



Civil Engineers • Land Use Planners

February 26, 2020

Sarah McShane  
Zoning Director and Administrator  
Town of Stowe, Akeley Memorial Building  
67 Main Street, Stowe, VT 05672

**Subject: Proposed 9-Lot Subdivision (Tax ID 12004-010)  
Stowe Hollow Road, LLC  
Stowe Hollow Road, Stowe, VT**

**Project #18045**

Dear Sarah,

We are in receipt of a memorandum from Harry Shepard, Town of Stowe Public Works Director, dated February 18<sup>th</sup>, 2020 which includes review of the plans, details, and supporting materials for the above-referenced project.

Mr. Shepard is concerned with potential risk of undue adverse impacts. We offer the below responses along with associated materials and revised plans, as well as proposed conditions to be included with the Town's approval, that will ensure any potential of adverse impacts are not of significant risk and not likely to occur. The project site has been thoroughly vetted, including review and analysis by a wetland specialist, professional forester, geological professor, and others. The proposed site plan has undergone several iterations and considerations by a Professional Engineering firm with extensive design, engineering, and details well beyond other subdivision plans typically permitted in Stowe. Most critical, an experienced large-scale site contractor will conduct the work associated with the subdivision roadway, erosion controls, and stormwater management systems, and controls will be in place to ensure that the work adheres to the plans, details, specifications, and permit conditions of both the Town of Stowe and the governing State agencies. The final product will be a solid well-constructed site that will stand the test of time and out-live all of us, much like many of the numerous hillside roads and driveways throughout our town.

The project site slopes from Stowe Hollow Road down to the west. The areas of the property along the edge of the existing Stowe Hollow Road are approximately 2H:1V (26.6°), which is a 50% slope. However, the majority of the site includes areas that range from 3H:1V (18°) to 4H:1V (14°), which are 33% to 25% slopes. The lower third of the site is 5H:1V (11.3°) or less, which is 20% slopes. The proposed roadway and houses are being constructed in the middle section of the property, in areas ranging from 20% to 33% slopes.

The site work associated with the proposed subdivision will initially include the construction of the roadway. The building of the individual lots will take place at later dates as each of the lots are sold. Attached is a site plan sketch, SK-2, which shows the proposed grading associated with the roadway only and excludes any potential grading of the individual lots. As you will see, there is a significant amount of fill required for the beginning portion of the new roadway as it connects from Stowe Hollow Road and enters the site. However, once the proposed road meets the existing grade (elevation ~835' at approximate Station 4+00), the roadway construction is generally linear and balanced with limited cuts or fills. Approximately 380 linear feet of retaining walls at 5' tall are proposed along the east side of the road to help limit the extents of cuts into the existing slope. Additional retaining walls are expected for the individual lots to help attain appropriate driveway slopes and building areas.

The following are the numbered comments from Mr. Shepard's memo (shown in *italic*), with associated responses.

*Regarding the proposed grading/earthwork/erosion controls....:*

1. *The construction of steep deep fill embankments above steep naturally occurring subgrades supporting structures requires specialized engineering design, materials and quality controls during construction to assure slope stability and adequate foundations. The application materials do not provide this level of detail.*
  - a. **Response:**
    - i. The Plans are appropriate and typical for a qualified site contractor to complete the roadway work. Construction notes have been included in the plans.
      1. Attached is a **Construction Specifications** booklet for the proposed work and to be included as part of the plans.
    - ii. An Erosion Prevention and Sediment Control Plan has been provided which includes construction phasing along with proposed control measures and construction standards. This plan will be expanded upon for the required Stormwater Construction General (CGP) permit from the State of Vermont Stormwater Program. The State rules and standards for erosion control are referenced in the Town of Stowe Zoning Regulations multiple times.
      1. **Proposed Condition:** the required State Stormwater Construction General Permit (CGP) will be acquired prior to issuance of the Zoning Permit.
    - iii. The proposed site plans are intended to show that the lots can be developed. Individual lot owners may decide on a different layout. However, each landowner will need to acquire a CGP permit and provide appropriate EPSC plans & methods – and their site contractor will be subject to the same level of scrutiny and controls as determined in the parent CGP permit for the project.
      1. **Proposed condition:** the required State Stormwater Construction General Permit (CGP) will be acquired by each lot owner prior to issuance of the associated building permits
    - iv. Each lot owner will have a different house design with associated architecture and structural engineering. It is the responsibility of the owner to ensure that dwellings are constructed in a manner so that the building foundation will not fail. The majority of the lots will be constructed at or close to existing grades. Only Lot 9 and potentially Lot 8 will be constructed on fill.
      1. **Proposed condition:** Houses constructed on fill shall have a geotechnical analysis and structural design completed prior to issuance of a building permit.
2. *The earthwork notes on sheet C9, which appear to be based on VTrans Standard Specifications, are generally intended for lineal transportation projects. These types of projects generally attempt to balance earthwork quantities and include earthwork sections. They are also generally implemented by a Resident Engineer authorized to make adjustments of grading and materials used where required for the conditions and materials encountered. They would also provide the requisite construction quality control which is extensive for this scope of earthwork operations. This is not the norm for this type of private site development project*
  - a. **Response:**
    - i. The attached Construction Specifications booklet will be included as part of the plans.
    - ii. There is a significant amount of fill required for the beginning portion of the new roadway as it connects from Stowe Hollow Road and enters the site. However, once the proposed road meets the existing grade (elevation ~835' at approximate Station 4+00), the roadway construction is generally linear and balanced
    - iii. **Proposed condition:** an inspection/testing consultant will be hired to perform materials and compaction testing on a regular schedule to confirm that the roadway is being constructed

in accordance with the specifications.

3. *The Geology Report affirms that the existing surficial soils are shallow glacial tills. It also accurately notes that when excavated and remolded during construction, the cohesive strength is greatly reduced during construction. It is noteworthy of the special considerations and requirements associated cohesive soils in the earthwork notes on Drawing C9. These soil types have a large percentage of fines which render them very susceptible to high moisture content when wet and when above optimum moisture content, it is not possible to achieve the compaction required for embankment stability. There is approximately 15,000 CY of earthwork cut and fill of existing till materials proposed. Depending on in-situ moisture conditions, it may not be possible to successfully utilize these materials for the proposed earthwork. It is also noteworthy that under the "Considerations for Construction" section of the Geology Report, Items #1 and #2 are essentially affirmed.*

a. **Response:**

- i. The construction notes in the plans and the attached Construction Specifications will control and mandate how and when fill can be placed, in accordance with required compaction for embankment stability.
- ii. The geological report states that the remolded till that will be cut from excavations and used as fill will be less stable than the native material – not that it will be unusable at all. Furthermore, there is limited cuts associated with the roadway work (mainly a ‘fill’ project).
- iii. The condition of having an inspection/testing consultant to perform materials and compaction testing on a regular schedule to confirm that the roadway is being constructed in accordance with the specifications will ensure that appropriate embankment stability is being attained.

4. *The Erosion and Sedimentation Control Plans require an On-Site Plan Coordinator to be retained by the Contractor. We advise that for an earthwork project of this magnitude, the On-Site Coordinator should be a licensed consultant independent of the Contractor*

a. **Response:** The State of Vermont Stormwater Program will mandate Erosion Prevention and Sediment Control measures along with Construction Phasing plans and construction requirements, including the need for an On-site Plan Coordinator to monitor erosion control measures, construction sequencing, and potential stormwater discharges.

- i. **Proposed Condition:** the required State Stormwater Construction General Permit (CGP) will be acquired prior to issuance of the Zoning Permit and will include an on-site plan coordinator.

*Regarding the proposed stormwater system:*

5. *The stormwater management pond is not practically accessible for operations and maintenance activities. The existing topography along the proposed access easement is approximately a 40% grade and near the road it is a 2H/1 V (50%) embankment slope. Practical access with rubber-tired construction equipment is required for operations and maintenance activities*

a. **Response:**

- i. The access route is over existing grades of 33% or less, however it does cross over proposed roadside embankments of 2:1 slope. Therefore, we have revised the plans to include a **proposed access path** that leads from the “Y” turnaround area and through Lot 5 down to the proposed stormwater pond.
- ii. It is expected that the proposed access will only need to be utilized for once or twice-yearly mowing or brush-hogging, and mini-excavator work to dredge the sediment basin every three to five years.

6. In general, the stormwater management pond consists of a 3'+/- cut and fill across the width, with 2H/1V embankment slopes without a nominally flat access width across the top. The outlet works located in the southwest corner opposite the proposed access is similarly not accessible with equipment for operations and maintenance activities. The downgradient embankment slope, which is approximately 15' high should also not exceed 3H/1V slope
- a. **Response:** The plans have been revised to include a **wide flat access** around the top of the stormwater pond. The downhill sides of the pond have been **revised to 3H:1V slopes**. This will cause an increase in the wetland buffer impacts and will need to be approved by the State.
7. Hydrology and Hydraulic calculations were submitted for 1, 10 and 25-year storm events. The following is noted:
- a. Stormwater detention facilities for a development of this size and sensitivities should be designed for a 100-year storm event. It is noted that this is also the applicable design standard in the VTDEC Standards Compliance Workbook submitted with the application.
    - i. **Response:** State of Vermont Stormwater Management rules state that "Compliance with the Extreme Flood Protection Standard (100-year storm) shall not be required if... the impervious area on site or otherwise associated within a common plan of development, constructed after 2002, is less than 10 acres," (page 2-26).
  - b. The predevelopment runoff curve number (CN) used is 58. The CN value for forested woods with forest litter and brush cover should be 55. The CN Value for the proposed condition for the 1-year storm was 75, which I agree is appropriate but note that it was reduced to 73 for the 10 and 25-year events.
    - i. **Response:** Our numbers are based on State standards and we use the VTDEC Standards Compliance Workbook to calculate curve numbers instead of HydroCAD's internal spreadsheet. The differences are nominal.
  - c. The proposed condition has impervious areas directly connected. The model for proposed conditions should input the percentage of impervious area (not 100% pervious).
    - i. **Response:** we use the VTDEC Standards Compliance Workbook to calculate curve numbers instead of HydroCAD's internal spreadsheet and therefore the impervious area values in HydroCAD are set to 100% pervious.
  - d. The stage-storage inputs are inconsistent between storm events analyzed.
    - i. **Response:** This has been corrected and **revised HydroCAD report is attached**.
  - e. The reported pond elevation in the forebay for the 10-year event= 785.76. This exceeds the top of the embankment elevation of 785.5. This suggests the forebay embankment is overtopped with a 10-year event.
    - i. **Response:** Due to the above error with the stage-storage inputs, the 10-year event elevations were also in error. It has been corrected in the attached revised HydroCAD report.
  - f. The proposed stage-storage computations utilize the voids within for the depth of the constructed gravel wetlands which is underlain by a liner and intended to normally be saturated for the intended wetland plant functions. If intended to be normally saturated, the voids are not available for storage.
    - i. **Response:** In order to account for this difference with measurement of available volumes, the **proposed gravel wetland stormwater pond has changed in size**. Please see attached **revised plans** and associated HydroCAD report for the revised pond size and exclusion of the saturated areas of the pond.
  - g. The Broad-Crested Weir and downgradient discharge channel is proposed as a primary outlet control over the downgradient embankment. Primary discharge over the embankment is not a recommended practice. The outlet controls should be designed to pass all design storms with at least 1' of freeboard between the maximum ponding elevation during a 100-year event and the top

of the embankment. Any discharge over the embankment should be limited to secondary emergency discharges

- i. **Response:** The broad-crested weir of the gravel wetland pond is not expected to experience any flow of stormwater discharge for any of the rainfall events analyzed (including up to the 25-year storm). The primary outflow controls include a 1" vertical orifice which controls the saturated wetland level, a 15" vertical orifice which controls the top of the wetland level, and a 29"x29" horizontal grate inlet to manage rainfall event pond levels.
- ii. There is 10" of freeboard provided between the maximum ponding elevation and the top of the pond embankment for the 25-year storm. The State rules do not require 12" of freeboard or analysis of the 100-year storm event for this proposed site.

*The net result of these items noted is that in my opinion, the detention basin does not achieve the requisite zero increase in peak stormwater discharges*

- i. **Response:** The proposed stormwater collection system and gravel wetland pond will adhere to all State of Vermont Stormwater Management rules and regulations which are referenced in the Town of Stowe zoning rules.
  - a. **Proposed Condition:** the required State Stormwater Operational General Permit (3-9015) will be acquired prior to issuance of the Zoning Permit.

8. *It is noted that a primary stormwater run is located directly in front of and immediately adjacent to the proposed houses on lots 5 thru 8. Some of the culverts are within a couple of feet of the houses. The maintenance, repair and future replacement of these elements will be very challenging for the future common interest association and impactful to these properties. At a minimum we recommend 10' minimum separation between the culvert run and the houses with a 20' wide easement to the common interest entity. We also recommend the foundations for the abutting home be at least as deep as the abutting culvert inverts and retaining walls not be constructed above the culverts.*

- a. **Response:** The **plans have been revised** accordingly with appropriate separation distances.

9. *The drainage inlets and connecting culvert run noted in item 4 will be very susceptible to clogged inlets and frozen pipe conditions. Provisions for overflow of the private common driveway at the proposed low point is advisable*

- a. **Response:** The above-mentioned revisions should address these concerns. It is not expected that there will be overflow in the stormwater collection system.

10. *It is also noted the access issues noted with the Stormwater Management pond are also applicable to the mound leaching systems on the western portion of the project. This is potentially particularly a concern for those that are being accessed via a 10' wide easement over 2H/1 V embankment slopes. Practical access for future maintenance, repair and replacement is required*

- a. **Response:** The above-mentioned new proposed access through Lot 5 will also provide access to the wastewater mound systems for on-going maintenance. The expected maintenance includes once or twice-yearly mowing or brush-hogging.

Please review and let me know if you have any questions or concerns. You can contact me at [tyler@mumleyinc.com](mailto:tyler@mumleyinc.com) or 802-881-6314.

Sincerely,

Tyler Mumley, P.E.



Mumley Engineering, Inc.

**Ridge at Stowe Hollow  
Stowe Hollow Road, LLC  
Stowe Hollow Road, Stowe, VT 05672**

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**CONSTRUCTION SPECIFICATIONS**

**Prepared**

**February 2020**

**By  
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**As Project Number 18045**

**CONSTRUCTION SPECIFICATIONS**  
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SECTION 02100 - EXCAVATION AND BACKFILL

PART 1 – GENERAL

WORK INCLUDED

This Section shall include Section 02000 General Requirements.

EXTENT OF WORK

Obtain and pay for all required permits that pertain to the work specified, that have not been obtained and paid for by the Owner. Conduct construction operations to comply with all environmental and land use permit conditions applicable to the project.

Perform select demolition and clearing as shown. Remove trees, brush, stumps, pavement debris and organic matter in the area of the site improvements and building construction from the project site. The Contractor assumes all responsibility for off-site disposal in a legal manner.

- i. Stumps may be ground into mulch and surface spread on-site.

Stockpile suitable topsoil where directed by the Owner for later reuse. Protect stockpiled topsoil from erosion.

- i. Remove topsoil, surplus to the landscaping requirement, from the project site. Screening of the topsoil for landscaping purposes is specified further under Division 2.

Perform mass earthwork to excavate and fill for subgrade in the area of the building, access road and other site improvements. On-site cut materials may not be used as fill under buildings or pavement.

Complete all rough grading as shown on the Drawings. Rough grades shall be the finish grades shown less the thickness of finish surface course materials and underlying processed granular base course materials.

Balance out mass excavation cuts and fills with on-site material in non-structural locations only. Coordinate with Owner and Engineer on selection of waste area or additional cut area as required to obtain the plan quantities.

- i. Dispose of surplus cut off site.
- ii. Dispose of unsuitable fill materials off site.

In areas where final site structures will be used to retain grades, provide temporary 2:1 transition slopes centered on the site structure, unless shown otherwise. This requirement applies specifically to foundation walls and retaining walls.

Excavate and backfill for footings, foundations, concrete slabs and miscellaneous structures.

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## EXCAVATION AND BACKFILL 02100-2

Excavate and backfill for miscellaneous site concrete such as light and flag pole bases, bollards, transformers, etc.

Furnish and install gravel base and/or process stone base for all asphalt pavement and all concrete slabs on grade. This includes concrete exterior site slabs and interior concrete slabs. (Fine grading is specified in Sections 02900 and Division 3).

Provide survey control for earth work and utilities.

Provide drainage and dewatering to keep construction areas and excavations free of water from any source without disturbance to the foundation soil strata.

Furnish and install all sheeting and shoring required for excavations to maintain safe working conditions and to comply with all municipal, state and federal regulations.

Furnish and install the building's foundation perimeter insulation.

Coordinate with the Owner and testing laboratory to ensure that the testing, as required in this section, is being performed.

Provide and maintain sedimentation, erosion and dust control measures. Remove upon completion of the project, unless directed by the engineer to remain in place.

Place topsoil, seed and restore all disturbed areas where not paved. This work is further defined in Division 2 of this Specification.

### RELATED WORK IN OTHER SECTIONS

Section 02400 – Storm Drainage Systems.

Section 02600 – Loam & Seed.

Section 02225 – Trenching.

Section 02231 – Aggregate Base Course.

Section 02510 – Asphalt Concrete Paving.

Section 02732 – Site Sanitary Sewerage Systems.

Section 02936 – Seeding.

Section 02990 – Sedimentation and Erosion Control.

Section 02520 – Cast-In Place Concrete (Site).

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Section 03200 – Interior Concrete Slabs.

Section 03300 – Exterior Concrete Pavement.

Section 15400 Plumbing.

Division 16 Electrical.

### SHOP DRAWING SUBMITTALS

Furnish shop drawings on the following items:

- i. Modified standard proctor curves and gradation tests for appropriate materials obtained both on-site and off-site.
- ii. Test reports shall show the intended use of the material, i.e. “foundation backfill”, the gradation required in this Specification for that use and the source of the material.
- iii. The Contractor shall submit samples of all materials from all on-site and off-site sources to the testing laboratory at least ten (10) calendar days prior to use in the work. The Contractor shall not deliver or use any materials from off-site sources until written approval is received from the Engineer based upon test results showing compliance with these Specifications.
- iv. Perimeter insulation catalogue data, if applicable.
- v. Geotextile fabric catalogue data.

### EXAMINATION OF SITE

The Contractor must carefully examine the site and determine for himself all conditions affecting the work under this Section. The Contractor shall field survey to verify existing topography prior to start of work and shall notify the Engineering in writing of discrepancies. Failure to notify the Engineer of specific deficiencies prior to start of work shall constitute acceptance of the site.

### BENCH MARKS AND MONUMENTS

Carefully maintain all bench marks, monuments and reference points; however, if they are disturbed or destroyed, they shall be replaced by the surveyor at this Contractor’s expense.

UNSUITABLE SOIL

In the event that naturally occurring soft or yielding soils are encountered in the building or pavement areas immediately notify the Owner and Engineer. Payment for unsuitable soil will be included in the unit price bid item for unsuitable soil. Such price shall include full compensation for the furnishing and placing of materials required to complete the replacement of unsuitable soil, including excavation and disposal of soft and yielding material, grading and compaction of the replacement granular or structural fill and for all labor, equipment tools and incidentals needed to complete the work in conformity with the Drawings and Specifications.

No measurement will be made except for unsuitable soil replacement required per Specifications in areas where disturbed natural soils are unstable in natural state. Soils which have been disturbed by the Contractor's construction operations or which have been exposed by excavation and subject to adverse weather conditions (rain, snow, etc.) without protection and are required to be removed and replaced with stabilizing granular or structural fill, shall not be measured nor the fill paid for by the Owner.

Stabilizing granular or structural fill required in areas where undisturbed natural soils are unstable in the natural state will be measured on a cubic yard basis in place after grading and compaction based on the authorized width, length and depth of the excavation at point of placement. The Contractor will keep daily records of use of such material. The Engineer or an authorized representative shall agree to quantities used at the end of each day by signing the Contractor's daily report. Daily records that do not bear the Engineer's or an authorized representative's signature will not be approved for payments, no exceptions.

UNIT PRICES

Complete the following unit price schedule, submit with site work bids. All unit prices quoted are inclusive of all labor, materials, overhead, profit, supervision and taxes.

Ledge and Boulder Removal: Prices include removal of ledge or boulders and replacement with compacted fill, as further defined in this Specification, to achieve the payment lines defined in the Specification.

- i. Boulder removal: For removal of boulders larger than 3 cubic yards in size the Contractor shall be paid the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).
- ii. Open area ledge removal: For removal of ledge in open excavation areas by drilling and blasting the Contractor shall be paid the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).
- iii. Open area ledge removal: For removal of ledge in open excavation areas by ripping, the Contractor shall be paid the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).
- iv. Trench ledge removal: For the removal of ledge in trench areas by ripping, the Contractor shall be paid the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).

- v. Trench ledge removal: For removal of ledge in trench areas by drilling and blasting the Contractor shall be paid the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).

Unsuitable Soils: In the event that unsuitable soils or solution cavities are uncovered in pavement areas, payment shall be made for corrective action as defined in this Specification.

- i. For the excavation and replacement, the sum of \_\_\_\_\_ per CY (\$\_\_\_\_\_/CY).

