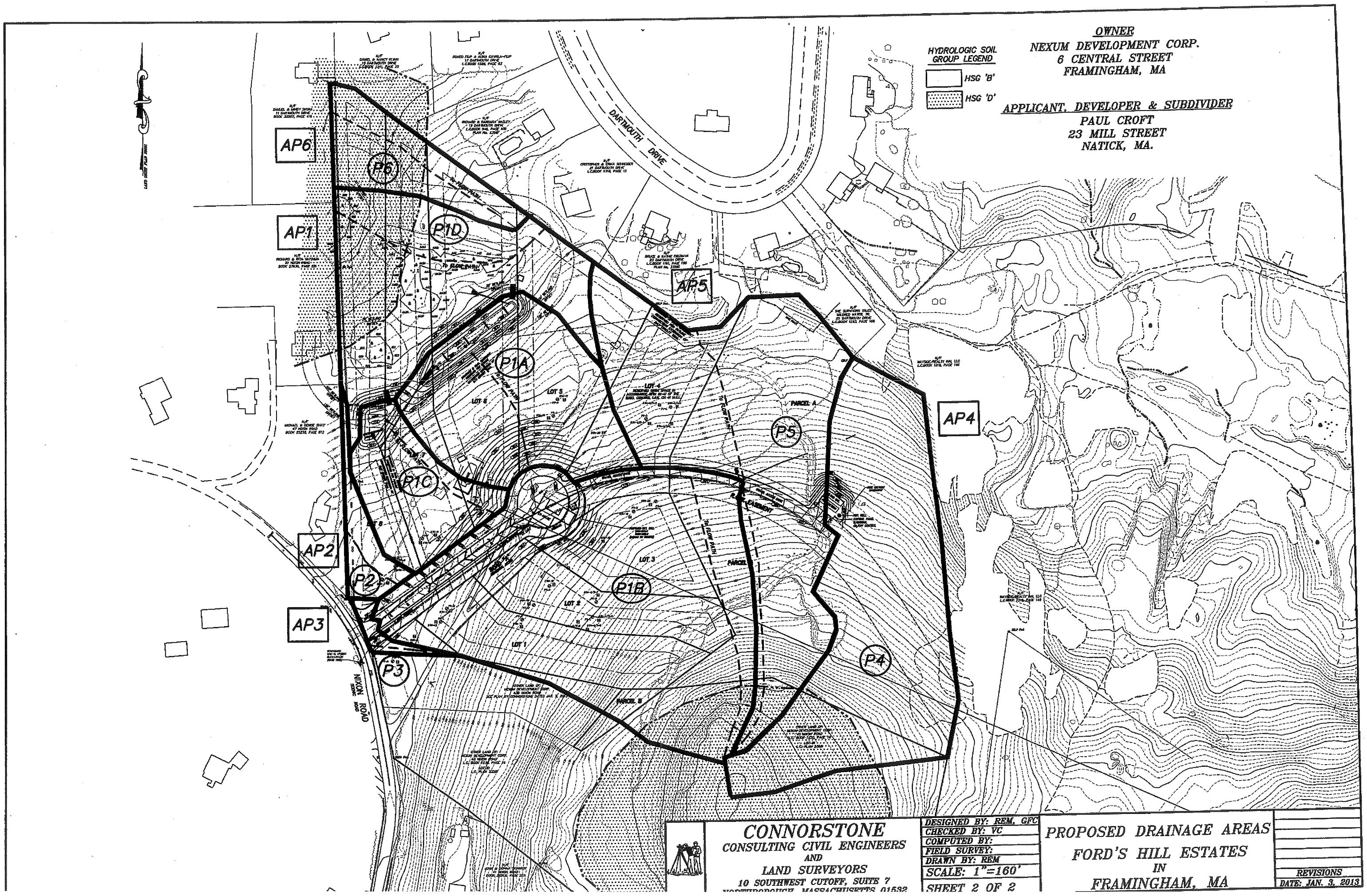
APPLICANT, DEVELOPER & SUBDIVIDER
PAUL CROFT
23 MILL STREET
NATICK, MA.

CONNORSTONE
CONSULTING CIVIL ENGINEERS
AND
LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7

DESIGNED BY:	REM, GFC
CHECKED BY:	VC
COMPUTED BY:	
FIELD SURVEY:	
DRAWN BY:	REM
SCALE:	1"=160'

EXISTING DRAINAGE AREAS
FORD'S HILL ESTATES
IN
FRAMINGHAM, MA

REVISIONS



OWNER
NEXUM DEVELOPMENT CORP.
6 CENTRAL STREET
FRAMINGHAM, MA

APPLICANT, DEVELOPER & SUBDIVIDER
PAUL CROFT
23 MILL STREET
NATICK, MA.

