New England Environmental Design, LLC

P.O. Box 376, Rutland, MA 01543 Phone: (508) 829-7222 Email: needlez@hotmail.com

Town of Holden
Planning Board
1204 Main Street
Holden, MA. 01520

Enclosed please find the revised Definitive Plan (Sunshine Ridge) submitted by:
Bailey Road Development, Inc.
P.O. Box 413
Rutland, MA. 01543

Location:
Bailey Road
Holden, MA. 01520
Job#: 1614-20

The following is a list of all plan copies and other materials submitted with the Baily Road Development, Inc. revised Definitive Plan:

- (2) full size 24x36 copies of the revised plans
- (5) reduced Size 11x17 copies of the revised plans
- (3) copies of the revised stormwater report
- (1) response letter per the Planning Board peer review
- (1) copy of the sewer capacity calculations and fire flow calculations
- (1) copy of the revised hydrant flow test
- (1) copy of the annual maintenance cost estimate
- (1) set of all revised environmental figures with parcel layout added
- (1) copy of the SWPPP inspection form

An electronic copy of all the attached material has also been submitted to Pamela Harding, Director of Planning and Development, via email. If you have any questions or need any further information, please feel free to contact me at (508) 829-7222.

Sincerely,

Julian P. Votruba
New England Environmental Design, LLC.

New England Environmental Design, LLC

P.O. Box 376, Rutland, MA 01543 Phone: (508) 829-7222 Email: needllc@hotmail.com

February 22, 2021

Holden Planning Board
1196 Main Street
Holden, MA. 01520

RE: Definitive Subdivision – 160 Bailey Road
Town of Holden Department of Public Works Letter Dated January 21, 2021.
Holden Fire Department Letter Dated January 05, 2021
Planning Comments via email dated January 29, 2021

To The Board:

This office has received the review letter from the Town of Holden Department of Public Works, the Holden Fire Department and Planning Comments referenced above. This letter follows the format of the review letter with New England Environmental Design's (NEED) responses in *italics.*

DPW Review Letter Dated January 21, 2021:

The plans and stormwater report shall be stamped and signed by a Massachusetts registered professional civil engineer. The plan and stormwater report are signed by a mechanical engineer and insufficient relevant experience was provided to justify a non-civil engineer performing the design for this project.
The Massachusetts Stormwater Manual and the Town of Holden Subdivision Control Regulations require that stormwater design is to be stamped by a professional engineer registered in the Commonwealth of Massachusetts. The only justification that needs to be provided to the DPW is that the Professional Engineer holds a current, valid P.E. license. The author of this letter is a registered environmental engineer, that does not make this letter null-in-void because they are not designated as a Civil Engineer. The plans have been prepared and certified by a licensed Professional Engineer in the state of Massachusetts and his experience and qualifications have been submitted.

Water and Sewer:

1. A sewer shed analysis shall be completed to prove that the existing Bailey Rd sewer line to the DCR trunk sewer is adequate to handle the flows from this proposed development (such as Salisbury Pine Tree Estates), as well as any other proposed or possible developments in the area.
A sewer shed analysis has been recently done for the area by Places Associates, Inc. New England Environmental Design, LLC., has compiled an analysis based on the calculations previously submitted and new calculations based on the proposed seven houses, to determine that the existing Bailey Road sewer line is adequate to handle the flows. (See Attached)

2. A connection to the existing forced sewer system in Bailey Road shall be studied to determine if it can handle the forced sewer flows from the proposed development. If upgrades are necessary, the applicant shall provide an upgrade design for review. Parallel force sewer mains will not be allowed in Bailey Road.
   Consulting with F.R. Mahoney & Associates, Inc., they have indicated that the existing 2" line in Bailey Road is adequate to accept the additional seven houses. We have provided them with an updated set of plans, and they are currently working on revising their report with details that are site specific. The revised report will be provided to the Town prior to obtaining permits.

3. The sewer force main shall be located in the public right of way (ROW) along the new road and on Bailey Rd. The proposed easement around the new road shall be removed.
   The proposed sewer force main has been relocated within the proposed right of way and the easement has been removed from the plan.

4. The fire flow test calculations on the KD Tapping & Testing LLC sheet submitted with this package are incorrect. The flows at 20-PSI and 10-PSI should be higher than the total flow, they are shown as lower. There is an updated and corrected report that shall be submitted.
   The fire flow test calculations that were submitted were incorrect, there was an updated and correct report that has been submitted along with this letter.

5. Sheet 2 of 3 of the fire flow calculations says there is an 8" line in Bailey road, when there is a 6" line
   Sheet 2 of 3 of the fire flow calculations have been revised to indicate the 6" line that exists in Bailey Road.

6. The head loss calculations assume an 8" pipe for the entire distance from the existing hydrant to the proposed hydrants, when in reality the existing main portion is a 6" main.
   The head loss calculations have been revised to indicate the 6" line that exists in Bailey Road. (see attached)

7. Add to the plans full pipe restraint in addition to thrust block schedule.
   A table for the pipe restraints to be used and their locations has been added to the thrust block schedule on sheet D-03.

8. Detail of a residential sewer service connection shall be shown.
   Details of E-one units that are to be used and a connection detail have been added to the plan on Sheet D-04. Further detail and specifications can be found in the report by F.R. Mahoney & associates, Inc. that was provided with the submission.

9. Move the hydrant from Station 1 +60 closer to the intersection with Bailey Rd north side.
   The Hydrant has been relocated from station 1+60 to station 0+21.60 closer to the intersection with Bailey Road as requested by the Town of Holden D.P.W.

10. Ensure one foot separation between the water main and the catch basin laterals to DMH-1 and DMH-2.
    The separation between the water main and the catch basin laterals to DMH-1 and DMH-2 are 1.2' and 1.3' respectively between the bottom of the 12 HDPE drainage pipes and the top of the proposed 8" water main as shown on the Holmes Drive Profile, (scale as noted) located on sheet P-01 of the definitive plan set.

Roadway:

11. All utilities shall be installed within the proposed ROW or within an adequate easement, including but not limited to, sewer force main, water, drainage, electrical, tv and cable. Easements adjacent to, and/or parallel to the proposed ROW shall not be used.
All utilities are now located within the proposed right of way as requested.

12. The applicant must submit an application for street entry permit with the Department of Public Works (DPW) prior *to* beginning any work within the Bailey Rd ROW.
The applicant will submit an application for a street entry permit with the DPW prior to beginning any work within the Bailey Road R.O.W.

13. Remove unnecessary easements and unbuildable parcels including, but not limited to, Parcel A and abutting utility easement.
While moving the location of the proposed sewer force main will eliminate the need for a utility easement along the proposed Holmes Drive, the easement would need to remain as a temporary grading easement for the construction of the roadway. Since the temporary grading easement would be null in void upon completion of the roadway construction, the proposed bounds have been removed from the easement corners. The easements that are shown on land now of formerly Lafraita and Tiffany Gallo are existing easements shown on a plan recorded at W.D.R.O.D. plan book 950 plan 99 as noted within the easements on sheet S-02 of the definitive plan set. According to section IV.B.4 of the Town of Holden Subdivision Control Regulations, all existing and proposed easements are required to be shown on the definitive plan submission. The property depicted as Parcel "A" on the proposed plans is required to be part of the subject property as it sits, in order to meet the requirements, set forth in table 2 located in section VI of the Town of Holden Zoning By-laws in order to be considered a buildable lot. Because the proposed road separates Parcel "A" from the remainder of the property, an agreement exists between the applicant and Lafraita and Tiffany Gallo that the parcel will be conveyed to the abutting property and become part of the deed recorded with the W.D.R.O.D. book 62919 page 60 once the plan has been approved by the Town of Holden Planning Board, as denoted on sheet S-02 of the proposed plan. The applicant reserves the right to preserve his land as a buildable lot until said approval takes place.

14. Section V.A.2.a requires the minimum width of the roadway and (ROW) to be 28 feet and 50 feet respectively. A waiver to this requirement for acceptance of a 24 feet wide road shall be required.
A waiver from Section V.A.2.a. to allow for the proposed 24 foot pavement width from the required 28 foot width has been requested and notation of the request can be found on the index sheet of the plan set.

15. Section IV.B.4 requires existing and proposed lines of lots and their connection from existing property corners. The site plan for the east site of the property is missing and shall be provided.
Section IV.B.4. reads as follows, "Existing and proposed lines of streets, ways, lots, sidewalks, bike paths, easements and public areas within the subdivision and their connection by distance and direction from the nearest monumented highway and/or established existing property corner monuments." All of the required information can be found on sheets S-02, S-03, and C-01 of the proposed definitive subdivision plans. Section IV.B of the subdivision control regulations requires that the plans be drawn at a scale of one inch to forty feet and that the sheet size be 24" x 36". The entire property could not be shown on this sheet however a supplemental plan drawn at a scale of one inch to fifty feet that included the entire property was provided as part of the definitive plan submittal.

16. The proposed size of the cul-de-sac radius of 165-ft and ROW of 200-ft are excessive. The paved radius and ROW shall be 50-ft and 60-ft respectively in support of low impact development (LID) practices.
Section V.4.b. of the Town of Holden Subdivision Control Regulations states that "Dead-end street shall be provided at the closed end with a turn around or (cul-de-sac) having an outside diameter of at least one hundred (100) feet paved, and a right-of-way diameter of at least one hundred twenty (120) feet.". Also based on a letters from Sean Smith, Deputy Chief of the Holden Fire Department, dated September 8, 2020 and January 05, 2021 there seems to be a concern of the proposed turning radius being appropriate for the largest department vehicle. The design provides a turn around that should be more than adequate for this concern. At the public hearing the Planning Board was in support of the proposed cul-de-sac and island configuration.

17. The DPW recommends that sidewalk be provided only on one side of the road in support of LID practices.
The site plan has been revised to have sidewalk on one side of the road and a waiver has been requested from the Subdivision Control Regulations. At the public hearing the Planning Board was in support of providing sidewalks only on one side of the proposed road.

