TECHNICAL REPORT

SINGLE-FAMILY RESIDENTIAL DEVELOPMENT

100 HIGH ROAD
NEWBURY, MASSACHUSETTS
May 21, 2025

SUBMITTED TO:

TOWN OF NEWBURY
PLANNING BOARD & CONSERVATION COMMISION
12 KENT WAY
BYFIELD, MA 01922

APPLICANT:

100 HIGH ROAD, LLC
7 SULLIVANS COURT
WEST NEWBURY, MA 01985

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TECHNICAL REPORT NARRATIVE

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I. EXECUTIVE SUMMARY

The applicant proposes to construct a two-lot residential subdivision at 100 High Road in Newbury, Massachusetts. The two new Lots will have frontage on a proposed new subdivision road accessing off High Road. The existing single-family dwelling with an accessory barn at 100 High Road will maintain its access off High Road.

The property is shown on the Town of Newbury's Assessor's Map R-34 as Lot 21. The property is situated entirely within the Agricultural Residential (AR-G) Zoning District. The project will require Definitive Subdivision Approval through the Newbury Planning Board. The following narrative contains a description of existing and proposed site conditions, stormwater management design methodology and results summary and other supplemental information in support of the stormwater best management system design. It also includes a brief description of the proposed private sanitary disposal systems and private water supply.

A description of requested waivers from Newbury Subdivision Regulations is included at the end of this narrative, which are required in order to approve the project as described above and shown on the associated Definitive Subdivision Plans.

II. EXISTING SITE DESCRIPTION

The site at 100 High Road consists of a land area of 166,587 SF (3.82 acres). The site is mostly grass and thin, new growth trees as well as some agricultural fields. The site is bordered to the west, north, east and south by Agricultural - Residential zoned and developed land. Refer to Figure 1: Ortho Map and Figure 2: USGS Map for an illustration of the site and surrounding features.

Grades on the western portion of the site are relatively flat with an average slope of approximately 2%, while the eastern portion of the site (where the existing dwelling is located) is steeper with an average slope of approximately 9%. The site has a high elevation onsite of approximately 56 ft. (NAVD88) at the east property line near High Road to a low of 32.9 ft. at the west property line.

Soils on site consist of Buxton silt loam (0-3%) [Hydrologic Soil Group (HSG) D (228A)], Buxton silt loam (3-8%) [Hydrologic Soil Group (HSG) D (228B)], Unadilla very fine sandy loam (3-8%) [Hydrologic Soil Group (HSG) B (230B)], and Unadilla very fine sandy loam (8-15%) [Hydrologic Soil Group (HSG) B (230C)] as defined in the Soil Resource Report for Essex County, Massachusetts, issued 2009 (See Figure 3: SCS Soils Map). Soil testing performed on April 4, 2025, by Will Schkuta throughout the site confirmed this classification.

The estimated seasonal high groundwater table was determined to be between 34 and 42 inches along the western portion of the site. The entire site is shown to be in a Zone X on the FEMA Federal Insurance Rate Map (FIRM) #25009C0136G dated July 16, 2014 (See Figure 4: FEMA Flood Map). There is no stormwater management controls on the site. Stormwater runoff emanating from the site and adjacent off-site area is mostly contained on site or discharges to the west. The existing watershed was evaluated to determine the rates of flow and volume of runoff at the one discharge point to the west. The site is not located within an area of critical environmental concern (ACEC) or an area mapped within a Natural Heritage & Endangered Species Program protection area.

III. PROPOSED SITE DESCRIPTION

Infrastructure associated with the development of the site will include natural gas, electric, communications and fiber optic services. Stormwater will be managed by surface-based measures including conveyance infiltration swales and a large, shallow infiltration basin to provide mitigation and groundwater recharge. In order to assess and mitigate the impacts of this development project, a comprehensive stormwater management plan was prepared. The existing watershed characteristics, flow paths and drainage patterns were matched in the proposed condition to ensure that there are no adverse impacts to adjacent properties at the design point.

The industry standard for stormwater management design in Massachusetts is governed by the Massachusetts Stormwater Management Handbook published by the Mass Department of Environmental Protection, January 2008. The Newbury Stormwater Bylaw require applicants to comply with the Handbook standards for any development projects that impacts 1 acre or more. The Handbook lists 10 standards covering both mitigation and renovation of stormwater runoff. A full discussion on the project compliance with the standards can be found at the end of this report. However, the next section will summarize the projects compliance with the mitigation standards 1 and 2 of the Handbook relating to reducing peak rates of runoff and creating no adverse down gradient impacts.

Proposed septic systems are designed for the development on each lot. As recommended in the MA Stormwater Handbook a setback of 50 ft was provided from any storm infiltration system and the leaching facilities associated with the septic systems. Proposed leach beds were designed in the back of the new lots. Each of the two new dwellings will initially have potable water service provided by wells, but will have the option to connect to Town water in the future. All setbacks will meet Mass Title 5 regulations.

IV. STORMWATER MANAGEMENT

A. Existing Watershed Description

Stormwater runoff discharges from this site in the existing condition in one (1) distinct location (DP1) which drains to the west. This design point and the tributary watersheds (or subcatchments) are illustrated on Figure 5: Existing Watershed Plan included herein. The table below lists the total area associated with each subcatchment area and includes both on-site and off-site area contributing to the design point.

Summary of Existing Subcatchments

Existing Subcatchment	Total Area (SF)	% Impervious
ES1	166,589	4.35
OFF-ES1	34,333	10.08
Totals	**200,922**	**5.33**

- **Subcatchment ES1:** The entire existing lot at 100 High Road. The area is comprised of grass with a few trees with the existing dwelling and accessory barn. Stormwater flows travel from the property line at High Road to the west, before discharging to the adjacent property.

- **Subcatchment OFF-ES1:** Located to the northeast of the site also along High Road. This subcatchment is comprised of grass, building and pavement. Flows travel to from the property line along High Road to the west onto our developed site before discharging to DP1.

B. Proposed Watershed Description

The proposed development of the site will maintain the design point identified in the existing watershed analysis. The table below provides the total drainage area both on site and off site and the percentage that will be impervious in the post-development condition.

Summary of Proposed Subcatchments

Proposed Subcatchment	Total Area (SF)	% Impervious
PS1	113,396	6.39
OFF-PS1	34,333	10.08
PS2	53,193	34.55
Totals	**200,922**	**14.48**

- **Subcatchment PS1:** PS1 is the remaining onsite area not impacted by the development activities. The dwellings require fill, so the drainage was routed around each building. Otherwise the runoff pattern remained in its existing condition flowing to DP1.
- **Subcatchment OFF-PS1:** Located to the northeast of the site also along High Road. This subcatchment is comprised of grass, building and pavement and remains unchanged in the post condition. Flows travel to from the property line along High Road to the west onto our developed site before discharging to DP1
- **Subcatchment PS2:** PS2 is the subcatchment collecting all the proposed development and conveying it to an infiltration basin to be treated before discharging to DP1.

C. Hydrologic Analysis

To demonstrate that there will be no downstream impacts because of the development of the site, a stormwater analysis was performed using the U.S. Soil Conservation Service (S.C.S) method of analysis contained in Technical Release #20 (TR-20) published by the U.S. Conservation Service, along with the extreme precipitation values published by the Northeast Regional Climate Center. The software application HydroCAD was utilized to analyze the pre- and post-development watershed conditions. This analysis allows the engineer to verify that a given drainage system is adequate for the area under consideration, and further allows the engineer to predict where flooding or erosion are most likely to occur. The HydroCAD model was used to analyze the storm drainage system designed for the development to demonstrate that the drainage system complies with the State's Stormwater Management Standards and the Town of Newbury Stormwater Bylaw. In order to more accurately represent the runoff generated from the variety of surface covers and hydrologic soil groups, the HydroCAD analysis was performed using a composite curve number generated from each subcatchment.

The HydroCAD analysis was performed by examining the design point that was previously described. The following is a listing of the total pre-and post-development rates and volumes of stormwater runoff for the proposed development for the 2, 10, and 100-year rainfall events:

Comparison of Existing and Proposed Rates of Runoff

Design Point	Storm Event (Years)	Existing Conditions (Peak CFS)	Proposed Conditions (Peak CFS)	Change in Peak (CFS)
DP-1	2	3.8	2.7	-1.1
	10	9.5	7.8	-1.7
	100	26.2	27.5	1.3

Comparison of Existing and Proposed Volumes of Runoff

Design Point	Storm Event (Years)	Existing Conditions (CF)	Proposed Conditions (CF)	Change in Volume (CF)
DP-1	2	14,201	10,239	-3,962
	10	33,618	27,709	-5,909
	100	91,932	84,756	-7,176

As shown in the tables above the proposed development will reduce or maintain peak flow runoff rates to DP 1 for the 2 and 10-year design storms as required by the Massachusetts Stormwater Management Handbook and the Town of Newbury Stormwater Bylaws.

The peak runoff rate for the 100-year storm event increases slightly for DP-1. Potential flooding impacts for downstream properties were analyzed for the 100-year event by analyzing the total volume of runoff leaving the site to determine if the development will increase potential flooding impacts downstream. As demonstrated in the table above, the total volume of runoff leaving the site is reduced in all storm events including a 7,176 CF decrease during the 100-year event, therefore having no increase for flooding impacts to the surrounding area.