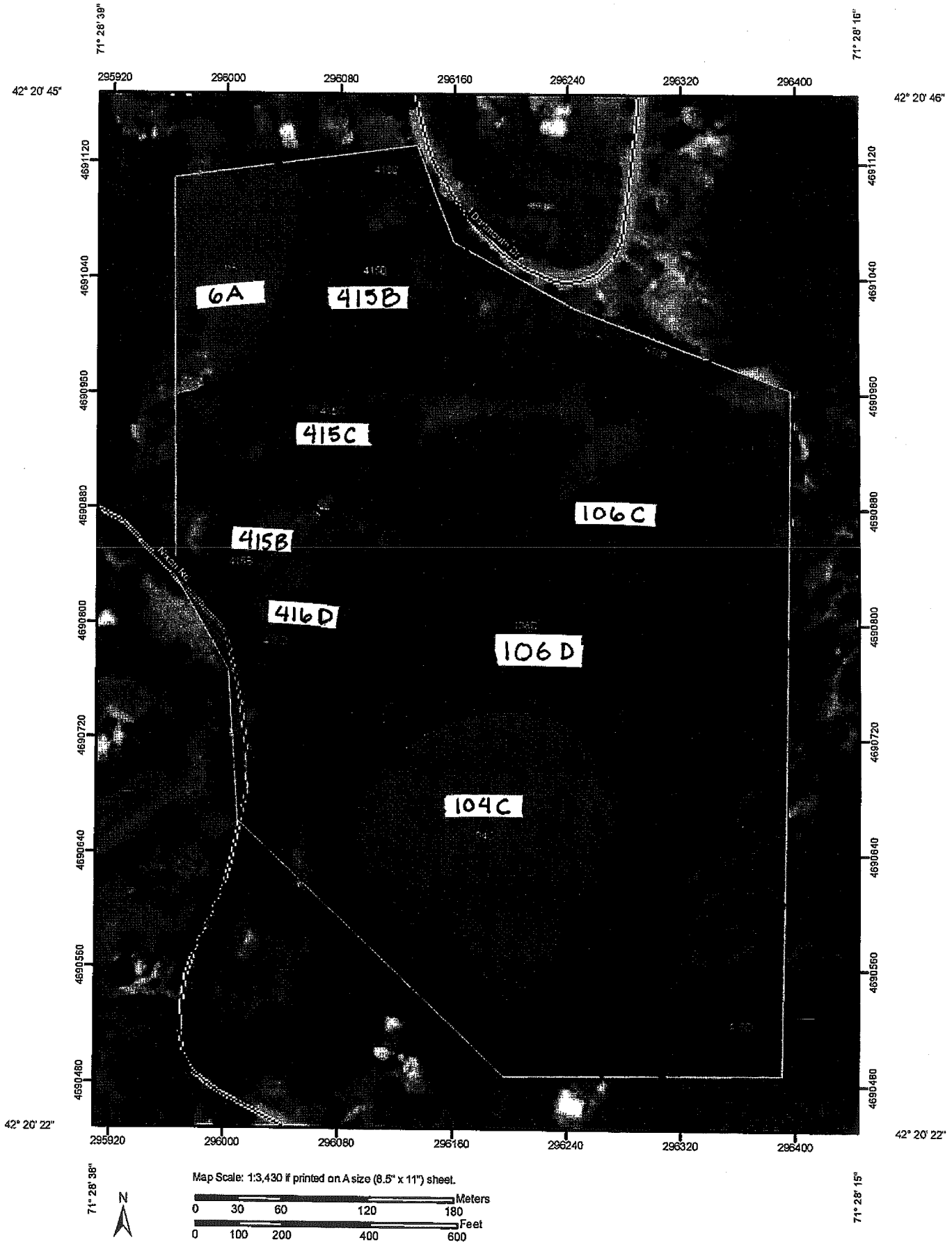
CONNORSTONE
CONSULTING CIVIL ENGINEERS
AND
LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532

DESIGNED BY: REM, GFC	
CHECKED BY: VC	
COMPUTED BY:	
FIELD SURVEY:	
DRAWN BY: REM	
SCALE: 1"=160'	
SHEET 2 OF 2	

PROPOSED DRAINAGE AREAS
FORD'S HILL ESTATES
IN
FRAMINGHAM, MA

REVISIONS
DATE: JAN. 3, 2013

SUBSURFACE SOIL DATA


71° 28' 39"
71° 28' 16"
42° 20' 45"
42° 20' 46"
295920
296000
296080
296160
296240
296320
296400
4691120
4691040
4690960
4690880
4690800
4690720
4690640
4690560
4690480
42° 20' 22"
71° 28' 38"
71° 28' 15"
6A
415B
415C
106C
415B
416D
106D
104C
Map Scale: 1:3,430 if printed on A size (8.5" x 11") sheet.
N
Meters
0 30 60 120 180
Feet
0 100 200 400 600

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Middlesex County, Massachusetts (MA017)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	D	2.7	5.1%
104C	Hollis-Rock outcrop-Charlton complex, 3 to 15 percent slopes	D	6.1	11.5%
106C	Narragansett-Hollis-Rock outcrop complex, 3 to 15 percent slopes	B	12.4	23.2%
106D	Narragansett-Hollis-Rock outcrop complex, 15 to 25 percent slopes	B	16.1	30.1%
415B	Narragansett silt loam, 3 to 8 percent slopes	B	4.5	8.4%
415C	Narragansett silt loam, 8 to 15 percent slopes	B	6.2	11.6%
416B	Narragansett silt loam, 3 to 8 percent slopes, very stony	B	0.9	1.8%
416D	Narragansett silt loam, 15 to 25 percent slopes, very stony	B	4.5	8.4%
Totals for Area of Interest			**53.5**	**100.0%**

Soil Logs

DTH-110
0-5" Sandy Loam
5-37" Sandy Loam
37-98" Loamy Sand w/ gravel
Mottles @ 50"
No water