18. Update the site plan and roadway cross section detail to include 5-ft wide sidewalks. 5-ft wide sidewalks are required for handicap accessibility and the DPW will not accept sidewalks less than 5-ft wide
The site plan and the roadway cross section have been revised to show 5 ft. sidewalks and a waiver has been requested from the Subdivision Control Regulations, located on the index sheet of the plan set.

19. To comply with LID, the ROW radius of the cul-de-sac shall be 60-ft and not 100-ft. The pavement radius shall be 50-ft.
See response for comment number 16.

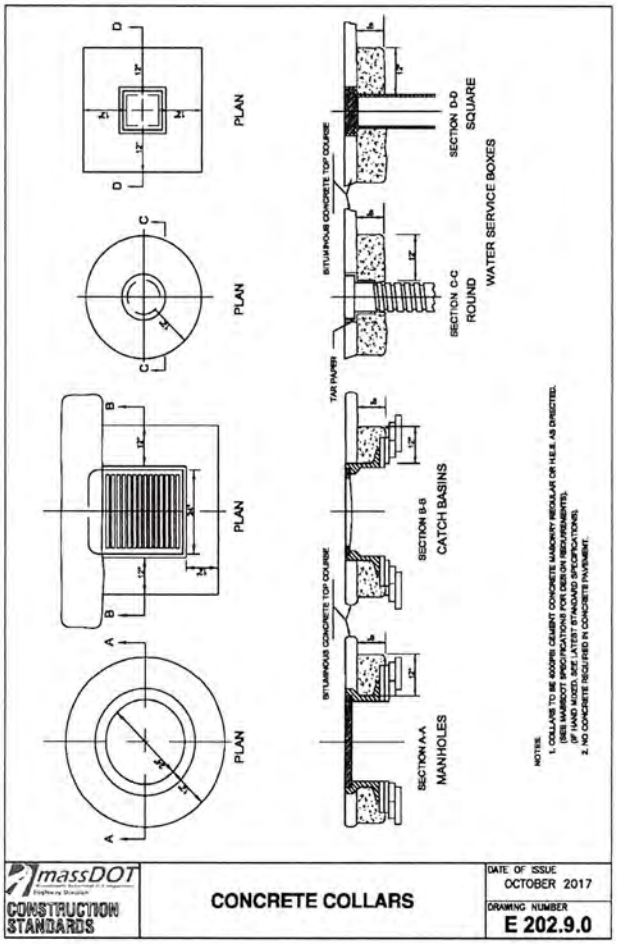
20. Although required by Section V.4.e to have an island installed with a minimum fifteen foot radius in the center of the cul-de-sac, the DPW requests that the Applicant remove the island and associated landscaping and pave the center of the cul-de-sac for plowing purposes.
The proposed cul-de-sac and island configuration were discussed at the public hearing and the Planning Board was in favor of the proposed design.

21. Section VI.D.3 requires the installation of reinforced concrete bounds at the angle points of all easements to the Town of Holden and granite bounds at point of curvature and point of tangency of side line roadway curves. Several concrete bounds for the proposed easements are missing, these shall be added to the Plans with a clear legend.
After reviewing the plan, there are two locations that concrete bounds were omitted on the proposed plan and will be added. There is a legend located in the bottom middle of sheets S-01 through S-03 that clearly shows the symbols for the types of bounds with labels.

22. Add a minimum setback requirement of 10 feet from any poles, catch basins and hydrants to the driveway detail shall be maintained.
This requirement has been met and a note stating the requirement has been added to typical driveway detail on Sheet D-02.

23. The detail of the ADA compliant ramp shall be updated to meet the MassDOT access ramp standard details. The material shall be concrete, with yellow detectable warning panels.
The detail of the ADA Compliant ramp has been updated to meet the MassDOT access ramp standard.

24. Remove the concrete collar reference in the detail for drain manhole. The Town does not allow for concrete collars.
A concrete collar is typically cast in place around the frame and grates for manholes and catch basins in order to provide additional strength and reinforcement to the manhole from vehicular traffic as well as snow removal operations. They are also required by the MassDOT standard specifications section 201.63 as detailed in drawing number E 202.9.0 of the MassDOT construction Standards (shown below). If the Town of Holden does not allow for concrete collars, New England Environmental Design, LLC. is requesting the town specifications on the method that we are to use in the roadway design as well as the state approval for use of such method as an alternative.



25. The dimension of the utility easement shall be corrected to say 168.3-ft instead of 16.83-ft in the N83°47'39" bearing.
The dimension of the utility easement has been corrected on the plans to read the correct distance of 106.83'.

Traffic:

26. Information shall be provided to confirm that sight distance is adequate for the proposed intersection of Bailey Rd. The information provided is unsatisfactory. The sight distances shall be evaluated against the 85th percentile speed on Bailey Rd., a plan and profile shall be provided using the A Policy on Geometric Design of Highways and Streets (Green Book) AASHTO guidelines.
The note regarding the site distance has been revised to include 85th percentile speed on Bailey Road. This information was based on an extensive report done that included this area on Bailey Road. The report, by MDM Transportation Consultants, Inc., dated October 2019, can be found on public record at the Town of Holden.

27. Traffic impacts in the area from the proposed subdivision shall be examined in a traffic study that includes the potential impacts from traffic generated from the currently proposed Pine Tree subdivision nearby. The traffic impacts should include an examination of pedestrian usage, particularly to the nearby elementary school rear driveway (Hubbard Road).
The report mentioned above, in comment #26, contains detailed information on all these areas. The proposed seven lots within this subdivision will not provide enough of an impact to alter the information previously provided to the Town of Holden.

Stormwater:

28. Each proposed Stormwater Best Management Practice (BMP) shall meet the Massachusetts Stormwater Management Standards. A 44% TSS removal pretreatment is required for proposed infiltration BMPs. All discharges shall have 90% TSS removal rates as required by the EPA MS4 permit. The stormwater report shall be updated to provide this information.
The submitted stormwater report and drawings as well as the revised stormwater report and drawings submitted indicate that the proposed stormwater BMPs meet the Massachusetts Stormwater Management Standards. Section 4 of the Stormwater Report indicates that 44% removal pretreatment is provided prior to the proposed infiltration BMP. The below segment from the USEP MA MS4 General Permit (Effective July 1,2018 with Modification Effective January 6, 2021) dictates that the average annual pollutant removal requirements are achieved through one of four methods. Section 4 of the submitted Stormwater report also indicates that the proposed project achieves the average annual pollutant removal requirements by "retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site" in accordance with Section 2.3.6.a.ii.3.a)2. of the USEPA MA MS4 General Permit (EFFECTIVE July 1, 2018 with Modification Effective January 6, 2021.

From USEPA MA MS4 General Permit (EFFECTIVE July 1, 2018 with Modification Effective January 6, 2021) – GENERAL PERMITS FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS IN MASSACHUSETTS, Page 45 Section 2.3.6.a.ii.3

3. Stormwater management systems on new development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site[10].

    a) Average annual pollutant removal requirements in 2.3.6.a.ii.3 are achieved through one of the following methods:

1. installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1'sBMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
2. retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
3. meeting a combination of retention and treatment that achieves the above standards; or
4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

This information has been added in the report.

29. The Pre- and Post-development drainage maps shall clearly show the point of analysis (POA). The POA shall include existing abutting properties that could potentially be impacted.
The points of analysis have been labeled on Pre/Post Development Watershed Maps. The revised stormwater report identifies the watershed areas that contribute to the points of analysis. These watersheds account for runoff that reaches the POA from the proposed project as well as runoff from abutting properties that contribute flow to the site.

30. The Pre- and Post-development drainage maps lack of the following: sub-basins area, breakdown of type of cover and area, total area (impervious and other), time of concentration path lines. This data shall be included to demonstrate compliance with Standard 2 and 3.
Section 2 of the Stormwater Report provides the information noted above to demonstrate compliance with Standard 2. Section 3 of the Stormwater Report provides the information required to demonstrate compliance with Standard 3. Specifically, the Pre/Post Development HydroCad Reports include the details noted above.

31. The HydroCAD report for pre- and post- development shall not be combined. Provide separate reports for each scenario.
The HydroCAD report has been separated into pre-development and post-development as requested.

32. There is a discrepancy between the stormwater report grading and the site plan grading Sheet C-O1. The information provided on both shall be reciprocal.
The grading has been revised on the Post-Development Watershed Map.

33. Add a sheet that include the existing grading on the east side of the property. Sheet C-0 I doesn't include the entire property.
Section IV.B of the subdivision control regulations requires that the plans be drawn at a scale of one inch to forty feet and that the sheet size be 24" x 36". The entire property could not be shown on this sheet however a supplemental plan drawn at a scale of one inch to fifty feet that included the entire property was provided as part of the definitive plan submittal.

34. The feed to the Detention Pond appears to be runoff from a grass swale on the back yard of lots 3 and 4. This is an unreliable design as the owners of the lots would regrade the yards to their likelihood and the swale will be gone.
A grass swale is not proposed, the land is graded in such a way that the water will naturally flow to the detention pond. As per building code the land has to slope away from the houses that are located on the lots located upgradient from the detention pond. The detention pond is also located downgradient from said lots so that water will flow to the proposed detention pond.

35. The report shall include the 2, 10, 25 and 100-yr storm events. The 25-yr is missing.
The 25-year storm has been added to the Stormwater Report.

36. The design of the drainage pipes and manholes sizes shall be done using the 25-yr storm event.
The Stormwater report has been revised to include the 25-year storm.