D. Stormwater Management Standards

The development will comply with all Stormwater Management Standards and will improve existing conditions. The drainage system has been designed to attenuate peak rates of stormwater runoff leaving the site so that they are no greater than in the existing condition. Stormwater will be recharged to groundwater using a surface infiltration basin. The following is an assessment of each Standard:

1. **STANDARD:** No stormwater conveyance system discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

SUMMARY OF MITIGATING MEASURES: There are no proposed stormwater conveyance systems that discharge untreated stormwater directly to the on-site wetlands or to the waters of the Commonwealth.

CONCLUSION: The proposed project meets this standard.

2. **STANDARD:** The stormwater management system shall be designed such that post-development peak rates of stormwater runoff do not exceed pre-development rates for the 2- and 10-year storm events.

   SUMMARY OF MITIGATING MEASURES: As mentioned in the design above, several BMPs are utilized to treatment and recharge of runoff and ensure reduction of rates for the required storm events.

   CONCLUSION: The proposed project meets this standard.

3. **STANDARD:** Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater handbook.

   SUMMARY OF MITIGATING MEASURES: An infiltration basin was sized to ensure it had adequate volume and rates to recharge the required amount as calculated.

   CONCLUSION: The proposed project meets this standard.

4. **STANDARD:** Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

   SUMMARY OF MITIGATING MEASURES: All proposed pavement areas are to be treated prior to discharge. Treatment will be achieved by the use of best management practices including a sediment forebay for pretreatment and an infiltration basin to achieve 80% TSS removal, prior to discharging offsite.

   CONCLUSION: The proposed project meets this standard.

5. **STANDARD:** For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

   SUMMARY OF MITIGATING MEASURES: Not applicable.

   CONCLUSION: The proposed project meets this standard as it does not apply.

6. **STANDARD:** Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the

specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Management handbook.

SUMMARY OF MITIGATING MEASURES: Not applicable.

CONCLUSION: The proposed project meets this standard as it does not apply.

7. **STANDARD:** A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

   SUMMARY OF MITIGATING MEASURES: Not applicable.

   CONCLUSION: The proposed project meets this standard as it does not apply.

8. **STANDARD:** A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented).

   SUMMARY OF MITIGATING MEASURES: Refer to the Construction Phase Best Management Practices prepared by MCG, dated May 21, 2025. The project will disturb greater than one acre of land so a SWPPP will be prepared and a NPDES Construction General Permit will be obtained prior to land disturbance.

   CONCLUSION: The proposed project meets this standard.

9. **STANDARD:** A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

   SUMMARY OF MITIGATING MEASURES: Refer to the Long-Term Best Management Practices Operation and Maintenance Plan prepared by MCG, dated May 21, 2025.

   CONCLUSION: The proposed project meets this standard.

10. **STANDARD:** There shall be no new illicit discharges created as a result of the project.

    SUMMARY OF MITIGATING MEASURES: To the best of our knowledge and belief there are no illicit discharges being created as a result of the proposed project. An illicit discharge statement is included herein.

    CONCLUSION: The proposed project meets this standard.

V. EROSION AND SEDIMENTATION CONTROL

The project will disturb more than one (1) acre of land and therefore will require a Construction General Permit (CGP) from the Environmental Protection Agency be obtained prior to any land disturbance. Before applying for a CGP, a Stormwater Pollution Prevention Plan (SWPPP) will be developed. The SWPPP will identify potential sources of stormwater pollution or erosion, describe

practices to reduce pollutants or erosion in stormwater discharges from the construction site and identify procedures used to comply with the CGP provisions.

To manage the on-site sedimentation control during construction several practices will be used. Perimeter controls including silt fence and silt sock will be used to slow down and filter (remove sediment) stormwater discharge from the work area. A stabilized construction entrance will remove sediment from construction vehicles exiting the site. Material stockpiles will be placed in locations upstream of the perimeter controls with exact locations to be determined by the contractor. Several additional methods and controls will be used and these will be detailed in the SWPPP. The erosion controls will be inspected and regular intervals to ensure they are maintained per the SWPPP. A Construction Phase Best Management Practices Plan has been included in Appendix E. An Operations and Maintenance Plan for the long-term operation (Long Term Stormwater Best Management Practices Operation and Maintenance Plan) of the site have been included in Appendix F.

VI. REQUESTED WAIVERS

The following is a list of requested waivers from Chapter 117 Subdivision of Land: Articles III and IV of the Planning Board Rules and Regulations, Town of Newbury, Massachusetts:

1. 117-18 (C): A waiver is requested for the need for an environmental analysis since the proposed development is less than 5 lots. The proposed subdivision will create 2 additional residential dwellings with minimal impacts on the land. There are no wetlands on or near the property. The proposed drainage system has been designed in full compliance with the Town of Newbury Stormwater Management, Illicit Discharge and Erosion Control Rules & Regulations.

2. 117-21 (D): A waiver is requested to not require the 30 foot minimum radius roundings at the intersection with the High Road property line. The proposed development is for 2 residential dwellings with a waiver request to reduce the required pavement width to 16 feet therefore the roundings at High Road would not be necessary. This would be consistent with the Knight's Court Development to the north of this property.

3. 117-23 (A): A waiver is requested to allow a reduction in the minimum R.O.W. width from 53 feet to 40 feet. The proposed subdivision will create 2 additional residential lots and a larger R.O.W. is not necessary for this size development. A 40 foot wide R.O.W. is consistent with Knight's Court, a similar residential development to the north of this property.

4. 117-23 (B): A waiver is requested to allow a 120 foot outside sideline diameter in the cul-de-sac where 165 feet is required and to eliminate a paved cul-de-sac and allow a tee turnaround for emergency vehicles as proposed. The smaller diameter cul-de-sac would be consistent with the rural character of the neighborhood. The tee turnaround has been designed in the same fashion as the Knight's Court development to the north of this property.

5. 117-24: The following waivers are being requested from the typical road cross section:

    a. Allow the paved road to not be centered in the R.O.W. This will allow the proposed roadway to be located further from the abutter to the north and eliminate the need for retaining walls.

    b. Allow the reduction in the requirement pavement width from 22 feet to 16 feet. The proposed development is for 2 residential dwellings and the proposed 16 foot wide paved road should be sufficient for 2 dwellings and is consistent with the width required for a common driveway. Knight's Court, a similar development to the north, was approved wit ha 15 foot wide roadway.

    c. Eliminate the need for a 5 foot wide sidewalk. There is no sidewalk on the west side of High Road to connect into from the subdivision. There is no need to provide sidewalk access to High Road since the subdivision will only create 2 lots.

    d. Allow for a 3 foot wide stone infiltration swale instead of the required 5 foot wide grassed swale. The proposed stone infiltration swale is sufficient to intercept/convey runoff from the proposed roadway surface which has been designed as 16 feet side instead of the required 22 foot width (see waiver request above).

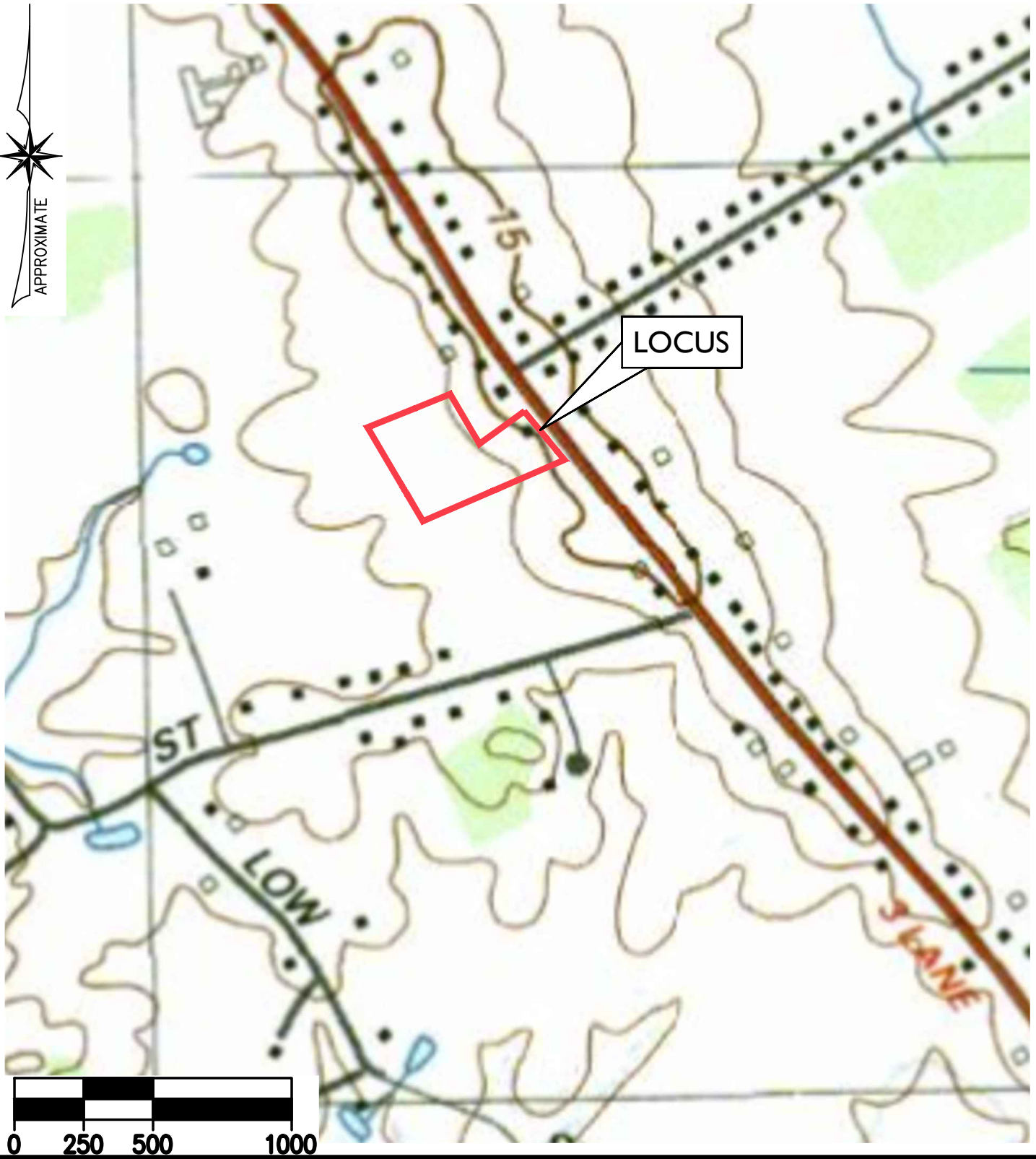
    e. Eliminate the need for street trees to be planted in the R.O.W. The 2 homeowners in the development will provide tasteful landscaping at the roadway entrance at High Road and beyond which will be consistent with the rural character of the neighborhood.