## PART 2 – PRODUCTS

### FILL MATERIALS

Ordinary Fill: For general structural fill within the site improvement areas. Satisfactory materials from final building subgrade elevations to a depth of one (1') foot below foundation bearing elevations from the final building subgrade elevation to a depth of one (1') below utility inverts and in the top one (1') foot below final pavement subgrade elevations shall be free of rock or gravel larger than six (6") inches in any dimension. Satisfactory materials placed below these elevations within the building footprint shall be free of rock or gravel larger than twelve (12") inches in any dimension. Satisfactory materials placed below these elevations within pavement areas shall have minimum rock or gravel particles in accordance with the Standard Road and Bridge Specifications, unless placed along new utility routes where no rock or gravel particles should exceed six (6") inches in any dimension. Ordinary fill shall be free of all trash, alkali, salt petroleum products, ice, snow, organic materials, tree stumps and roots.

Granular Fill: For use as structural fill within the building footprint and under site structures, foundation backfill, asphalt pavement, subbase and trench backfill shall consist of hard durable sand and gravel, be free from ice and snow, cinders, alkali, salt, petroleum products, roots, sods, rubbish and other deleterious or organic matter. Excavated material from on-site sources which meets this gradation may be used.

<u>US SIEVE NO.</u>	<u>PERCENT PASSING BY WEIGHT</u>
3 1/2"	100
1 1/2"	55-100
1/4"	25-60
#10	15-45
#40	5-25
#100	0-10
#200	0-5

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Sand: Shall be clean, free of all deleterious or organic matter conforming to ASTM C33 and the following gradation requirements.

<u>US SIEVE NO.</u>	<u>PERCENT PASSING BY WEIGHT</u>
1/2"	100
#4	95-100
#20	30-90
#200	0-8

Process Gravel/Crushed Aggregate Base Course: For use directly under asphalt pavement and directly under interior and exterior concrete slab on grade as a base material and for use as roadway shoulder finish surface course. The material shall consist of processed sand-gravel mixture or crushed stone with fines.

<u>US SIEVE NO.</u>	<u>PERCENTAGE BY WEIGHT PASSING</u>	
	<u>CRUSHED GRAVEL</u>	<u>CRUSHED STONE</u>
1 1/2"	100	100
1"	75-100	---
3/4"	---	---
1/2"	40-75	30-60
#4	30-60	25-55
#10	20-45	15-40
#40	10-30	---
#200	3-10	2-8

Crushed Stone: For building perimeters in designated areas install over geotextile fabric designated for landscape purposes within this Specification Section. Stone shall comply with the following ASTM C33, Size No. 2 Specifications.

<u>US SIEVE NO.</u>	<u>PERCENT PASSING BY WEIGHT</u>
2 1/2"	100
2"	90-100
1 1/2"	35-70
1"	0-15
1/2"	0-5

Crushed Stone: For pipe and structure bedding where shown or specified

<u>US SIEVE NO.</u>	<u>PERCENT PASSING BY WEIGHT</u>
1"	100
3/4"	0-100
#4	0-10
#8	0-8

Crushed Stone: For filter stone to be used under riprap banks stone shall be ASTM C33, Size No. 467.

<u>US SIEVE NO.</u>	<u>PERCENT PASSING BY WEIGHT</u>
2"	100
1 1/2"	95-100
3/4"	35-70
1/2"	10-30
#40	0-5

Riprap:

- i. Shall be sound, dense, durable and angular field or quarry stone, blast rock or crushed gravel, free of loam, silt, clay, organic materials and defects such as seams, cracks, impairing durability. Broken concrete and rounded stones are not acceptable. Finished slope shall not vary by more than three (3") inches from specified grades and shall present an even, tight surface. Gradations shall conform to the following:
- ii. Intermediate riprap shall conform to the following gradation:

<u>STONE SIZE</u>	<u>PERCENT OF MASS</u>
18" or over	0
10" to 18"	30-50
6" to 10"	30-50
4" to 6"	20-30
2" to 4"	10-20
Less than 2"	0-10

Modified riprap shall conform to the following gradation:

<u>STONE SIZE</u>	<u>PERCENT OF MASS</u>
10" or over	0
6" to 10"	20-50
4" to 6"	30-60
2" to 4"	30-40
1" to 2"	10-20

Crushed Stone: For pipe bedding or at pavement edges for snow disposal areas stone shall conform to the following gradation.

<u>US SIEVE NO.</u>	<u>PERCENT PASSING</u>
2 ¼"	100
2"	90-100
1 ½"	30-55
1 ¼"	0-25
1"	0-5

### GEOTEXTILE FABRIC

Geotextile fabric for reinforcement and ground stabilization under road subbase shall be Mirafi 500x or approved equivalent woven fabric.

Geotextile fabric for wrapping underdrains, use under riprap or stone blankets or as a separation fabric under crushed or process base courses where shown in the Plan shall be Mirafi 140N or approved equivalent non-woven fabric.

Geotextile fabric for landscaping purposes shall be Mirascape by Mirafi or approved equivalent. Install in full width fills in accordance with the manufacturer's recommendation.

### CONTROLLED LOW STRENGTH FLOWABLE FILL

This work shall consist of furnishing and placing flowable fill as an alternate to compacted soil as approved by the Engineer. Applications for this material include bedding, encasements and closures for tanks and pipe and general backfill for trenches and foundations.

All materials and placement practices shall meet the requirements of the ACI Committee 229 Report, latest Edition.

Flowable fill is a mixture of Portland cement, fly ash, fine aggregate, air entraining admixtures and water. Flowable fill contains a low cementitious content for reduced strength development. High air generators

or foaming agents may be used in lieu of conventional air entraining admixtures and may be added at jobsite and mixed in accordance with manufacturer’s recommendations.

- i. The Contractor shall submit mix designs for flowable fill to the Engineer for approval. The following are suggested mix designs for excavatable and non-excavatable flowable fill:

	EXCAVATABLE	NON-EXCAVATABLE
Cement Type I	75-100 lbs/yd	75-150 lbs/yd
Fly Ash	---	15-600 lbs/yd
Water	0*	0*
Air**	15-35%	5-15%
28 Day Compressive Strength**	Maximum 100 psi	Minimum 125 psi
Unit Weight (Wet)**	90-110 lbs/ft	100-125 lbs/ft

\*Mix design shall produce a consistency that will result in a flowable self-leveling product at time of placement.

\*\* The requirements for percent air, compressive strength and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements.

PART 3 – EXECUTION

DISPOSAL OF UNSUITABLE MATERIAL

All trees, brush, fencing, stumps, debris, concrete debris, asphalt pavement and all unsuitable fill excess to the needs of the project shall be removed from the site.

The Contractor assumes all liability for the legal disposal of materials off site.

SITE MASS EXCAVATION

Clearing and Grubbing: The areas within the limits of work shall be cleared of all trees, stumps, roots, brush and other vegetation and debris.

- i. Remove stumps from the project site or grind into mulch and spread on site. Do not spread in proposed house, driveway, road or wastewater disposal areas.
- ii. Protect trees to be relocated or to remain.

Stripping: completely strip all areas to remove topsoil for the new building and area of site improvements including all areas of cut and fill operations.

- i. All superficial materials unsuitable for use as ordinary fill shall be classified as unsuitable and be disposed of off site by the Contractor.
- ii. Topsoil shall be stockpiled at an area designated on the plans or by the Owner.

Excavation:

- i. In all areas to be cut, excavate to the rough grades required. Remove all materials from areas which can be removed by conventional excavation methods.
- ii. All materials encountered during excavation that meet the requirements for ordinary fill may be reused on site as ordinary fill.
- iii. All materials encountered during excavation which do not meet the requirements for ordinary fill shall be classified as unsuitable and be disposed of off site.

Separation of Subgrade: Scarify the exposed surface to a depth of six (6") inches, achieve adequate moisture content and compact to the requirements specified. Remove all soft and yielding material and replace as specified for "PLACING OF FILL AND BACKFILLING". Remove all nuts, hummocks and other uneven surfaces by surface grading prior to placement of fill. Compact existing subgrade with four passes of a large, heavy 10-ton vibrating drum or sheep's foot roller to obtain the same density as required for superimposed layers of fill.

Prior to initiating any work the Contractor shall verify the location of all existing underground utilities. Any existing utilities which are damaged as a result of a contractor's operations shall be repaired at no additional cost to the Owner.

Evacuation of Unsuitable Materials: When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions.

#### BUILDING, TRENCH AND UTILITY EXCAVATION

Excavate footings to the lines and grades shown on the Drawings and as required to accommodate form work. The bottom of all footing excavations shall be graded and compacted/recompact to at least 95% of the maximum dry density based on the standard Proctor Method. All unsuitable, soft and yielding material shall be removed and placed as specified. The Contractor shall not excavate more trench footings than can be formed and poured the same day, unless otherwise instructed.

Trenches for other work shall be adequate in size to build forms if for concrete work, and adequate for making pipe and conduit joints if for mechanical and electrical work, as determined in conjunction with the contractors for that work. In general, provide 12" clearance around all new utility work.

All excavations shall be made in conformance with all local and federal regulations. Excavation protection measures shall be installed where required in accordance with local regulations and VOSHA standards. The Engineer and Owner assume no responsibility for excavation design or safety.

No excavations shall be made for footings or utilities when freezing temperatures may be expected, unless the area to be excavated can be protected from freezing. Should protection fail, all frozen material at the bottom of said excavation shall be removed and replaced with concrete or compacted granular fill, as directed by the Engineer, at no cost to the Owner.

Prior to initiating any work, the Contractor shall verify the location of all existing underground utilities which may be encountered during excavation for new utilities. Any existing utilities damaged as a result of the Contractor's operations shall be repaired at no cost to the Owner.

Excavation of Unsuitable Materials: When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavation deeper as directed by the Engineer. As unsuitable materials are excavated under foundations, the width of the excavation shall be increased by one foot for each foot of depth. Replace excavated material with granular fill, crushed stone or approved on-site material.

#### DEWATERING

General: Perform all work in the dry. Prevent surface water and subsurface water from entering excavation, fill operations and trenches.

- i. Do not place, spread or roll fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.
- ii. Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collection in depressions. All areas shall be free of surface water during placement of fill.
- iii. Where soils has been softened or eroded remove all damaged areas and recompact as specified for "PLACING OF FILL AND BACKFILLING".
- iv. Provide and maintain at all times during the construction, ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the work. Dewater by means which will ensure dry excavations and the preservation of the final lines and grades at the bottom of excavations. Dewatering discharges shall be discharged in a manner which does not cause downstream erosion or sedimentation.
- v. Use hay bales, silt fence and other temporary measures as required to prevent erosion. See Section 02990.

#### LEDGE/BOULDER EXCAVATION

If boulders over 3 cy are encountered during excavation that cannot be removed by conventional excavation methods, then additional compensation shall be allowed. Payment shall be made on a unit price per cubic yard.

- i. Boulders shall be set aside, measured and numbered by the Contractor. The quantity of boulders shall be witnessed and signed for by a site representative authorized by the Owner or Engineer.
- ii. The boulders shall then be removed off site or disposed of at an approved on-site location by the Contractor after verification of size and quantity by the Engineer.

If ledge is encountered in trench excavation or in the open, the Contractor shall expose the ledge and perform topographic survey prior to ripping, drilling, chipping or blasting. Rippable rock shall be ripped by suitable equipment in lieu of drilling and blasting. Payment shall be made on a cubic yard basis.

- i. Payment lines for trenches shall be the width of the pipe diameter plus 2.0 ft and the pipe invert less 0.5 ft.
- ii. Payment lines for utility structures shall be the plan dimension of the structure plus 2.0 ft and the invert elevation less 1.0 ft.
- iii. Payment lines for building area ledge removal shall be 2.0 ft below the bottom of the floor slabs and 1.0 ft below the bottom of footings by the width of the footing plus 2.0 ft.
- iv. Remove ledge to 6" below bottom of subbase material in paved areas and lawn areas.
- v. Payment lines at slope cut areas shall start at the bottom of the ditch line and maximum rock side slopes shall be six units vertical to one unit horizontal.

Unit prices shall include replacement of any ledge or boulder with compacted ordinary fill. Additional compensation for over-excavation and replacement of ledge and boulders outside the payment lines will not be allowed.

Prior to blasting, the Contractor shall submit a blasting plan for review. Accordingly, such plan shall explain the proposed sequence of operations in compliance with State and Federal regulations. The blasting plan shall be developed specifically for the project's conditions cited herein and the Blasting Contractor's inspection of the site.

Blasting shall not create vibrations in excess of 2.0 inches per second peak particle velocity at any adjacent structure. If vibrations exceed this limit, all blasting activity should cease until blast design is revised.

All blasts shall be monitored with a three component seismograph. Proper geophone coupling shall be ensured by following the manufacturer's recommendations. A record shall be kept of each blast.

Blasting with the overburden in place may preclude the need for blasting mats. However, it is the responsibility of the Contractor to ensure that no fly rock is generated as a result of blasting operations.

The Contractor shall properly insure the project for any and all claims regarding damage caused by blasting.

If blast rock is to be used as fill under building, future building areas, sloped areas or paved areas then the rock augmentation shall be controlled such that 90% of the rock is 9 cubic feet or smaller.

- i. No blast rock at the lower sections of deep fills shall have a face dimension in excess of 30" if used under slope or pavement areas or 18" if used under building or designated future expansion areas.
- ii. Blast rock used within the upper 36" of any subgrade shall not have a face dimension in excess of 12".
- iii. Individual rock fill lifts shall be no deeper than 36". Choke off the top of each rock fill lift with a 12" lift of filter stone compacted with a 10 ton vibratory compactor.
- iv. No additional compensation shall be allowed for rework of excavated blast rock to conform to this requirement for acceptable size of rock fill. The Contractor shall adjust the drill and blast technique to produce the size of rock specified or rework the excavated rock to adjust the size, all at no additional compensation.

Boulders may not be used below building pad or paved area locations unless reworked to conform to the requirements above.

Boulders and blast rock shall be removed off site or reused on site at an approved location under slope areas. On site burial shall not conflict with utility locations, future expansion plans or other sections of this Specification.

#### PLACING OF FILL AND BACKFILLING

General: Place acceptable soil material in layers to required finish or subgrade elevations. Fill, backfill and compact to produce minimum subsequent settlement of the material and provide adequate support for the surface treatment of structure to be placed on the material. Place material in approximately horizontal layers beginning at lowest area to be filled. Do not impair drainage.

- i. All material to be placed where Drawings or Specifications call for "fill" or "rough-grading" may be ordinary fill. All materials to be placed in controlled compacted fills directly under building floor slabs, exterior concrete slabs, asphalt pavement and other soil-bearing situations shall be processed gravel or crushed stone base course as specified. On-site fill materials may be used under the building and pavement as mass earthworks provided that the material is dried/wetted to obtain optimum moisture and compacted by suitable compaction equipment to obtain the specified compaction.

- ii. Provide and place any additional fill material from off the site as may be necessary to produce the grades required. Fill obtained from off-site shall be of kind and quality as specified for fills herein and the source approved by the Engineer prior to delivery of that material to the site.
- iii. If the subgrade below the bottom of the footings is over-excavated due to soft materials, ledge removal or boulder removal, then granular fill or crushed stone shall be used to restore the subgrade to proper elevation. The cost of the granular material shall be included in the unit prices quoted for the removal of the unsuitable material, ledge or boulders, additional compensation will not be allowed for providing and placing this material.

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions and deleterious materials from ground surface prior to placement of fills. Scarify surfaces so that fill material will bond with existing surface.

- i. The surface of the natural soil before fill is placed shall be at no less than the same density required for superimposed layers of fill. Compact the natural soil if necessary to fulfill the requirement.

Placement: Place backfill and fill materials in layers not more than 12" in loose depth for material compacted by heavy compaction equipment and not more than 6" in loose depth for material compacted by hand-operated tampers.

- i. Each fill layer shall be spread evenly at right angles to previous layer and shall be thoroughly blade-mixed during spreading to ensure uniformity of material in each layer. Water or aerate if required to obtain proper optimum moisture content.
- ii. Place backfill materials evenly adjacent to structures to required elevations. Take care to prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately the same elevation in each lift.
- iii. Do not allow heavy machinery within 5 feet of structure during backfilling and compacting.
- iv. Fill shall not be placed over frozen material. Placement of fill shall be suspended during unfavorable weather conditions and not resume until the moisture content of previously placed material is restored to the required specifications.

Backfilling of Foundations: Backfilling of foundations shall not commence for at least 3 days after concrete has been placed, unless otherwise approved by the Engineer.

- i. The Contractor shall ensure that all form materials and trash have been removed from the excavation and that the walls are adequately braced prior to backfilling.

- ii. If fill is required on both sides of the wall it shall be brought up simultaneously and evenly on both sides. Avoid damage to the walls and other work in place.
- iii. Backfill within 18” of the face of foundation walls shall be granular fill.

Backfill of Utility Trenches: Do not commence backfilling operations until all piping, conduit, etc. has been installed, tested and approved and the locations of all pipe and appurtenances have been recorded.

- i. Backfill carefully by hand by compacting/tamping around pipe to 6” above the pipe crown using the specified bedding material.
- ii. Electrical conduit, cast iron soil drain and waste pipe, reinforced concrete and ductile iron pipe shall be bedded in sand.
- iii. Plastic pipe shall be bedded in crushed stone specified for pipe bedding.
- iv. Remaining trench backfill above bedding material shall be sand or ordinary fill in lawn or slope areas and sand or granular fill inside buildings, under asphalt pavement or under site slabs.

SOIL COMPACTION

Compaction shall be accomplished by vibratory steel drum rollers, sheep’s foot roller, pneumatic-tired roller or other approved equipment well suited for the soil being compacted. Material shall be moistened or aerated as necessary to provide the optimum moisture content that will readily facilitate obtaining the specified compaction.

Degree of Compaction: Compact to the following minimum densities:

<u>Fill and Backfill Location</u>	<u>Density</u>
Under building, structures and detention pond embankment	95% of max.
Top 2 feet under pavement subgrade, including trenches	95% of max.
Below top 2 feet under pavement subgrade, including trenches	92% of max.
Trenches through unpaved areas	90% of max.
Embankments and lawn areas	90% of max.
Pipe bedding	92% of max.

Laboratory density shall be determined as follows:

- i. Cohesive materials: Modified Proctor Compaction Test, ASTM D1557, Method C & D.
- ii. Cohesionless material: ASTM D4253 and D4254.

Field density tests: ASTM D1556 (sand cover) or ASTM D2922 (nuclear methods), or ASTM D2167 (rubber balloon).

Hydraulic jetting of fills will not be permitted for densification of cohesionless material.

Where tests indicate that fill does not conform to the compact density specified, the fill and underlying subgrade, if necessary, shall be removed and replaced with conforming materials, at no expense to the Owner.

## GRADING

General:

- i. Uniformly grade the areas within the limits of grading under this Section, including adjacent transition areas.
- ii. Smooth the finished surfaces within specified tolerance.
- iii. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
- iv. Where a change of slope is indicated on the Drawings, construct a rolled transition section having a minimum radius of approximately 8'-0", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

Grading outside structures:

- i. Grade areas adjacent to buildings to achieve drainage away from the structures and to prevent ponding.
- ii. Finish the surfaces to be free from irregular surface changes, and:
  1. Shape the surface of areas scheduled to be under seeded areas to line, grade and cross-section with finished surface not more than 0.20 ft above the required subgrade elevation.
  2. Shape the surface of areas scheduled to be under pavement to line, grade and cross-section with finished surface not more than 0.05 feet above or below the required subgrade elevation.

If during the progress of rough grading work, any water pipe, sewer, conduit, drain or other construction is damaged as a result of operations under this contract, the Contractor shall repair all such damage and restore work to the original conditions at no cost to the Owner.

Perform other cutting, filling and rough grading to the lines and grades indicated on the Drawings. Grade evenly to the finished grades shown on the Drawings.

Graded areas should be protected from action of elements. Repair any settlement or washing and reestablish grades until pavement and slabs are complete or the work is accepted. Provide erosion control measures to prevent contamination of surface runoff.

### ROAD, PAVEMENT AND SLAB-ON-GRADE BASE COURSE

Place base course material on the prepared and accepted subgrade. The material shall be back-dumped and spread in a uniform lift thickness. This Section applies to the layer(s) of processed material(s) directly beneath finish materials such as asphalt pavement, concrete slab-on-grade and curbing.

Protect against "pumping" moisture to surface by limiting travel on exposed subgrade. Where it is determined by the Engineer that construction vehicle traffic (other than proof rolling) has caused subgrade instability, remove disturbed soils and replace with granular fill at no additional cost to the Owner.

Handle and spread materials in a manner that will prevent segregation of sizes. When vibrating or other acceptable types of compaction equipment are used, the entire course may be placed in one lift, provided the ability of the equipment to achieve specified compaction to the full lift depth is demonstrated. In no case shall compacted lift thickness be greater than 8".

When base course is constructed in more than one lift, the previously placed layer shall be clean of loose and foreign matter. Upper lift of base course shall not be less than 1 1/2" deep, nor shall fine materials be added to reach final grade.

Overstressing the surged soil and base course shall be avoided by utilizing equipment in spreading and dumping that exerts only moderate pressures on the soil. Avoid excessive travel on lower base course lifts. Severe rutting, cracking or yielding is an indication of overstressing the soil. Any ruts or cracks which develop in the base course during spreading or compacting shall be repaired as directed at no additional cost to the Owner.