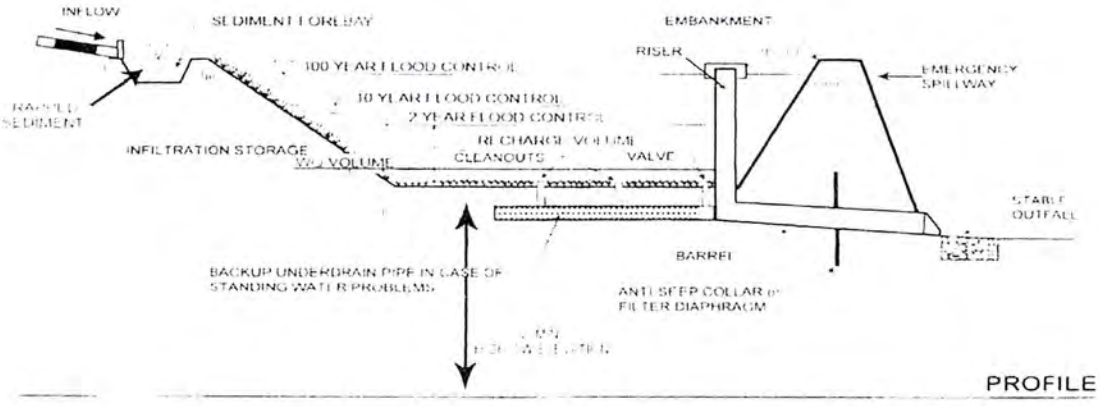
37. Provide a capacity analysis of the culverts on Hubbard Rd and show that there are no negative impacts to the culverts.
Stormwater Management mandates that a site cannot provide and increased flow leaving a site in post development conditions, therefore the flow that is currently impacting those culverts will not change as indicated in the Stormwater Report.

38. At least 1-ft of freeboard shall be provided for both BMPs from the 100-yr storm elevation to the emergency spill elevation. As proposed, the Detention Pond will overflow under the 100-yr storm conditions. Add to Sheet D-05, the elevations of the emergency spill for the basins.
The spillway elevations for the emergency spillways for each basin have been added to the revised Sheet D-05. 1-ft of freeboard between the 100-year storm elevation and the spillway is not a requirement per Stormwater Standards that needs to be met for these BMPs. These BMPs would be considered non-jurisdictional when concerning the Office of Dam Safety as neither hold back 15 acre-feet of water and neither have an embankment height in excess of 6 feet. Both BMPs have been sized to detain and/or safely pass the 100-year storm through their spillways.

The infiltration basin is designed so that the 100-year storm elevation is slightly lower than the spillway. The Massachusetts Stormwater Handbook allows for a basin to be designed to the brimful condition for a 2-year, 10-year, and 100-year storm as noted on page 91 in Volume 2, Chapter 2 of the handbook.

The detention basin is designed with a spillway capable of passing large storms as required by the Massachusetts Stormwater Handbook. The detention pond does not overtop during the 100-year storm as the BMP/spillway has been designed to safely pass the 100-year storm.

The image of a detention basin below was scanned from the Massachusetts Stormwater Handbook – Structural BMPs – Volume 2, Chapter 2, page 109. There is a similar image for an infiltration basin on page 87. The image below shows the 100-yr storm elevation above the emergency spillway and the 10-yr storm elevation at a brimful condition. Stormwater Management Requirements have been met for the designed BMPs and 1-ft of freeboard between the 100-yr storm elevation and the spillway is not a requirement for these BMPs.



39. The back of the BMPs are proposed on fill. Update the berm detail to include specifications for the impervious clay barrier. The emergency spillway shall not be on fill.
The berm detail located on Sheet D-05 has been updated to provide specifications for the impervious clay barrier. The emergency spillways have been relocated in both ponds as to not be constructed in fill.

40. A Homeowners Association (HOA) shall be established for the long-term operation and maintenance of the storm water detention and infiltration basins. An annual maintenance cost and proof that the owner/HOA has a maintenance contract shall be provided.
A homeowners association for the long-term operation and maintenance of the stormwater detention and infiltration basins will be established prior to the start of construction once the plans are approved.

41. Adequate access from the road to the detention and infiltration basins for operation and maintenance shall be provided. A detail of the construction of the access road shall be added to the plans.
The site plan on Sheet C-01 has been revised to clearly depict the location of the basin access drive. A detail for the proposed basin access drive has been added to the plan set on Sheet D-05.

42. The Town shall be notified when confirmation test pits are to be performed for any proposed infiltration BMP. The applicant shall contact the Town at least 48-hrs in advance so we can witness the testing. The method for performing test pits and infiltration rates shall be provided.
As indicated in the Stormwater Report and the Table on Sheet-C-01 test pits have already been completed for the proposed project this includes the test pits for the stormwater BMPs. The testing methods included soils textural analysis that was conducted based on USDA NRCS methods. For determining saturated hydraulic conductivity, the Rawls Rates were selected for the soils based on the hydraulic soil group and the results of the textural analysis of the soils performed in the field. The Rawls Rates may be used as the static method was utilized for sizing storage volume for the infiltration BMP per Massachusetts Stormwater Standards. The test pit information was required prior to designing the project and developing the stormwater report and therefore was performed prior to submitting to the Planning Board. Stormwater Management Standards and the Town of Holden Subdivision Control Regulations do not require the observation hole analysis to be witnessed by the Town. The locations of the ponds were staked out prior to the site walk with the Holden Conservation Commission, which was attended by the Town Engineer. At the site walk the soil test areas were observed for location and the spoils clearly indicated the sand and gravel material.

43. The estimated seasonal high groundwater (ESHGW) elevations shall be added to the Plans.
The estimated seasonal high groundwater elevations have been added to the soil logs located on Sheet C-01.

44. Under the submittal package add the parcel layout to all environmental figures ie. DEP Priority Resource Map and Title V, etc., and resubmit. It is unclear what the overlap to these sensitive areas is because the parcel layout is missing.
The parcel layout has been added to the maps in question. (see attached)

Holden Fire Department Letter Dated January 05, 2021:

1. Hydrants: Locations TBD in conjunction with the DPW- Water Department.
Spacing of 500' is required in the RIO district with minimum specified locations at the corner of Bailey Road and nearest the cul-de-sac.
Hydrants have been relocated to the locations requested by the DPW on the revised plans

2. Proposed cul-de-sac to meet town subdivision regulations included roadway width and appropriate turning radius for the largest Department vehicle. (See attached specifications)
   The proposed cul-de-sac has been designed to more than adequately accommodate the turning radius for the largest department vehicle.

3. The Fire Department would like the cul-de-sac to have no landscaped island. This will assist with apparatus turning and positioning.
   At the public hearing the Planning Board was in favor of the proposed island however the cul-de-sac and island configuration was designed in order to accommodate turning and positioning of vehicles in question.

Planning Comments per Email From Pam Harding Dated January 29, 2021:

1. Parcel A must be conveyed to 160 Bailey Road, the subdivision n cannot create a nonconforming lot.
   The property depicted as Parcel "A" on the proposed plans is required to be part of the subject property as it sits, in order to meet the requirements, set forth in table 2 located in section VI of the Town of Holden Zoning By-laws in order to be considered a buildable lot. Because the proposed road separates Parcel "A" from the remainder of the property, an agreement exists between the applicant and Lafraita and Tiffany Gallo that the parcel will be conveyed to the abutting property and become part of the deed recorded with the W.D.R.O.D. book 62919 page 60 once the plan has been approved by the Town of Holden Planning Board, as denoted on sheet S-02 of the proposed plan. The applicant reserves the right to preserve his land as a buildable lot until said approval takes place.

2. Lighting must be placed every 200' the final placement and style must be determined by the Holden Municipal Light Department.
   The proposed plans will be submitted to the Holden Municipal Light Department for approvals.

3. This property is located in the Asian Long Horned Beatle Zone. All host trees must be removed in accordance with current ALB regulations.
   The general erosion/sediment control and construction procedures notes have been revised to inform the contractor that trees are to be removed in accordance with the current ALD regulations.

4. Street trees must be planted in the grass strip between the curb and sidewalk. The trees species size and placement must be approved by the Town Forester prior to planting, no ALB host species can be utilized.
   The street trees have been moved to the grass strip between the curb and the sidewalk. The planting detail on Sheet D-02 has been revised to propose Red Oak trees as the street trees. This species was selected from the reforestation list per the department of conservation and recreation. The plans will be submitted to the Town Forester for approval prior to construction.

5. Sidewalks should be 5' in width.
   The proposed plans have been revised to show 5 ft. sidewalks and a waiver has been requested from the Subdivision Control Regulations, located on the index sheet of the plan set.

6. Detention/Retention ponds must be surrounded by a black chain link fence.
   Both the proposed infiltration pond and the detention pond are surrounded by a black chain link fence as shown on the proposed Site Plan located on Sheet C-01 and the Black Vinyl Coated Chain Link Fence Detail shown on Sheet D-05.

7. An annual maintenance budget must be provided to the Town based on DEP Operation and Maintenance Plans.
   An annual Maintenance budget attached based on DEP Operation and Maintenance Plans.

8. A Homeownership Association must be formed to maintain the drainage easements and drainage structures. A draft of this Association must be provided prior to the start of construction. Fess must be entered into an escrow account to cover two to five years of maintenance.
   A homeowner's association will be established for the long-term operation and maintenance of the stormwater detention and infiltration basins will be established prior to the start of construction once the plans are approved.

Please do not hesitate to call our office at 508-829-7222 if you have any questions or comments.

Sincerely,
New England Environmental Design, LLC.

Julian P. Votruba
Project Manager

New England Environmental Design, LLC

P.O. Box 376, Rutland, MA 01543 Phone: (508) 829-7222 Email: needllc@hotmail.com

Definitive Subdivision Plan
Sunshine Ridge
Located on
Bailey Road
Holden, Massachusetts

Owned by
Baily Road Development, Inc.
P.O. Box 413
Rutland, MA 01543

Assessor' s Parcel:
Map 173 Parcel 44
Map 172 Parcel 17

Douglas E. Best

W.D.R.O.D. Deed Book 62516 Page 212
W.D.R.O.D. Plan Book 950 Plan 99

Sewer Capacity
Calculations and
Fire Flow Calculations
Section VI E.2.b.(i)

Revised February 09, 2021

Sunshine Ridge
Bailey Road
Holden, MA

Job#: 1614-20

Calculations for Existing Sewer Capacity in Bailey Road:

Using on line information from the Town of Holden Website, we were able to determine the existing lots served by the Bailey Road sewer line and the number of bedrooms per existing lot. The calculated flows from the proposed Salisbury Pine Tree Estates to the Bailey Road sewer line were also provided in the documents obtained from the Town of Holden Website. Using Title 5 (Septic System Design Criteria), each bedroom discharges 110 gallons per day (gpd). A total of 140 bedrooms are served by the Bailey Road sewer line and an additional 168 bedrooms were proposed as part of the Salisbury Pine Tree Estates Project.