For questions regarding this Report, please contact The Morin-Cameron Group, Inc. between the hours of 8:30am to 4:30pm at (978) 777-8586.

FIGURES

APPENDICIES

FIGURES



THE MORIN-CAMERON GROUP, INC.
66 ELM STREET, DANVERS, MA 01923
P | 978.777.8586
WWW.MORINCAMERON.COM

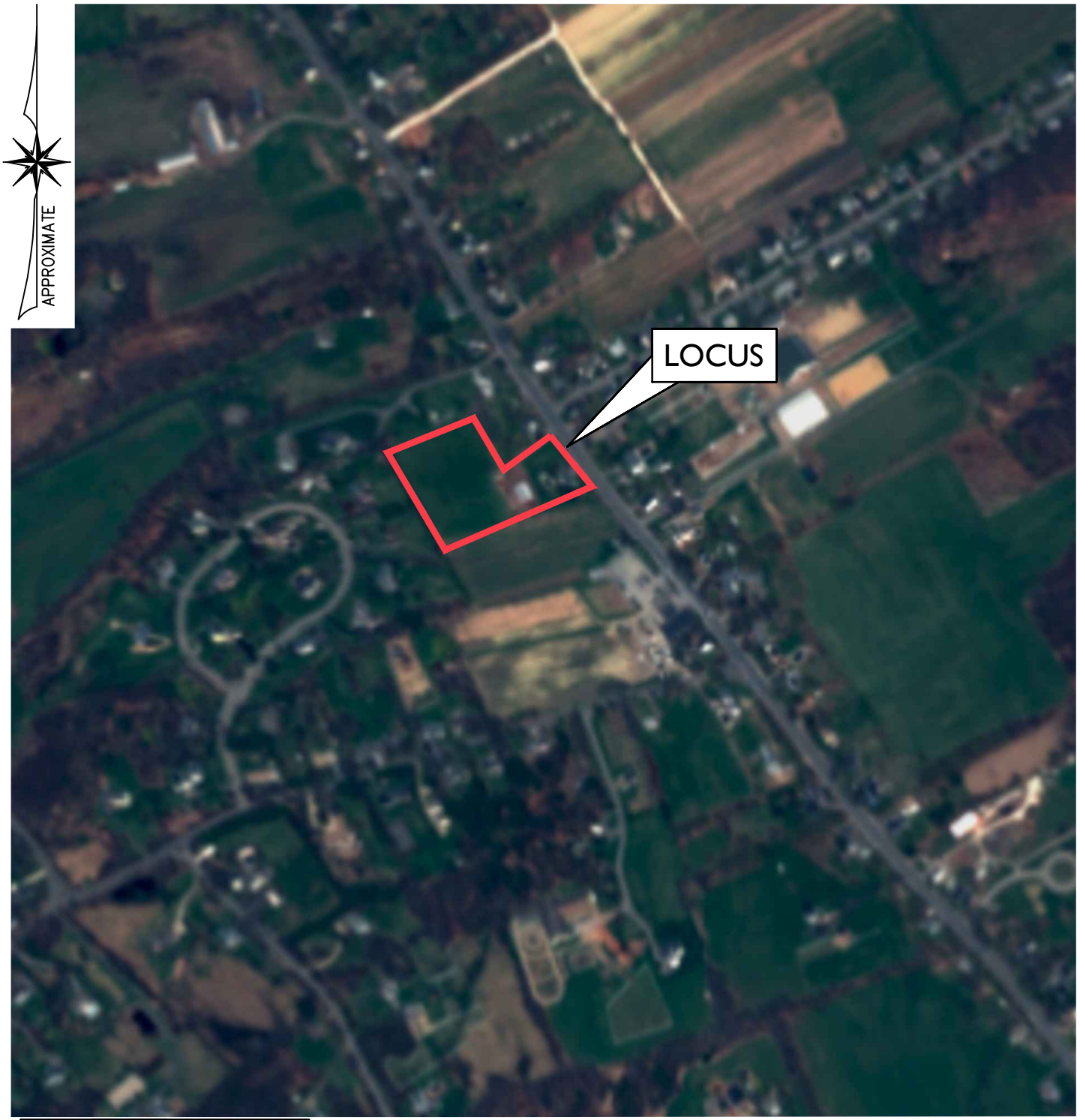
100 HIGH ROAD
IN
NEWBURY, MA

DATE: MAY 19, 2025

SCALE: 1" = 500'

FIGURE 1: USGS MAP

PROJ. 4303



ORTHO IMAGERY OBTAINED FROM MASS GIS

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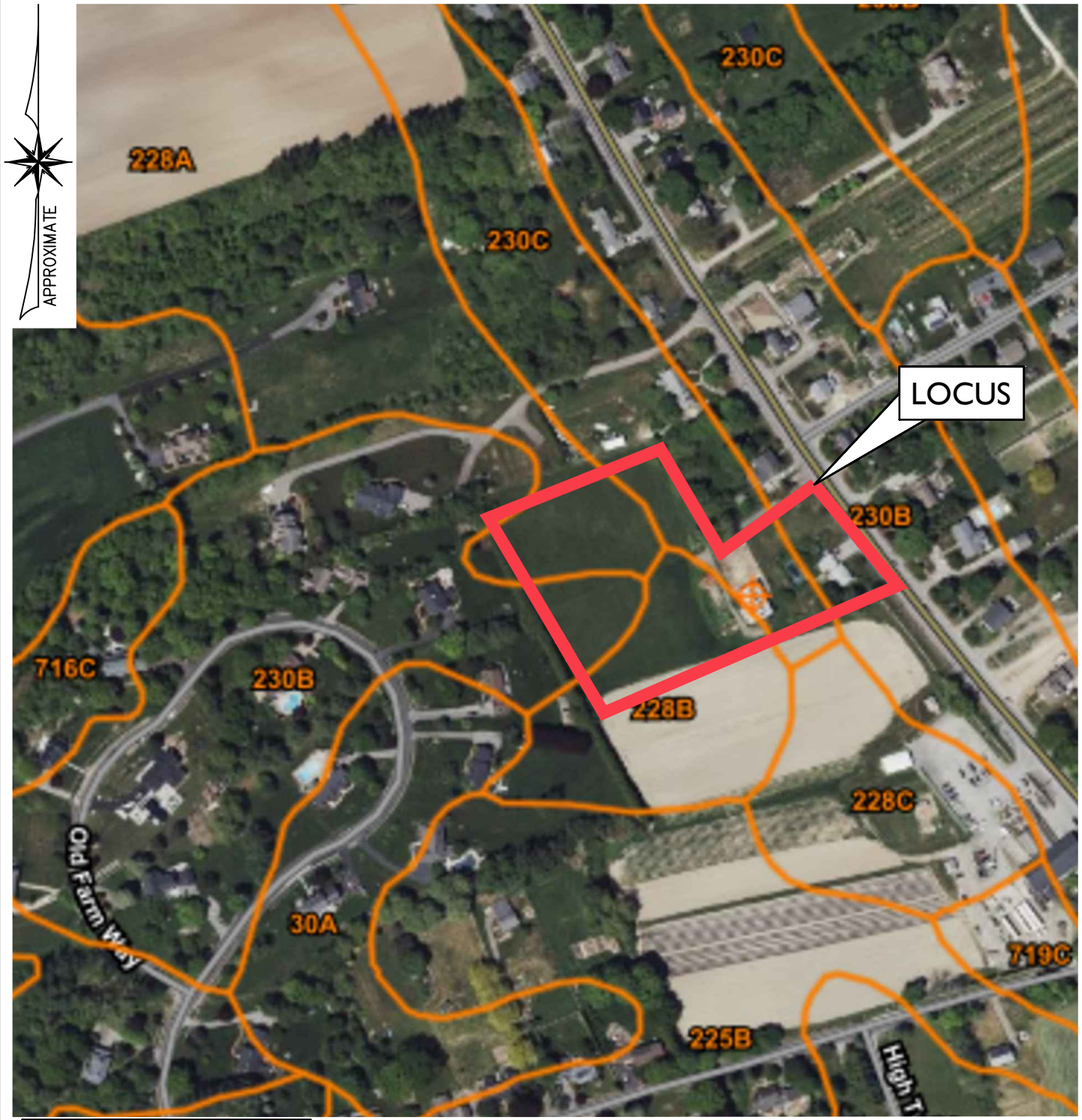
100 HIGH ROAD
IN
NEWBURY, MA

DATE: MAY 19, 2025

SCALE: 1" = 500'

FIGURE II: ORTHO IMAGE

PROJ. 4303



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100 HIGH ROAD
IN
NEWBURY, MA