Base course shall be compacted to no less than 95% maximum modified proctor density, as determined by ASTM 1557. Moisture content shall be maintained to within 1.5% of optimum throughout placing and compaction operations.

- i. Compaction shall always be commenced along the edge of the area to be compacted and the roller shall gradually advance toward the center of the area to be compacted.

- ii. Compaction equipment shall be operated along lines parallel or concentric with the centerline of the road being constructed and no material variation therefore will be permitted.

Base course shall be substantially true to line and grade as indicated on the Drawings. Completed thickness of base course shall be within ½” of indicated thickness, with average thickness not less than that indicated.

The top surface of compacted base course shall be finished by blading or rolled with equipment designed for that purpose.

Proof roll completed surface, remove and rework any failing areas at no cost to the Owner.

Temporary Graded Surface:

- i. When allowed by the local jurisdiction having authority, where trenches are excavated in paved traffic lanes, the surface course may be temporarily replaced by a surface consisting of base course material. The base course shall be removed and replaced with pavement as soon as conditions permit, or as required by local jurisdiction having authority.
- ii. The surface shall be maintained to provide for a smooth flow of traffic without holes, bumps, etc. until final acceptance of the work.

### PROTECTION

Maintain adequate barricades, guards, warning lights and other protection required at hazards created by this work.

Protect overhead and underground utilities, sidewalks, drains, curbs, trees (including roots), shrubs, ground cover, bench marks, monuments, other reference points, adjacent buildings and property that are to remain.

Fence and/or box-in all trees and plant material which are to remain before work is started. Do not permit heavy equipment or stockpiles within branch spread. Remove interfering branches without injury to trunks, cover scars with tree paint.

Use all means necessary to protect all materials in this Section before, during and after installation. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Owner.

Conduct site clearing operations to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

### DUST CONTROL

Use all means necessary to control dust on or near the work, if such dust is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site. Apply Calcium Chloride or water for dust control. Sweep public roads as required.

### FOUNDATION PERIMETER INSULATION

Furnish and install 2" perimeter foundation wall insulation as detailed or from the underside of the building finish floor to 4 feet below exterior finished grade.

Adhere rigid boards to foundation wall with mastic. Return insulation at intersecting interior walls by 2 feet.

Insulate sides and top of pipe trenches as shown on Drawings.

### TESTING LABORATORY

An independent testing laboratory will be retained by the Owner to perform laboratory testing of proposed fill materials. The testing laboratory will provide a qualified representative to perform field density tests during all controlled fill operations.

- i. A minimum of six (6) density tests per day per lift at any lift location shall be performed.
- ii. Test granular base course material at a rate of one (1) test per 1,500 s.f.
- iii. The test lab may vary the frequency of testing with the Engineer's approval if adequate backfill compaction is consistently obtained.

The Contractor shall rework all areas that do not meet the technical or design requirements of the construction documents. The testing laboratory representative will document all failing tests and all tests of reworked areas. No deviations shall be made from the Contract Documents without specific and written approval from the Engineer.

The testing laboratory shall test soil and material samples for maximum laboratory density and gradation. Obtain samples from on-site and off-site sources of material considered for use in areas of controlled fills and backfills. Conduct new gradation tests periodically during the work and when the character of the source appears to change.

Provide copies of all reports directly to the office of the Engineer within one week of the date of the test. Provide daily test results to the Owner's on-site representative.

Test reports shall document horizontal control and elevation of test location with reference to the building's column ties or other recorded survey control. Reports shall document specified soil compaction requirements for the material being tested and the pass/failure condition of each test. All failed areas shall be reworked and retested until the area is brought into compliance.

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EXCAVATION AND BACKFILL 02100-20

The testing laboratory shall notify the Contractor immediately of test results on a daily basis. Should the testing laboratory observe the covering of work which failed to meet Specification, the Owner and the Engineer shall be notified immediately so corrective action may be taken.

END OF SECTION 02100.

SECTION 02110 – SITE CLEARING

PART 1 – GENERAL

SECTION INCLUDES

Remove surface debris.

Clear Site of plant life and grass in areas of proposed construction activities.

Remove trees and shrubs except where designated to remain on the plans.

Topsoil excavation.

RELATED SECTIONS

Drawings and general provisions of contract, including General Conditions apply to this section.

Section 02211 – Rough Grading.

PART 2 – EXECUTION

PREPARATION

Verify that existing plant life designated to remain, is tagged or identified.

PROTECTION

Locate, identify, and protect utilities that remain from damage.

Protect trees, plant growth, and features designated to remain as final landscaping.

Protect benchmarks and property corner markers from damage or displacement.

Install erosion control measures such as silt fence, where appropriate, prior to site clearing.

CLEARING

Clear areas required for access to site and execution of Work. See clearing limits on drawing.

Remove abandoned foundations, paving, curbs, and sidewalks, if any, as indicated on the drawings.

Remove trees and shrubs not indicated to remain. Remove stumps and main root ball.

Clear undergrowth and deadwood, without disturbing subsoil.

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SITE CLEARING 02110-2

### REMOVAL

Remove debris, rock, and extracted plant life from site. Trees and stumps shall be disposed of in a legal manner. Burning on site is not allowed.

### TOPSOIL EXCAVATION

Excavate topsoil from site where construction activities will occur.

Stockpile in area to be designated on site to depth not exceeding 8 feet. Protect from erosion and contamination. Remove excess topsoil not being reused, from site.

END OF SECTION 02110

## SECTION 02211 - ROUGH GRADING

### PART 1 - GENERAL

#### SECTION INCLUDES

Removal of subsoil.

Cutting, grading, filling and rough contouring the site for pavement, building, and other site structures.

#### RELATED SECTIONS

Drawings and general provisions of contract, including General Conditions and apply to this section.

Section 02225 - Trenching: Trenching and backfilling for utilities.

#### REFERENCES

State of Vermont, Agency of Transportation, Standard Specifications, 2006.

### PART 2 - PRODUCTS

#### MATERIALS

Topsoil: Native topsoil, if available. If insufficient native topsoil exists, provide topsoil from off-site sources. Off-site topsoil shall meet 2006 State of Vermont, Agency of Transportation specification 755.02 - Topsoil.

Miscellaneous Fill: for use in non-structural locations, including lawn areas, drainage swales, etc. Do not use misc. fill under areas to receive structural fill. Miscellaneous fill is defined as native silt-loam subsoil materials taken from on-site excavations. If insufficient native miscellaneous fill exists, provide miscellaneous fill of similar quality, approved by the Engineer, from off-site sources.

### PART 3- EXECUTION

#### PREPARATION

Identify required lines, levels, contours, and datum.

Stake and flag locations of known utilities.

Locate, identify, and protect utilities that remain from damage.

Notify utility company to remove utilities, where appropriate.

Protect above and below grade utilities that remain.

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ROUGH GRADING 02211-2

Protect plant life and other features remaining as a portion of final landscaping, including all trees and shrubs within municipal rights-of-way or on private property of others, unless specified for removal on the drawings.

Protect benchmarks, property corner markers, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

### SUBSOIL EXCAVATION

Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.

Stockpile in an area to be designated on site to a depth not exceeding 8 feet. Protect from erosion.

Remove subsoil not being reused from site.

### FILLING

Fill non-structural areas to contours and elevation with unfrozen material.

Slope grade away from building a minimum 2 inches in 10 ft, unless note otherwise.

Make grade changes gradual. Blend slope into level areas.

Remove surplus fill materials from site.

### TOLERANCES

Top Surface of Subgrade: Plus or minus 1/10 foot.

END OF SECTION 02211

## SECTION 02225 – TRENCHING

### PART 1 – GENERAL

#### SECTION INCLUDES

Excavating trenches for utilities from building foundation to municipal utilities.

Excavating other utility trenches such as, but not limited to: natural gas, power, telephone and cable television.

Backfilling and compaction.

#### RELATED SECTIONS

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division I Specification Sections, apply to this section.

Section 02211 – Rough Grading: Topsoil and subsoil removal from site surface.

Section 02229 – Rock Removal: Pay limits for ledge or boulder removal, if required.

Section 02667 – Site Water Lines: Water piping and bedding from building to municipal utilities.

Section 02722 – Site Storm Sewerage Piping: Storm sewer piping and bedding.

Section 02732 – Site Sanitary Sewerage System: Sanitary sewer piping and bedding.

#### REFERENCES

State of Vermont, Agency of Transportation Standard Specifications, 2006.

ANSI/ASTM C136 – Method for Sieve analysis of Fine and Coarse Aggregates.

ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

#### DEFINITIONS

Utility: Any buried pipe, conduit, or cable.

## PART 2 – PRODUCTS

### FILL MATERIALS

Sand Bedding meeting 2006 State of Vermont, Agency of Transportation Specification 703.03A, Sand Borrow and Cushion.

Drainage Stone:  $\frac{3}{4}$  inch diameter gray clean crushed stone from Swanton Limestone Company or approved equivalent.

### SOIL MATERIALS

Topsoil: Excavated from site and free of weeds. Shall meet 2006 State of Vermont, Agency of Transportation Specification 755.

## PART 3 – EXECUTION

### PREPARATION

Identify required lines, levels, contours, and datum.

Protect plant life, lawns and other features remaining as a portion of the final landscaping.

Protect benchmarks, property corner markers, existing structures, fences, sidewalks and paving from excavation equipment and vehicular traffic.

Maintain and protect above and below grade utilities which are to remain.

Cut out soft areas of subgrade not capable of in situ compaction. Backfill and compact to density equal to or greater than requirements for subsequent backfill material.

### EXCAVATION

Excavate subsoil required for utilities. Site Contractor is to excavate for all underground utilities on site.

Gas pipelines will be installed by others in Contractor's trench. Furnish and install conduits where indicated on the drawings.

Cut trenches sufficiently wide to enable installation and allow inspection.

Do not interfere with 45 degree bearing splay of foundations.

Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

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TRENCHING 02225-3

Remove lumped subsoil, boulders, and rock, up to 1 CY, measured by volume. Boulders larger than 3 CY shall be removed per Section 02229 – Rock Removal.

Correct areas over excavated.

Stockpile excavated material in an area designated on site and remove excess material not being used from site.

### BACKFILLING

Backfill trenches to contours and elevations with unfrozen materials. Site contractor shall backfill all utilities.

Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

Sand Bedding: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.

Drainage Stone and Misc. Native Fill: Place and compact material in continuous layers not exceeding 12 inches compacted depth.

Remove surplus fill materials from site.

Leave fill material stockpile areas completely free of excess fill materials.

Adhere to Section 02231 – Aggregate Base Course under areas to be paved or receive concrete slabs, curbs, or walks.

### COMPACTION

All trenches under structural areas or within 36” of structural areas shall be compacted to 95 percent of maximum Modified Proctor density, in 12 inch thick maximum lifts.

Trenches in non-structural areas shall be surcharged slightly to compensate for anticipated settlement.

### TOLERANCES

Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

END OF SECTION 02225

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ROCK REMOVAL 02229-1

## SECTION 02229 – ROCK REMOVAL

### PART 1 – GENERAL

#### SECTION INCLUDES

Removal of unidentified rock during excavation.

Explosives to assist rock removal.

#### RELATED SECTIONS

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division I specification Sections, apply to this section.

Section 02225 – Trenching: Trenching and backfilling for utilities.

#### UNIT PRICE – MEASUREMENT AND PAYMENT

Rock Removal: All Types

Basis of Measurement: By the cubic yard measured before removal, in neat line quantities.

Basis of Payment: Includes preparations of rock for removal, explosive disintegration of rock, removal from position, loading and removing from site.

Over Excavation: Payment will not be made for over excavated work nor for replacement materials.

Payment: Based on unit price submitted with Contractor's bid extended with the volume of rock to be removed as described above.

#### REFERENCES

NFPA 495 – Code for Explosive Materials.

#### DEFINITIONS

Site Rock: Solid mineral material with a volume in excess of 3 cu yd.

Trench Rock: Solid mineral material with a volume in excess of 3 cu yd or solid material that cannot be removed with a 3 cu yd capacity power shovel.

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ROCK REMOVAL 02229-2

### REGULATORY REQUIREMENTS

Conform to applicable code for explosive disintegration of rock and to NFPA 495 for handling explosive materials.

Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling is started.

### PART 2 – PRODUCTS

#### MATERIALS

Explosives: Type recommended by explosives firm.

Delay Device: Type recommended by explosives firm.

Blast Mat Materials: Type recommended by explosives firm.

### PART 3 – EXECUTION

#### ROCK REMOVAL – EXPLOSIVE METHOD

Conduct survey and document conditions of buildings near location of rock removal and, prior to blasting, photograph existing conditions identifying existing irregularities.

Advise owners of adjacent buildings or structures in writing, prior to executing rock removal.

Determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

Disintegrate rock and remove from excavation.

Remove rock at excavation bottom to form level bearing.

In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

Remove excavated material from site.

Correct unauthorized rock removal to directions of Architect/Engineer.

END OF SECTION 02229

## SECTION 02400 STORM DRAINAGE SYSTEM

### PART 1 GENERAL

#### 1.01 WORK INCLUDED

- a. This section shall include Section 02000 General Requirements.
- b. All work shall be in accordance with all local codes. Notify the Engineer of conflicts requiring resolution.

#### 1.02 EXTENT OF WORK

- a. Furnish all labor, materials, and equipment necessary for completion of all storm drainage shown on or reasonably implied by the Drawings and Specifications.

#### 1.03 RELATED WORK IN OTHER SECTIONS

- a. Section 02100 Excavation and Backfill
- b. Section 02900 Asphalt Pavement
- c. Section 03100 Cast-In-Place Concrete
- d. Section 03300 Exterior Concrete Pavement
- e. Section 15400 Plumbing

#### 1.04 SUBMITTALS

- a. Furnish shop drawing on the following items, as a minimum:
  - i. Manholes and structures
  - ii. Frames and grates
  - iii. Pipe, fittings and accessories
  - iv. End sections

### PART 2 PRODUCTS

#### 2.01 PRECAST CONCRETE STRUCTURES

- a. Manholes, catch basins, curb inlets, end sections and other structures shall be precise as detailed on the Drawings. Structures shall conform to the requirements of ASTM C478 and the local authority having jurisdiction.
- b. All joints between precast sections shall be sealed with 1" butyl rubber gaskets.

- c. Minimum structure size shall be compatible with intersecting pipe sizes, but not less than 4'-0" diameter. The precast fabricator shall be responsible for verifying the structure size and the compatibility with piping.
- d. All structures shall be marked with the date and name of the manufacturer.
- e. Steps shall meet local codes and be plastic encapsulated steel rods, PSI-PF by M.A. Industries or approved equal.
- f. All pipe entrances shall be neoprene boots cast into the structure.
- g. Precast components with through cracks, damaged ends, excessively honeycombed surfaces or out of line steps shall be rejected and replaced at no cost to the Owner.
- h. Provide drop sumps or cast in place inverts which establish a smooth flow line as detailed on the Drawings.
- i. Precast concrete items shall be kept at the fabrication yard and not delivered to the job site until seven days past their casting date.

## 2.02 FRAMES AND GRATES

- a. Frames, covers, and grates and curb inlets shall be heavy duty, roadway weight, H-20 loading rated. Manufacturer is the Contractor's option, but shall conform to local code requirements. Solid covers shall bear the word "STORM". Grates in paved areas shall be ductile iron. Final adjustment of frames and installation of concrete collars in asphalt paved areas is specified in Section 02900. Final adjustment of frames in concrete paved areas is specified in Section 03100.

## 2.03 CMP (CORRUGATED METAL PIPE)

- a. Corrugated metal pipe shall be bituminous coated and conform to AASHTO M35 Type 1 or AASHTO M245 Type 1.

## 2.04 CPP (CORRUGATED PLASTIC PIPE)

- a. Corrugated plastic pipe shall conform to Type S pipe under AASHTO M294. N-12 as manufactured by ADS, Inc. (1-800-733-9554) or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- a. Examine the areas and conditions under which the work is to be performed. Correct conditions detrimental to the proper completion of the work.
- b. Protect existing utilities to remain. Repair any damage to existing work at no additional cost to the Owner.
- c. Excavation, bedding, and backfilling shall be in accordance with Section 02100.
- d. Place all pipe in the grades and alignment shown with a tolerance of one in 1,000 vertical and one in 500 horizontal. All reaches in excess of 40 shall be set with a laser.
- e. Carefully align and clean all ends to be joined and join pipe carefully to insure a tight connection.
- f. Do not install defective or damaged pipe.
- g. Avoid displacement or damage to pipe during compaction or subsequent movement by construction equipment.
- h. Set all structures on 12" minimum depth of ¾" crushed stone bedding. Backfill all structures in 8" lifts.
- i. Any adjustments in frame elevation above the precast structure shall be made with concrete rings by the Contractor. This adjustment shall be made to set the top of frame elevation to a tolerance of +/-0.1'.
- j. Final adjustment of frame elevation within a tolerance of +/-0.1' shall be made by the Fine Grading Contractor. Concrete slab area frame elevation adjustment is specified in Sections 03100 and 03300. Asphalt pavement area frame elevation adjustment is specified in Section 02900.
- k. The Contractor shall remove all accumulated silt and debris from all storm drainage pipes and structures prior to contract completion and to the Engineer's satisfaction. Final cleaning shall take place after grass is established.

END OF SECTION 02400

Stowe Hollow Road LLC  
Stowe, Vermont 05672  
Project #18045  
February 2020

PORTLAND CEMENT CONCRETE (SITE) 02520-1

SECTION 02520 – PORTLAND CEMENT CONCRETE (SITE)

PART 1 – GENERAL

SECTION INCLUDES

Concrete sidewalks, curbs, slabs, headwalls, light pole bases, etc.

PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Anchor Bolts.

Conduit for lights.

RELATED SECTIONS

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division I Specifications, apply to this section.

Section 02211 – Rough Grading: Preparation of site for paving base.

Section 02231 – Aggregate Base Course.

Section 02510 – Asphaltic Concrete Paving.

Electrical – Refer to architectural/electrical specifications.

REFERENCES

State of Vermont, Agency of Transportation, Standard Specifications, 2018.

ANSI/ASTM A185 – Welded Steel Wire Fabric for Concrete Reinforcement.

ANSI/ASTM D1752 – Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

ASTM A615 – Deformed and Plain Billet-Steel for Concrete Reinforcement.

ASTM C33 – Concrete Aggregate.

ASTM C94 – Ready Mix Concrete.

ASTM C150 – Portland Cement.

ASTM C260 – Air-Entraining Admixtures for Concrete.

Stowe Hollow Road LLC  
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PORTLAND CEMENT CONCRETE (SITE) 02520-2

QUALITY ASSURANCE

Perform work in accordance with Vermont Agency of Transportation Specifications.

ENVIRONMENTAL REQUIREMENTS

Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 – PRODUCTS

FORM MATERIALS

Wood or steel form material, profiled to suit conditions.

Joint Filler: ANSI/ASTM D1751; ½” thick.

CONCRETE MATERIALS

Concrete Materials: Provide in accordance with Vermont Agency of Transportation specifications, Section 501, Class B.

Water: Potable, not detrimental to concrete.

Air Entrainment: ASTM C260.

CONCRETE MIX

Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

Provide concrete to the following mix design:

<u>Unit</u>	<u>Measurement</u>
Compressive Strength (28 day)	3000 psi (light pole bases) 3500 psi (sidewalks, curbs)
Air Entrained:	All concrete 4-8%
Slump:	ASTM C-143

Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

Use calcium chloride only when approved by Architect/Engineer.

Use set retarding admixtures during hot weather only when approved by Architect/Engineer.

All concrete will be obtained from S.D. Ireland or Harrison, unless another source is approved by the Architect/Engineer.

Stowe Hollow Road LLC  
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PORTLAND CEMENT CONCRETE (SITE) 02520-3

## REINFORCING

Comply with ASTM A-615 Grade 60 rebar and ASTM A-185 for wire fabric.

## PART 3 – EXECUTION

### EXAMINATION

Verify compacted granular base is acceptable and ready to support concrete and imposed loads.

Verify gradients and elevations of base are correct.

### SUBBASE

Section 02231 – Aggregate Base Course forms the base construction for work of this Section.

### PREPARATION

Moisten base to minimize absorption of water from fresh concrete.

Notify Architect/Engineer a minimum of 24 hours prior to commencement of concreting operations.

### FORMING

Place and secure forms to correct locations, dimension, and profile.

Assemble formwork to permit easy stripping and dismantling without damaging concrete.

Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

Place reinforcement as indicated on the drawings.

### PLACING CONCRETE

Place concrete in accordance with Vermont Agency of Transportation Specifications 618.03, 616.06 and Section 501.

Ensure embedded parts, formed joints, reinforcement and other items are not disturbed during concrete placement.

Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

At wheel chair ramps, match adjacent travel surfaces.

Stowe Hollow Road LLC  
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PORTLAND CEMENT CONCRETE (SITE) 02520-4

### JOINTS

Place expansion joints at 20 foot intervals in curbs and sidewalks. Align curb and sidewalk joints.

Place joint filler between concrete components and building or other appurtenances. Recess top of filler ¼ inch.

Provide scored joints at 5 foot intervals on sidewalks 5 feet wide, and at 4 foot intervals on sidewalks 4 feet wide. Refer to drawings for widths.

### FINISHING

Sidewalk Paving: Light broom, perpendicular to primary direction of travel and trowel joint edges.

Curbs and Gutters: Light broom; trowel joint edges.