The source material, provides calculations using a peaking factor of 5x that shows that substantial excess capacity exists in the Bailey Road sewer pipe using the following:

1. The existing sewer line is an 8" diameter pipe; it is considered to be flowing "full" at 50% depth or flowing at 4".
2. A peaking factor of 5.5 x was applied using TR-16 methodologies.
3. Inflow & Infiltration (I&I) were also assessed and added to the assessment. The portion of Bailey Road that is a pump based system was excluded from I&I calculation.
4. The flattest section of pipe exists just prior to its connection to the sewer main. This pipe therefore collects all of the flow and is the most restrictive pipe along the entire reach. This capacity was calculated and provided to be 373 gpm in the Environmental Review Report & Utility Impact Assessment for Salisbury Pine Tree Estates (Available on the Town of Holden Website).

Results:

The Average Daily Flow = 140 bedrooms x 110 gpd/bedroom = 15,400 gpd = 10.7 gpm. (See Source 1)

The peak existing flow rate Q_p = 58.85 gpm + 0.554 gpm I&I = 59 gpm. (See Source 1)

The capacity of an 8" diameter pipe flowing ½ full at a slope of 1.9% is 373 gpm. (See Source 1)

The Bailey Road sewer pipe has an excess capacity of 314 gpm or 452,160 gpd. (373-59 = 314) (See Source 1)

See attached (source 1) for supporting data:

1. Excerpt from the Environmental Review Report & Utility Impact Assessment for the Application for a Definitive Subdivision Plan Salisbury Pine Tree Estates Holden, Massachusetts dated October 10, 2019

Calculated flows from the Project (Sunshine Ridge) and the Project (Salisbury Pine Hill Estates – Proposed by Others) to Bailey Road:

A total of 49 units are proposed (7 proposed units, Lots 1-7, from Sunshine Ridge and 42 proposed units, Lots 1-9 and Lots 38 to 45 from Salisbury Pine Tree Estates) that will flow to the Bailey Road sewer line from the respective projects. Accordingly, the Q_{peak} Flows to Bailey Rd are:

Salisbury Pine Tree Estates:

42 units x 4 bedrooms/unit x 110 gpd/bedroom = 18,480 gpd, 12.8 gpm (Average Daily Flow)

$Q_{peak} = 5.5 \times Q_{design} + I$ where Q_{peak} = peak design flow

$Q_{design} = Q_{dailyfiow,}$ from above, (18,480 gpd)

I = inflow and infiltration, where:

(I= pipe dia. (inches) x 375 gpd/inch dia/mile pipe)

5.5 = peaking factor for pipes $\leq$ 8"in diameter

Solving for I; there are approximately 1,100± total linear feet of proposed 8" sewer line for the Henry Way sewer

I = 8 inch ø x 375 gpd/inch/mile x 1,100ft/5,280ft/mile = 625 gpd, 0.434 gpm

Solving for Q_{peak}::

$Q_{peak;} = 5.5 \times Q_{desgn} + I$

or $Q_{peak;} = (5.5 \times 18{,}480 \text{ gpd}) + 625 \text{ gpd}$

or **$Q_{peak;}$ = 102,265 gpd Peak Flow = 71.02 gpm**

Sunshine Ridge Definitive Subdivision:

7 units x 4 bedrooms/unit x 110 gpd/bedroom = 3,080 gpd, 12.8 gpm (Average Daily Flow)

$Q_{peak} = 5.5 \times Q_{design} + I$ where Q_{peak} = peak design flow

$Q_{design} = Q_{dailyfiow,}$ from above, (3,080 gpd)

I = inflow and infiltration, where:

(I= pipe dia. (inches) x 375 gpd/inch dia/mile pipe) There will be no infiltration considered for the Sunshine Ridge sewer force main

5.5 = peaking factor for pipes $\leq$ 8"in diameter

Solving for Q_{peak}::

$Q_{peak;} = 5.5 \times Q_{desgn} + I$

or $Q_{peak;} = (5.5 \times 3{,}080 \text{ gpd}) + 0 \text{ gpd}$

or **$Q_{peak;}$ = 16,940 gpd Peak Flow = 11.77 gpm**

Per above the existing Bailey Road sewer pipe has a remaining capacity of 452,160 gpd or 314 gpm.

314 gpm - (71.02 gpm + 11.77 gpm) = $Q_{remaining\ capacity}$ = 231.21 gpm or 332,876 gpd. **[Remaining flow capacity]**

Therefore, Bailey Road sewer has sufficient capacity to support the peak flows from the proposed projects (Henry Way portion of Salisbury Pine Tree Estate and Holmes Drive of Sunshine Ridge).

2-9-2021

BAILEY RD FIRE FLOW CALCS

PER THE TOWN OF HOLDEN'S SUBDIVISION REGS THE MINIMUM REQUIRED FIRE FLOW:

$$F = 18 \times C \times A^{0.5}$$

WHERE F = REQUIRED FLOW, GPM

C = COEFFICIENT BASED ON CONSTRUCTION TYPE

A = TOTAL FLOOR AREA, ALL STORIES, EXCLUDES BASEMENT

FOR THIS PROJECT C = 1.0 FOR ORDINARY WOOD FRAME CONSTRUCTION

$A = 2920\ FT^2$

$F = 18 \times 1.0 \times 2920^{0.5}$

$F = 972$ GPM

∴ THE REQUIRED FIREFLOW FOR THIS PROJECT IS 972 GPM

USING TEST DATA FROM AN EXISTING HYDRANT TO ESTIMATE FLOWS AND PRESSURES AT PROPOSED HYDRANT 1 (AT INTERSECTION OF PROPOSED ROAD AND BAILEY RD) AND HYDRANT 2 (AT CUL-DE-SAC OF PROPOSED RD)

ELEVATION OF EXISTING HYDRANT OUTLET = 777 FT

ELEVATTION OF PROPOSED HYDRANT 1 OUTLET = 784.00FT

ELEVATION OF PROPOSED HYDRANT 2 OUTLET = 791.06 FT

DISTANCE BETWEEN HYD EXISTING AND HYD 1 = 240' OF 6" PIPE, 36' OF 8" PIPE

DISTANCE BETWEEN HYD EXISTING AND HYD 2 = 240' OF 6" PIPE, 591.5' OF 8" PIPE

1 FT ELEV IN WATER PIPE IS EQUAL TO A 0.433 PSI PRESSURE DIFFERENTIAL

ESTIMATE THE DROP IN PRESSURE AT PROPOSED HYDRANTS BASED ON ELEVATION:

Δ ELEV. HYD 1 = 7.0 FT Δ ELEV HYD 2 = 14.06 FT

MULTIPLY BY 0.433 $\frac{psi}{FT}$

∴ PRESSURE DROP FOR HYD 1 IS 3.03 psi; FOR HYD 2 IS 6.09 psi; DUE TO ELEVATION DIFFERENCE BETWEEN THE EXISTING AND PROPOSED HYDRANTS.

2-9-2021

BAILEY RD FIRE FLOW CALCS

THERE ARE 3 COMPONENTS OF ENERGY LOSS TO CONSIDER WHEN UTILIZING BERNOULLI'S EQUATION.

PRESSURE LOSSES DUE TO:

ΔELEV, Δ PIPE DIAMETER, AND HEADLOSS

SINCE AN 8" DIAMETER PIPE IS PROPOSED DOWNSTREAM OF THE 6" DIAMETER PIPE IN BAILEY ROAD WE MUST CONSIDER PRESSURE LOSSES DUE TO ΔELEV, HEADLOSS, AND Δ PIPE DIAMETER BETWEEN THE EXISTING AND PROPOSED HYDRANTS.

ΔELEV: HYD 1 = 3.03 psi;
HYD 2 = 6.09 psi

HEADLOSS CALC: USING HAZEN WILLIAMS NOMOGRAPH FROM CERM 15th ED APPENDIX 17.E

FOR A FLOW OF 825 GPM (TEST FLOW AT EXISTING HYD) THE HEADLOSS IS EQUAL TO:

80 FT / 1000' FOR A 6" DIAMETER PIPE

19 FT / 1000' FOR A 8" DIAMETER PIPE

MINOR LOSSES: MINOR LOSSES ACCOUNT FOR FRICTION LOSSES DUE TO FITTINGS AND VALVES.

FROM APPENDIX 17.D AN EQUIVALENT LENGTH OF STRAIGHT PIPE CAN BE OBTAINED TO ACCOUNT FOR MINOR LOSSES.