DATE: MAY 19, 2025

SCALE: 1" = 250'

FIGURE III: SCS SOILS MAP

PROJ. 4303

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100 HIGH ROAD
IN
NEWBURY, MA

DATE: MAY 19, 2025

SCALE: 1" = 500'

FIGURE IV: FEMA IMAGE

PROJ. 4303

PLAN
SCALE: 1" = 30'
0 15 30 60

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
66 ELM STREET, DANVERS, MASSACHUSETTS 01923
P: 978-777-8586, W: WWW.MORINCAMERON.COM

SURVEY BY: MCG
DRAFTED BY: BAL
CHECKED BY: JMM
APPROVED BY: JMM
SCALE: 1" = 30'
DATE: MAY 21, 2025

NO.	DESCRIPTION	DATE

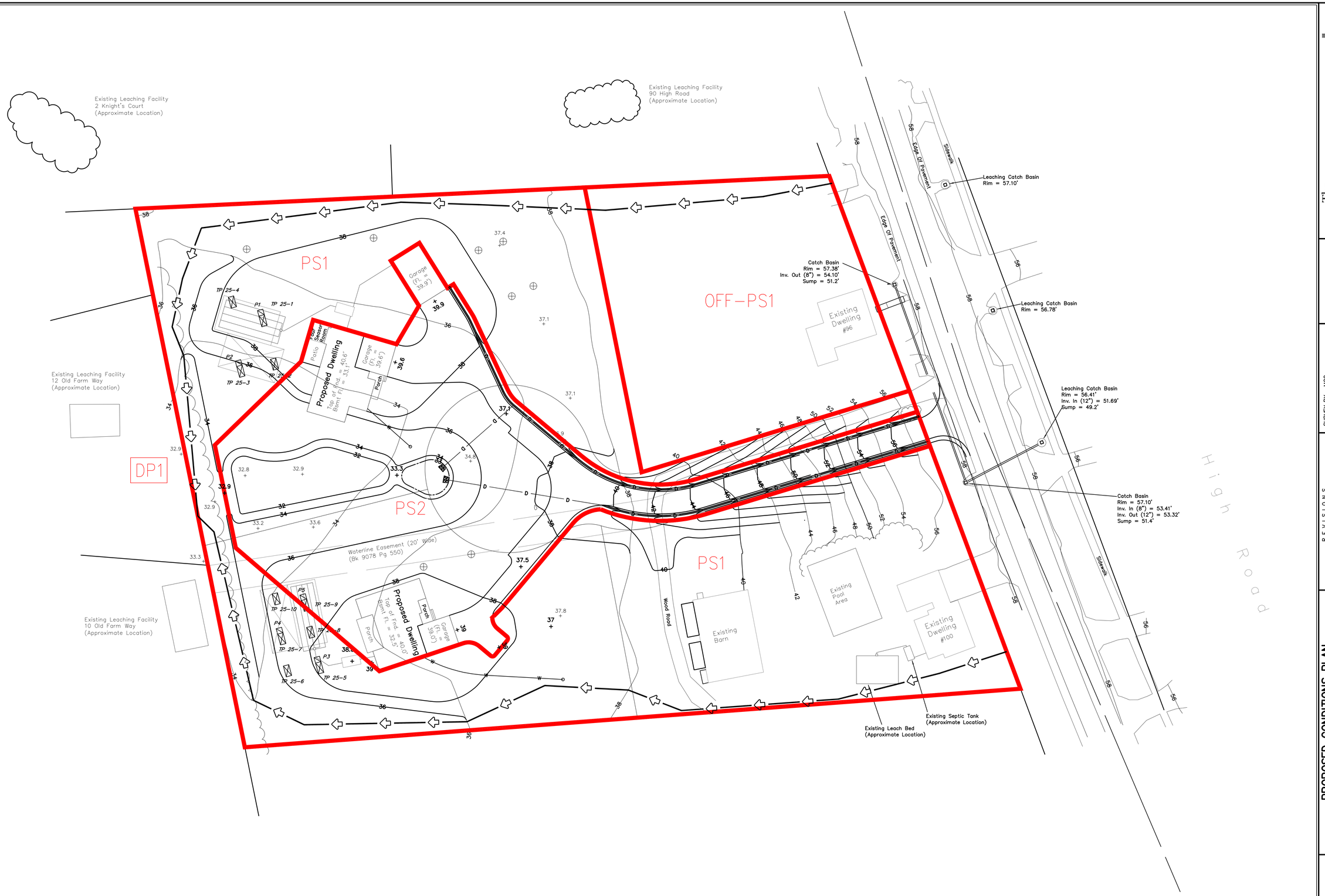
REVISIONS

EXISTING CONDITIONS PLAN
IN
NEWBURY, MASSACHUSETTS
100 HIGH ROAD (ROUTE 1A)
(ASSESSOR'S MAP R-34 LOT 21)
PREPARED FOR:
TOM NEVE

EXIST

DRAWING NO. 1 OF 2

PROJ. #4303
DRAWING: Site Design.dwg



PLAN
SCALE: 1" = 30'
0 15 30 60

The Morin-Cameron GROUP, INC.
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LAND SURVEYORS | LAND USE PLANNERS
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SURVEY BY: MCG
DRAFTED BY: BAL
CHECKED BY: JMM
APPROVED BY: JMM
SCALE: 1" = 30'
DATE: MAY 21, 2025

REVISIONS

NO.	DESCRIPTION	DATE

PROPOSED CONDITIONS PLAN
IN
NEWBURY, MASSACHUSETTS
100 HIGH ROAD (ROUTE 1A)
(ASSESSOR'S MAP R-34 LOT 21)
PREPARED FOR:
TOM NEVE

PROP

DRAWING NO. 2 OF 2

PROJ. #4303
DRAWING: Site Design.dwg

APPENDIX A:

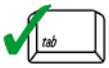
MASSDEP STORMWATER MANAGEMENT REPORT CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

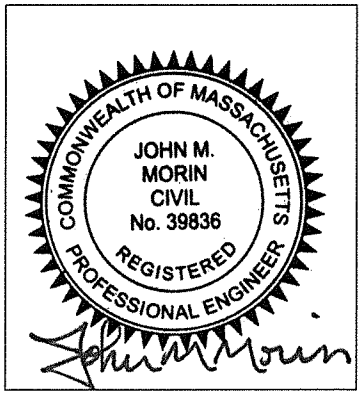
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



John M Morin 5/21/25
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☒ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Infiltration Basin and Sediment Forebay

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

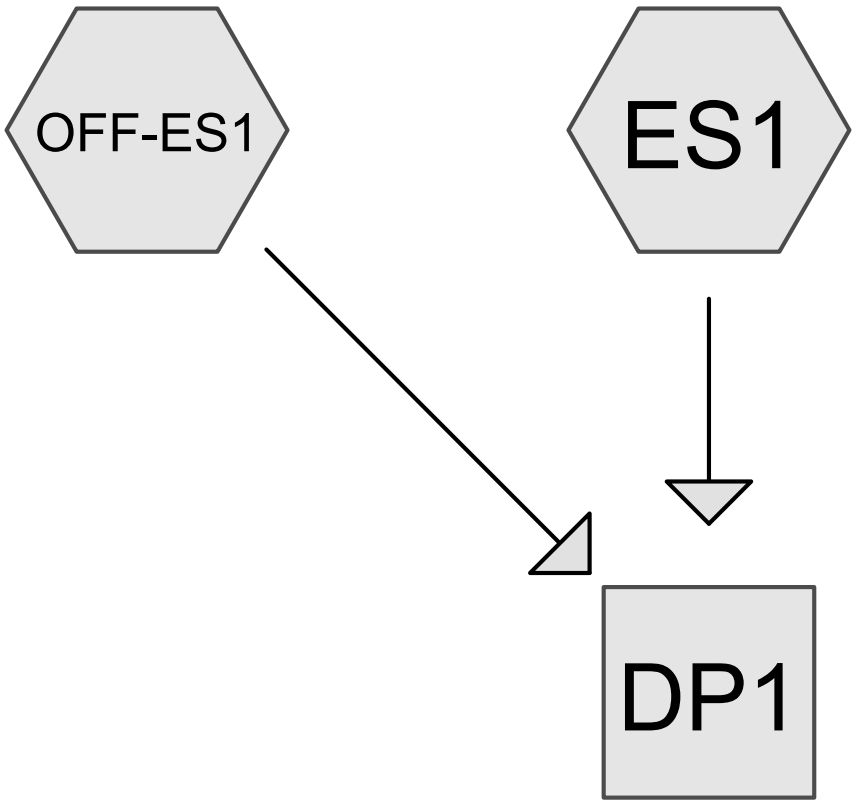
☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX B:

EXISTING CONDITIONS

HYDROLOGIC ANALYSIS



Subcat Reach Pond Link

Routing Diagram for High Road Existing Hydrologic Analysis
Prepared by The Morin-Cameron Group, Inc, Printed 5/20/2025

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
112,533	61	>75% Grass cover, Good, HSG B (ES1, OFF-ES1)
77,689	80	>75% Grass cover, Good, HSG D (ES1)
8,855	98	Bldg; Impervious (ES1, OFF-ES1)
1,846	98	Paved; Impervious (ES1, OFF-ES1)

Summary for Subcatchment ES1:

Runoff = 3.3 cfs @ 12.16 hrs, Volume= 12,441 cf, Depth= 0.90"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.23"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
	81,659	61	>75% Grass cover, Good, HSG B
	77,689	80	>75% Grass cover, Good, HSG D
	166,589	71	Weighted Average
	159,348		95.65% Pervious Area
	7,241		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	644	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	694	Total			