### PROTECTION

Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION 02520

Stowe Hollow Road LLC  
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Project #18045  
February 2020

SEEDING 02936-1

## SECTION 02936 – SEEDING

### PART 1 – GENERAL

#### SECTION INCLUDES

Preparation of subsoil.

Placing topsoil.

Seeding, mulching and fertilizing.

#### RELATED SECTIONS

Section 02225 – Trenching: Rough grading over cut.

Section 02950 – Trees, Plants and Ground Cover.

#### REFERENCES

FS O-F-241 – Fertilizers, Mixed Commercial.

#### DEFINITIONS

Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel and Brome Grass.

#### QUALITY ASSURANCE

Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging and location of packaging.

#### REGULATORY REQUIREMENTS

Comply with regulatory agencies for fertilizer and herbicide composition.

#### DELIVERY, STORAGE AND PROTECTION

Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

Deliver fertilizer in waterproof bags showing weight, chemical analysis and name of manufacturer.

Stowe Hollow Road LLC  
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February 2020

SEEDING 02936-2

## PART 2 – PRODUCTS

### SEED MIXTURE

Seed Mixture:

Mix for sunny to partial shade areas:

	<u>Proportion</u>	<u>Purity</u>	<u>Germination</u>
Creeping Red Fescue	60%	85%	97%
Merion, Ky. Bluegrass	25%	85%	95%
Red Top	15%	85%	90%

### SOIL MATERIALS

Topsoil: Excavated from site and free of weeds. Shall meet the 2018 State of Vermont, Agency of Transportation Specification 755.

### ACCESSORIES

Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life and dry. Hay or chopped cornstalks are not acceptable.

Fertilizer: FS O-F-241, Type recommended for grass with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil.

Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

## PART 3 – EXECUTION

### EXAMINATION

Verify that prepared soil base is ready to receive the work of this section.

### PREPARATION OF SUBSOIL

Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

Remove foreign materials, stones greater than ¾ inch in diameter, weeds and undesirable plants and their roots. Remove contaminated subsoil.

Scarify subsoil to a depth of 3 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

### PLACING TOPSOIL

Spread topsoil to a minimum depth of four (4) inches over area to be seeded. Hand rake all areas until smooth. Remove all roots, sod and stones greater than ½ inch.

Place topsoil during dry weather and on dry unfrozen subgrade.

Remove vegetable matter and foreign non-organic material from topsoil while spreading.

Grade topsoil to eliminate rough, low or soft areas and to ensure positive drainage.

Roll topsoil with landscape roller to compact.

### FERTILIZING

Apply fertilizer in accordance with manufacturer's instructions.

Apply after smooth raking of topsoil.

Do not apply fertilizer at the same time or with the same machine as will be used to apply seed.

Mix thoroughly into upper 2 inches of topsoil.

Lightly water to aid the dissipation of fertilizer.

### SEEDING

Hydro-seeding is acceptable in lieu of the following:

Apply seed at a rate of 3 lbs per 1,000 sq ft evenly in two intersecting directions. Rake in lightly.

Do not seed areas in excess of that which can be mulched on same day.

Planting Season: Seed Winter Rye after October 1st and before snowfall.

Do not sow immediately following rain, when ground is too dry or during windy periods.

Immediately following seeding, apply mulch to a thickness of ½ inch. Maintain clear of shrubs and trees.

Apply water with a fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

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SEEDING 02936-4

SEED PROTECTION

Identify seeded areas with stakes and string around area periphery. Set string height to 36 inches. Space stakes at 10 feet.

SCHEDULE

Seed all disturbed areas not scheduled to receive gravel, pavement, rip-rap or structures.

END OF SECTION 02936

Stowe Hollow Road LLC  
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Project #18045  
February 2020

EROSION CONTROL 02990-1

## SECTION 02990 – EROSION CONTROL

### PART 1 – GENERAL

#### SECTION INCLUDES:

Temporary and permanent erosion control during construction, including stone check dams, silt fence, riprap and geotextile fabric.

#### RELATED SECTIONS

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 1 specification Sections, apply to this section.

Section 02211 – Rough Grading.

Section 02722 – Site Storm Sewerage and Underdrain Systems.

#### REFERENCES

Vermont Agency of Transportation Standard Drawing T-2 "Erosion Control Details".

Vermont Handbook for Soil Erosion and Sediment Control On Construction Sites.

Vermont Agency of Transportation Standard Specifications, 2018.

### PART 2 – PRODUCTS

#### EROSION CONTROL MATERIALS

Mulch: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry hay or chopped corn stalks are not acceptable.

Riprap: Vermont Agency of Transportation Specifications 706.04, Stone For Stone Fill Type II, unless otherwise specified on drawings.

Geotextile Fabric: Vermont Agency of Transportation Specification 720.

Stowe Hollow Road LLC  
Stowe, Vermont 05672  
Project #18045  
February 2020

EROSION CONTROL 02990-2

### PART 3 – EXECUTION

#### SCHEDULE

Install erosion control measures as needed as soon as topsoil and subsoil stripping operations are complete. Maintain erosion control methods in place until final erosion protection has been established, either through the establishment of turf, placement of rip-rap or the installation of wearing course of pavement.

#### MAINTENANCE

The Contractor shall be responsible for inspecting and maintaining erosion control methods. Perform at least one inspection per week and clean, repair or replace erosion protection as necessary. Refer to the Vermont Handbook for Soil Erosion and Sediment Control On Construction Sites in regard to proper placement, installation and maintenance of erosion control methods.

#### REMOVAL

Upon completion and acceptance of the project and the establishment of turf in all areas to be grassed, remove stone check dams and silt fence utilized as temporary erosion and sediment control from the site. If instructed by the Engineer, leave erosion protection in place.

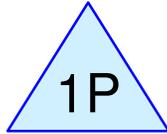
END OF SECTION 02990



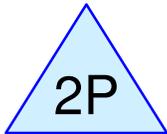
Pre Dev SN001



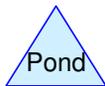
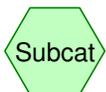
Post Dev SN001 1 yr



Gravel Wetland Forebay



Gravel Wetland



**Routing Diagram for Stowe Hollow Road**

Prepared by Ruggiano Engineering, Printed 2/26/2020

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# Stowe Hollow Road

Prepared by Ruggiano Engineering

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Type II 24-hr 1 yr Rainfall=2.09"

Printed 2/26/2020

Page 2

## Summary for Subcatchment 1S: Pre Dev SN001

Runoff = 0.04 cfs @ 13.41 hrs, Volume= 0.029 af, Depth= 0.05"

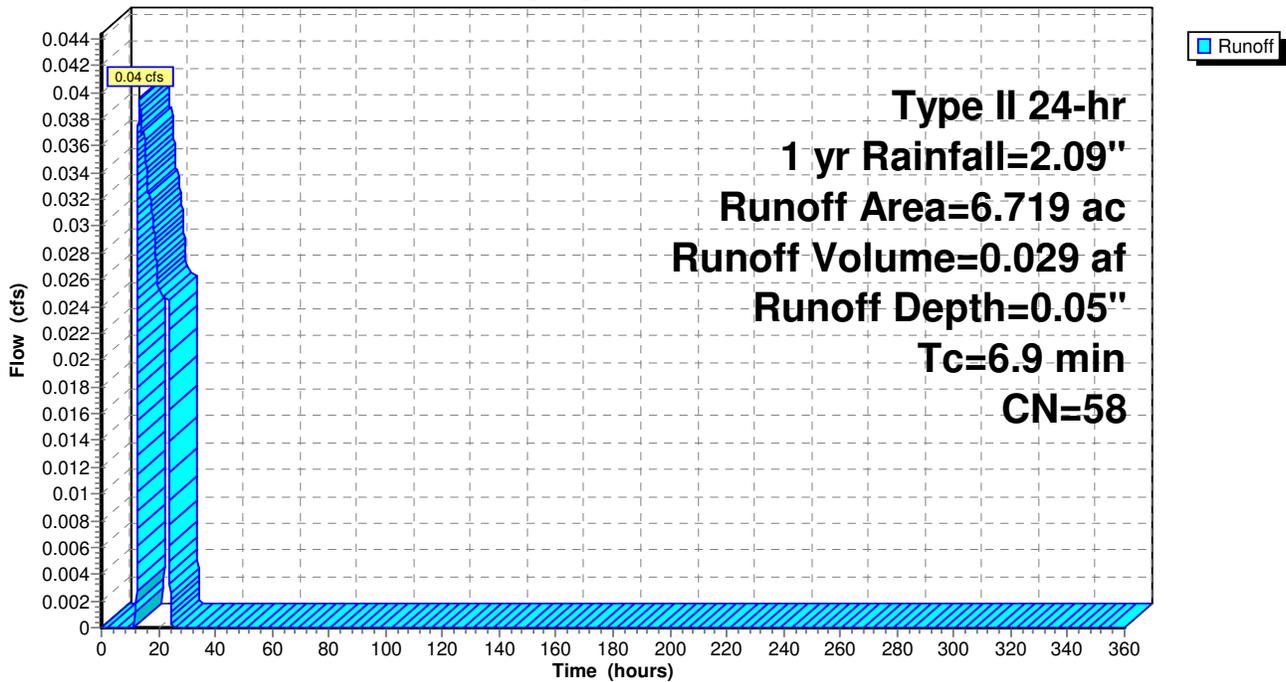
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 1 yr Rainfall=2.09"

Area (ac)	CN	Description
* 6.719	58	
6.719		100.00% Pervious Area

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

## Subcatchment 1S: Pre Dev SN001

Hydrograph



# Stowe Hollow Road

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Type II 24-hr 1 yr Rainfall=2.09"

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Page 3

## Summary for Subcatchment 2S: Post Dev SN001 1 yr

Runoff = 5.09 cfs @ 11.97 hrs, Volume= 0.238 af, Depth= 0.43"

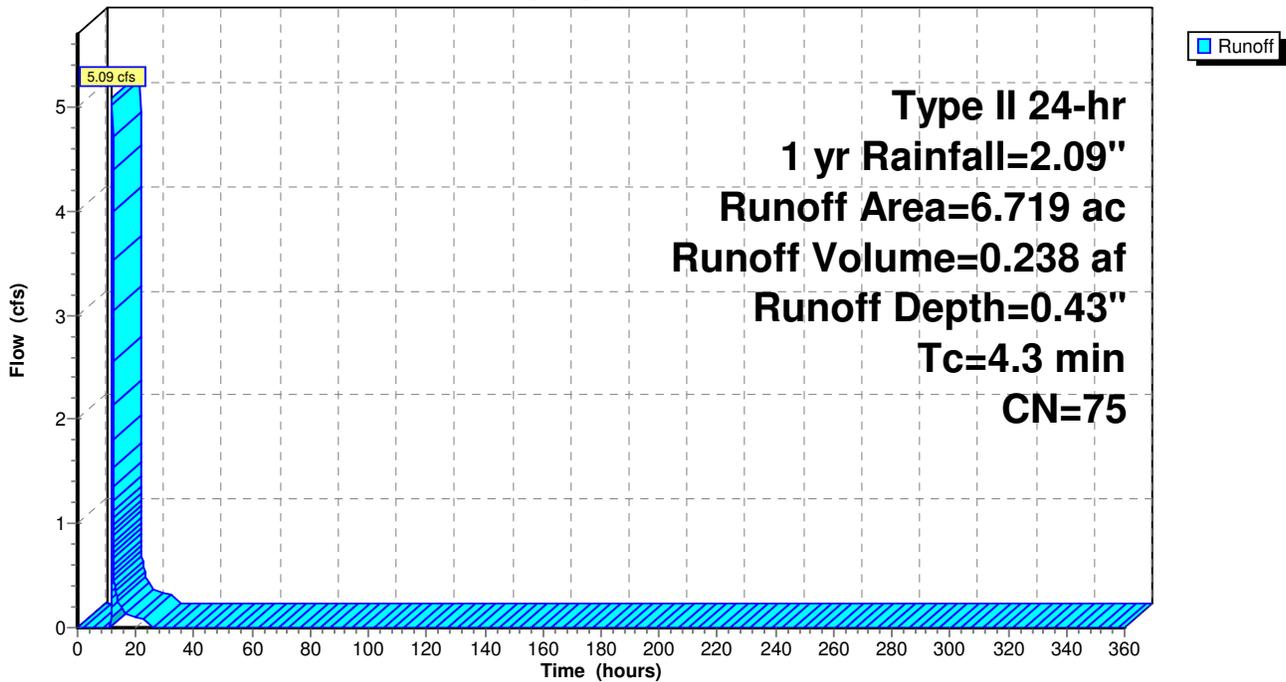
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 1 yr Rainfall=2.09"

Area (ac)	CN	Description
* 6.719	75	
6.719		100.00% Pervious Area

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

## Subcatchment 2S: Post Dev SN001 1 yr

Hydrograph



**Stowe Hollow Road**

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Type II 24-hr 1 yr Rainfall=2.09"

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**Summary for Pond 1P: Gravel Wetland Forebay**

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 0.43" for 1 yr event  
 Inflow = 5.09 cfs @ 11.97 hrs, Volume= 0.238 af  
 Outflow = 0.91 cfs @ 12.14 hrs, Volume= 0.167 af, Atten= 82%, Lag= 10.7 min  
 Primary = 0.91 cfs @ 12.14 hrs, Volume= 0.167 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Peak Elev= 782.82' @ 12.14 hrs Surf.Area= 1,514 sf Storage= 3,205 cf

Plug-Flow detention time= 194.2 min calculated for 0.167 af (70% of inflow)  
 Center-of-Mass det. time= 75.2 min ( 961.2 - 886.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	780.00'	5,050 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	790	0	0
781.00	1,025	908	908
782.00	1,282	1,154	2,061
783.00	1,565	1,424	3,485
784.00	1,565	1,565	5,050

Device	Routing	Invert	Outlet Devices
#1	Primary	782.75'	<b>20.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=0.91 cfs @ 12.14 hrs HW=782.82' TW=779.08' (Dynamic Tailwater)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.91 cfs @ 0.66 fps)

# Stowe Hollow Road

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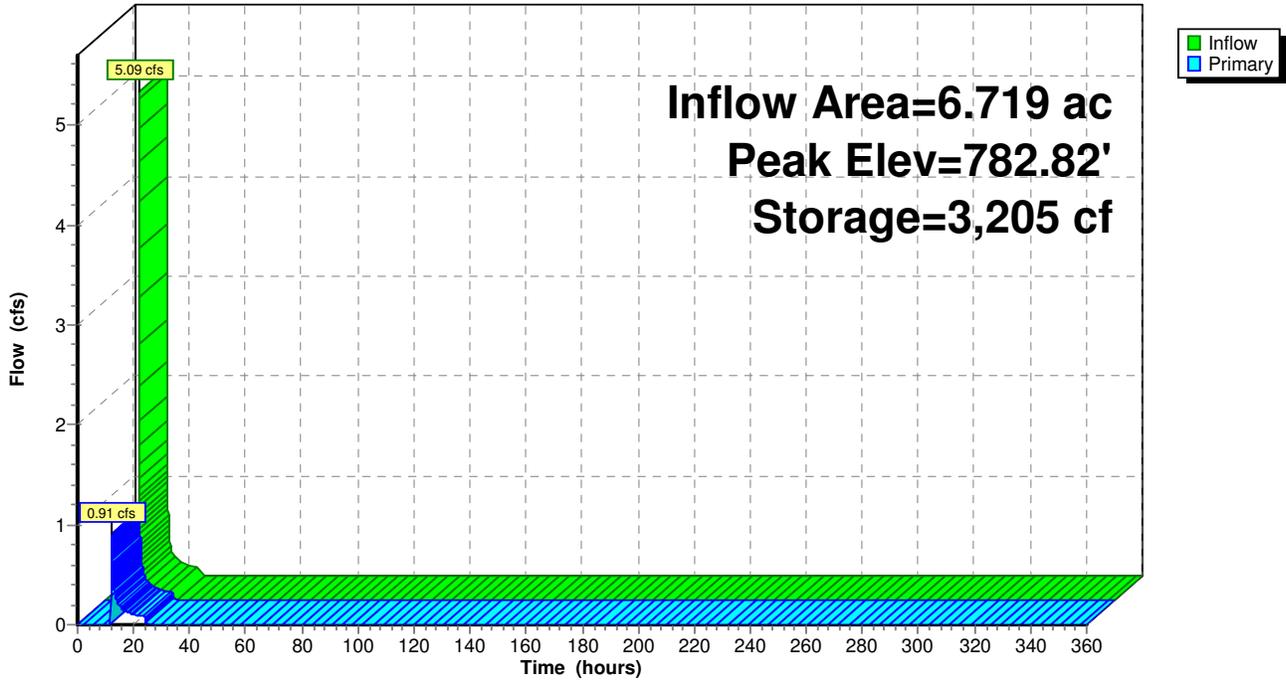
Type II 24-hr 1 yr Rainfall=2.09"

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Page 5

## Pond 1P: Gravel Wetland Forebay

Hydrograph



**Stowe Hollow Road**

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Type II 24-hr 1 yr Rainfall=2.09"

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Page 6

**Summary for Pond 2P: Gravel Wetland**

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 0.30" for 1 yr event  
 Inflow = 0.91 cfs @ 12.14 hrs, Volume= 0.167 af  
 Outflow = 0.18 cfs @ 15.30 hrs, Volume= 0.167 af, Atten= 80%, Lag= 189.6 min  
 Primary = 0.18 cfs @ 15.30 hrs, Volume= 0.167 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Starting Elev= 779.00' Surf.Area= 4,754 sf Storage= 5,705 cf  
 Peak Elev= 780.19' @ 15.30 hrs Surf.Area= 9,621 sf Storage= 8,510 cf (2,805 cf above start)

Plug-Flow detention time= 2,007.1 min calculated for 0.036 af (22% of inflow)  
 Center-of-Mass det. time= 548.9 min ( 1,510.1 - 961.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	776.00'	7,606 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 19,016 cf Overall x 40.0% Voids
#2	780.00'	17,041 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
		24,647 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
776.00	4,754	0	0
777.00	4,754	4,754	4,754
778.00	4,754	4,754	9,508
779.00	4,754	4,754	14,262
780.00	4,754	4,754	19,016

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	4,754	0	0
781.00	5,358	5,056	5,056
782.00	5,986	5,672	10,728
783.00	6,640	6,313	17,041

Device	Routing	Invert	Outlet Devices
#1	Primary	779.00'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	780.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	782.00'	<b>29.0" x 29.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	782.50'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=0.18 cfs @ 15.30 hrs HW=780.19' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.15 fps)
- 2=Orifice/Grate (Orifice Controls 0.15 cfs @ 1.48 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Stowe Hollow Road**

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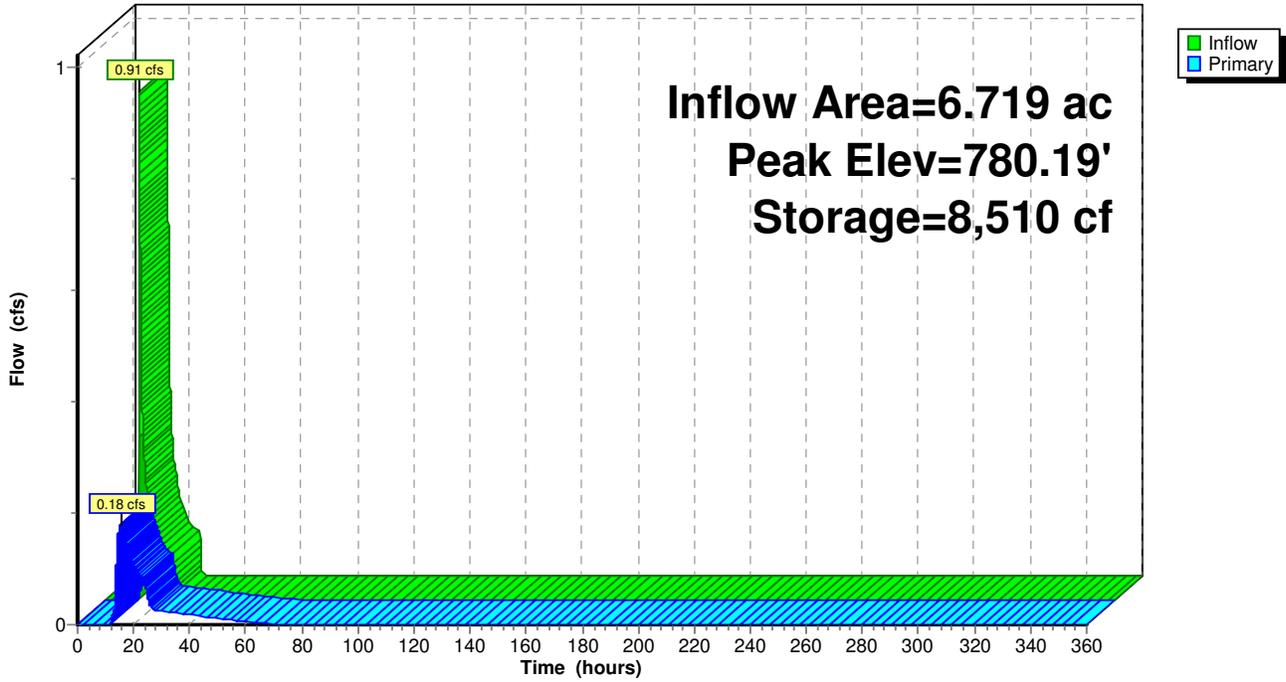
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**Pond 2P: Gravel Wetland**