DTH-111
0-10" Sandy Loam
10-38" Sandy Loam
38-95" Loamy Sand w/ gravel
Mottles @ 65"
No water

DTH-112
0-7" Sandy Loam
7-36" Sandy Loam
36-86" Sand
86-101" Loamy Sand w/ gravel
Mottles @ 60"
No water

DTH-113
0-8" Sandy Loam
8-30" Sandy Loam
30-109" Loamy Sand w/ gravel
Mottles @ 62"
Water @105"

Stormwater Pollution Prevention Plan

for

Ford's Hill Estates
Nixon Road
Framingham, MA

This Stormwater Pollution Prevention Pan has been prepared in accordance with the MA Department of Environmental Protection Stormwater Standards and NPDES General Construction Permit for Stormwater Discharges from Construction Activities. All work shall be in accordance with the order of conditions issued by the Local Conservation Commission.

1.1 Project Information

Project Name and Location:	Fords Hill Estates Off Nixon Road Framingham, MA
Owner Name and Address:	Nexum Development Corp. 6 Central Street Framingham, MA
Site Operator:	Paul Croft 23 Mill Street Natick, MA
Accompanying Documents:	Plans titled "Ford's Hill Estates, Definitive Plan, in Framingham Massachusetts," prepared by Connorstone Engineering, Inc., are to be considered a part of this document.
NDPES Tracking Number:	_____
Latitude/Longitude:	Lat: 42° 20' 36" Long: 71° 28' 30"
Project Description:	Residential Definitive Subdivision
Estimated Dates:	Start: Completion:
Name of Receiving Waters:	Hagar Pond
Estimated Area of Disturbance:	8.5 Acres

1.2 Contact Information / Responsible Parties (complete prior to construction)

Operator(s):

Company Name: Paul Croft
Address: 23 Mill Street, Natick, MA
Telephone #: 617-694-5645
Area of Control: Entire Site

Project Manager(s) or Site Supervisor(s):

Company Name:
Name:
Address:
Telephone #:
Area of Control: Entire Site

This SWPPP was Prepared by:

Connorstone Engineering, Inc.:
10 Southwest Cutoff
Northborough, MA 01532 / 508-393-9727

Emergency 24-Hour Contact:

Company Name:
Name:
Address:
Telephone #:

Subcontractors:

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the Subcontractor Certifications/Agreement (Attached).

1.3 Existing Conditions

The site consists of a 22 acre +/- parcel located on the east side of Nixon Road (#45 Nixon Road). The site topography ranges from elevation 502 to 282 sloping in a northwesterly direction. The existing site is currently developed as a single family residential dwelling. The developed portion of the site is generally located at the base of the hill and includes a dwelling, in ground swimming pool, driveway, outbuildings, and landscaping. The southern portion of the site, generally located on the upper portions of the hill, is undeveloped and wooded.

1.4 Proposed Development / Nature of Construction Activities

The proposed development includes the construction of a 500 foot long cul-de-sac designed to allow for the creation of 8 new lots. The proposed work will also include earthwork, drainage (described below), underground utilities, fire protection cistern, and lot development. All of the proposed lots will be serviced by individual on-site wells and septic systems.

The proposed roadway drainage system includes a typical catch basin to drain manhole collection system. This collection system will provide the initial pretreatment through the use of deep sump catch basins providing 25% total suspended solids (TSS) removal. Stormwater will then flow to a diversion structure where the first flush water quality volume (0.5 inches over the impervious area) will be diverted to an infiltration basin for both recharge to groundwater and treatment (80% TSS removal). Overflow from the diversion structure and the infiltration basin will then flow to a wet water quality swale to provide further treatment (additional 70% TSS removal) and mitigation of peak flows. The outlet from this structure will discharge to a stabilized upland area, which then ultimately flows to the on-site wetland area.

1.5 Construction Site Estimates

Total parcel area (0 Turnpike Road & 300 Turnpike Road):	22 +/- acres
Total land disturbance:	8.5 acres
Impervious area before construction:	0.4 acres
Impervious area after construction:	1.2 acres

1.6 Sensitive Areas / Wetland Resources

Wetland resources areas exist on the site including three wetland areas located on the north portion of the site and the bottom of the hill. These wetlands flow off-site to the northwest.

1.7 Discharge Information

Existing and proposed surface runoff generated from the developed portion of the site generally flows to the on-site wetlands in the north portion of the site. This wetland flows to the northwest and ultimately discharges to Hagar Pond.

1.8 Endangered Species Certification

The proposed project is not located in an Estimated or Priority Habitat of Rare Wildlife as indicated on the 2008 Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)

1.9 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing operations
- Grading and site excavation operations
- Vehicle tracking
- Topsoil stripping and stockpiling
- Landscaping operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area—small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage.
- Materials Storage Area—general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- Construction Activity—paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction.
- Concrete Washout Area

2.1 General Construction Sequencing of Major Activities

It is assumed that under normal conditions work will proceed in accordance with the following schedule. Major shifts in the schedule must be approved by the department of public works or their designate.

1. Hours of operation: Mon-Sat. 7:00 - 5:00

2. Site preparation:
    - Install perimeter erosion controls
    - Rough grade entrance off Nixon Road and install crushed stone construction entrance
    - Remove existing buildings and structures.
    - Cut and remove trees
    - Install temporary sediment basin including outlet structure and diversion berms/swales
    - Prepare stockpile areas.