Summary for Subcatchment OFF-ES1:

Runoff = 0.5 cfs @ 12.14 hrs, Volume= 1,760 cf, Depth= 0.62"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.23"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.6	489	0.0390	3.18		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.2	539	Total			

Summary for Reach DP1:

Inflow Area = 200,923 sf, 5.33% Impervious, Inflow Depth = 0.85" for 2-Year event
Inflow = 3.8 cfs @ 12.16 hrs, Volume= 14,201 cf
Outflow = 3.8 cfs @ 12.16 hrs, Volume= 14,201 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

Summary for Subcatchment ES1:

Runoff = 8.2 cfs @ 12.15 hrs, Volume= 28,963 cf, Depth= 2.09"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.96"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
	81,659	61	>75% Grass cover, Good, HSG B
	77,689	80	>75% Grass cover, Good, HSG D
	166,589	71	Weighted Average
	159,348		95.65% Pervious Area
	7,241		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	644	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	694	Total			

Summary for Subcatchment OFF-ES1:

Runoff = 1.4 cfs @ 12.14 hrs, Volume= 4,655 cf, Depth= 1.63"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.96"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.6	489	0.0390	3.18		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.2	539	Total			

Summary for Reach DP1:

Inflow Area = 200,923 sf, 5.33% Impervious, Inflow Depth = 2.01" for 10-Year event
Inflow = 9.5 cfs @ 12.15 hrs, Volume= 33,618 cf
Outflow = 9.5 cfs @ 12.15 hrs, Volume= 33,618 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

Summary for Subcatchment ES1:

Runoff = 22.0 cfs @ 12.15 hrs, Volume= 78,003 cf, Depth= 5.62"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=9.18"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
	81,659	61	>75% Grass cover, Good, HSG B
	77,689	80	>75% Grass cover, Good, HSG D
	166,589	71	Weighted Average
	159,348		95.65% Pervious Area
	7,241		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	644	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	694	Total			

Summary for Subcatchment OFF-ES1:

Runoff = 4.3 cfs @ 12.13 hrs, Volume= 13,929 cf, Depth= 4.87"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=9.18"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.6	489	0.0390	3.18		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.2	539	Total			

Summary for Reach DP1:

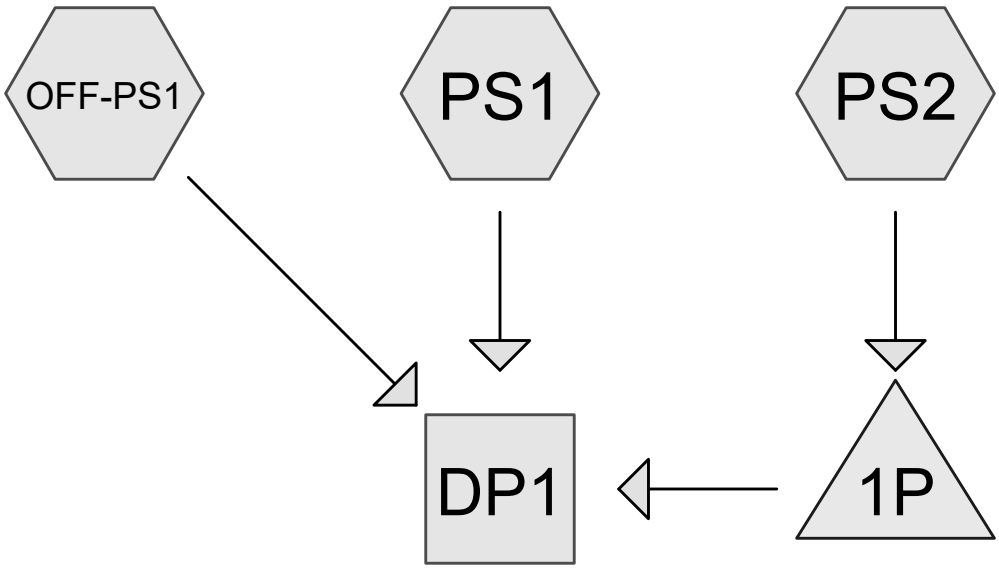
Inflow Area = 200,923 sf, 5.33% Impervious, Inflow Depth = 5.49" for 100-Year event
Inflow = 26.2 cfs @ 12.15 hrs, Volume= 91,932 cf
Outflow = 26.2 cfs @ 12.15 hrs, Volume= 91,932 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

APPENDIX C:

PROPOSED CONDITIONS

HYDROLOGIC ANALYSIS



Subcat Reach Pond Link

Routing Diagram for High Road Proposed Hydrologic Analysis
Prepared by The Morin-Cameron Group, Inc, Printed 5/20/2025

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
104,817	61	>75% Grass cover, Good, HSG B (OFF-PS1, PS1, PS2)
67,026	80	>75% Grass cover, Good, HSG D (PS1, PS2)
15,910	98	Bldg; Impervious (OFF-PS1, PS1, PS2)
13,170	98	Paved; Impervious (OFF-PS1, PS1, PS2)

Summary for Subcatchment OFF-PS1:

Runoff = 0.4 cfs @ 12.15 hrs, Volume= 1,760 cf, Depth= 0.62"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.23"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
*	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.6	615	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.2	665	Total			

Summary for Subcatchment PS1:

Runoff = 2.3 cfs @ 12.16 hrs, Volume= 8,480 cf, Depth= 0.90"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.23"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
*	61,375	61	>75% Grass cover, Good, HSG B
*	44,928	80	>75% Grass cover, Good, HSG D
	113,544	71	Weighted Average
	106,303		93.62% Pervious Area
	7,241		6.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	646	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	696	Total			

Summary for Subcatchment PS2:

Runoff = 2.1 cfs @ 12.13 hrs, Volume= 6,906 cf, Depth= 1.56"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.23"

	Area (sf)	CN	Description
*	11,324	98	Paved; Impervious
*	7,055	98	Bldg; Impervious
*	12,568	61	>75% Grass cover, Good, HSG B
*	22,098	80	>75% Grass cover, Good, HSG D
	53,045	82	Weighted Average
	34,666		65.35% Pervious Area
	18,379		34.65% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 200,923 sf, 14.47% Impervious, Inflow Depth = 0.61" for 2-Year event
Inflow = 2.7 cfs @ 12.16 hrs, Volume= 10,239 cf
Outflow = 2.7 cfs @ 12.16 hrs, Volume= 10,239 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P:

Inflow Area = 53,045 sf, 34.65% Impervious, Inflow Depth = 1.56" for 2-Year event
Inflow = 2.1 cfs @ 12.13 hrs, Volume= 6,906 cf
Outflow = 0.1 cfs @ 14.01 hrs, Volume= 6,907 cf, Atten= 93%, Lag= 112.4 min
Discarded = 0.1 cfs @ 14.01 hrs, Volume= 6,907 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.72' @ 14.01 hrs Surf.Area= 4,296 sf Storage= 2,774 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 218.4 min (1,080.0 - 861.6)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	9,394 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.00	3,413	273.9	0	0	3,413
34.00	6,111	423.6	9,394	9,394	11,751

Device	Routing	Invert	Outlet Devices
#1	Discarded	32.00'	**1.020 in/hr Exfiltration over Wetted area**
#2	Primary	32.90'	**30.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.1 cfs @ 14.01 hrs HW=32.72' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=32.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Subcatchment OFF-PS1:

Runoff = 1.3 cfs @ 12.15 hrs, Volume= 4,655 cf, Depth= 1.63"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.96"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
*	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.6	615	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.2	665	Total			

Summary for Subcatchment PS1:

Runoff = 5.6 cfs @ 12.15 hrs, Volume= 19,741 cf, Depth= 2.09"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.96"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
*	61,375	61	>75% Grass cover, Good, HSG B
*	44,928	80	>75% Grass cover, Good, HSG D
	113,544	71	Weighted Average
	106,303		93.62% Pervious Area
	7,241		6.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	646	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	696	Total			

Summary for Subcatchment PS2:

Runoff = 4.1 cfs @ 12.13 hrs, Volume= 13,453 cf, Depth= 3.04"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.96"

	Area (sf)	CN	Description
*	11,324	98	Paved; Impervious
*	7,055	98	Bldg; Impervious
*	12,568	61	>75% Grass cover, Good, HSG B
*	22,098	80	>75% Grass cover, Good, HSG D
	53,045	82	Weighted Average
	34,666		65.35% Pervious Area
	18,379		34.65% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 200,923 sf, 14.47% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 7.8 cfs @ 12.18 hrs, Volume= 27,709 cf
Outflow = 7.8 cfs @ 12.18 hrs, Volume= 27,709 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P:

Inflow Area = 53,045 sf, 34.65% Impervious, Inflow Depth = 3.04" for 10-Year event
Inflow = 4.1 cfs @ 12.13 hrs, Volume= 13,453 cf
Outflow = 2.1 cfs @ 12.22 hrs, Volume= 13,453 cf, Atten= 48%, Lag= 5.5 min
Discarded = 0.2 cfs @ 12.22 hrs, Volume= 10,140 cf
Primary = 2.0 cfs @ 12.22 hrs, Volume= 3,313 cf
Routed to Reach DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.99' @ 12.22 hrs Surf.Area= 4,652 sf Storage= 3,980 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 205.8 min (1,042.7 - 836.9)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	9,394 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.00	3,413	273.9	0	0	3,413
34.00	6,111	423.6	9,394	9,394	11,751