6" PIPE	EQUIV. LENGTH	8" PIPE	
2 GATE VALVES	2.6 X 2 = 5.2'	1 EXPANSION	K = 37'
1 TEE BRANCH	15'	3 GATE VALVES	K = 2.7 X 3 = 8.1'

HEADLOSS IN 6" PIPE FROM EXISTING HYDRANT TO PROPOSED TEE

$(240' + 5.2' + 15') * \frac{80}{1000} = 20.82$ FT $\times 0.433 \frac{psi}{FT} = 9.02$ psi

HEADLOSS IN 8" PIPE FROM PROPOSED TEE TO HYD 1

$(36' + 37' + 8.1') * \frac{19}{1000} = 1.54$ FT $\times 0.433 \frac{psi}{FT} = 0.67$ psi

HEADLOSS IN 8" PIPE FROM PROPOSED TEE TO HYD 2

$(591.5' + 37' + 8.1') * \frac{19}{1000} = 12.10$ FT $\times 0.433 \frac{psi}{FT} = 5.24$ psi

HEADLOSS: HYD 1 = 9.69 psi;
HYD 2 = 14.26 psi

PRESSURE CHANGE DUE TO Δ PIPE DIAMETER

FROM THE BERNOULLI PRINCIPLE WE CAN DERIVE THE FOLLOWING FOR LOCATIONS ON BOTH SIDE OF A REDUCER / EXPANSION WHERE ELEVATION REMAINS CONSTANT

$\Delta P = P_1 - P_2 = \frac{1}{2} \rho [V_2^2 - V_1^2]$

ΔP = DIFFERENCE IN PRESSURE GOING FROM PIPE d_1 AND PIPE d_2 (psi)
V = FLUID VELOCITY ($\frac{FT}{S}$)
ρ = FLUID DENSITY ($\frac{lb}{FT^3}$)
A = CROSS SECTIONAL AREA OF FLUID FT^2

ASSUME FLOW EQUALS FIRE TEST FLOW.
USING CONTINUITY EQUATION FOR INCOMPRESSIBLE FLUID IN A PIPE/CONDUIT

$Q = V_1 A_1 = V_2 A_2$

$V_2 = \frac{V_1 A_1}{A_2}$

$A_1 = A_{6inch} = \pi r^2 = \pi 0.25^2 = 0.196\ FT^2$

$A_2 = A_{8inch} = \pi r^2 = \pi 0.33^2 = 0.348\ FT^2$

FROM FLOW TEST WE KNOW Q

$V_1 = \frac{Q}{A_1}$

$Q = 825 \frac{GALLON}{MIN} * \frac{1\ MIN}{60\ S} * \frac{1\ FT^3}{7.48\ GALLONS}$

$Q = 1.84 \frac{FT^3}{S}$

$V_1 = \frac{1.84 \frac{FT^3}{S}}{0.196\ FT^3} = 9.39 \frac{FT}{S}$

$V_2 = \frac{9.39 \frac{FT}{S} * 0.196\ FT^2}{0.348\ FT^2} = 5.29 \frac{FT}{S}$

$\Delta P = \frac{1}{2} \rho [V_2^2 - V_1^2]$

$= \frac{1}{2} 62.4 \frac{lb}{FT^3} [(5.29 \frac{FT}{S})^2 - (9.39 \frac{FT}{S})^2]$

$= \frac{1}{2} 62.4 \frac{lb}{FT^3} [27.98 \frac{FT^2}{S^2} - 88.17 \frac{FT^2}{S^2}]$

$= \frac{1}{2} 62.4 \frac{lb}{FT^3} [-60.19 \frac{FT^2}{S^2}]$

$= -1877.93 \frac{lb\ FT^2}{FT^3\ S^2}$

APPLY CONVERSION TO GET INTO UNITS OF $\frac{lbf}{FT^2}$

$= -1877.93 \frac{lb\ FT^2}{FT^3\ S^2} * \frac{1\ lbf}{32.17 \frac{FT * lb}{S^2}} = -58.38 \frac{lbf}{FT^2}$

APPLY CONVERSION TO GET INTO UNITS OF psi

$= -58.38 \frac{lbf}{FT^2} * \frac{1\ FT^2}{144\ INCHES^2} = -0.41\ psi$

$\boxed{\Delta P = P_1 - P_2 = -0.41\ psi}$

∴ THIS CALCULATION INDICATES THAT THERE IS AN INCREASE IN PRESSURE DUE TO THE TRANSITION FROM 6" DIAMETER PIPE TO 8" DIAMETER PIPE. THIS INCREASE IS VERIFIED BY THE BERNOULLI PRINCIPLE: IF ELEVATION REMAINS CONSTANT THEN IF V_2 IS LESS THAN V_1 THEN P_2 MUST BE GREATER THAN P_1. V_2 IS DECREASED FROM V_1 DUE TO A LARGER PIPE DIAMETER ∴ P_2 WILL BE GREATER THAN P_1.

2-9-2021

BAILEY RD FIRE FLOW

PRESSURE DROP FROM EXISTING HYDRANT TO:

HYD 1 = (3.03 + 9.69 - 0.41) psi = 12.31 psi

HYD 2 = (6.09 + 14.26 - 0.41) psi = 19.94 psi

USING THE DARCY-WEISBACH FRICTION LOSS EQ WE CAN ESTIMATE THE FLOW Δ BETWEEN THE EXISTING AND PROPOSED HYDRANTS BASED ON THE PRESSURE DROP ALONG THE EXISTING/PROPOSED PIPE LENGTH

$$dP = 2.161 \times 10^{-4} \left(\frac{fLpQ^2}{d}\right)$$

SOLVE FOR Q

$$Q = \sqrt{\frac{(dP)(d^5)}{(2.161 \times 10^{-4})(fLp)}}$$

dP = PRESSUR Δ, psi

f = DARCY FRICTION FACTOR

L = PIPE LENGTH (FT)

p = FLUID DENSITY - 62.4 $\frac{lb}{FT^3}$ FOR H_2O

Q = FLOW RATE, (GPM)

d = PIPE DIAMETER (INCHES)

FOR LAMINAR FLOW $f = \frac{64}{Re}$ Re = REYNOLDS #

d = 8" IS USED FOR THE CALCULATIONS AS IT WILL BE THE WORSE CASE FOR FLOW LOSS WHEN CONSIDERING 8" OR 6" d PIPE PER THE FRICTION LOSS EQ.

$$Re = \frac{Vd}{(\text{KINEMATIC VISCOSITY})}$$

WHERE: V = VELOCITY, FT/S FROM HAZEN WILLIAMS NOMOGRAPH

d = DIAMETER, FT

KINEMATIC VISCOSITY IN $\frac{FT^2}{S} * 10^{-5}$ @ 60°F

$$Re = \frac{(4.9)(0.667)}{1.21} = 2.70$$

FRICTION FACTOR $f = \frac{64}{Re} = \frac{64}{2.70} = 23.70$

HYD 1 $\Delta Q = \sqrt{\frac{(12.31)(8^5)}{(2.161 \times 10^{-4})(23.694)(276)(62.4)}} = 67.63$ GPM

HYD 2 $\Delta Q = \sqrt{\frac{(19.94)(8^5)}{(2.161 \times 10^{-4})(23.694)(831.5)(62.4)}} = 49.59$ GPM

2-9-2021

BAILEY RD FIRE FLOW

FLOW AT EXISTING HYDRANT BASED ON 10/8/2020 TESTING WAS 825 GPM, PRESSURE WAS 71 psi

FLOW AT HYD 1 = 825 GPM − 67.63 GPM = 757.37 GPM
FLOW AT HYD 2 = 825 GPM − 49.59 GPM = 775.41 GPM
PRESSURE AT HYD 1 = 71 psi − 12.31 psi = 58.69 psi
PRESSURE AT HYD 2 = 71 psi − 19.94 psi = 51.06 psi

USE NFPA 291, 2010 Eq 4.10.1.2 FOR DETERMINING RATED CAPACITY. THIS EQUATION ALLOWS US TO DETERMINE THE FIRE FLOW AT A DESIRED RESIDUAL PRESSURE OF 20 psi.

$$Q_R = Q_F \left(\frac{H_R}{H_F}^{0.54} \right)$$

Q_R = FLOW AT SPECIFIC RESIDUAL PRESSURE
Q_F = MEASURED OR ESTIMATED FLOW AT HYDRANT
H_R = PRESSURE DROP FROM STATIC TO DESIGNED RESIDUAL
H_F = ACTUAL MEASURED OR ESTIMATED PRESSURE DROP

FOR HYD 1

$$Q_R = 757.37 * \left(\frac{92-20}{92-58.69} \right)^{0.54} = \underline{1148.36 \text{ GPM}} \text{ @ } 20 \text{ psi RESIDUAL}$$

FOR HYD 2

$$Q_R = 775.41 * \left(\frac{92-20}{92-51.06} \right)^{0.54} = \underline{1051.80 \text{ GPM}} \text{ @ } 20 \text{ psi RESIDUAL}$$

∴ BOTH PROPOSED HYDRANT FLOWS EXCEED THE REQUIRED MINIMUM FIRE FLOW OF 972 GPM WITH A RESIDUAL PRESSURE OF 20 psi

$Q_{HYD1} = 1148.36 \text{ GPM} > 972 \text{ GPM}$

$Q_{HYD2} = 1051.80 \text{ GPM} > 972 \text{ GPM}$

New England Environmental Design, LLC

P.O. Box 376, Rutland, MA 01543 Phone: (508) 829-7222 Email: needllc@hotmail.com

Sunshine Ridge
Bailey Road
Holden, MA.