3. Each of the following steps must be approved by the public works inspector on the job.

- Clearing and cleaning: including excavating or stripping poor material
- Preparation of sub-base including necessary cuts and fills.
- Installations-of drainage mains.
- Installation of other underground utilities.
- Installation of road subdrain where conditions warrant.
- Install fire cistern, well, suction line, and hydrant.
- Application of material sub-base.
- Gravel approved by town engineer.
- Application of gravel in or above sub-base (for roadway and cistern access driveway).
- Compaction testing.
- Certification of gravel grades by professional engineer or surveyor.
- Application of gravel in sidewalks.
- Application of base course.
- Installation of granite curbing.
- Removal or application of material for slopes.
- Application of bituminous concrete base and top courses for sidewalks and aprons.
- Application of bituminous concrete top courses for roadway, and restoration of the public way per department of public works requirements.
- Application of loam for lawns and slopes.
- Installation of stone bounds and lot corner points.
- Installation of street lights.

2.2 Erosion and Sediment Controls

General Conditions – Prior to initiating construction, all sedimentation and erosion control measures shall be installed as shown on the plans and detail drawings. This plan depicts the minimum required sedimentation and erosion controls. The contractor shall employ additional sedimentation and erosion control measures as necessitated by site conditions, or as directed by the owner, the owner's representative, or the conservation commission to ensure protection of all wetland resources and control sediment transport. if sedimentation plumes occur, the contractor shall stop work and install additional sedimentation control devices immediately to prevent further sedimentation.

Temporary Stabilization – Topsoil stockpiles and disturbed portions of the site where construction activity will temporarily cease for at least 14 days, shall be stabilized with a temporary seed and mulch no later than 14 days from the last construction activity in that area. The temporary seed shall be Erosion Control mix. Seeding shall be nutrient enriched 10 –10 – 10 hydroseed with tackifer and cellulose or other degradable fibers capable of retaining moisture.

Permanent Stabilization – Disturbed portion of the site where construction activity ceases shall be stabilized with permanent seed no later than 14 days after the last construction activity. The permanent seed mix consists of tall fescue, and annual rye. Prior to seeding, ground agricultural limestone shall be applied. Seeding shall be nutrient enriched 10 –10 – 10 hydroseed with tackifers and cellulose or other degradable fibers capable of retaining moisture.

Staked Hay Bales and Silt Fence (Perimeter Controls) – Hay bales shall be 'salt marsh hay bales' or equivalent weed free erosion barrier to prevent spread of invasive species. Prior to the commencement of work, staked hay bales and silt fence (or approved equal) shall be installed along the edge of proposed development, and as indicated on the plans. Additional hay bales and silt fence shall be located as conditions warrant or as directed by the owner, his representatives, or the local authority. In some areas hay bales/silt fencing structures may have to be duplicated at regular intervals up gradient of wetlands, and it may be necessary to provide crushed stone armor to hay bales/silt fencing when anticipated flows are expected to be heavy or fast.

Track out controls / Construction Entrance – A stabilized stone apron construction entrance shall be at all construction entrances to help prevent vehicle tracking of sediments. All vehicles shall enter and exit the sit via the stabilized construction entrance. The contractor shall inspect the construction entrance daily and after heavy use. If mud and soil clogs the voids in the crushed stone reducing the effectiveness, the pad shall be top dressed with new, clean stone. If the pad becomes completely clogged, replacement of the entire pad may be necessary. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

Track out controls / Street Sweeping – Street sweeping in the vicinity of the project area shall be performed as needed until the project limits have been stabilized. All sediment tracked outside the limit of work shall be swept at the end of each working day.

Inlet Protection – All existing and proposed drainage system inlets, which may receive stormwater flow from disturbed areas, shall be provided with inlet protection (ring of haybales and catch basin inserts). The contractor shall maintain these devices until all work is completed and all areas have been adequately stabilized.

Temporary Sediment Traps / Basins – Sediment traps and/or basins shall be constructed as shown on the approved plans and as necessitated by field conditions. The minimum volume shall be 3600 cubic feet of storage for each acre of drainage area. Sediment traps/basins should be readily accessible for maintenance and sediment removal, and should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place. Remove basin after drainage area has been permanently stabilized, inspected, and approved. Before removing dam, drain water and remove sediment; place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize.

Dust Control – Dust control measures shall be implemented and maintained properly throughout dry weather periods until all disturbed areas have been permanently stabilized. Methods for dust control shall include water sprinkling and/or other methods approved by the engineer.

Soil Stockpiles – Soil stockpiles shall be stabilized to prevent erosion along with perimeter sedimentation controls. No materials subject to erosion shall be stockpiled overnight within 100 feet of a wetland unless covered. Stockpiling of "drier" glacial till material is not recommended unless protected from moisture.

Dewatering Operations – Dewatering operations, if required, shall discharge onto stabilized areas. All discharge water is to pass through sedimentation control devices to prevent impacts upon water bodies, bordering vegetated wetlands, drainage systems and abutting properties. No discharges from dewatering operations shall be discharged directly to the drainage system.

Snow Removal – Snow shall be plowed to the snow storage area indicated on the plans. Any excess of that which can be stored on-site shall be removed. Snow shall not be plowed into the 20-foot buffer zone to any wetland area. All catch basins shall be uncovered and functional immediately after snow plowing. The snow pile shall be placed so that it will not interfere with runoff flow.