Hydrograph

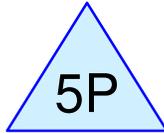




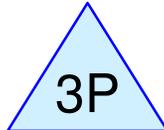
Pre Dev SN001



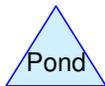
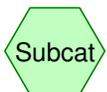
Post Dev SN001 10 yr



Gravel Wetland Forebay



Gravel Wetland



# Stowe Hollow Road

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Type II 24-hr 10 yr Rainfall=3.79"

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## Summary for Subcatchment 1S: Pre Dev SN001

Runoff = 5.43 cfs @ 12.01 hrs, Volume= 0.320 af, Depth= 0.57"

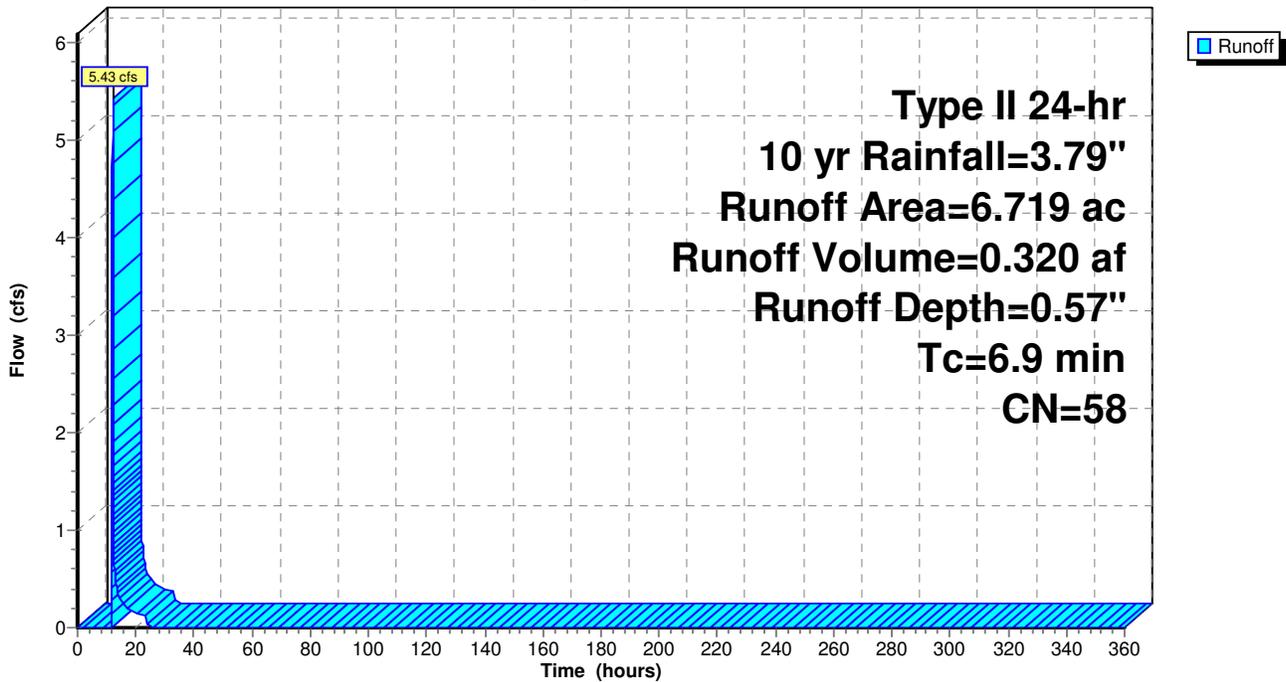
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 10 yr Rainfall=3.79"

Area (ac)	CN	Description
* 6.719	58	
6.719		100.00% Pervious Area

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

## Subcatchment 1S: Pre Dev SN001

Hydrograph



# Stowe Hollow Road

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Type II 24-hr 10 yr Rainfall=3.79"

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## Summary for Subcatchment 3S: Post Dev SN001 10 yr

Runoff = 17.49 cfs @ 11.96 hrs, Volume= 0.772 af, Depth= 1.38"

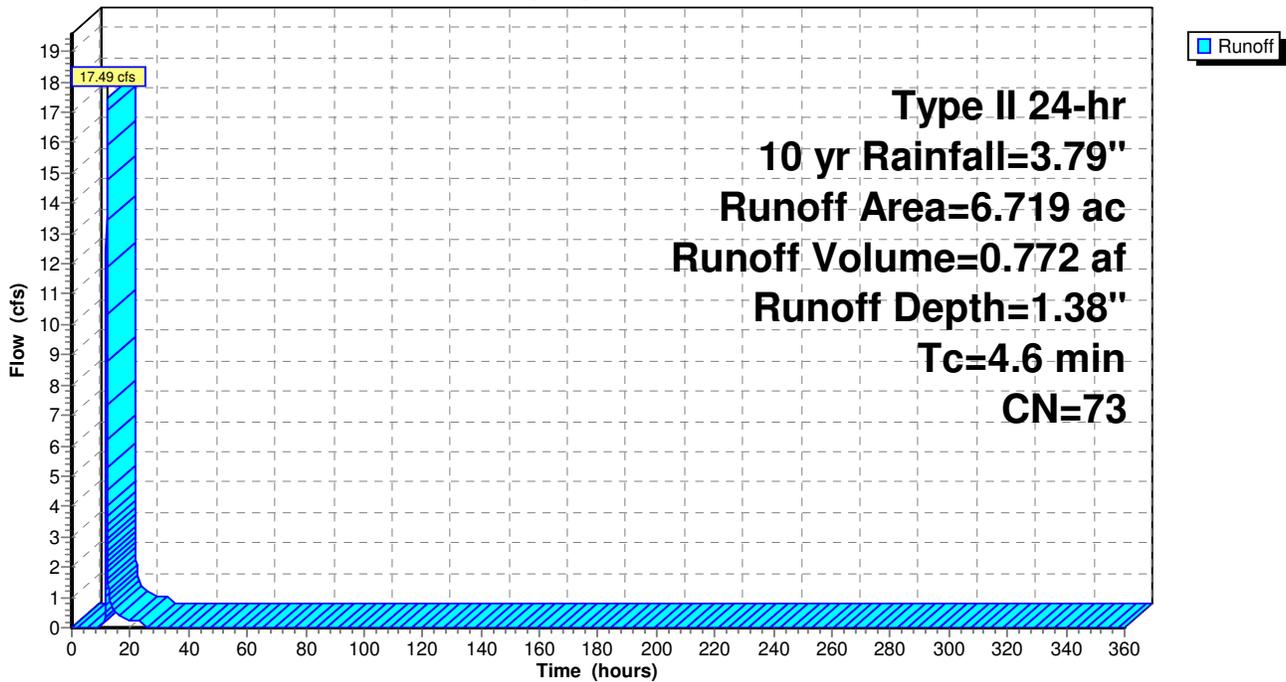
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 10 yr Rainfall=3.79"

Area (ac)	CN	Description
* 6.719	73	
6.719		100.00% Pervious Area

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

## Subcatchment 3S: Post Dev SN001 10 yr

Hydrograph



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Type II 24-hr 10 yr Rainfall=3.79"

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Page 4

**Summary for Pond 3P: Gravel Wetland**

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 1.25" for 10 yr event  
 Inflow = 17.17 cfs @ 11.97 hrs, Volume= 0.701 af  
 Outflow = 3.62 cfs @ 12.13 hrs, Volume= 0.701 af, Atten= 79%, Lag= 9.3 min  
 Primary = 3.62 cfs @ 12.13 hrs, Volume= 0.701 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Starting Elev= 779.00' Surf.Area= 4,754 sf Storage= 5,705 cf  
 Peak Elev= 781.39' @ 12.13 hrs Surf.Area= 10,359 sf Storage= 14,821 cf (9,116 cf above start)

Plug-Flow detention time= 319.3 min calculated for 0.570 af (81% of inflow)  
 Center-of-Mass det. time= 166.2 min ( 1,034.7 - 868.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	776.00'	7,606 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 19,016 cf Overall x 40.0% Voids
#2	780.00'	17,041 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
		24,647 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
776.00	4,754	0	0
777.00	4,754	4,754	4,754
778.00	4,754	4,754	9,508
779.00	4,754	4,754	14,262
780.00	4,754	4,754	19,016

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	4,754	0	0
781.00	5,358	5,056	5,056
782.00	5,986	5,672	10,728
783.00	6,640	6,313	17,041

Device	Routing	Invert	Outlet Devices
#1	Primary	779.00'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	780.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	782.00'	<b>29.0" x 29.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	782.50'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=3.62 cfs @ 12.13 hrs HW=781.39' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.38 fps)
- 2=Orifice/Grate (Orifice Controls 3.58 cfs @ 4.55 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

# Stowe Hollow Road

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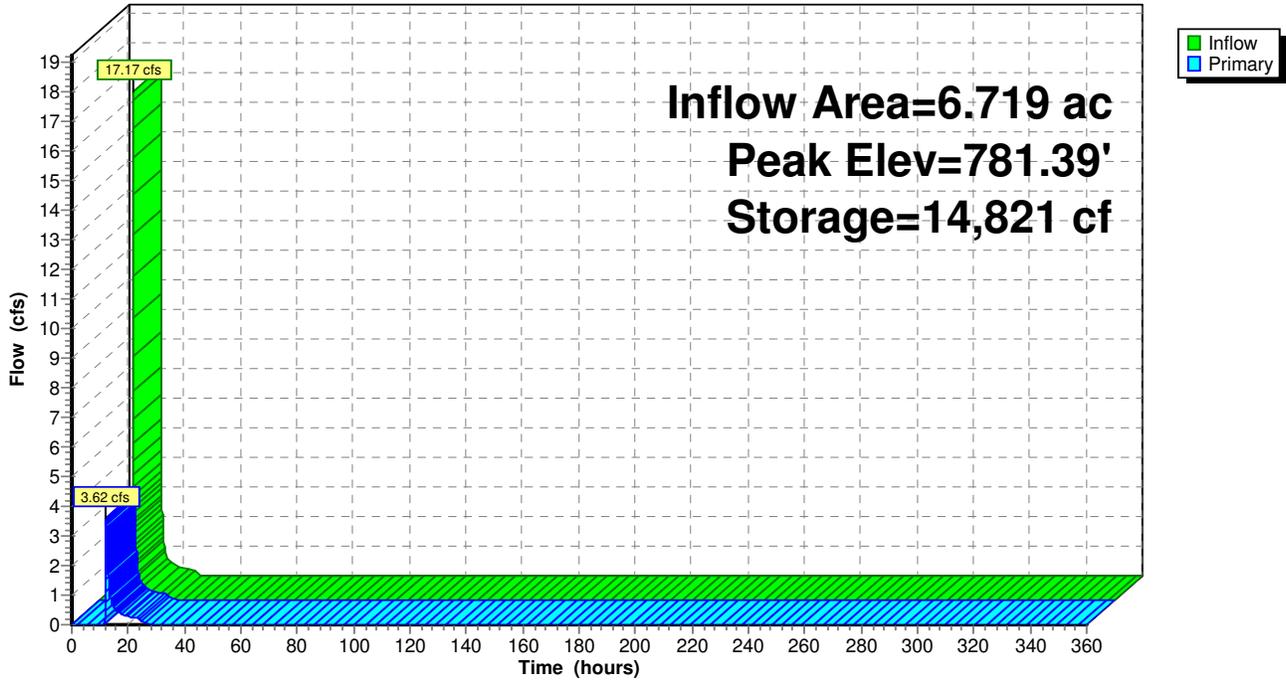
Type II 24-hr 10 yr Rainfall=3.79"

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## Pond 3P: Gravel Wetland

Hydrograph



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Type II 24-hr 10 yr Rainfall=3.79"

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**Summary for Pond 5P: Gravel Wetland Forebay**

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 1.38" for 10 yr event  
 Inflow = 17.49 cfs @ 11.96 hrs, Volume= 0.772 af  
 Outflow = 17.17 cfs @ 11.97 hrs, Volume= 0.701 af, Atten= 2%, Lag= 0.7 min  
 Primary = 17.17 cfs @ 11.97 hrs, Volume= 0.701 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Peak Elev= 783.51' @ 11.97 hrs Surf.Area= 1,565 sf Storage= 4,280 cf

Plug-Flow detention time= 66.0 min calculated for 0.701 af (91% of inflow)  
 Center-of-Mass det. time= 18.2 min ( 868.5 - 850.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	780.00'	5,050 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	790	0	0
781.00	1,025	908	908
782.00	1,282	1,154	2,061
783.00	1,565	1,424	3,485
784.00	1,565	1,565	5,050

Device	Routing	Invert	Outlet Devices
#1	Primary	782.75'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=17.13 cfs @ 11.97 hrs HW=783.51' TW=780.69' (Dynamic Tailwater)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 17.13 cfs @ 2.26 fps)

# Stowe Hollow Road

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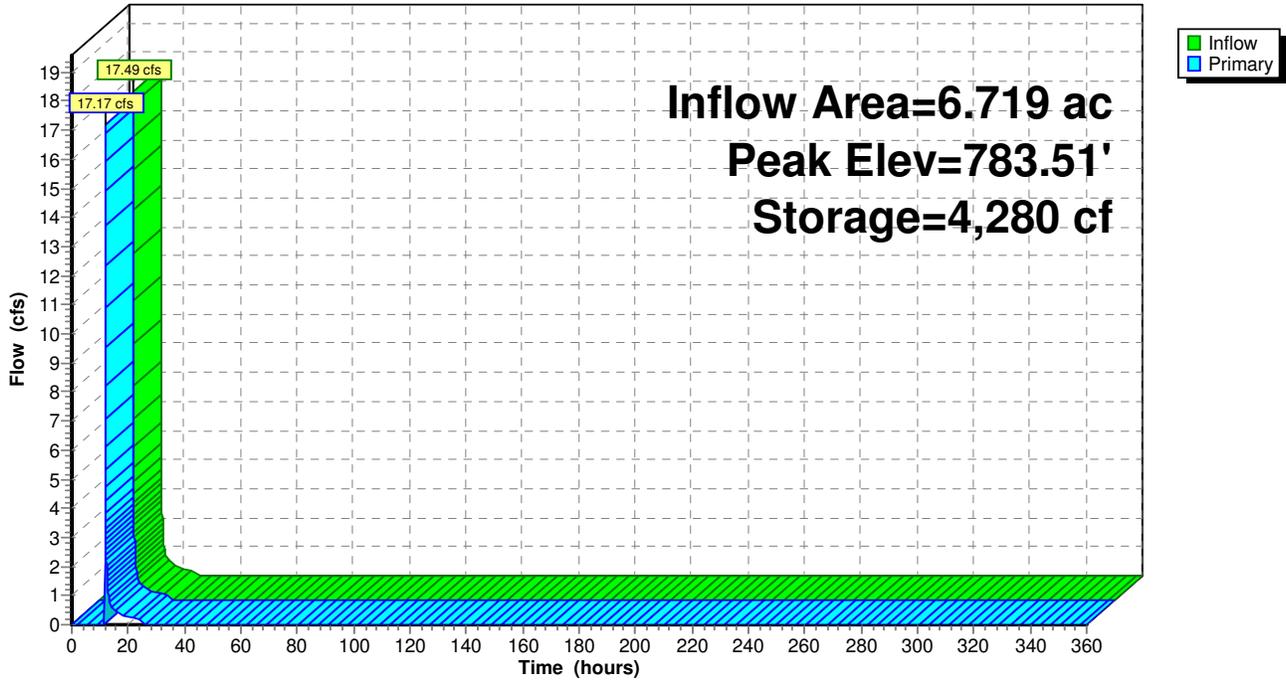
Type II 24-hr 10 yr Rainfall=3.79"

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## Pond 5P: Gravel Wetland Forebay

Hydrograph

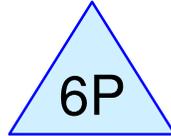




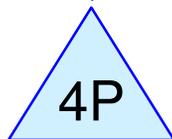
Pre Dev SN001



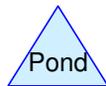
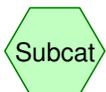
Post Dev SN001 25 yr



Gravel Wetland Forebay



Gravel Wetland



# Stowe Hollow Road

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Type II 24-hr 25 yr Rainfall=4.59"

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## Summary for Subcatchment 1S: Pre Dev SN001

Runoff = 10.12 cfs @ 12.00 hrs, Volume= 0.532 af, Depth= 0.95"

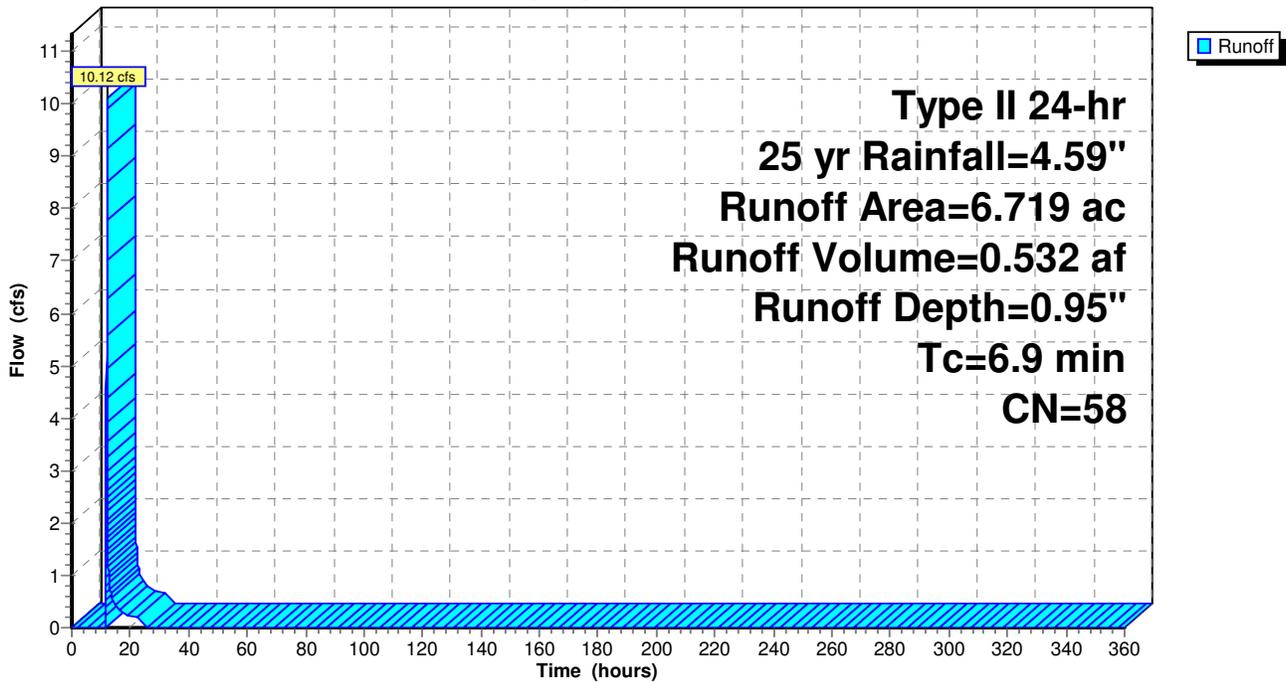
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 25 yr Rainfall=4.59"

Area (ac)	CN	Description
* 6.719	58	
6.719		100.00% Pervious Area

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

## Subcatchment 1S: Pre Dev SN001

Hydrograph



# Stowe Hollow Road

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Type II 24-hr 25 yr Rainfall=4.59"

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## Summary for Subcatchment 4S: Post Dev SN001 25 yr

Runoff = 24.95 cfs @ 11.96 hrs, Volume= 1.100 af, Depth= 1.96"

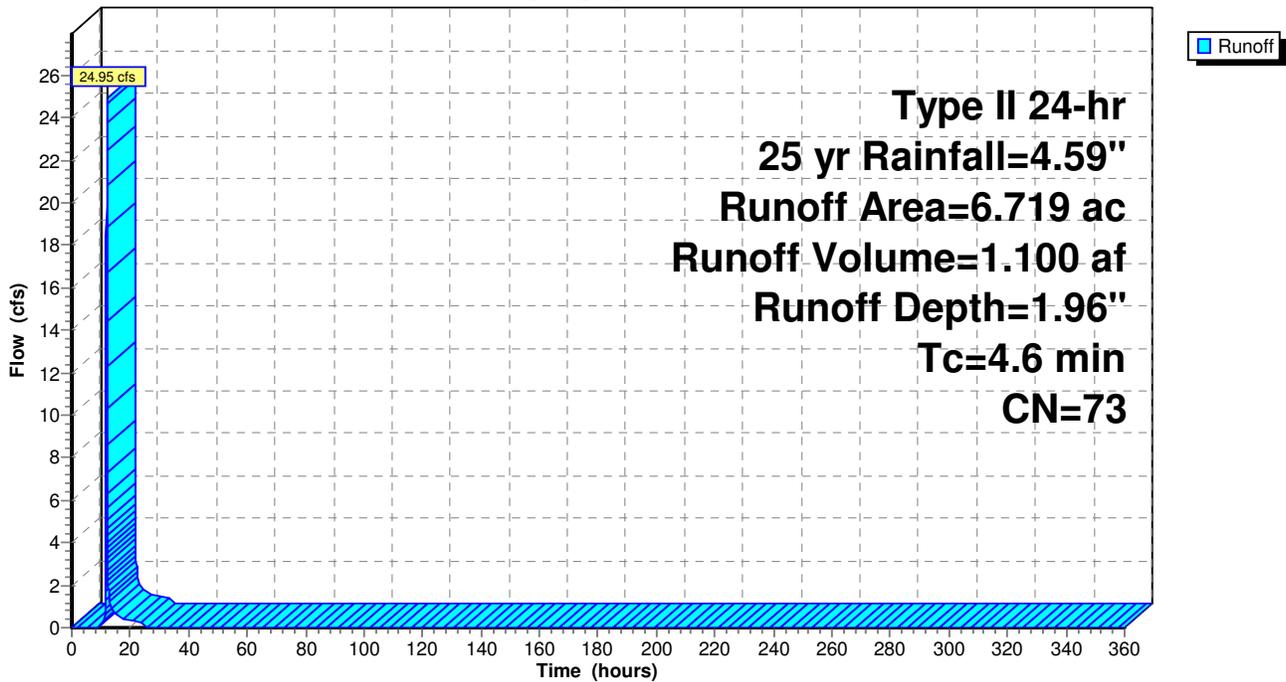
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
Type II 24-hr 25 yr Rainfall=4.59"