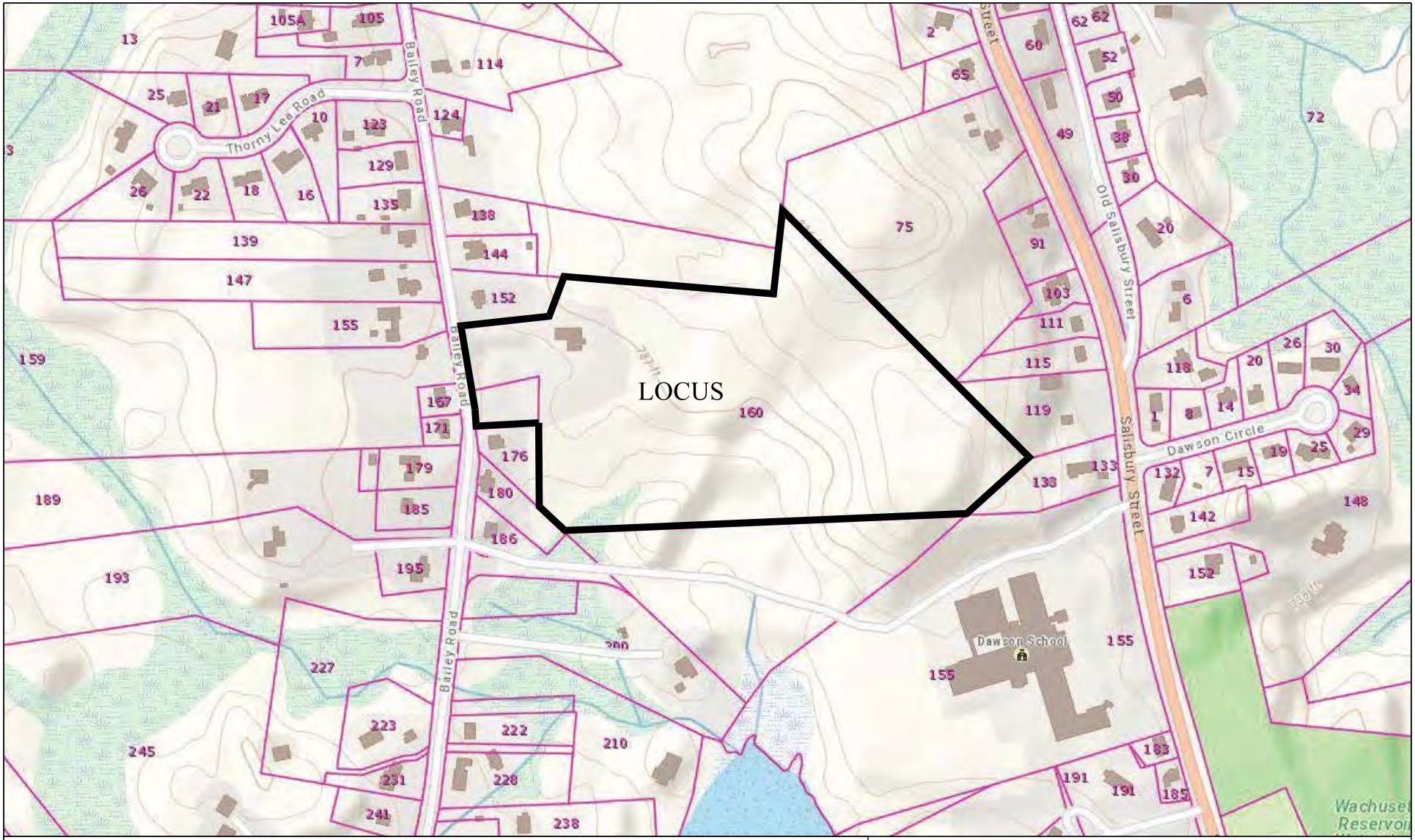
Annual Maintenance Budget

Part of the Homeowner's Agreement
(Annual Minimum)

1. Clean up trash and debris within the infiltration and detention ponds…….……$ 150.00
2. Maintenance and mowing of the infiltration and detention ponds……...…$ 300.00
3. Fence Inspection and maintenance……...…..$ 25.00
4. Maintenance of the landscaped island……...$250.00

Annual Budget: $725.00

5-year security: $ 3,625.00



OLIVER: MASS GIS LOCUS MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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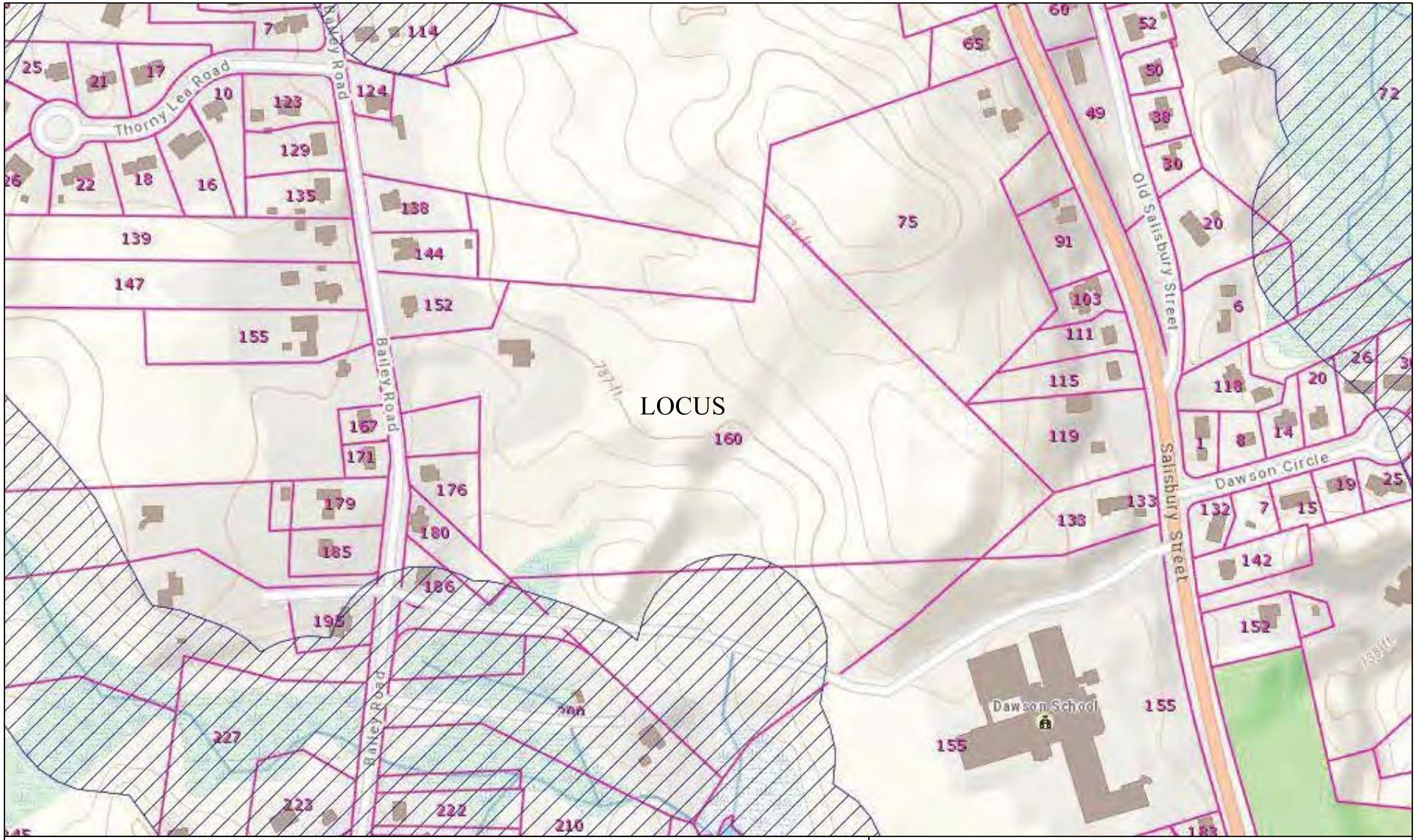

OLIVER: ZONE A

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

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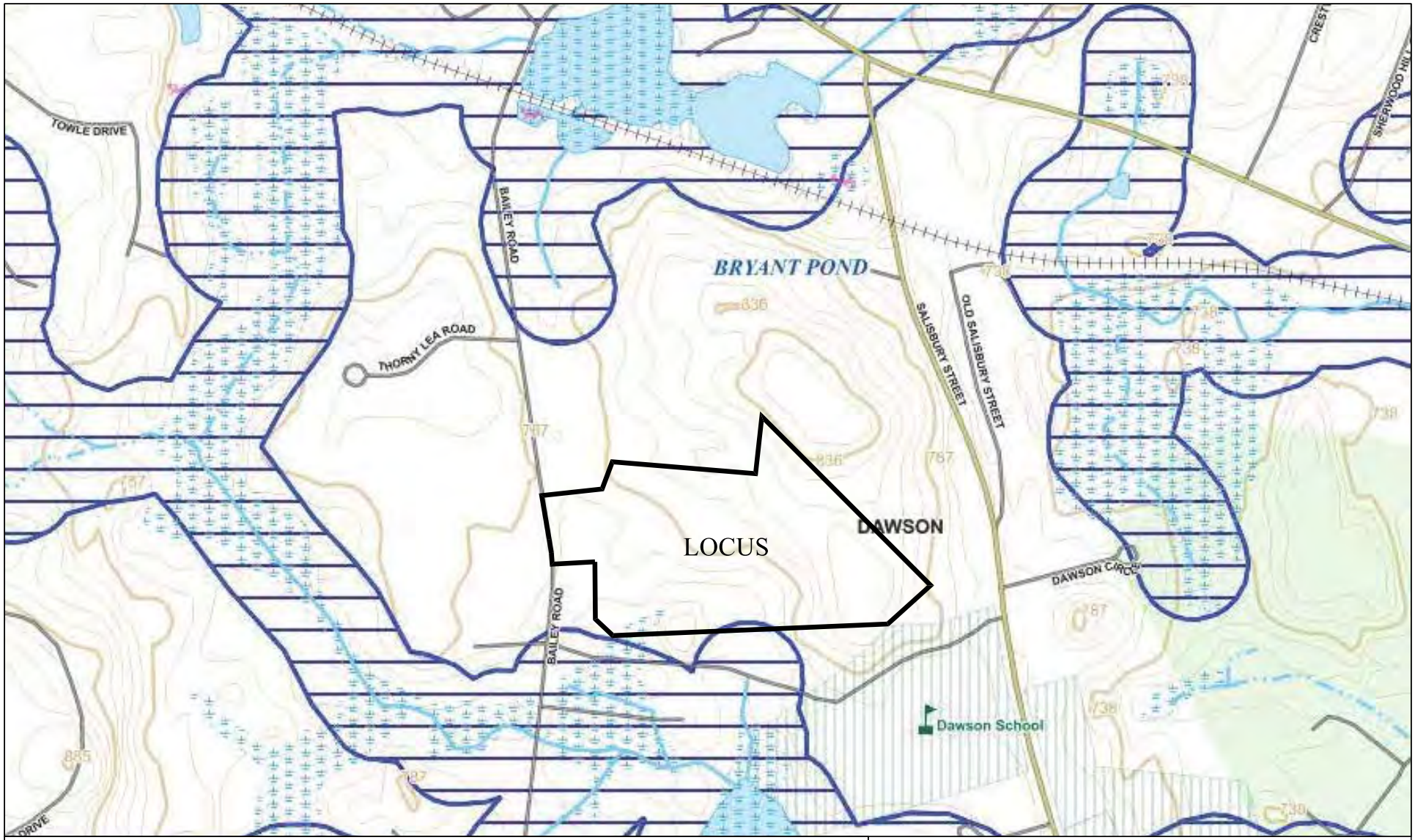