Topsoil – Topsoil shall be stripped and stockpiled on-site for reuse, unless otherwise noted on the plans (per stockpile requirements). Materials shall be re-used on-site to the maximum extent practical. Any excess shall be properly exported off-site.

Minimize Soil Compaction – Within the limits of the infiltration galley, the use of heavy equipment shall be limited to the maximum extent practical.

Vehicle Washing – Vehicle and equipment washing, other than hose down with clean water, shall not be allowed. All wash down water shall be directed to a sediment control device (not directly to any stormwater drainage system or wetland).

Fertilizer Discharge Restrictions.

- Apply at a rate and in amounts consistent with manufacturer's specifications,
- Apply during the growing season, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- Never apply to frozen ground;
- Never apply to stormwater conveyance channels with flowing water; and
- Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

Washing of Applicators and Containers used for Paint, Concrete, or Other Materials. - Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation Handle washout or cleanout wastes as follows: Do not dump liquid wastes in storm sewers; Dispose of liquid wastes in accordance with applicable regulations; and. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes. Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

2.3 Buffers

A minimum 30 foot no disturb buffer zone around the onsite wetlands. Estimated sediment removal for a 50-foot buffer with medium density weeds (under story) is 66%. The only work within 50 feet of this wetland is to construct the Stormwater Basins. As additional mitigation to compensate for the reduction in undisturbed buffer a temporary sediment control basin and hay bales have been provided up gradient of the wetlands and buffer strip. The sediment basin has been sized in accordance with the Massachusetts Sedimentation and Erosion Control Guidelines.

2.4 Inspection and Maintenance Schedule

The responsible party shall be responsible for maintaining all temporary and permanent sedimentation and erosion controls until work is complete and all areas have been permanently stabilized. At such time all sedimentation and erosion control measures shall be removed. These are the inspection and maintenance practices that will be used to maintain erosion and sediment controls during construction.

Schedule:

- All control measures will be inspected at least ***once each week***.

Maintenance Practices:

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report of any deficiencies.
- Built up sediment shall be removed from the silt fence when it reaches a depth equal to one-third the height of the fence.
- The sediment basins shall be inspected for depth of sediment, and built up sediment will be removed when it reached 25 percent of the design capacity or at the end of the job. Check embankment for: settlement, seepage, or slumping along the toe or around pipe. Look for signs of piping. Repair immediately. Remove trash and other debris from principal spillway, emergency spillway, and pool area. Clean or replace gravel when sediment pool does not drain properly.
- Any diversion dikes will be inspected for breaches and promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts and healthy growth.
- Contractor to maintain a supply of erosion control devises on site at all times to repair any broken or damaged materials.

The site superintendent, will select three individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports. Personnel selected for inspection and maintenance responsibilities shall be a "qualified personnel" as defined in section 4. D of the GCP. Staff shall be trained in all inspection and maintenance practices for keeping the erosion and sediment controls used onsite in good working order.

An *inspection report* will be made after each inspection. Copies of the reports shall be maintained on site. At a minimum, the inspection report must include:

- The inspection date;
- Names, titles, and qualifications of personnel making the inspection;
- Weather information for the period since the last inspection including estimate of the beginning and duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
- Location(s) of discharges of sediment or other pollutants from the site;
- Location(s) of BMPs that need to be maintained;
- Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
- Corrective action required including implementation dates.

The inspection report must be signed in accordance with Appendix G, Section 11 of the GCP.

2.5 Staff and Training Requirements.

Prior to the commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, you must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
- Personnel responsible for the application and storage of treatment chemicals (if applicable);
- Personnel who are responsible for conducting inspections as required in Part 4.1.1; and
- Personnel who are responsible for taking corrective actions.

Notes: (1) If the person requiring training is a new employee, who starts after you commence earth-disturbing or pollutant-generating activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit. (2) For emergency-related construction activities, the requirement to train personnel prior to commencement of earth-disturbing activities does not apply, however, such personnel must have the required training prior to NOI submission.

The operator is responsible for ensuring that all activities on the site comply with the requirements of the permit. The operator is not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of the permit that may be affected by the work they are subcontracted to perform. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):

- The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
- The proper procedures to follow with respect to the permit's pollution prevention requirements; and
- When and how to conduct inspections, record applicable findings, and take corrective actions.

3.1 Storage, Handling, and Waste Disposal

Building Products - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Pesticides, herbicides, insecticides and fertilizers - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals- store chemicals in water-tight containers, and provide either (1) cover (e.g., plastic sheeting or temporary roofs) to prevent these containers from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., spill kits), or provide secondary containment (e.g., spill berms, decks, spill containment pallets). Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge

Hazardous Waste - Separate hazardous or toxic waste from construction and domestic waste. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements; iii. Store all containers that will be stored outside within appropriatelysized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in covered area or having a spill kit available on site);

Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements. site personnel will be instructed in these practice and the individual who manages the day to day site operations, will be responsible for seeing that these procedures are followed.

Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge

Sanitary Waste – All sanitary waste will be collected from the portable units a minimum of once per week by the sanitary pumping company, licensed by the Commonwealth of Massachusetts and as required by the local regulation. Position units in a secure location where they cannot be tipped over.