Device	Routing	Invert	Outlet Devices
#1	Discarded	32.00'	**1.020 in/hr Exfiltration over Wetted area**
#2	Primary	32.90'	**30.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.2 cfs @ 12.22 hrs HW=32.99' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=2.0 cfs @ 12.22 hrs HW=32.99' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.0 cfs @ 0.72 fps)

Summary for Subcatchment OFF-PS1:

Runoff = 4.1 cfs @ 12.14 hrs, Volume= 13,929 cf, Depth= 4.87"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=9.18"

	Area (sf)	CN	Description
*	1,230	98	Paved; Impervious
*	2,230	98	Bldg; Impervious
*	30,874	61	>75% Grass cover, Good, HSG B
	34,334	65	Weighted Average
	30,874		89.92% Pervious Area
	3,460		10.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.6	615	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.2	665	Total			

Summary for Subcatchment PS1:

Runoff = 15.0 cfs @ 12.15 hrs, Volume= 53,166 cf, Depth= 5.62"
Routed to Reach DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=9.18"

	Area (sf)	CN	Description
*	616	98	Paved; Impervious
*	6,625	98	Bldg; Impervious
*	61,375	61	>75% Grass cover, Good, HSG B
*	44,928	80	>75% Grass cover, Good, HSG D
	113,544	71	Weighted Average
	106,303		93.62% Pervious Area
	7,241		6.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
3.7	646	0.0325	2.90		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.9	696	Total			

Summary for Subcatchment PS2:

Runoff = 9.0 cfs @ 12.13 hrs, Volume= 30,883 cf, Depth= 6.99"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=9.18"

	Area (sf)	CN	Description
*	11,324	98	Paved; Impervious
*	7,055	98	Bldg; Impervious
*	12,568	61	>75% Grass cover, Good, HSG B
*	22,098	80	>75% Grass cover, Good, HSG D
	53,045	82	Weighted Average
	34,666		65.35% Pervious Area
	18,379		34.65% Impervious Area

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

Summary for Reach DP1:

Inflow Area = 200,923 sf, 14.47% Impervious, Inflow Depth = 5.06" for 100-Year event
Inflow = 27.5 cfs @ 12.15 hrs, Volume= 84,756 cf
Outflow = 27.5 cfs @ 12.15 hrs, Volume= 84,756 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P:

Inflow Area = 53,045 sf, 34.65% Impervious, Inflow Depth = 6.99" for 100-Year event
Inflow = 9.0 cfs @ 12.13 hrs, Volume= 30,883 cf
Outflow = 8.6 cfs @ 12.15 hrs, Volume= 30,884 cf, Atten= 5%, Lag= 1.2 min
Discarded = 0.2 cfs @ 12.15 hrs, Volume= 13,222 cf
Primary = 8.4 cfs @ 12.15 hrs, Volume= 17,662 cf
Routed to Reach DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 33.14' @ 12.15 hrs Surf.Area= 4,854 sf Storage= 4,683 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 125.2 min (931.7 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	9,394 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.00	3,413	273.9	0	0	3,413
34.00	6,111	423.6	9,394	9,394	11,751

Device	Routing	Invert	Outlet Devices
#1	Discarded	32.00'	**1.020 in/hr Exfiltration over Wetted area**
#2	Primary	32.90'	**30.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.2 cfs @ 12.15 hrs HW=33.14' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=8.4 cfs @ 12.15 hrs HW=33.14' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 8.4 cfs @ 1.18 fps)

APPENDIX D:

SUPPLEMENTAL STORMWATER MANAGEMENT CALCULATIONS

May 21, 2025

Stormwater Management Calculations

100 High Road Newbury, MA Date: 5/21/25

STANDARD 3: Recharge To Groundwater: Static Method

1. Calculate Impervious Area *(From HydroCAD Model)*
   - New Impervious Area (HSG B Soil) = 7,715 SF
   - New Impervious Area (HSG D Soil) =10,664 SF

2. Determine Rainfall Depth to be Recharged
   (MassDEP Stormwater Management Handbook)

Hydrologic Soil Group	Recharge Rainfall Depth
B	0.35"
D	0.10"

3. Calculate Recharge Volume
   '*Rv*' = [(0.35" x 7,715 SF) / 12 SF-In]+[(0.10" x 10,664 SF) / 12 SF-In] = 314 CF
   '*Rv*' = 314 CF

4. Calculate Provided Recharge

HCAD System ID	Bottom of Infiltration	Lowest System Outlet	Total Recharge Volume Provided (cf)	10-YR Storm Event Peak Elevation
1P	32.0'	32.9'	**3,563**	32.99'
TOTAL			**3,563**	

Required Recharge Volume Summary
Total Volume Provided Below Outlets = 3,563 CF
Total Volume Required = 314 CF
3,563 cf provided > 314 cf required

Verify Drawdown, Maximum 72-Hours: Static Method

HCAD System ID	Recharge Volume (CF)	Bottom Surface Area (SF)	Infiltration Rate Inches/Hour	Drawdown Time Rv / (K x A) (Hours)	Description
1P	3,563	3,413	1.02	12.3	Infiltration Basin (IB-1)

*****Design Complies with Recharge Volume Standard*****

STANDARD 4: Water Quality

Water Quality Volume

- **1P – Infiltration Basin**
- Tributary Impervious Area = 18,379 SF
  Calculate required water quality volume (1" depth)
  WQV = [(1" x 18,379 SF) / 12 SF-In = **1,532 CF**
- Lowest outlet elevation = 32.9'
  WQV provided below lowest outlet = **3,563 CF (OK)**

Pretreatment Volume

- **Sediment Forebay 1 (Pond 1P)**
- Volume = 0.1" × 18,379 SF / 12 = 153 CF required
- 202 CF of storage provided at 33.3'

APPENDIX E:

CONSTRUCTION PHASE

BEST MANAGEMENT PRACTICES PLAN

Construction Phase Best Management Practices (BMP's)

Erosion and Sedimentation will be controlled at the site by utilizing Structural Practices, Stabilization Practices, and Dust Control. These practices correspond with plans entitled "100 High Road Definitive Subdivision Plan" prepared by The Morin-Cameron Group, Inc. dated May 7, 2025.

Responsible Party Contact Information:

Stormwater Management System Owner:	100 High Road LLC 7 Sullivans Court West Newbury, MA 01985 P: (978) 857-7333
Newbury Department of Public Works:	197 High Road Newbury, MA 01951 P: (978) 465-6512
Newbury Planning Board:	Newbury Municipal Offices 12 Kent Way Suite 101 Byfield, MA 01922 P: (978) 465-0862
Site Design Engineer Information:	The Morin-Cameron Group, Inc. 66 Elm Street Danvers, MA 01923 Phone: (978) 777-8586

Structural Practices:

1) **Silt Sock** – A silt sock barrier shall be installed in accordance with the approved plans where high rates of stormwater runoff are anticipated.

   a) Installation Schedule: Prior to Start of land disturbance.

   b) Maintenance and Inspection: The site supervisor shall inspect the barrier at least once every two weeks or after a major storm (0.25 inch of rainfall within a twenty-four-hour period). event and shall repair any damaged or affected areas of the barrier at the time they are noted. Remove sediment deposits promptly after storm events to provide adequate storage volume for the next rain and to reduce pressure on the barrier. Sediment will be removed from in front of the barrier when it becomes about 4" deep at the barrier. Take care to avoid undermining the barrier during cleanout.

2) **Sediment Track-Out** – Stabilized Construction Exit: Prior to the commencement of site work, crushed stone anti-tracking pads will be installed at the entrance to the site. This will prevent trucks from tracking material onto the road from the construction site. If, at any point during the project, the tracking pad becomes ineffective due to accumulation of soil, the crushed stone shall be replaced. Details for construction of the stabilized entrance can be found on the Construction Details sheet that is part of Site Plan set associated with the project. The site supervisor will inspect the tracking pads weekly to ensure that they are properly limiting the tracking of soil onto the road. If tracking onto the roadway is noted, it shall be removed immediately via a mechanical street sweeper.

Stabilization Practices:

Stabilization measures shall be implemented as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, with the following exceptions.

- Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

- Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on that portion of the site by the 14th day after construction activity temporarily ceased.

1) **Temporary Seeding** – Temporary seeding will allow a short-term vegetative cover on disturbed site areas that may be in danger of erosion. Temporary seeding will be done at stock piles and disturbed portions of the site where construction activity will temporarily cease for at least 21 days. The temporary seeding will stabilize cleared and unvegetated areas that will not be brought into final grade for several weeks or months.

Temporary Seeding Planting Procedures *

a) Planting should preferably be done between April 1st and June 30th, and September 1st through September 31st. If planting is done in the months of July and August, irrigation may be required. If planting is done between October 1st and March 31st, mulching should be applied immediately after planting.

b) Before seeding, install structural practice controls. Utilize Amoco supergro or equivalent.

c) Select the appropriate seed species for temporary cover from the following table.

Species	Seeding Rate (lbs./1,000 sq.)	Seeding Rate (lbs./acre)	Recommended Seeding Dates	Seed Cover required
Annual Ryegrass	1	40	April 1st to June 1st August 15th to Sept. 15th	¼ inch
Foxtail Millet	0.7	30	May 1st to June 30th	½ to ¾ inch
Oats	2	80	April 1st to July 1st August 15th to Sept. 15th	1 to 1-½ inch
Winter Rye	3	120	August 15th to Oct. 15th	1 to 1-½ inch

Apply the seed uniformly by hydroseeding, broadcasting, or by hand.

d) Use effective mulch, such as clean grain straw; tacked and/or tied with netting to protect seedbed and encourage plant growth.