MASS DEP PRIORITY RESOURCE MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

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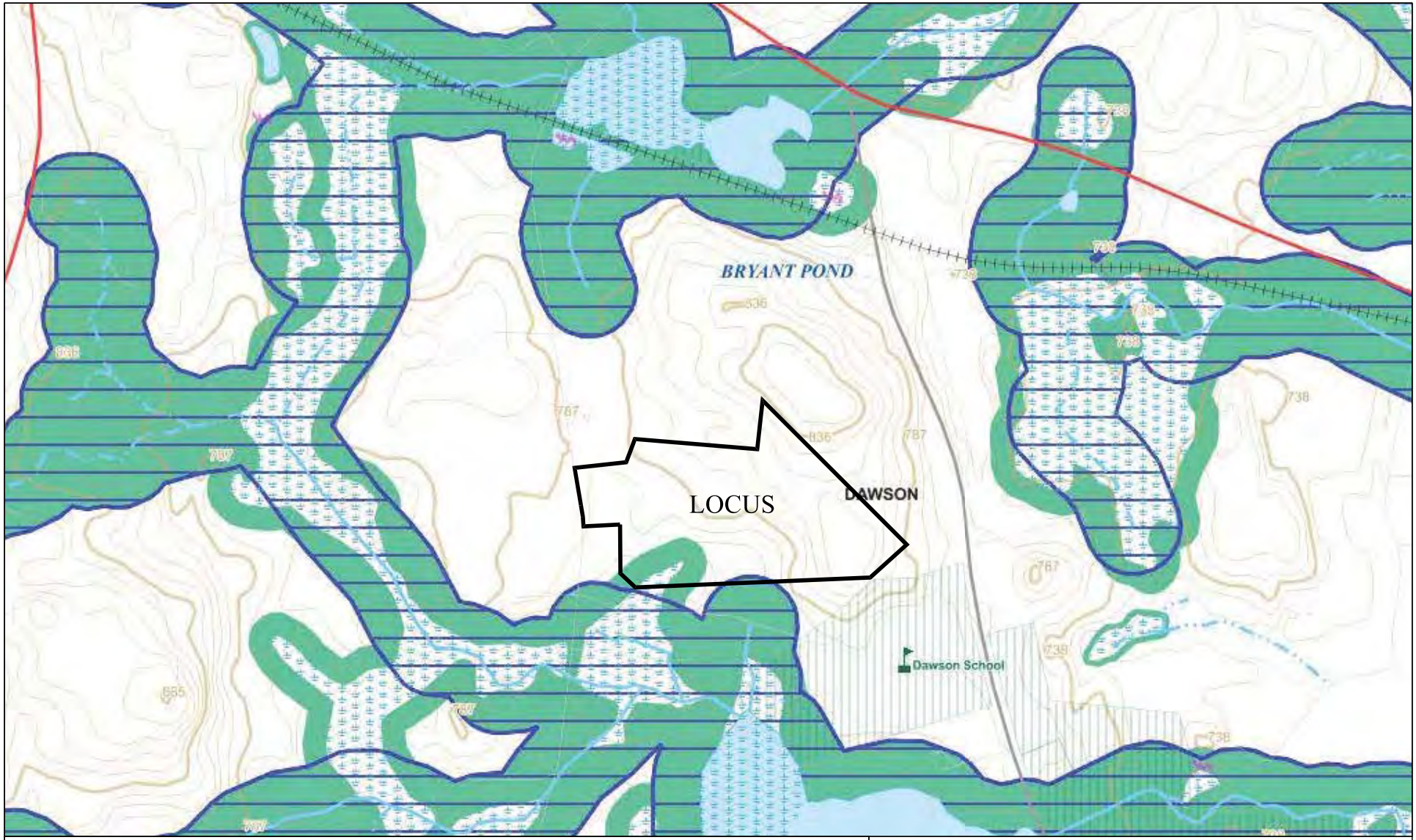

MASS DEP TITLE 5
SETBACK AREAS MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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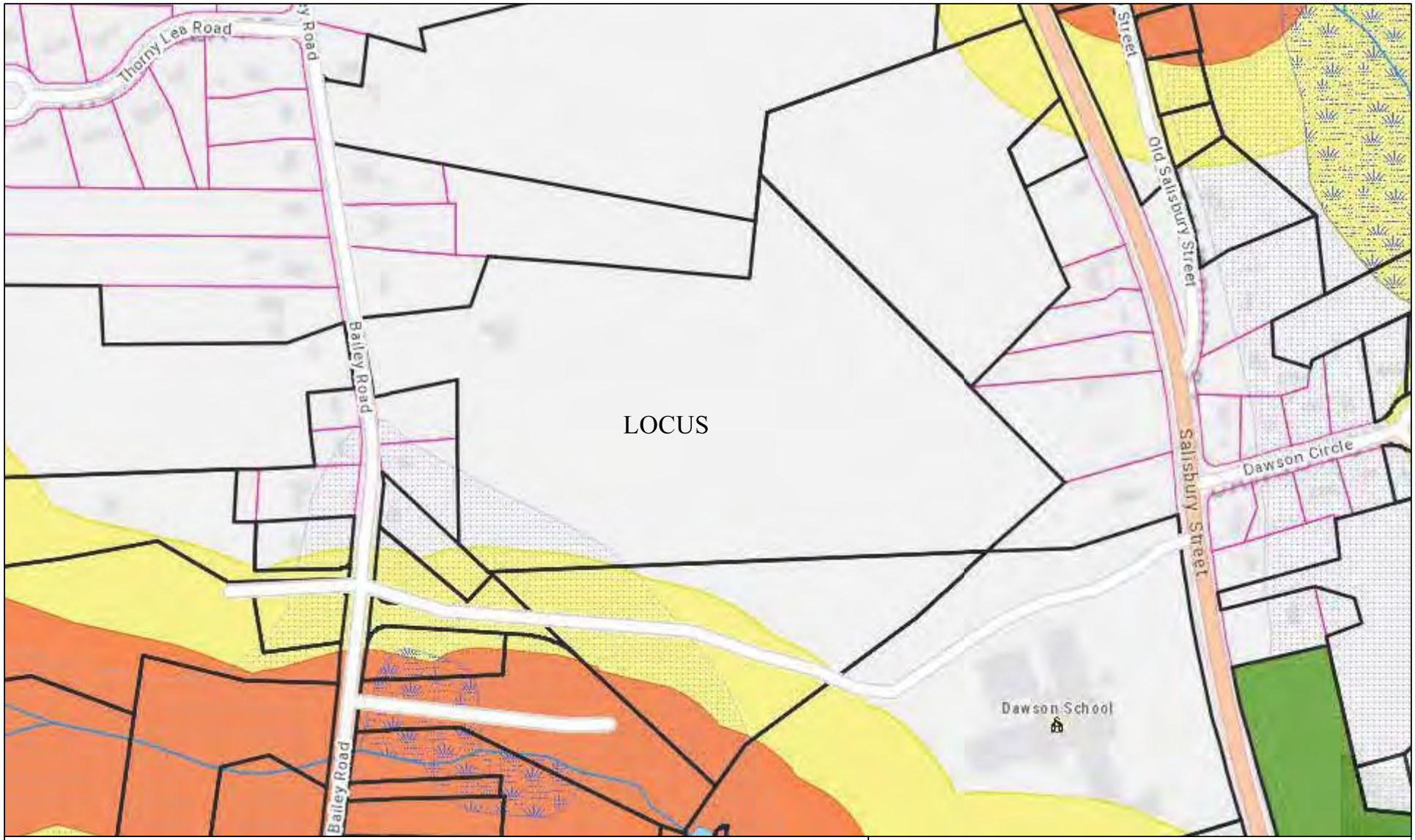

DCR WATERSHED PROTECTION ACT MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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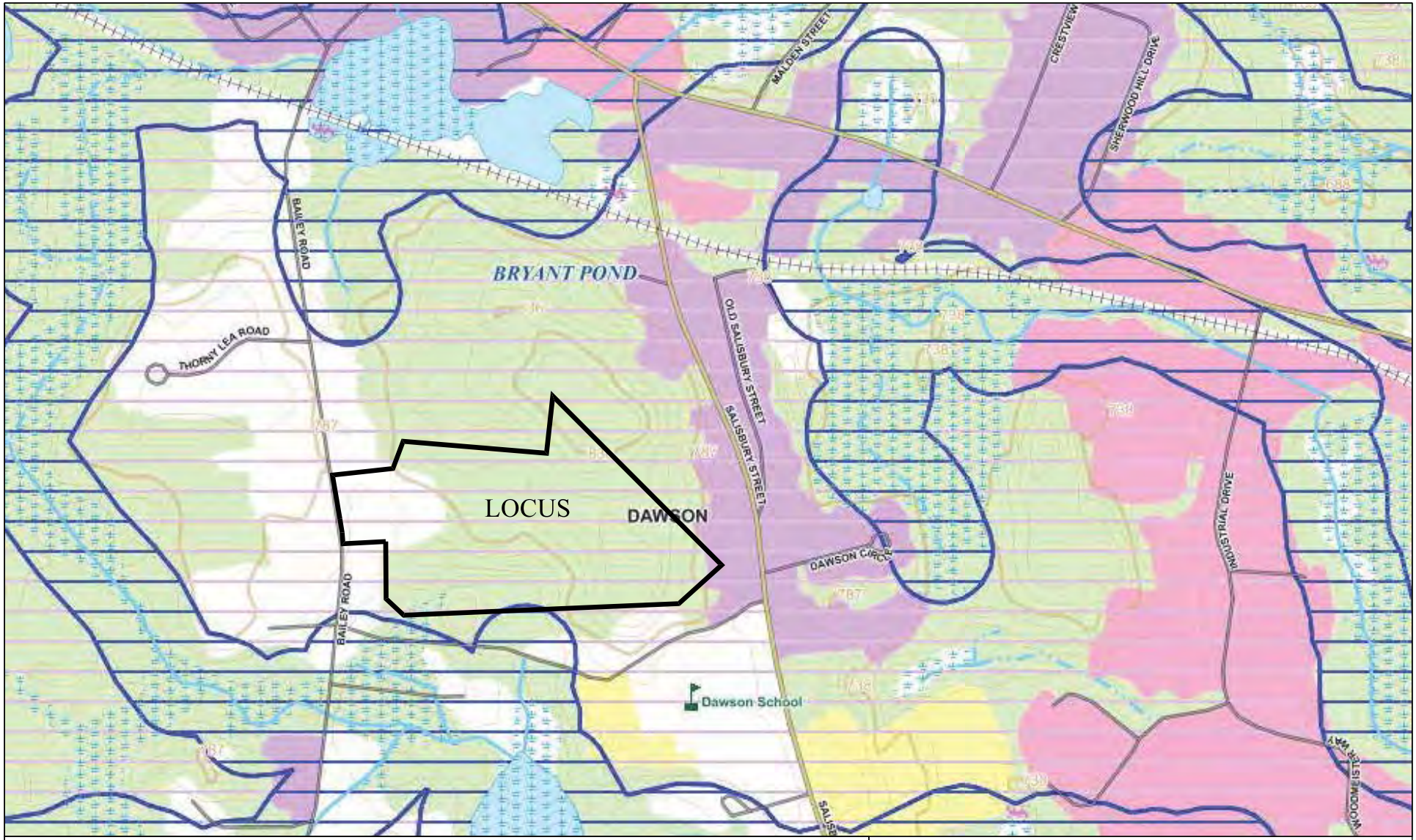