Waste Materials – All waste materials will be collected and stored in a securely lidded metal dumpster rented from a licensed waster management company. The dumpster will meet all local and State solid waster management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied at least twice per month or more often if necessary, and the waste will be hauled to the waste management company. On work days, clean up and dispose of waste in designated waste containers. Clean up immediately if containers overflow. No construction waste materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer. The individual managing the day-to-day site operations will be responsible for seeing that these procedures are followed.

3.2 Building Material Inventory for Pollution Prevention Plan

The materials or substances listed below are expected to be present onsite during construction:

- Concrete
- Petroleum based products including asphalt concrete/emulsions, fuel(s), oil, etc.
- Wood
- Fertilizers and tachifiers
- Paints (enamel, latex and oil based stains)
- Metal studs and products
- Masonry block
- Roofing shingles
- Gypsum and plaster
- Stone products

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. A watertight container will be used to store hand tools, small parts, and other construction materials.

3.2 Spill Prevention Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping – The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough products to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in this appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers and with the original manufacturers' label.
- Substances will not be mixed with one another unless recommended by the manufactures.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendation for proper use and disposal will be followed.
- The Site Superintendent will inspect daily to ensure proper use and disposal of materials.
- Hazardous Procedures – In accordance with industry standards and Applicable regulations

Product Specific Practices – The following product specific practices will be followed onsite:
Petroleum Products – Transport and delivery of fuel in approved containers only.
Fertilizers – In accordance with labeling
Paints – In accordance with labeling

Spill Control Practices – Any spills of hazardous materials shall be contained and cleaned up immediately. If appropriate, the Massachusetts Department of Environmental Protection (DEP) shall be notified. There shall, at all times when work is underway on-site, be an individual present who is trained in proper spill control practices.

In the event that hazardous material, gasoline or other petroleum is released, the following procedure should be followed:

1. Immediately contact the following agencies:
   Framingham Fire Department (508) 532-5940
   MassDEP Emergency Response (888) 304-1133

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period:

- Provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–267–2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and

- Within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. You must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

Vehicle Fueling and Maintenance – All major equipment/vehicle fueling and maintenance will be performed off-site. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets in accordance with Part 3.1 of the GCP. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.3 Non-Storm Water Discharges

It is expected that the following non-storm water discharge will occur from the site during the construction period:

- Pavement wash waters (where no spills or leaks of toxic or hazardous material have occurred).
- Discharges from Fire Fighting activities
- Hydrant and water line flushing
- Landscape irrigation
- Vehicle wash
- Water for dust control
- Foundation / footing drains
- Construction dewatering water

4.0 Record Keeping / Updating of Documentation

This document is intended as a living document to be continuously revised and updated based on changing site conditions and the progression of construction. The SWPPP shall be continuously revised to indicate the condition and location of the various Best Management Practices.

Copies of the GCP, signed and certified NOI, and EPA notification of receipt must be included in the SWPPP. This SWPPP plan, the approved drawings made part of this document, inspection reports (made at least weekly), and required logs shall be maintained on site at all times. Inspection reports shall be retained with the SWPPP for at least three years.

The following inspection reports and logs shall be maintained:

- Inspection Reports
- Corrective Action Log
- SWPPP Amendment Log
- Grading and Stabilization Activities Log

5.0 Certification

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

Name: _____ Title: _____

Signature: _____ Date: _____

Contact information: _____

_____

SWPPP Attachments

- ***NOI and Acknowledgement Letter from EPA/State (Insert once received)***
- ***Inspection Reports***
- ***Corrective Action Log***
- ***SWPPP Amendment Log***
- ***Grading and Stabilization Activities Log***
- ***Subcontractor Certifications/Agreements***
- ***NPDES Construction General Permit***

Stormwater Construction Site Inspection Report

General Information			
Project Name	**Fords hill Estates, Nixon Road**		
	Framingham, MA	**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Within 24 Hours: _____ inches
Within 72 Hours: _____ inches
Within 7 days: _____ inches

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Construction Entrance and Street Sweeping	❑Yes ❑No	❑Yes ❑No	
2a	Sediment Basin	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
2b	Diversion Swales & Berms	❑Yes ❑No	❑Yes ❑No	Any Evidence of Scour_____ Sediment Depth_____
3	Hay Bales and Silt Fence	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
4	Soil Stockpile Protection / Stabilization	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
5	Designated Construction Material Stockpile Areas	❑Yes ❑No	❑Yes ❑No	
6	Catch Basin Inlet Protection	❑Yes ❑No	❑Yes ❑No	Any Evidence of Bypass_____
7	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
8	Are natural resource areas protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
9	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
10	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
11	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
12	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
13	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
14	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
15	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

Additional Comments / Description of Current Site Work

CERTIFICATION STATEMENT

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

Print name and title: _____

Signature: _____ **Date:** _____

Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

SWPPP Amendment Log

Project Name:
SWPPP Contact:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Grading and Stabilization Activities Log

Project Name:
SWPPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Stormwater Operations and Management Plan and Long-term Pollution Prevention Program

Ford's Hill Estates
Nixon Road
Framingham, MA

Stormwater Management System Owner: & Responsible Party

Name: Ford's Hill Estates Homeowners Association

Signature:_____

Title:_____

This Operation and Maintenance Plan has been prepared in accordance with the MA Department of Environmental Protection stormwater standards and recommendations outlined in the stormwater handbook. This plan outlines the minimum efforts necessary to ensure that the stormwater collection and treatment system and sedimentation and erosion control system for this site operates in accordance with Massachusetts Department of Environmental Protection (DEP) stormwater management policy. Efforts in addition to the minimum listed herein may be required to ensure adequate stormwater management.