Area (ac)	CN	Description
* 6.719	73	
6.719		100.00% Pervious Area

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

## Subcatchment 4S: Post Dev SN001 25 yr

Hydrograph



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Type II 24-hr 25 yr Rainfall=4.59"

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**Summary for Pond 4P: Gravel Wetland**

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 1.84" for 25 yr event  
 Inflow = 24.81 cfs @ 11.97 hrs, Volume= 1.028 af  
 Outflow = 9.46 cfs @ 12.07 hrs, Volume= 1.028 af, Atten= 62%, Lag= 5.9 min  
 Primary = 9.46 cfs @ 12.07 hrs, Volume= 1.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Starting Elev= 779.00' Surf.Area= 4,754 sf Storage= 5,705 cf  
 Peak Elev= 782.16' @ 12.07 hrs Surf.Area= 10,847 sf Storage= 19,319 cf (13,615 cf above start)

Plug-Flow detention time= 216.2 min calculated for 0.897 af (87% of inflow)  
 Center-of-Mass det. time= 117.8 min ( 970.2 - 852.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	776.00'	7,606 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 19,016 cf Overall x 40.0% Voids
#2	780.00'	17,041 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
		24,647 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
776.00	4,754	0	0
777.00	4,754	4,754	4,754
778.00	4,754	4,754	9,508
779.00	4,754	4,754	14,262
780.00	4,754	4,754	19,016

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	4,754	0	0
781.00	5,358	5,056	5,056
782.00	5,986	5,672	10,728
783.00	6,640	6,313	17,041

Device	Routing	Invert	Outlet Devices
#1	Primary	779.00'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	780.00'	<b>15.0" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	782.00'	<b>29.0" x 29.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	782.50'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=9.44 cfs @ 12.07 hrs HW=782.16' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.05 cfs @ 8.51 fps)
- 2=Orifice/Grate (Orifice Controls 7.33 cfs @ 5.97 fps)
- 3=Orifice/Grate (Weir Controls 2.06 cfs @ 1.32 fps)
- 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

# Stowe Hollow Road

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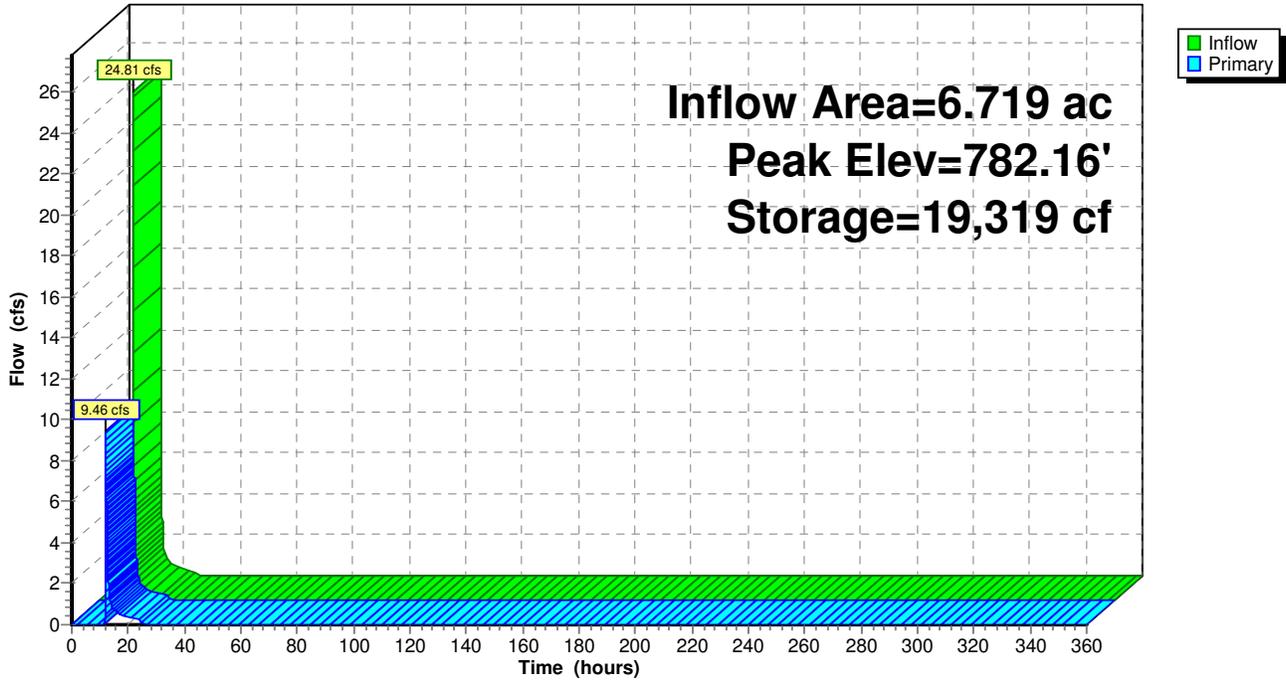
Type II 24-hr 25 yr Rainfall=4.59"

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## Pond 4P: Gravel Wetland

Hydrograph



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Type II 24-hr 25 yr Rainfall=4.59"

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## Summary for Pond 6P: Gravel Wetland Forebay

Inflow Area = 6.719 ac, 0.00% Impervious, Inflow Depth = 1.96" for 25 yr event  
 Inflow = 24.95 cfs @ 11.96 hrs, Volume= 1.100 af  
 Outflow = 24.81 cfs @ 11.97 hrs, Volume= 1.028 af, Atten= 1%, Lag= 0.4 min  
 Primary = 24.81 cfs @ 11.97 hrs, Volume= 1.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs  
 Peak Elev= 783.36' @ 11.97 hrs Surf.Area= 1,565 sf Storage= 4,046 cf

Plug-Flow detention time= 47.9 min calculated for 1.028 af (94% of inflow)  
 Center-of-Mass det. time= 12.6 min ( 852.4 - 839.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	780.00'	5,050 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
780.00	790	0	0
781.00	1,025	908	908
782.00	1,282	1,154	2,061
783.00	1,565	1,424	3,485
784.00	1,565	1,565	5,050

Device	Routing	Invert	Outlet Devices
#1	Primary	782.75'	<b>20.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=24.75 cfs @ 11.97 hrs HW=783.36' TW=781.50' (Dynamic Tailwater)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 24.75 cfs @ 2.03 fps)

# Stowe Hollow Road

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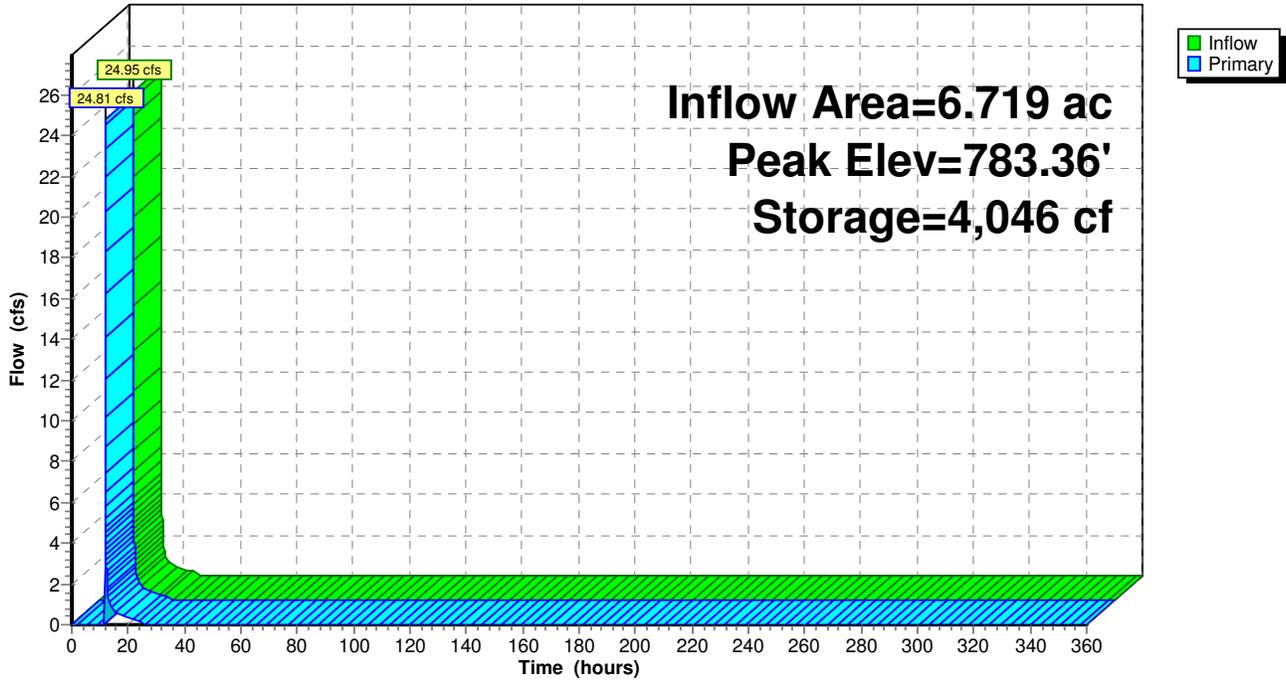
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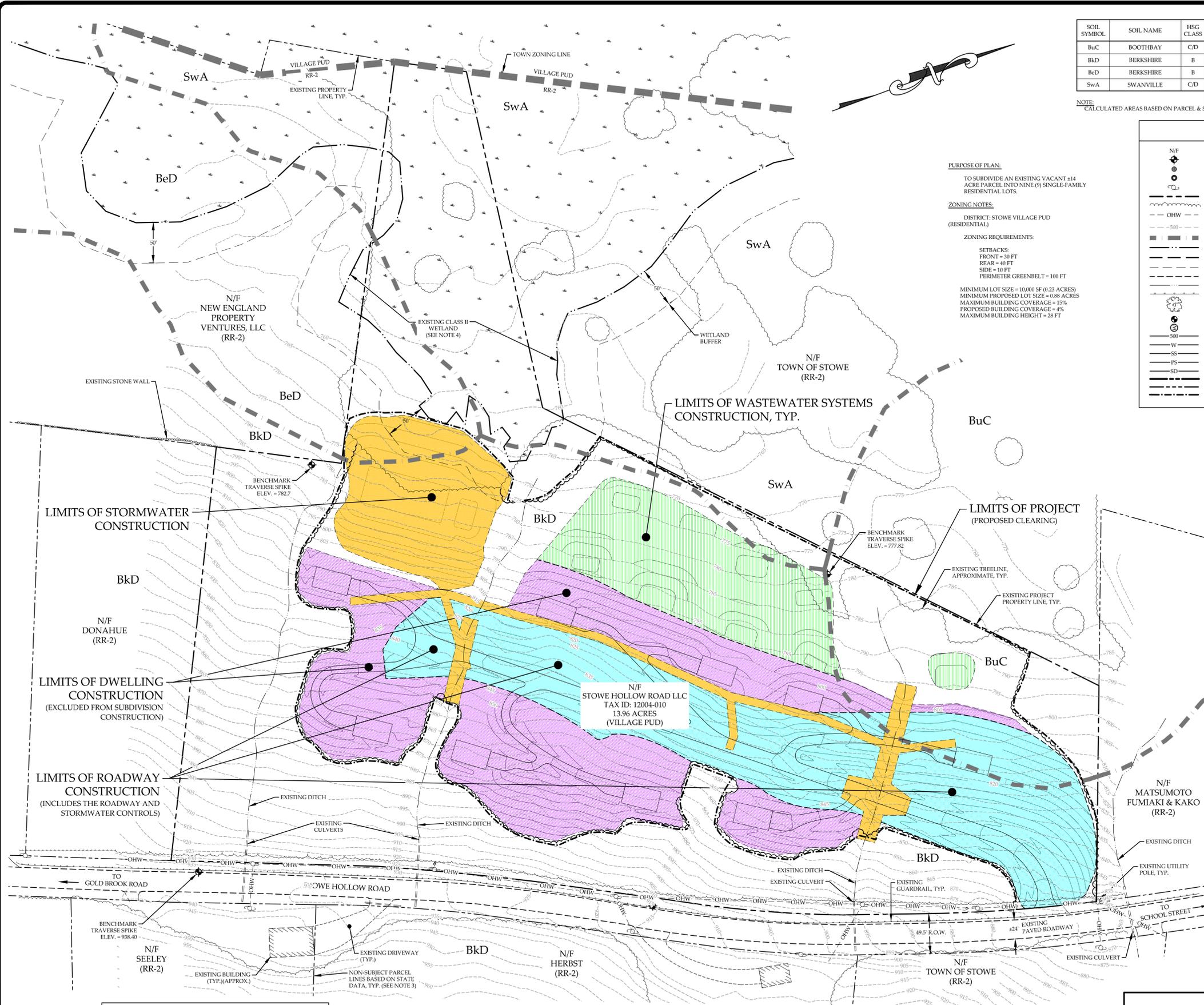
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## Pond 6P: Gravel Wetland Forebay

Hydrograph



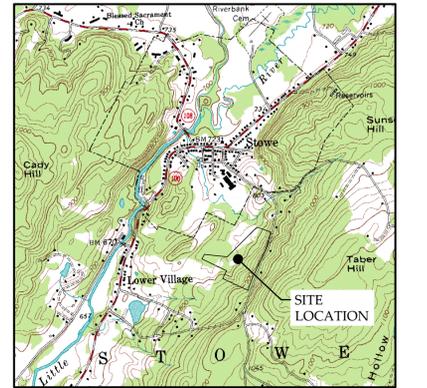


SOIL SYMBOL	SOIL NAME	HSG CLASS	AGRICULTURAL VALUE	ACREAGE	IMPACTED ACREAGE
BuC	BOOTHBAY	C/D	STATEWIDE (7)	±1.29	±0.64
BkD	BERKSHIRE	B	NPSL (6)	±10.55	±6.54
BeD	BERKSHIRE	B	NPSL (8)	±0.58	0
SwA	SWANVILLE	C/D	PRIME (b) (0)	±1.54	±0.08
TOTAL ACRES				±13.96	±7.26

NOTE: CALCULATED AREAS BASED ON PARCEL & SOIL LINES, SEE PLAN REFERENCES.

### LEGEND

- N/F: NOW OR FORMERLY OWNED BY
- : ELEVATION BENCHMARK
- : IRON PIPE / REBAR FOUND
- : REBAR TO BE SET
- : EXISTING UTILITY POLE & GUY WIRE
- : EXISTING PROPERTY LINE
- : EXISTING TREE LINE
- : EXISTING OVERHEAD WIRES
- : EXISTING CONTOUR
- : EXISTING SOILS
- : EXISTING WETLANDS VCGI
- : EXISTING WETLAND BUFFER
- : EXISTING EDGE OF GRAVEL
- : EXISTING EDGE OF PAVEMENT
- : EXISTING STREAM / DITCH
- : EXISTING GAURDRAIL
- : EXISTING TREES
- : TEST PIT LOCATION
- : PROPOSED DRILLED WELL
- : PROPOSED CONTOUR
- : PROPOSED WATER LINE
- : PROPOSED GRAVITY SEWER LINE
- : PROPOSED PRESSURE SEWER LINE
- : PROPOSED STORM DRAIN PIPE
- : PROPOSED PROPERTY LINE
- : PROPOSED RIGHT OF WAY / EASEMENT
- : LIMITS OF PROJECT



**SITE LOCATION MAP**  
NOT TO SCALE

- ### LIST OF DRAWINGS
- ER-1 PRE-DEVELOPMENT / DRAINAGE MAP
  - ER-2 EPSC CONSTRUCTION PLAN - PHASE 1
  - ER-3 EPSC CONSTRUCTION PLAN - PHASE 2
  - ER-4 EPSC CONSTRUCTION PLAN - PHASE 3
  - ER-5 EPSC CONSTRUCTION PLAN - PHASE 4
  - ER-6 EPSC DETAILS

**PURPOSE OF PLAN:**  
TO SUBDIVIDE AN EXISTING VACANT ±14 ACRE PARCEL INTO NINE (9) SINGLE-FAMILY RESIDENTIAL LOTS.

**ZONING NOTES:**  
DISTRICT: STOWE VILLAGE PUD (RESIDENTIAL)

**ZONING REQUIREMENTS:**  
SETBACKS:  
FRONT = 30 FT  
REAR = 40 FT  
SIDE = 10 FT  
PERIMETER GREENBELT = 100 FT

MINIMUM LOT SIZE = 10,000 SF (0.23 ACRES)  
MINIMUM PROPOSED LOT SIZE = 0.88 ACRES  
MAXIMUM BUILDING COVERAGE = 15%  
PROPOSED BUILDING COVERAGE = 4%  
MAXIMUM BUILDING HEIGHT = 28 FT

- PLAN REFERENCES:**
- 1) A BOUNDARY SURVEY OF SUBJECT PARCEL PROVIDED BY BUTTON LAND SURVEYORS ON JUNE 11, 2019.
  - 2) LOCATIONS OF UTILITY POLES, ROADS, DRIVES, CULVERTS, STREAMS, TEST PITS, PARTIAL TOPOGRAPHIC INFORMATION PROVIDED BY BUTTON LAND SURVEYORS ON JUNE 11, 2019.
  - 3) OTHER TOPOGRAPHIC DATA & PARCEL LINES USED FOR ADJUTING PROPERTIES TAKEN FROM THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION, ON SEPTEMBER 11, 2018.
  - 4) WETLAND LIMITS WITHIN PROPERTY AREA CONDUCTED BY ARROWWOOD ENVIRONMENTAL ON 9/23/19. CONFIRMED BY SHANNON MORRISON, STATE OF VERMONT, ON 10/2/19. LOCATION RECORDED VIA GIS BY MUMLEY ENGINEERING, INC. ON 10/20/19.

- NOTES:**
- 1) THIS DRAWING IS NOT A BOUNDARY SURVEY PLAT. BOUNDARY LINE INFORMATION SHOWN IS BASED ON PLAN REFERENCE #1. THE PROPERTY LINES, EASEMENTS AND OTHER REAL PROPERTY DESCRIPTIONS PROVIDED ON THIS DRAWING ARE FOR ILLUSTRATION PURPOSES ONLY. THEY DO NOT DEFINE LEGAL RIGHTS OR MEET LEGAL REQUIREMENTS FOR A LAND SURVEY AS DESCRIBED IN V.S.A. TITLE 27, SECTION 1403 AND SHALL NOT BE USED IN LIEU OF A SURVEY AS THE BASIS OF ANY LAND TRANSFER OR ESTABLISHMENT OF ANY PROPERTY RIGHT.
  - 2) THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES OR UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION. APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK.
  - 3) THIS TOPOGRAPHIC SURVEY WAS CONDUCTED WITHOUT THE BENEFIT OF "DIG SAFE" MARKINGS. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND ARE NOT WARRANTED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT "DIG SAFE" BEFORE COMMENCING ANY WORK AND SHALL PRESERVE ALL EXISTING UTILITIES NOT SPECIFIED TO BE REMOVED OR ABANDONED AS PART OF THE PROJECT.