MASS DEP WATER SUPPLY PROTECTION AREAS MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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MASS DEP WETLAND AND WETLAND CHANGE AREAS MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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NHESP PRIORITY AND ESTIMATED HABITATS MAP: AUGUST 1, 2017

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

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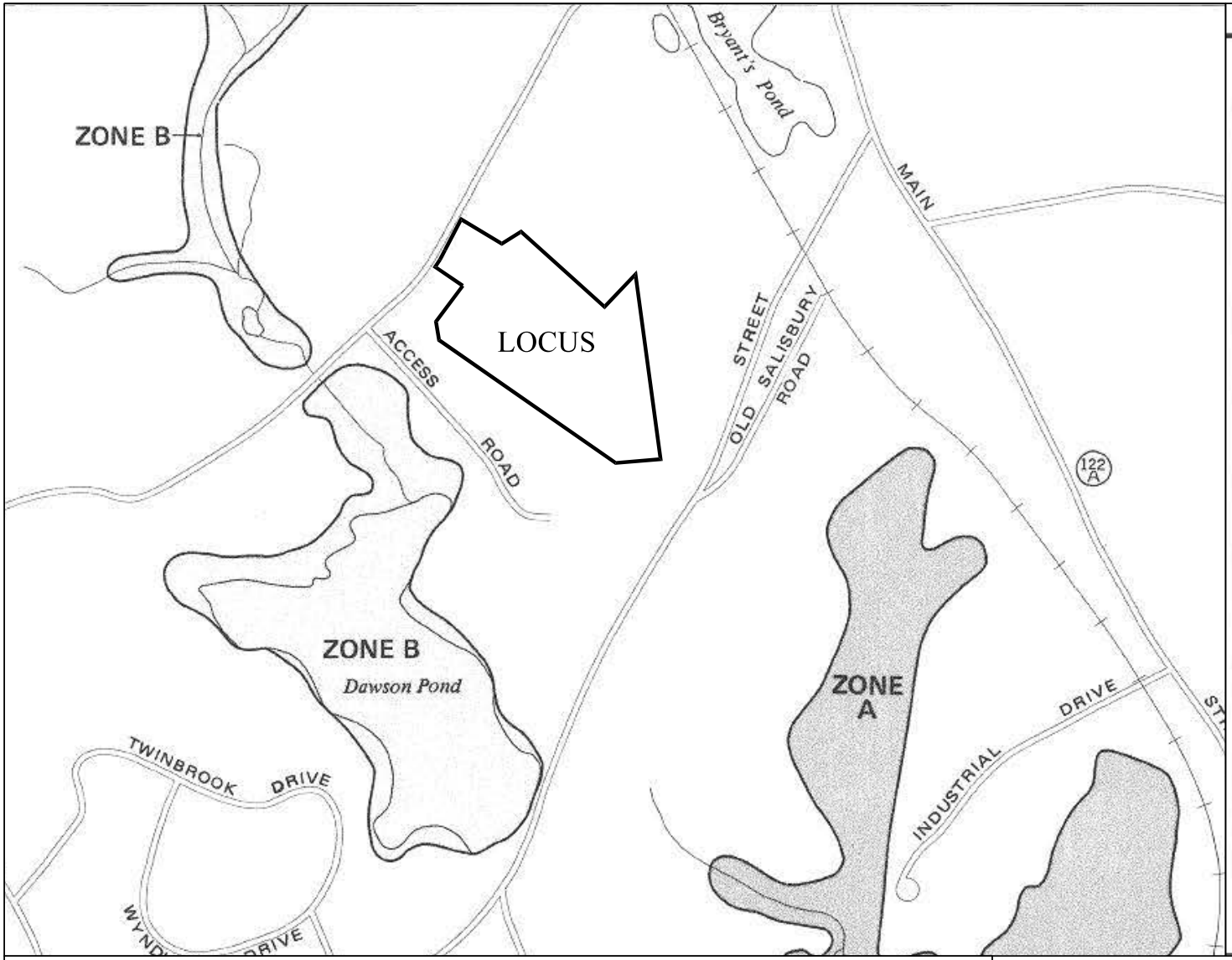

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
HOLDEN,
MASSACHUSETTS
WORCESTER COUNTY

PANEL 15 OF 20
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250309 0015 B

EFFECTIVE DATE:
JULY 2, 1981

federal emergency management agency
federal insurance administration

FEMA FLOOD MAP

SITE LOCATION: 160 BAILEY ROAD - HOLDEN, MA.

DATE: February 16, 2021

JOB #: 1614-20

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Stormwater Construction Site Inspection Report

General Information	
Project Name: Sunshine Ridge **Project Owner:** Baily Road Development, Inc. PO Box 413 Rutland, MA	**NEED Job Number:** 1614-20
NPDES Tracking No.: MAR10031Q	**Location:** Bailey Road, Holden, MA
Date of Inspection:	**Start/End Time:**
Inspector's Name(s): Julian P. Votruba	
Inspector's Contact Information: New England Environmental Design, LLC PO Box 376 Rutland, MA 01543	
Describe present phase of construction: Phase I	
Type of Inspection: ☐ Regular (7-day) ☐ Pre-storm event ☐ During storm event ☐ Post-storm event	

Weather Information
Has it rained since the last inspection? ☐ Yes ☐ No **If yes,** **Storm start date & time:** **Storm Duration (hrs):** **Approximate Rainfall (in.):** **Rainfall determined by (Rain gauge on site or weather station):** Station Number 01095375 Quinapoxet River at Canada Mills Near Holden, MA
Weather at time of this inspection?
Do you suspect that discharges may have occurred since the last inspection? ☐ Yes ☐ No
Are there any discharges at the time of inspection? ☐ Yes ☐ No

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Site-Specific Best Management Practices (BMPs)

Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of this numbered site map with you during your inspections. This list will help ensure that you are inspecting all required BMPs at your site. Corrective actions must be installed and completed within seven (7) calendar days in accordance with the Construction General Permit (CGP). If this is unfeasible, documentation must be provided as to why and added to the SWPPP.

Sediment Ponds

		BMP Description			Is BMP installed and operating properly?	Corrective Action Needed	Date for corrective action/responsible person
Perm. Pond	Temp. Pond	Temporary Pond Volume	Pond Depth	Sediment Depth			
	1	10,884.68 ft^3	3’		☐ Yes ☐ No		
	2	5,464.14 ft^3	2’		☐ Yes ☐ No		
	3	18,789.85 ft^3	3’		☐ Yes ☐ No		
					☐ Yes ☐ No		
					☐ Yes ☐ No		
					☐ Yes ☐ No		

Other Site-Specific Best Management Practices (BMPs)

	BMP Description	Is BMP installed and operating properly?	Corrective Action Needed	Date for corrective action/responsible person
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		
		☐ Yes ☐ No		

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Overall Site Issues

	BMP/Activity	Implemented?	Maintained?	Corrective Action Needed	Date for corrective action/responsible person
1	Are all slopes and disturbed areas not actively being worked properly stabilized	☐ Yes ☐ No	☐ Yes ☐ No		
2	Natural resources areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	☐ Yes ☐ No	☐ Yes ☐ No		
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	☐ Yes ☐ No	☐ Yes ☐ No		
4	Are discharged points and receiving water free of sediment deposit	☐ Yes ☐ No	☐ Yes ☐ No		
5	Are storm drain inlets properly protected?	☐ Yes ☐ No	☐ Yes ☐ No		
6	Construction exit/entrance installed and functioning properly? Any evidence of sediment being tracked off-site?	☐ Yes ☐ No	☐ Yes ☐ No		
7	Is trash/litter from work areas collected and placed in covered dumpsters	☐ Yes ☐ No	☐ Yes ☐ No		
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?				

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(*Continued*)

	BMP/Activity	Implemented?	Maintained?	Corrective Action Needed	Date for corrective action/responsible person
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	☐ Yes ☐ No	☐ Yes ☐ No		
10	Are materials that are potential stormwater contaminants stored inside or under cover?	☐ Yes ☐ No	☐ Yes ☐ No		
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐ Yes ☐ No	☐ Yes ☐ No		
12	Areas that were previously under construction secure and stabilized?	☐ Yes ☐ No	☐ Yes ☐ No		
13	(other)	☐ Yes ☐ No	☐ Yes ☐ No		

Certification Statement

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained herein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained herein is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations."

Print Name: Julian P. Votruba

Signature: _____

Date: _____