This plan includes general site restrictions, routing/non-routine operation and maintenance; reporting and record keeping; and an estimated budget.

General Site Restrictions

The following conditions are imposed as part of this Plan.

- Illicit discharges into stormwater management system are perpetually prohibited.
- The use of fertilizers should be limited to slow-release, low-nitrogen fertilizers.
- Uncovered and/or uncontained road de-icing materials shall not be stored on-site.

Operation and Maintenance:

All stormwater management facilities should be inspected a minimum of two times per year, with one of the inspections following a storm event. Upon completion of inspection, the inspector should specify any necessary corrective actions to be taken by ownership of the facility. The items to be inspected and maintained are described in the following sections.

Based on the observed conditions, the Responsible Party shall immediately schedule the appropriate maintenance. Some minor maintenance, such as the removal of blockages, debris and saplings in the basins may be conducted at the time of the inspection. More difficult maintenance activities, requiring special equipment, will have to be scheduled, such as the removal of excessive sediment or the repair of eroded areas. All sediment must be removed at least once per year.

Catch Basins and Manholes
The actual removal of sediments and associated pollutants and trash occurs only when sumps are cleaned out; therefore, regular maintenance is required. The more frequent the cleaning, the less likely sediments will be resuspended and subsequently discharged. Frequent cleaning also results in more volume available for future storms and enhances the overall performance.

At a minimum, deep sumps should be inspected two times per year, and cleaned whenever sediment accumulation exceeds half the sump depth (typically two feet), or at a minimum of once per year. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations. At each inspection, inspect gas trap hoods and repair as necessary. Inspect outlet pipe and remove any debris.

Clamshell buckets are typically used to remove sediment. However, vacuum trucks are preferable, because they remove more trapped sediment and supernatant than clamshells. Vacuuming is also a faster process and is less likely to damage the hood within the deep sump catch basin.

Street Sweeping
Street sweeping of the roadway should be performed at least twice per year, preferably in the spring after the snow has melted and in the fall, prior to snowfall. Disposal of the sweepings must be in accordance with applicable local, state, and federal guidelines and regulations.

Debris Accumulation
The inspector shall check catch basin grates, channels, inlets and outlets for both sediment and debris accumulations. Debris and sediment shall be removed at the time of the inspection, if feasible. Sediment shall not be allowed to accumulate and restrict flows. Most debris can be removed by hand or with hand tools (e.g. shovel). Some larger objects, such as fallen tree limbs, may have to be cut up before removal by hand is possible.

Vegetation
The initial vegetation inspection shall occur four (4) weeks after final stabilization of the site; vegetation shall be dense (and aesthetically acceptable on all portions of the project, including the side slopes, buffer strips and the embankments). The inspector shall determine and document: (1) whether fertilizing is required (2) the areas where grass shall be mowed, and (3) the areas which shall be protected against erosion. In addition, recently seeded areas shall be inspected for failures.

Eroded areas shall be filled and compacted, if necessary, and reseeded as soon as possible. If an area erodes twice, then a geotextile fabric is to be installed to stabilize the area to allow vegetation to be established. These maintenance activities shall take place during the planting season. Areas affected by lack of rainfall shall be watered. If a recently established vegetated area is determined to be inadequate for erosion control it shall be refertilized with microbial release, not sulfur encapsulated, fertilizer, (using half of the rate originally applied). If the stand is more than 60% damaged, it shall be reestablished, following the original preparation and seeding instructions. Areas of repeated erosion/scour problems shall be lined with riprap only after twice attempting to stabilize the area with geotextile fabric.

Snow Removal
Snow shall not be plowed toward the wetland areas. All catch basins shall be uncovered and functional immediately after snow plowing.

Pipe Inlets / Outlets

Outlet structures shall be checked for: (1) signs of seepage, (2) separation of joints, (3) cracks, breaks, or deterioration of materials, and (4) differential settlement. The outlet channel itself shall be free from obstruction (e.g., fallen trees) and bank scour, or the undermining of riprap.

Eroded areas shall be revegetated as described under "vegetation". In channels with repeated erosion problems, the slope may have to be cut flatter to help reduce velocities, or riprap may have to be added to protect the slope. When slope failure or settlement is apparent, damaged areas shall be filled, compacted and graded. Damaged natural areas along the outlet channel shall be filled, compacted, and reseeded, or lined with geotextile fabric, if necessary. Damaged rip rapped areas shall be replaced and supplemented.

The inspector shall ensure that there are no signs of scour around the inlets. Vegetation and riprap shall be in good condition (e.g., grass shall be dense and healthy looking; riprap shall be free from undermining and/or deterioration). Inlet structures shall be free from cracks, breaks, or deterioration of materials. If scour is evident, the damaged area shall be filled, compacted and reseeded, stabilized with a geotextile fabric, or lined with riprap in that order. If rip rapped areas have been damaged, the riprap shall be replaced or supplemented. The use of concentrated flow dissipation devices, such as level spreaders, may help to eliminate inlet scour problems.

Outlet channels should be free from obstruction (e.g., fallen trees) and bank scour, or the undermining of riprap. The spillway should show no signs of settlement, erosion, or slope failure. Damaged natural areas along the outlet channel should be filled, compacted, and reseeded, to lined with geotextile fabric. Damaged rip rapped areas should be replaced and supplemented.