- NOTES:**
- LIMITS OF DISTURBANCE TO BE DEMARCATED WITH 3" HIGH GRADE STAKES SPACED APPROX. 10' APART AND CONNECTED BY ORANGE FLAGGING RIBBON.
- ALL EROSION PREVENTION AND SEDIMENT CONTROL DEVICES (I.E. SILT FENCING) WILL BE INSTALLED PRIOR TO DISTURBANCES ASSOCIATED WITH THE PHASE.
- ALL SITE DEMARCATIONS WILL TAKE PLACE PRIOR TO INITIAL SITE DISTURBANCE.
- ALL DISTURBANCES TO BE LIMITED TO A MAXIMUM OF 2 ACRES AT ONE TIME. NEW DISTURBANCES WILL NOT BE INITIATED UNTIL PREVIOUS TASKS ARE STABILIZED.
- ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:
- A) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.
  - B) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.
  - C) TO ENSURE COVER OF DISTURBED SOIL IN ADVANCE OF A MELT EVENT DURING WINTER CONSTRUCTION, AREAS OF DISTURBED SOIL MUST BE STABILIZED AT THE END OF EACH WORK DAY, WITH THE FOLLOWING EXCEPTIONS:
    1. IF NO PRECIPITATION WITHIN 24 HOURS IS FORECAST AND WORK WILL RESUME IN THE SAME DISTURBED AREA WITHIN 24 HOURS, DAILY STABILIZATION IS NOT NECESSARY.
    2. DISTURBED AREAS THAT COLLECT AND RETAIN RUNOFF SUCH AS HOUSE FOUNDATIONS OR OPEN UTILITY TRENCHES.
- COMPLETE STABILIZATION OF EACH TASK IS NECESSARY BEFORE BEGINNING NEXT TASK.
- STABILIZATION OF OPERATIONAL STORMWATER TREATMENT PRACTICES (E.G. PONDS, GRASS LINED SWALES) WILL BE COMPLETE BEFORE RUNOFF IS DIRECTED TO THEM.
- DURING WINTER CONSTRUCTION, REMOVE SNOW OR ICE TO LESS THAN 1" THICKNESS PRIOR TO STABILIZATION.
- DURING WINTER CONSTRUCTION AND IN AREAS WITHIN 100' OF RECEIVING WATER, REINFORCE SILT FENCING OR REPLACE WITH PERIMETER DIKES, SWALES OR OTHER PRACTICES RESISTANT TO THE FORCES OF SNOW LOADS.

REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
REVISION: 01-23-20 - VARIOUS CHANGES TO PHASES & AREAS

**EPSC PLAN ONLY**  
NOT FOR CONSTRUCTION  
DATE: 2/10/20

**PRE-DEVELOPMENT / DRAINAGE MAP**  
SCALE: 1" = 60'  
Graphic Scale  
0 60 120 240 feet

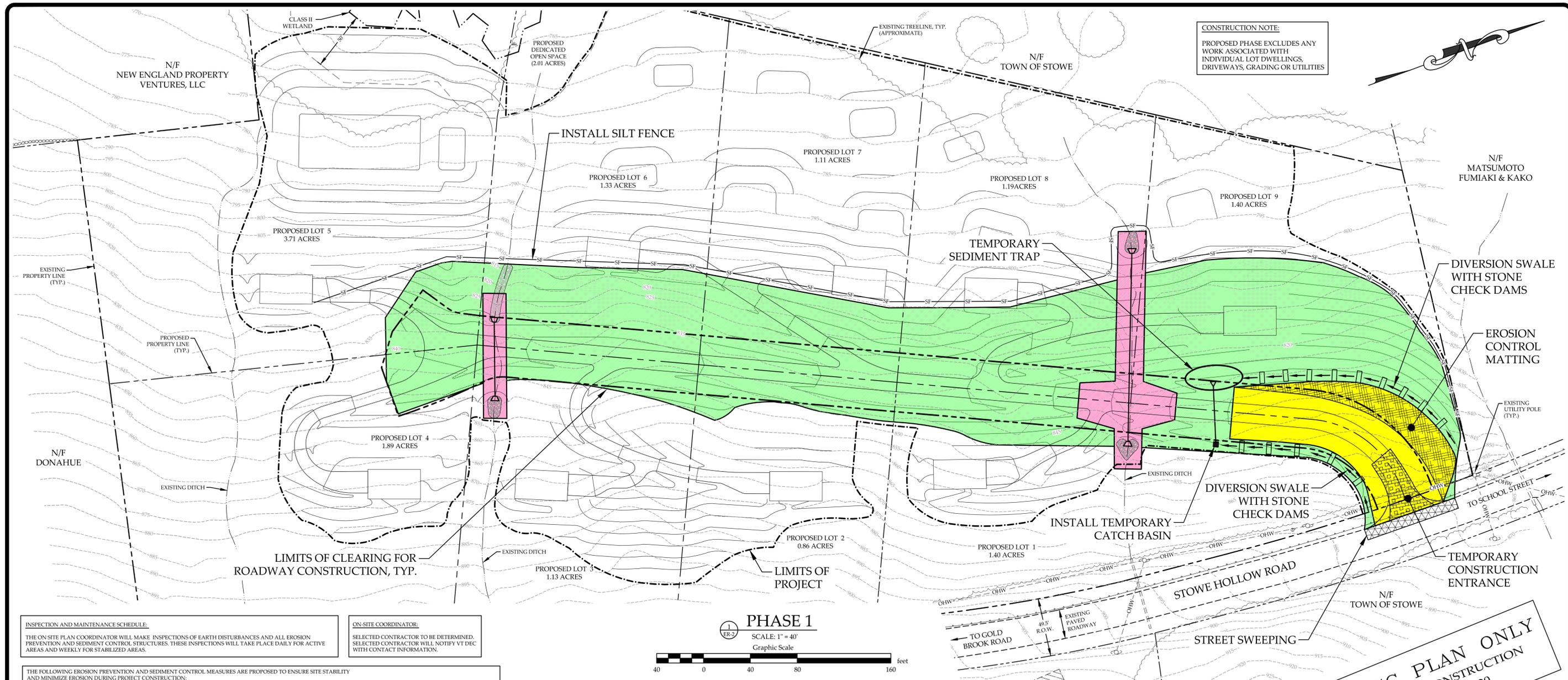
**OWNER OF RECORD:**  
STOWE HOLLOW ROAD LLC  
474 STOWE HOLLOW ROAD  
STOWE, VT 05672

**PRE-DEVELOPMENT / DRAINAGE MAP**  
RIDGE AT STOWE HOLLOW  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD, STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
454 MOUNTAIN ROAD, SUITE 4  
STOWE, VERMONT 05672  
WWW.MUMLEYENGINEERING.COM  
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PROJECT NO. ....18045  
DRAWN BY.....WEH  
CHECKED BY.....TRM  
SCALE.....1" = 60'  
DATE.....01/17/20

SHEET NO.  
**ER-1**  
1 OF 6 SHEETS



**INSPECTION AND MAINTENANCE SCHEDULE:**  
THE ON-SITE PLAN COORDINATOR WILL MAKE INSPECTIONS OF EARTH DISTURBANCES AND ALL EROSION PREVENTION AND SEDIMENT CONTROL STRUCTURES. THESE INSPECTIONS WILL TAKE PLACE DAILY FOR ACTIVE AREAS AND WEEKLY FOR STABILIZED AREAS.

**ON-SITE COORDINATOR:**  
SELECTED CONTRACTOR TO BE DETERMINED. SELECTED CONTRACTOR WILL NOTIFY VT DEC WITH CONTACT INFORMATION.

THE FOLLOWING EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE PROPOSED TO ENSURE SITE STABILITY AND MINIMIZE EROSION DURING PROJECT CONSTRUCTION:

**CATCH BASIN INLET PROTECTION:**  
THE SITE IS GRADED TO DIRECT MOST FLOW TO CATCHMENT BASINS FOR CONVEYANCE TO THE PERMANENT STORMWATER DETENTION POND. CATCHMENT BASINS WILL BE INSTALLED AS THE ROAD IS BUILT. STORMWATER RUNOFF FROM THE CONSTRUCTION SITE WILL BE DRAINED TO THESE CATCHMENT BASINS. TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE NETWORK, EXCAVATED DROP-TYPE STORM DRAIN INLET PROTECTION HAS BEEN SPECIFIED AT ALL CATCHMENT BASINS. THESE SHOULD BE INSTALLED AS THE CATCHMENT BASINS ARE INSTALLED, LEAVING ELEVATION AROUND THE INLET BELOW FINISHED GRADE TO CREATE THE EXCAVATED AREA WHICH WILL SLOW FLOW AND ALLOW SEDIMENTS TO SETTLE. SIZE IS BASED ON A MINIMUM OF 900 CU FT PER DRAINAGE AREA ACRE. EXCAVATED AREA WILL BE CLEANED WHEN 50% OF STORAGE VOLUME IS FILLED.

**STONE SUB-BASE:**  
FOLLOWING THE COMPLETION OF ROUGH GRADING OF THE ROAD A CRUSHED STONE SUB-BASE WILL BE INSTALLED. THE STONE SUB-BASE WILL ALSO PROVIDE A TEMPORARY STABILIZED SURFACE FOR EQUIPMENT OPERATION, MATERIALS STORAGE, AND CONTRACTOR PARKING DURING THE EARLY STAGES OF SITE WORK.

**STONE CHECK DAMS:**  
STONE CHECK DAMS WILL BE INSTALLED WITHIN SWALES TO PROVIDE SEDIMENT ENTRAPMENT AND REDUCTION IN FLOW VELOCITIES.

**SILT FENCE:**  
IN ORDER TO PROVIDE BARRIERS TO SEDIMENT MOVEMENT AND FROM CRITICAL SOIL DISTURBANCE AREAS, SILT FENCING WILL BE INSTALLED PARALLEL TO PROPOSED SITE CONTOURS AND WILL BE TOED-IN TO NATIVE SOILS. SILT FENCE WILL REMAIN UNTIL ADEQUATE VEGETATION ENSURES NO FURTHER EROSION OF DISTURBED SLOPES. SILT FENCING WILL BE USED SURROUNDING TEMPORARY SOIL STOCKPILES AND SURROUNDING INDIVIDUAL HOMESITES DURING CONSTRUCTION. USE AT LEAST 100 FEET OF FENCING FOR EVERY 1/4 ACRE OF DISTURBED AREA UPGRADENT. INSTALL SILT FENCE AHEAD OF GROUND FREEZING DURING WINTER CONSTRUCTION.

**STREET SWEEPING:**  
SWEEPING OF AREAS SURROUNDING THE ACCESS ROAD WILL BE SWEEPED ON A DAILY BASIS OR AS NECESSARY AS DETERMINED BY THE OSPC.

**STABILIZED CONSTRUCTION ENTRANCE/EXIT:**  
ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A CONSTRUCTION EXIT COMPOSED OF COARSE STONE TO THE DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS DETAIL SHEET. THE ROUGH TEXTURE OF THE STONE HELPS TO REMOVE CLUMPS OF SOIL ADHERING TO THE CONSTRUCTION VEHICLE TIRES THROUGH THE ACTION OF VIBRATION AND JARRING OVER THE ROUGH SURFACE AND THE FRICTION OF THE STONE MATRIX AGAINST SOILS ATTACHED TO VEHICLE TIRES.

**RIPRAP SLOPE PROTECTION:**  
RIPRAPPING HAS BEEN SPECIFIED IN AREAS OF HIGH EROSION RISK, ASSESSED BY SLOPE, CONCENTRATION OF FLOW, AND SOIL EROSION RISK FACTORS. SLOPES MUST BE GRADED TO ACCOUNT FOR DEPTH OF RIPRAP AND COMPACTED IF FILLED. FILTER FABRIC WILL BE PLACED ON THE PREPARED SLOPE WITH OVERLAPS OF 2 FEET ANCHORED EVERY 3 FEET. PLACE ROCK AS TO NOT RIP FILTER FABRIC, SORT STONE SIZE, OR CREATE VOIDS. INSTALL AT RIPRAP AS SOON AFTER SLOPE PREPARATION AS POSSIBLE TO HIGH EROSION RISK OF SPECIFIED AREAS.

**SEED AND MULCH:**  
SEED A CREEPING RED FESCUE AND KENTUCKY BLUEGRASS MIXTURE AT 2:1. THE MIXTURE IS EXPECTED TO BE USEFUL IN A WIDE RANGE OF DRAINAGE CHARACTERISTICS AND SOIL CONDITIONS. ADDITIONALLY, A MULCHING RATE OF 100 LBS/1,000 FT<sup>2</sup> (ABOUT 2-3 BALES) HAS BEEN SPECIFIED FOR TEMPORARY SOIL STABILIZATION.

IN AREAS WHERE THIS TECHNIQUE HAS BEEN SPECIFIED, IMPLEMENTATION MUST OCCUR IN THE NORMAL CONSTRUCTION SEASON AFTER APRIL 15, AND MUST BE COMPLETED PRIOR TO SEPTEMBER 15. IF VEGETATION COVERAGE IS NOT SIGNIFICANT BEFORE OCTOBER 15, A WINTER APPLICATION OF MULCH MUST BE APPLIED. THIS APPLICATION RATE IS DOUBLE THE REGULAR CONSTRUCTION APPLICATION RATE WITH 80-90% COVER. MULCH SHOULD BE TACKED IN OR STABILIZED WITH NETTING FOR THE WINTER.

**DRAINAGE SWALE:**  
A GRASS LINED CHANNEL HAS BEEN DESIGNED TO CONVEY STORMWATER RUNOFF FROM AN UPPER SLOPE AROUND AN AREA OF SENSITIVE SOIL TYPE. THIS DRAINAGE FEATURE WILL ALSO BENEFIT THE PERFORMANCE OF THE WASTEWATER DISPOSAL MOUND, IN CONJUNCTION WITH THE SPECIFIED UNDERDRAIN. THIS DIVERSION IS INTENDED TO PROTECT SOIL SURFACES THAT ARE VULNERABLE TO SOIL EROSION AND WILL ULTIMATELY BE VEGETATED. ENSURE THE OUTFALL IS CONSTRUCTED AS SPECIFIED TO REDUCE POTENTIAL EROSION.

**TEMPORARY SEDIMENT TRAP:**  
SEVERAL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED ON SITE TO DETAIN RUNOFF WATERS, TRAP SEDIMENT AND PREVENT DAMAGE BY EXCESSIVE SEDIMENTATION AND DEBRIS. ALL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED TO PROVIDE A MINIMUM OF 3,600 CUBIC FEET OF STORAGE CAPACITY PER UPSLOPE ACRE OF DRAINAGE AREA.

**NOTES:**

LIMITS OF DISTURBANCE TO BE DEMARCATED WITH 3" HIGH GRADE STAKES SPACED APPROX. 10' APART AND CONNECTED BY ORANGE FLAGGING RIBBON.

ALL EROSION PREVENTION AND SEDIMENT CONTROL DEVICES (I.E. SILT FENCING) WILL BE INSTALLED PRIOR TO ALL DISTURBANCES ASSOCIATED WITH THE PHASE.

ALL SITE DEMARCATATIONS WILL TAKE PLACE PRIOR TO INITIAL SITE DISTURBANCE.

ALL DISTURBANCES TO BE LIMITED TO A MAXIMUM OF 2 ACRES AT ONE TIME. NEW DISTURBANCES WILL NOT BE INITIATED UNTIL PREVIOUS TASKS ARE STABILIZED.

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:

A) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.

B) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.

C) TO ENSURE COVER OF DISTURBED SOIL IN ADVANCE OF A MELT EVENT DURING WINTER CONSTRUCTION, AREAS OF DISTURBED SOIL MUST BE STABILIZED AT THE END OF EACH WORK DAY, WITH THE FOLLOWING EXCEPTIONS:

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2. DISTURBED AREAS THAT COLLECT AND RETAIN RUNOFF SUCH AS HOUSE FOUNDATIONS OR OPEN UTILITY TRENCHES.

COMPLETE STABILIZATION OF EACH TASK IS NECESSARY BEFORE BEGINNING NEXT TASK. SEE ER-3 STABILIZATION PLAN.

STABILIZATION OF OPERATIONAL STORMWATER TREATMENT PRACTICES (E.G. PONDS, GRASS LINED SWALES) WILL BE COMPLETE BEFORE RUNOFF IS DIRECTED TO THEM.

DURING WINTER CONSTRUCTION, REMOVE SNOW OR ICE TO LESS THAN 1" THICKNESS PRIOR TO STABILIZATION.

ORDER OF OPERATIONS ARE DESCRIBED IN THE EROSION PREVENTION AND SEDIMENTATION PLAN NARRATIVE, SECTION III.

DURING WINTER CONSTRUCTION AND IN AREAS WITHIN 100' OF RECEIVING WATER, REINFORCE SILT FENCING OR REPLACE WITH PERMETER DIKES, SWALES OR OTHER PRACTICES RESISTANT TO THE FORCES OF SNOW LOADS.

**STORMWATER CONTROLS LEGEND**

	STABILIZED CONSTRUCTION ENTRANCE
	STREET SWEEPING
	JUTE MATTING
	CATCH BASIN INLET PROTECTION AREA
	STONE CHECK DAMS
	RIPRAP SLOPE PROTECTION
	SILT FENCE
	LIMITS OF DISTURBANCE FENCE/FLAGGING

**PHASE 1 - TASK LEGEND**

	TASK ONE - +2.2 ACRES CLEAR AND GRUB AREA OF ROADWAY, INSTALL SILT FENCE
	TASK TWO - +0.3 ACRE ACCESS ROAD ROUGH GRADING, CONSTRUCTION ENTRANCE, DIVERSION SWALE, TEMPORARY SEDIMENT TRAP # 1
	TASK THREE - +0.2 ACRES STORMWATER CULVERTS, ROADWAY ROUGH GRADING

**EPSC PLAN ONLY**  
NOT FOR CONSTRUCTION  
DATE: 2/26/20

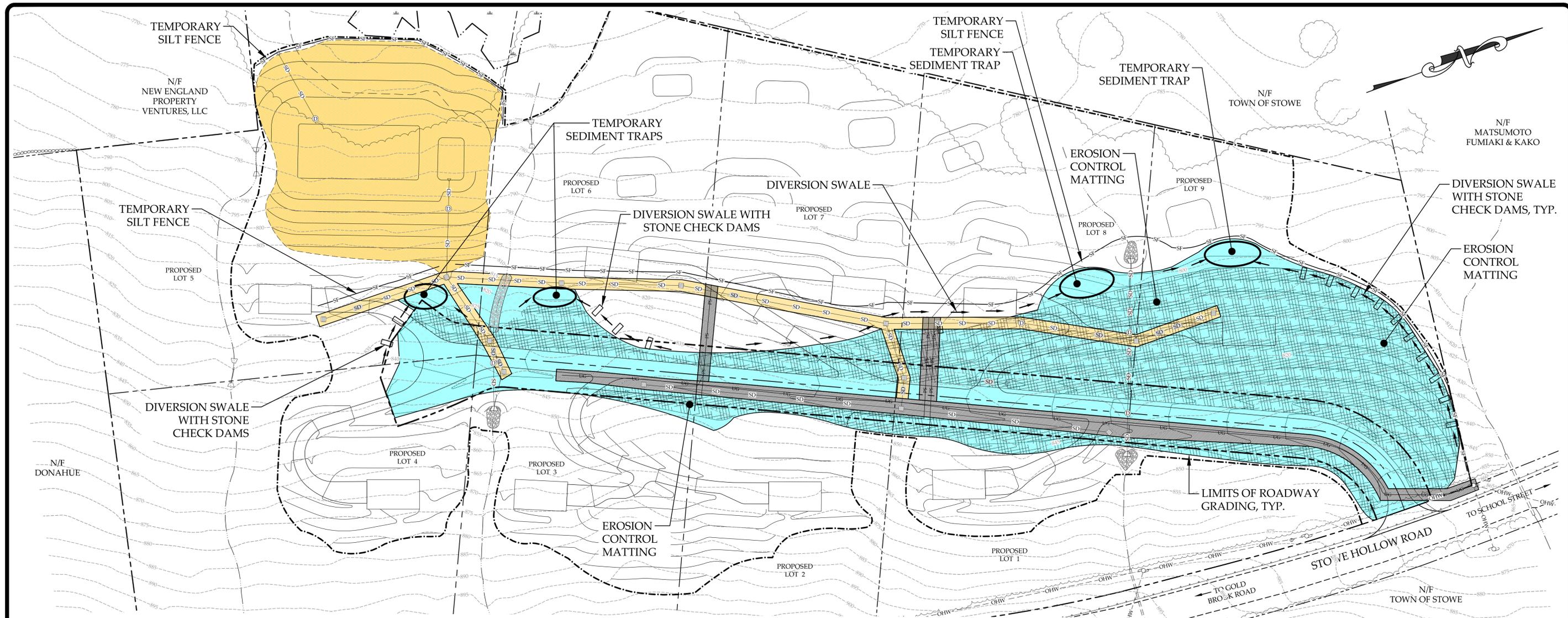
REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
REVISION: 01-23-20 - VARIOUS CHANGES TO PHASES & AREAS

**EPSC CONSTRUCTION PLAN - PHASE 1**  
RIDGE AT STOWE HOLLOW  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD, STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
454 MOUNTAIN ROAD, SUITE 4  
STOWE, VERMONT 05672  
WWW.MUMLEYENGINEERING.COM  
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PROJECT NO. ....18045  
DRAWN BY.....WEH  
CHECKED BY.....TRM  
SCALE.....1" = 40'  
DATE.....01/17/20

SHEET NO.  
**ER-2**  
2 OF 6 SHEETS



**INSPECTION AND MAINTENANCE SCHEDULE:**  
 THE ON SITE PLAN COORDINATOR WILL MAKE INSPECTIONS OF EARTH DISTURBANCES AND ALL EROSION PREVENTION AND SEDIMENT CONTROL STRUCTURES. THESE INSPECTIONS WILL TAKE PLACE DAILY FOR ACTIVE AREAS AND WEEKLY FOR STABILIZED AREAS.

**ON-SITE COORDINATOR:**  
 SELECTED CONTRACTOR TO BE DETERMINED. SELECTED CONTRACTOR WILL NOTIFY VT DEC WITH CONTACT INFORMATION.

THE FOLLOWING EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE PROPOSED TO ENSURE SITE STABILITY AND MINIMIZE EROSION DURING PROJECT CONSTRUCTION:

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**STONE SUB-BASE:**  
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**STONE CHECK DAMS:**  
 STONE CHECK DAMS WILL BE INSTALLED WITHIN SWALES TO PROVIDE SEDIMENT ENTRAPMENT AND REDUCTION IN FLOW VELOCITIES.