Temporary Seeding Inspection/Maintenance *

a) Inspect within 6 weeks of planting to see if stands are adequate. Check for damage within 24 hours of the end to a heavy rainfall (0.25 inch of rainfall within a twenty-four-hour period). Stands should be uniform and dense. Reseed and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary.

b) Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather. Water application rates should be controlled to prevent runoff.

2) **Geotextiles** - Geotextiles such as jute netting will be used in combination with other practices such as mulching to stabilize slopes. The following geotextile materials or equivalent are to be utilized for structural and nonstructural controls as shown in the following table.

Practice	Manufacturer	Product	Remarks
Sediment Fence	Amoco	Woven polypropylene 1198 or equivalent	0.425 mm opening
Construction Entrance	Amoco	Woven polypropylene 2002 or equivalent	0.300 mm opening
Outlet Protection	Amoco	Nonwoven polypropylene 4551 or equivalent	0.150 mm opening
Erosion Control (slope stability)	Amoco	Supergro or equivalent	Erosion control revegetation mix, open polypropylene fiber on degradable polypropylene net scrim

Amoco may be reached at (800) 445-7732

Geotextile Installation

a) Netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material.

Geotextile Inspection/Maintenance *

a) In the field, regular inspections should be made to check for cracks, tears, or breaches in the fabric. The appropriate repairs should be made.

3) **Mulching and Netting** – Mulching will provide immediate protection to exposed soils during the period of short construction delays, or over winter months through the application of plant residues, or other suitable materials, to exposed soil areas. In areas, which have been seeded either for temporary or permanent cover, mulching should immediately follow seeding. On steep slopes (slopes 3H:1V or greater), mulch must be supplemented with netting. The preferred mulching material is straw.

Mulch (Hay or Straw) Materials and Installation

a) Straw has been found to be one of the most effective organic mulch materials. The specifications for straw are described below, but other material may be appropriate. The straw should be air-dried; free of undesirable seeds & coarse materials. The application rate per 1,000 sq. is 90-100 lbs. (2-3 bales) and the application rate per acre is 2 tons (100-120 bales). The application should cover about 90% of the surface. The use of straw mulch is appropriate where mulch is maintained for more than three months. Straw mulch is subject to wind blowing unless anchored, is the most commonly used mulching material, and has the best microenvironment for germinating seeds.

Mulch Maintenance *

a) Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting.

b) Straw or grass mulches that blow or wash away should be repaired promptly.

c) If plastic netting is used to anchor mulch, care should be taken during initial mowing to keep the mower height high. Otherwise, the netting can wrap up on the mower blade shafts. After a period of time, the netting degrades and becomes less of a problem.

d) Continue inspections until vegetation is well established.

4) **Land Grading** – Grading on fill slopes, cut slopes, and stockpile areas will be done with full siltation controls in place.

Land Grading Design/Installation Requirements

a) Areas to be graded should be cleared and grubbed of all timber, logs, brush, rubbish, and vegetated matter that will interfere with the grading operation. Topsoil should be stripped and stockpiled for use on critical disturbed areas for establishment of vegetation. Cut slopes to be topsoiled should be thoroughly scarified to a minimum depth of 3-inches prior to placement of topsoil.

b) Fill materials should be generally free of brush, rubbish, rocks, and stumps. Frozen materials or soft and easily compressible materials should not be used in fills intended to support buildings, parking lots, roads, conduits, or other structures.

c) Earth fill intended to support structural measures should be compacted to a minimum of 90 percent of Standard Proctor Test density with proper moisture control, or as otherwise specified by the engineer responsible for the design. Compaction of other fills should be to the density required to control sloughing, erosion or excessive moisture content. Maximum thickness of fill layers prior to compaction should not exceed 9 inches.

d) The uppermost one foot of fill slopes should be compacted to at least 85 percent of the maximum unit weight (based on the modified AASHTO compaction test). This is usually accomplished by running heavy equipment over the fill.

e) Fill should consist of material from borrow areas and excess cut will be stockpiled on site. All disturbed areas should be free draining, left with a neat and finished appearance, and should be protected from erosion.

Land Grading Stabilization Inspection/Maintenance *

a) All slopes should be checked periodically to see that vegetation is in good condition. Any rills or damage from erosion and animal burrowing should be repaired immediately to avoid further damage.

b) If seeps develop on the slopes, the area should be evaluated to determine if the seep will cause an unstable condition. Subsurface drains or a gravel mulch may be required to solve seep problems.

c) Areas requiring revegetation should be repaired immediately. Control undesirable vegetation such as weeds and woody growth to avoid bank stability problems in the future.

5) **Topsoiling *** – Topsoiling will help establish vegetation on all disturbed areas throughout the site during the seeding process. The soil texture of the topsoil to be used will be a sandy loam to a silt loam texture with 15% to 20% organic content.

Topsoiling Placement

a) Topsoil should not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or when conditions exist that may otherwise be detrimental to proper grading or proposed seeding.

b) Do not place topsoil on slopes steeper than 2.5:1, as it will tend to erode.

c) If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. The best method is to actually work the topsoil into the layer below for a depth of at least 6 inches.

6) **Permanent Seeding** – Permanent Seeding should be done immediately after the final design grades are achieved. Native species of plants should be used to establish perennial vegetative cover on disturbed areas. The revegetation should be done early enough in the fall so that a good cover is established before cold weather comes and growth stops until the spring. A good cover is defined as vegetation covering 75 percent or more of the ground surface.

Permanent Seeding Seedbed Preparation

a) In infertile or coarse-textured subsoil, it is best to stockpile topsoil and re-spread it over the finished slope at a minimum 2 to 6-inch depth and roll it to provide a firm seedbed. The topsoil must have a sandy loam to silt loam texture with 15% to 20% organic content. If construction fill operations have left soil exposed with a loose, rough, or irregular surface, smooth with blade and roll.

b) Loosen the soil to a depth of 3-5 inches with suitable agricultural or construction equipment.

c) Areas not to receive topsoil shall be treated to firm the seedbed after incorporation of the lime and fertilizer so that it is depressed no more than ½ - 1 inch when stepped on with a shoe. Areas to receive topsoil shall not be firmed until after topsoiling and lime and fertilizer is applied and incorporated, at which time it shall be treated to firm the seedbed as described above.

Permanent Seeding Grass Selection/Application

a) Select an appropriate cool or warm season grass based on site conditions and seeding date. Apply the seed uniformly by hydro-seeding, broadcasting, or by hand. Uniform seed distribution is essential. On steep slopes, hydroseeding may be the most effective seeding method. Surface roughening is particularly important when preparing slopes for hydroseeding.

b) Lime and fertilize. Organic fertilizer shall be utilized in areas within the 100-foot buffer zone to a wetland resource area.

c) Mulch the seedings with straw applied at the rate of ½ tons per acre. Anchor the mulch with erosion control netting or fabric on sloping areas. Amoco supergro or equivalent should be utilized.

Permanent Seeding Inspection/Maintenance *

a) Frequently inspect seeded areas for failure and make necessary repairs and reseed immediately. Conduct or follow-up survey after one year and replace failed plants where necessary.

b) If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

c) If a stand has less than 40% cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If the season prevents resowing, mulch or jute netting is an effective temporary cover.

d) Seeded areas should be fertilized during the second growing season. Lime and fertilize thereafter at periodic intervals, as needed. Organic fertilizer shall be utilized in areas within the 100-foot buffer zone to a wetland resource area.

7) **Stockpiling** – All stock piling shall be placed upslope of in place erosion control measures. Temporary seeding will allow a short-term vegetative cover on disturbed site areas that may be in danger of erosion. Temporary seeding shall be done on stockpiles that will remain in place for at least 21 days. All stockpiling areas shall have erosion control measures implemented at the base in order to prevent migration of sediment into the work site and/or stormwater drainage system.

Dust Control:

Dust control will be utilized throughout the entire construction process of the site. For example, keeping disturbed surfaces moist during windy periods will be an effective control measure, especially for construction access roads. The use of dust control will prevent the movement of soil to offsite areas. However, care must be taken to not create runoff from excessive use of water to control dust. The following are methods of Dust Control that may be used on-site:

- Vegetative Cover – The most practical method for disturbed areas not subject to traffic.
- Calcium Chloride – Calcium chloride may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage.
- Sprinkling – The site may be sprinkled until the surface is wet. Sprinkling will be effective for dust control on haul roads and other traffic routes.
- Stone – Stone will be used to stabilize construction roads and will provide dust control.

The general contractor shall employ an on-site water vehicle for the control of dust as necessary.

Non-Stormwater Discharges:
The construction de-watering and all non-stormwater discharges will be directed into a sediment dirt bag (or equivalent inlet protection) or a sediment basin. Sediment material removed shall be disposed of in accordance with all applicable local, state, and federal regulations.

Inspection/Maintenance:
Operator personnel must inspect the construction site at least once every 14 calendar days and within 24 hours of a storm event of 0.25-inch or greater. The applicant shall be responsible to secure the services of a design professional or similar professional (inspector) on an on-going basis throughout all phases of the project. Refer to the Inspection/Maintenance Requirements presented earlier in the "Structural and Stabilization Practices." The inspector should review the erosion and sediment controls with respect to the following:

- Whether or not the measure was installed/performed correctly.
- Whether or not there has been damage to the measure since it was installed or performed.
- What should be done to correct any problems with the measure.

The inspector should document the findings and should request the required maintenance or repair for the pollution prevention measures when the inspector finds that it is necessary for the measure to be effective. The inspector should notify the appropriate person to make the required changes.