Infiltration Basin

After every major storm during the first 3 months of operation and at least twice annually thereafter, the inspector shall visually inspect the basin, noting each of the items listed below (Vegetation, Dewatering, Inlets, Outlets and Structural Stability). If any of the items are in need of attention, it shall be noted and the proper remedial action initiated, as described below, as soon as possible. At a minimum of twice per year, mow the buffer area, side slopes, and basin bottom. If grassed floor; rake if stone bottom; remove trash and debris; remove grass clippings and accumulated organic matter. Forebay area shall be inspected and cleaned of sediment twice per year

The inspector shall visit the site three to four days after the rainfall of a major storm has ended to ensure that the facility has drained to the appropriate level. If significant water remains ponded in the system three (3) days after the latest rainfall, sediment removal/blockage removal activities shall be investigated and/or performed.

The embankment and side slopes of the detention basins should exhibit no visible signs of erosion, settlement, slope failure, wildlife damage, or vehicle damage. Damaged side slopes should be repaired using similar fill of adequate permeability. Damaged embankments should be filled and compacted with impermeable soils to prevent seepage. Eroded areas should be reseeded as discussed under "vegetation". Repeated repairs to side slopes may necessitate the flattening of the slopes to ensure structural stability. Signs of vehicle damage may necessitate the construction of fences around certain areas.

Vegetation should be dense (and aesthetically acceptable on all portions of the device, including the side slopes, basin floor, buffer strips and the embankments. The inspector shall determine: (1) whether fertilizing is required (2) the areas where grass should be mowed, and (3) the areas which should be protected against erosion. In addition, recently seeded areas should be inspected for failures. Grasses of the fescue family can be mowed a minimum of twice per year, in July and late September. In addition to grass maintenance, any other vegetation in the basin area or access areas which has reached nuisance levels, (e.g., bushes, trees and weeds) should be trimmed or removed.

Repairs to damaged or deteriorating structures shall be made as soon as possible. Materials that cannot be adequately repaired, must be replaced.

Water Quality Swale (wet swale)
Inspect swales during the first few months after installation to make sure that the vegetation in the swales becomes adequately established. Thereafter, inspect swales twice a year. During the inspections, check the swales for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation. The types and distribution of the dominant wetland plants in the marsh, including planted species and any invasive species (invasives must be removed).

Regular maintenance includes mowing, fertilizing, liming, watering, pruning, and weed and pest control. Mow swales at least once per year. Manually remove sediment and debris at least once per year, and periodically re-seed, if necessary, to maintain a dense growth of vegetation. Accumulated sediment should be removed whenever the depth exceeds 2 inches.

The embankment and side slopes should exhibit no visible signs of erosion, settlement, slope failure, wildlife damage, or vehicle damage. Damaged side slopes should be repaired using similar fill of adequate permeability. Damaged embankments should be filled and compacted with impermeable soils to prevent seepage. Eroded areas should be reseeded as discussed under "vegetation". Repeated repairs to side slopes may necessitate the flattening of the slopes to ensure structural stability. Signs of vehicle damage may necessitate the construction of fences around certain areas.

Reporting and Record Keeping

The responsible party will be responsible for maintaining accurate Maintenance Logs for all maintenance and inspections. The maintenance logs shall be kept on site for a minimum of three (3) years and be available for inspection by the Town municipal departments or other auditing authority, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location). This will be a perpetual requirement of the Owners or their Designated Party.

The Site Maintenance Log will be completed as described above, and at a minimum will include the following items:

- Date activity performed;
- Last rain event;
- BMP's inspected and condition;
- Specific maintenance task;
- Staff or contractor performing activity;
- Verification of maintenance activity;
- For disposal include type of material and the disposal location; and
- Recommended additional maintenance tasks.

Estimated Budget

The estimated annual budget to perform the routine scheduled maintenance is approximately $5,000. This estimate does not include the repair of structures, pipes, embankments; cleaning drain lines; snow plowing; or other non-routine tasks.

Easements

A proposed drainage easement is located on the rear portion lots 4, 5, 6, 7 and 8. These easements provide sufficient space for access and maintenance.

Emergency Response Plan / Spill Control Practices

On-site storage of hazardous materials shall not be allowed.

In the event of an accident in the roadway or on individual lots, where a significant amount of gasoline or other petroleum product is released, the following procedure should be followed:

1. Immediately contact the following agencies:

Framingham Fire Department	(508) 532-5940
MassDEP Emergency response	(888) 304-1133

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

If the volume of spill has reached the catch basins, the structures should be cleaned by a licensed liquid waste hauler. The outlet to the drainage system should be inspected. If there is evidence of discharge from the drainage system, additional corrective actions must be taken extending to the receiving water or beyond.

MAINTENANCE INSPECTION LOG FORM
Ford's Hill Estates
Framingham, MA

Contractor _____ Date _____

OPERATION	Inspected	Cleaning / Maintenance required
1. Inspect catch basins (7)		
2. Inspect drop inlets (2)		
3. Inspect drainage outlets (4)		
4. Inspect for signs of drain line blockage		
5. Inspect water quality swale (1)		
6. Inspect Infiltration Basin (1)		
7. Inspect vegetation on site		
8. Inspect site & roadway for debris/sediment		

COMMENTS / MAINTENANCE REQUIRED: _____