It is essential that the inspector document the inspection of the pollution prevention measures. These records will be used to request maintenance and repair and to prove that the inspection and maintenance were performed. The forms list each of the measures to be inspected on the site, the inspector's name, the date of the inspection, the condition of the measure/area inspected, maintenance or repair performed and any changes which should be made to the Operation and Maintenance Plan to control or eliminate unforeseen pollution of storm water.

APPENDIX F:

LONG TERM BEST MANAGEMENT PRACTICES O&M PLAN

Long Term Stormwater Best Management Practices
Operation and Maintenance Plan
for
100 High Road
Newbury, Massachusetts
Issued May 21, 2025

The following operation and maintenance plan has been provided to satisfy the requirements of Standard 9 of the Mass DEP Stormwater Management Handbook associated with development of the site and associated infrastructure. The success of the Stormwater Management Plan depends on the proper implementation, operation and maintenance of several management components. The following procedures shall be implemented to ensure success of the Stormwater Management Plan:

1. The contractor shall comply with the details of construction of the site as shown on the approved plans.
2. The stormwater management system shall be inspected and maintained as indicated below.
3. Effective erosion control measurers during and after construction shall be maintained until a stable turf is established on all altered areas.
4. A Stormwater Management Maintenance Log is included at the end of this Appendix.

Stormwater Management System Owner:
100 High Road LLC
7 Sullivans Court
West Newbury, MA 01985
P: (978) 857-7333

Newbury Department of Public Works:
197 High Road
Newbury, MA 01951
P: (978) 465-6512

Newbury Planning Board:
Newbury Municipal Offices
12 Kent Way Suite 101
Byfield, MA 01922
P: (978) 465-0862

Site Design Engineer Information:
The Morin-Cameron Group, Inc.
66 Elm Street
Danvers, MA 01923
Phone: (978) 777-8586

Erosion and Sedimentation Controls during Construction:

The site and drainage construction contractor shall be responsible for managing stormwater during construction. Routine monitoring of disturbed soils shall be performed to ensure adequate runoff and pollution control during construction.

A sediment and erosion control barrier will be placed as shown on the Site Plan prior to the commencement of any clearing, grubbing, and earth removal or construction activity. The integrity of the erosion control barrier will be maintained by periodic inspection and replacement as necessary. The erosion control barrier will remain in place until the first course of pavement has been placed and all side slopes have been loamed and seeded and vegetation has been established.

Operations and maintenance plans for the Stormwater Management construction phase and long term operation of the system have been attached to this report.

General Conditions

1. The site contractor shall be responsible for scheduling regular inspections and maintenance of the stormwater BMP's until the project has been completed. The BMP maintenance shall be conducted as detailed in the following long-term pollution prevention plan and on the approved design plans:
   ""100 High Road Definitive Subdivision Plan in Newbury, Massachusetts (Assessor's Map R-34, Lot 21) Prepared for 100 High Road, LLC", dated May 21, 2025.
2. All Stormwater BMP's shall be operated and maintained in accordance with the design plans and the following Long-Term Pollution Prevention Plan.
3. The owner shall:
   a. Maintain an Operation and Maintenance Log for the last three years. The Log shall include all BMP inspections, repairs, replacement activities and disposal activities (disposal material and disposal location shall be included in the Log);
   b. Make the log available to the Newbury Planning Board, Conservation Commission and Department of Public Works upon request;
   c. Allow members and agents of the Newbury Planning Board, Conservation Commission and Department of Public Works to enter the premises and ensure that the Owner has complied with the Operation and Maintenance Plan requirements for each BMP.
4. A recommended inspection and maintenance schedule is outlined below based on statewide averages. This inspection and maintenance schedule shall be adhered to at a minimum for the first year of service of all BMP's referenced in this document. At the commencement of the first year of service, a more accurate inspection/maintenance schedule shall be determined based on the level of service for this site.

Long-Term Pollution Prevention Plan (LTPPP)

Vegetated Areas:

Immediately after construction, monitoring of the erosion control systems shall occur until establishment of natural vegetation. Afterwards, vegetated areas shall be maintained as such. Vegetation shall be replaced as necessary to ensure proper stabilization of the site.

Cost: Included with annual landscaping budget. Consult with local landscape contractors.

Grassed Infiltration Basins:

The best management practices shall be inspected after every major storm event for the first 3 months after construction; a major storm event is 3.23 inches of rainfall in a 24-hour period (2-year storm). Thereafter, the basin shall be inspected twice per year, typically in the spring and fall. If erosion or loss of vegetation is observed in the basin, it shall be repaired immediately, and new vegetation shall be established. Trash, leaves, branches, etc. shall be removed from basins. The infiltration, detention basin and water quality swale shall be mowed twice per year. Reseed as required. Inspect swales to make sure vegetation is adequate, check dams are in place and functioning and slopes are not eroding. Check for rilling and gullying. Repair eroded areas and revegetated as needed.

Infiltration Swale:

The swale shall be inspected after every major storm event for the first 3 months after construction; a major storm event is 3.23 inches of rainfall in a 24-hour period (2-year storm). After 3 months, the swale shall be inspected twice a tear, typically in the spring and fall. If erosion or rutting of aggregate is observed in the swale, it shall be repaired immediately and reestablished. No snow shall be stored in the swale.

Cost: Consult with local landscaping companies for associated costs if necessary.

Roof Leaders, Gutters and Downspouts:

The gutters and downspouts shall be inspected and cleaned at least once per year to remove any debris accumulation (i.e. leaves, sticks). The roof leaders shall be inspected regularly and cleaned at least twice per year (April and October) to confirm that the roof leaders are not obstructed by debris.

Cost: $200-300 per cleaning for the gutters as needed. The owner should consult local contractors for a detailed cost estimate.

Debris & Litter:

All debris and litter shall be removed from the roadway as necessary to prevent migration into the drainage system.

Pesticides, Herbicides, and Fertilizers:

Pesticides and herbicides shall be used sparingly. Fertilizers shall be restricted to the use of organic fertilizers only. All fertilizers, herbicides, pesticides, sand and salt for deicing and the like shall be stored in dry area that is protected from weather.

Cost: Included in the routine landscaping maintenance schedule. The Owner shall consult local landscaping contractors for details.

Public Safety Concerns: Chemicals shall be stored in a secure area to prevent children from obtaining access to them. Any major spills shall be reported to municipal officials.

Prevention of Illicit Discharges:

Illicit discharges to the stormwater management system are not allowed. Illicit discharges are discharges that are not comprised entirely of stormwater. Pursuant to Mass DEP Stormwater Standards the following activities or facilities are not considered illicit discharges: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, De-chlorinated water from swimming pools, water used for street washing and water used to clean residential building without detergents.

To prevent illicit discharges to the stormwater management system the following policies should be implemented:

1. Good Housekeeping Practices
   - The site shall be kept clean of litter and debris and continuously maintained in accordance with the Long-Term Pollution Prevention Plan as noted above. All chemicals shall be covered and stored in secured location. Any land disturbances that change drainage characteristics shall be remedied to pre-disturbance characteristics (i.e. shoulder rutting from vehicles, land disturbance from plowing, etc.) as soon as possible to ensure proper treatment of all stormwater runoff.
2. Provisions for Storing Materials and Waste Products Inside or Under Cover
   - All chemicals and chemical waste products shall be stored inside or in a secured covered location to prevent potential discharge. Any major spills shall be reported to municipal officials and a remediation plan shall be implemented immediately.
3. Vehicle Maintenance
   - Any vehicle maintenance shall be done with care to prevent discharge of illicit fluids. If fluids are accidentally spilled, immediate action shall be implemented to clean and remove the fluid to prevent discharge into the stormwater management system and/or infiltrating into the groundwater.
4. Pet Waste Management Provisions
   - Pet waste shall be picked up and disposed of in an appropriate individual waste refuse area.
5. Spill Prevention and Response Plans
   - If a major spill of an illicit substance occurs, town officials (including but not limited to the Fire Department and Police Department) shall be notified immediately. A response plan shall then be implemented immediately to prevent any illicit discharges from entering the stormwater management system and ultimately surface waters of the Commonwealth.
6. Solid waste
   - All domestic solid waste shall be disposed of in accordance with all applicable local, state and federal regulations. Waste shall be placed into covered dumpsters and/or covered waste bins to prevent water intrusion and potentially contaminated runoff. No household chemicals, hazardous materials, construction debris or non-household generated refuse shall be disposed of in the on-site waste disposal containers.

Snow Storage:

Property owner shall inform their snow removal contractor of the designated areas for snow storage.

APPENDIX G

ILLICIT DISCHARGE

COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

I, John M. Morin, P.E., hereby notify the Newbury Conservation Commission that I have not witnessed, nor am aware of any existing illicit discharges at the site known as 100 High Road in Newbury, Massachusetts. I also hereby certify that the development of said property as illustrated on the final plans entitled "100 High Road Definitive Subdivision of Land in Newbury, Massachusetts (Assessor's Map R-34, Lot 21)," prepared by The Morin-Cameron Group, Inc. dated May 21, 2025 and as revised and approved by the Newbury Conservation Commission and maintenance thereof in accordance with the "Construction Phase Pollution Prevention Plan" and "Long-Term Pollution Prevention Plan" prepared by The Morin-Cameron Group, Inc dated May 21, 2025 and as revised and approved by the Newbury Conservation Commission will not create any new illicit discharges. There is no warranty implied regarding future illicit discharges that may occur as a result of improper construction or maintenance of the stormwater management system or unforeseen accidents.

Name: John M. Morin, P.E.

Company: The Morin-Cameron Group, Inc.

Title: Owner's Representative

Signature: John M Morin

Date: 5/21/25