**SILT FENCE:**  
 IN ORDER TO PROVIDE BARRIERS TO SEDIMENT MOVEMENT AND FROM CRITICAL SOIL DISTURBANCE AREAS, SILT FENCING WILL BE INSTALLED PARALLEL TO PROPOSED SITE CONTOURS AND WILL BE TIED-IN TO NATIVE SOILS. SILT FENCE WILL REMAIN UNTIL ADEQUATE VEGETATION ENSURES NO FURTHER EROSION OF DISTURBED SLOPES. SILT FENCING WILL BE USED SURROUNDING TEMPORARY SOIL STOCKPILES AND SURROUNDING INDIVIDUAL HOMESITES DURING CONSTRUCTION. USE AT LEAST 100 FEET OF FENCING FOR EVERY 1/4 ACRE OF DISTURBED AREA UPGRADIENT. INSTALL SILT FENCE AHEAD OF GROUND FREEZING DURING WINTER CONSTRUCTION.

**STREET SWEEPING:**  
 SWEEPING OF AREAS SURROUNDING THE ACCESS ROAD WILL BE SWEEPED ON A DAILY BASIS OR AS NECESSARY AS DETERMINED BY THE OSPC

**STABILIZED CONSTRUCTION ENTRANCE EXIT:**  
 ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A CONSTRUCTION EXIT COMPOSED OF COARSE STONE TO THE DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS DETAIL SHEET. THE ROUGH TEXTURE OF THE STONE HELPS TO REMOVE CLUMPS OF SOIL ADHERING TO THE CONSTRUCTION VEHICLE TIRES THROUGH THE ACTION OF VIBRATION AND JARRING OVER THE ROUGH SURFACE AND THE FRICTION OF THE STONE MATRIX AGAINST SOILS ATTACHED TO VEHICLE TIRES.

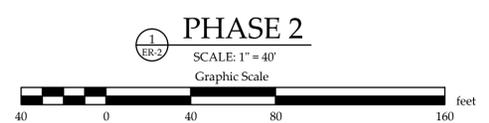
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**SEED AND MULCH:**  
 SEED A CREEPING RED FESCUE AND KENTUCKY BLUEGRASS MIXTURE AT 2:1. THE MIXTURE IS EXPECTED TO BE USEFUL IN A WIDE RANGE OF DRAINAGE CHARACTERISTICS AND SOIL CONDITIONS. ADDITIONALLY, A MULCHING RATE OF 100 LBS/1,000 FT<sup>2</sup> (ABOUT 2-3 BALES) HAS BEEN SPECIFIED FOR TEMPORARY SOIL STABILIZATION.

IN AREAS WHERE THIS TECHNIQUE HAS BEEN SPECIFIED, IMPLEMENTATION MUST OCCUR IN THE NORMAL CONSTRUCTION SEASON AFTER APRIL 15, AND MUST BE COMPLETED PRIOR TO SEPTEMBER 15. IF VEGETATION COVERAGE IS NOT SIGNIFICANT BEFORE OCTOBER 15, A WINTER APPLICATION OF MULCH MUST BE APPLIED. THIS APPLICATION RATE IS DOUBLE THE REGULAR CONSTRUCTION APPLICATION RATE WITH 80-90% COVER. MULCH SHOULD BE TACKED IN OR STABILIZED WITH NETTING FOR THE WINTER.

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**TEMPORARY SEDIMENT TRAP:**  
 SEVERAL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED ON SITE TO DETAIN RUNOFF WATERS, TRAP SEDIMENT AND PREVENT DAMAGE BY EXCESSIVE SEDIMENTATION AND DEBRIS. ALL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED TO PROVIDE A MINIMUM OF 3,600 CUBIC FEET OF STORAGE CAPACITY PER UPSLOPE ACRE OF DRAINAGE AREA.



**NOTES:**  
 LIMITS OF DISTURBANCE TO BE DEMARCATED WITH 3' HIGH GRADE STAKES SPACED APPROX. 10' APART AND CONNECTED BY ORANGE FLAGGING RIBBON.

ALL EROSION PREVENTION AND SEDIMENT CONTROL DEVICES (I.E. SILT FENCING) WILL BE INSTALLED PRIOR TO ALL DISTURBANCES ASSOCIATED WITH THE PHASE.

ALL SITE DEMARCATATIONS WILL TAKE PLACE PRIOR TO INITIAL SITE DISTURBANCE.

ALL DISTURBANCES TO BE LIMITED TO A MAXIMUM OF 2 ACRES AT ONE TIME. NEW DISTURBANCES WILL NOT BE INITIATED UNTIL PREVIOUS TASKS ARE STABILIZED.

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:

A) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.

B) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.

C) TO ENSURE COVER OF DISTURBED SOIL IN ADVANCE OF A MELT EVENT DURING WINTER CONSTRUCTION, AREAS OF DISTURBED SOIL MUST BE STABILIZED AT THE END OF EACH WORK DAY, WITH THE FOLLOWING EXCEPTIONS:

1. IF NO PRECIPITATION WITHIN 24 HOURS IS FORECAST AND WORK WILL RESUME IN THE SAME DISTURBED AREA WITHIN 24 HOURS, DAILY STABILIZATION IS NOT NECESSARY.
2. DISTURBED AREAS THAT COLLECT AND RETAIN RUNOFF SUCH AS HOUSE FOUNDATIONS OR OPEN UTILITY TRENCHES.

COMPLETE STABILIZATION OF EACH TASK IS NECESSARY BEFORE BEGINNING NEXT TASK. SEE ER-3 STABILIZATION PLAN.

STABILIZATION OF OPERATIONAL STORMWATER TREATMENT PRACTICES (E.G. PONDS, GRASS LINED SWALES) WILL BE COMPLETE BEFORE RUNOFF IS DIRECTED TO THEM.

DURING WINTER CONSTRUCTION, REMOVE SNOW OR ICE TO LESS THAN 1" THICKNESS PRIOR TO STABILIZATION.

ORDER OF OPERATIONS ARE DESCRIBED IN THE EROSION PREVENTION AND SEDIMENTATION PLAN NARRATIVE, SECTION III.

DURING WINTER CONSTRUCTION AND IN AREAS WITHIN 100' OF RECEIVING WATER, REINFORCE SILT FENCING OR REPLACE WITH PERIMETER DIKES, SWALES OR OTHER PRACTICES RESISTANT TO THE FORCES OF SNOW LOADS.

**CONSTRUCTION NOTE:**  
 PROPOSED PHASE EXCLUDES ANY WORK ASSOCIATED WITH INDIVIDUAL LOT DWELLINGS, DRIVEWAYS, GRADING OR UTILITIES

**PHASE 2 - TASK LEGEND**

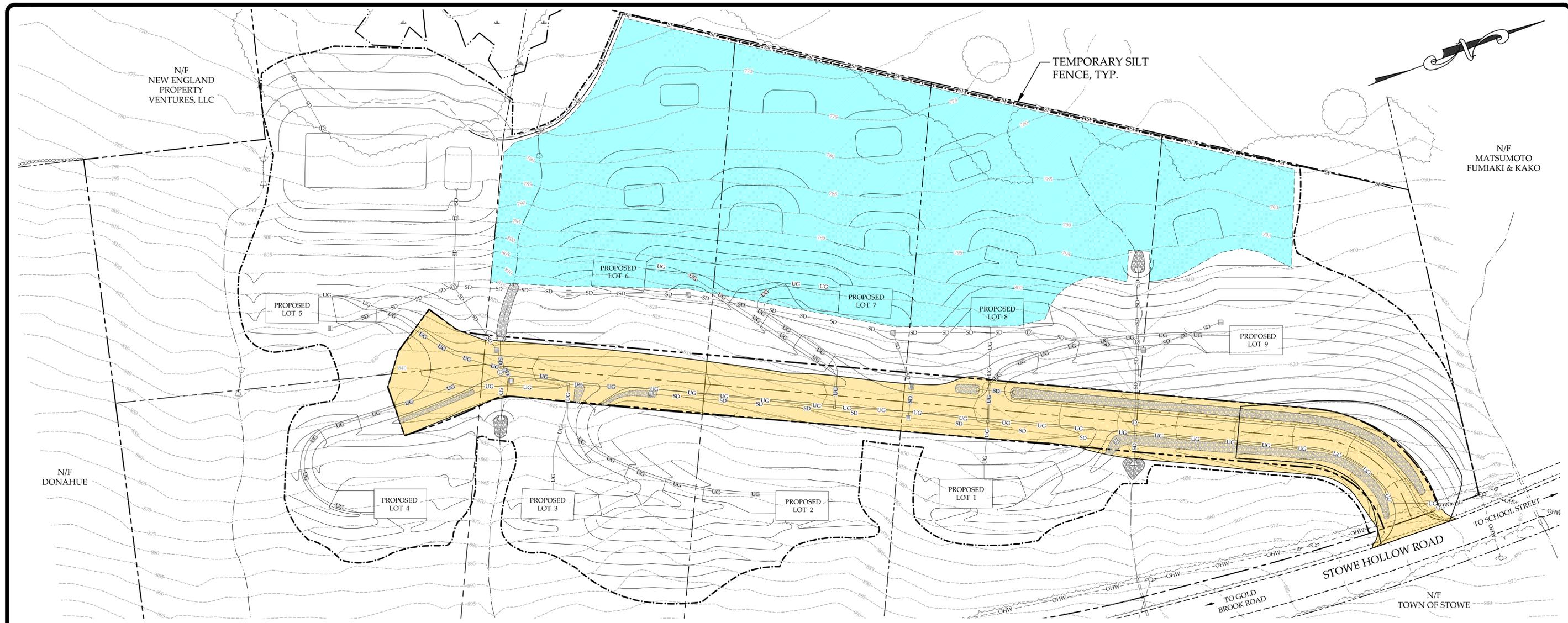
	TASK ONE - ±2.3 ACRES ROUGH GRADING OF PROPOSED ROADWAY, INSTALLATION OF SILT FENCE, DIVERSION SWALES AND SEDIMENT TRAPS
	TASK TWO - ±1.0 ACRE CONSTRUCTION OF STORMWATER STRUCTURES, CULVERTS, AND PONDS
	TASK THREE - ±0.2 ACRE INSTALLATION OF UTILITIES

**EPSC PLAN ONLY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20

REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
 REVISION: 01-23-20 - VARIOUS CHANGES TO PHASES & AREAS

**EPSC CONSTRUCTION PLAN - PHASE 2**  
 RIDGE AT STOWE HOLLOW  
 STOWE HOLLOW ROAD LLC  
 STOWE HOLLOW ROAD, STOWE, VERMONT

 <b>MUMLEY ENGINEERING, INC.</b> 454 MOUNTAIN ROAD, SUITE 4 STOWE, VERMONT 05672 WWW.MUMLEYENGINEERING.COM COPYRIGHT © 2020 - MUMLEY ENGINEERING, INC.	PROJECT NO. ....18045	SHEET NO.
	DRAWN BY.....WEH	 3 OF 6 SHEETS
	CHECKED BY.....TRM	
	SCALE.....1" = 40'	
DATE.....01/17/20		



TEMPORARY SILT FENCE, TYP.

N/F  
NEW ENGLAND  
PROPERTY  
VENTURES, LLC

N/F  
MATSUMOTO  
FUMIAKI & KAKO

N/F  
DONAHUE

N/F  
TOWN OF STOWE

**INSPECTION AND MAINTENANCE SCHEDULE:**  
THE ON SITE PLAN COORDINATOR WILL MAKE INSPECTIONS OF EARTH DISTURBANCES AND ALL EROSION PREVENTION AND SEDIMENT CONTROL STRUCTURES. THESE INSPECTIONS WILL TAKE PLACE DAILY FOR ACTIVE AREAS AND WEEKLY FOR STABILIZED AREAS.

**ON-SITE COORDINATOR:**  
SELECTED CONTRACTOR TO BE DETERMINED. SELECTED CONTRACTOR WILL NOTIFY VT DEC WITH CONTACT INFORMATION.

**PHASE 3**  
SCALE: 1" = 40'  
Graphic Scale



THE FOLLOWING EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE PROPOSED TO ENSURE SITE STABILITY AND MINIMIZE EROSION DURING PROJECT CONSTRUCTION:

**CATCH BASIN INLET PROTECTION:**  
THE SITE IS GRADED TO DIRECT MOST FLOW TO CATCHMENT BASINS FOR CONVEYANCE TO THE PERMANENT STORMWATER DETENTION POND. CATCHMENT BASINS WILL BE INSTALLED AS THE ROAD IS BUILT. STORMWATER RUNOFF FROM THE CONSTRUCTION SITE WILL BE DRAINED TO THESE CATCHMENT BASINS. TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE NETWORK, EXCAVATED DROP TYPE STORM DRAIN INLET PROTECTION HAS BEEN SPECIFIED AT ALL CATCHMENT BASINS. THESE SHOULD BE INSTALLED AS THE CATCHMENT BASINS ARE INSTALLED, LEAVING ELEVATION AROUND THE INLET BELOW FINISHED GRADE TO CREATE THE EXCAVATED AREA WHICH WILL SLOW FLOW AND ALLOW SEDIMENTS TO SETTLE. SIZE IS BASED ON A MINIMUM OF 900 CU.FT PER DRAINAGE AREA ACRE. EXCAVATED AREA WILL BE CLEANED WHEN 50% OF STORAGE VOLUME IS FILLED.

**STONE SUB-BASE:**  
FOLLOWING THE COMPLETION OF ROUGH GRADING OF THE ROAD A CRUSHED STONE SUB-BASE WILL BE INSTALLED. THE STONE SUB BASE WILL ALSO PROVIDE A TEMPORARY STABILIZED SURFACE FOR EQUIPMENT OPERATION, MATERIALS STORAGE, AND CONTRACTOR PARKING DURING THE EARLY STAGES OF SITE WORK.

**STONE CHECK DAMS:**  
STONE CHECK DAMS WILL BE INSTALLED WITHIN SWALES TO PROVIDE SEDIMENT ENTRAPMENT AND REDUCTION IN FLOW VELOCITIES.

**SILT FENCE:**  
IN ORDER TO PROVIDE BARRIERS TO SEDIMENT MOVEMENT AND FROM CRITICAL SOIL DISTURBANCE AREAS, SILT FENCING WILL BE INSTALLED PARALLEL TO PROPOSED SITE CONTOURS AND WILL BE TOED-IN TO NATIVE SOILS. SILT FENCE WILL REMAIN UNTIL ADEQUATE VEGETATION ENSURES NO FURTHER EROSION OF DISTURBED SLOPES. SILT FENCING WILL BE USED SURROUNDING TEMPORARY SOIL STOCKPILES AND SURROUNDING INDIVIDUAL HOMESITES DURING CONSTRUCTION. USE AT LEAST 100 FEET OF FENCING FOR EVERY 1/4 ACRE OF DISTURBED AREA UPGRADIENT. INSTALL SILT FENCE AHEAD OF GROUND FREEZING DURING WINTER CONSTRUCTION.

**STREET SWEEPING:**  
SWEEPING OF AREAS SURROUNDING THE ACCESS ROAD WILL BE SWEEPED ON A DAILY BASIS OR AS NECESSARY AS DETERMINED BY THE OSPC

**STABILIZED CONSTRUCTION ENTRANCE/EXIT:**  
ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A CONSTRUCTION EXIT COMPOSED OF COARSE STONE TO THE DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS DETAIL SHEET. THE ROUGH TEXTURE OF THE STONE HELPS TO REMOVE CLUMPS OF SOIL ADHERING TO THE CONSTRUCTION VEHICLE TIRES THROUGH THE ACTION OF VIBRATION AND JARRING OVER THE ROUGH SURFACE AND THE FRICTION OF THE STONE MATRIX AGAINST SOILS ATTACHED TO VEHICLE TIRES.

**RIPRAP SLOPE PROTECTION:**  
RIPRAPPING HAS BEEN SPECIFIED IN AREAS OF HIGH EROSION RISK, ASSESSED BY SLOPE, CONCENTRATION OF FLOW, AND SOIL EROSION RISK FACTORS. SLOPES MUST BE GRADED TO ACCOUNT FOR DEPTH OF RIPRAP AND COMPACTED IF FILLED. FILTER FABRIC WILL BE PLACED ON THE PREPARED SLOPE WITH OVERLAPS OF 2 FEET ANCHORED EVERY 3 FEET. PLACE ROCK AS TO NOT RIP FILTER FABRIC, SORT STONE SIZE, OR CREATE VOIDS. INSTALL AT RIPRAP AS SOON AFTER SLOPE PREPARATION AS POSSIBLE DUE TO HIGH EROSION RISK OF SPECIFIED AREAS.

**SEED AND MULCH:**  
SEED A CREEPING RED FESCUE AND KENTUCKY BLUEGRASS MIXTURE AT 2:1. THE MIXTURE IS EXPECTED TO BE USEFUL IN A WIDE RANGE OF DRAINAGE CHARACTERISTICS AND SOIL CONDITIONS. ADDITIONALLY, A MULCHING RATE OF 100 LBS/1,000 FT<sup>2</sup> (ABOUT 2 1/2 BALES) HAS BEEN SPECIFIED FOR TEMPORARY SOIL STABILIZATION.

IN AREAS WHERE THIS TECHNIQUE HAS BEEN SPECIFIED, IMPLEMENTATION MUST OCCUR IN THE NORMAL CONSTRUCTION SEASON AFTER APRIL 15, AND MUST BE COMPLETED PRIOR TO SEPTEMBER 15. IF VEGETATION COVERAGE IS NOT SIGNIFICANT BEFORE OCTOBER 15, A WINTER APPLICATION OF MULCH MUST BE APPLIED. THIS APPLICATION RATE IS DOUBLE THE REGULAR CONSTRUCTION APPLICATION RATE WITH 80-90% COVER. MULCH SHOULD BE TACKED IN OR STABILIZED WITH NETTING FOR THE WINTER.

**DRAINAGE SWALE:**  
A GRASS LINED CHANNEL HAS BEEN DESIGNED TO CONVEY STORMWATER RUNOFF FROM AN UPPER SLOPE AROUND AN AREA OF SENSITIVE SOIL TYPE. THIS DRAINAGE FEATURE WILL ALSO BENEFIT THE PERFORMANCE OF THE WASTEWATER DISPOSAL MOUND, IN CONJUNCTION WITH THE SPECIFIED UNDERDRAIN. THIS DESIGN IS INTENDED TO PROTECT SOIL SURFACES THAT ARE VULNERABLE TO SOIL EROSION AND WILL ULTIMATELY BE VEGETATED. ENSURE THE OUTFALL IS CONSTRUCTED AS SPECIFIED TO REDUCE POTENTIAL EROSION.

**TEMPORARY SEDIMENT TRAP:**  
SEVERAL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED ON SITE TO DETAIN RUNOFF WATERS, TRAP SEDIMENT AND PREVENT DAMAGE BY EXCESSIVE SEDIMENTATION AND DEBRIS. ALL TEMPORARY SEDIMENTATION TRAPS WILL BE CONSTRUCTED TO PROVIDE A MINIMUM OF 3,600 CUBIC FEET OF STORAGE CAPACITY PER UPSLOPE ACRE OF DRAINAGE AREA.

**NOTES:**

LIMITS OF DISTURBANCE TO BE DEMARCATED WITH 3" HIGH GRADE STAKES SPACED APPROX. 10' APART AND CONNECTED BY ORANGE FLAGGING RIBBON.

ALL EROSION PREVENTION AND SEDIMENT CONTROL DEVICES (I.E. SILT FENCING) WILL BE INSTALLED PRIOR TO ALL DISTURBANCES ASSOCIATED WITH THE PHASE.

ALL SITE DEMARCATATIONS WILL TAKE PLACE PRIOR TO INITIAL SITE DISTURBANCE.

ALL DISTURBANCES TO BE LIMITED TO A MAXIMUM OF 2 ACRES AT ONE TIME. NEW DISTURBANCES WILL NOT BE INITIATED UNTIL PREVIOUS TASKS ARE STABILIZED.

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:

- A) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.
- B) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.
- C) TO ENSURE COVER OF DISTURBED SOIL. IN ADVANCE OF A MELT EVENT DURING WINTER CONSTRUCTION, AREAS OF DISTURBED SOIL MUST BE STABILIZED AT THE END OF EACH WORK DAY, WITH THE FOLLOWING EXCEPTIONS:
  1. IF NO PRECIPITATION WITHIN 24 HOURS IS FORECAST AND WORK WILL RESUME IN THE SAME DISTURBED AREA WITHIN 24 HOURS, DAILY STABILIZATION IS NOT NECESSARY.
  2. DISTURBED AREAS THAT COLLECT AND RETAIN RUNOFF SUCH AS HOUSE FOUNDATIONS OR OPEN UTILITY TRENCHES.

COMPLETE STABILIZATION OF EACH TASK IS NECESSARY BEFORE BEGINNING NEXT TASK. SEE ER-3 STABILIZATION PLAN.

STABILIZATION OF OPERATIONAL STORMWATER TREATMENT PRACTICES (E.G. PONDS, GRASS LINED SWALES) WILL BE COMPLETE BEFORE RUNOFF IS DIRECTED TO THEM.

DURING WINTER CONSTRUCTION, REMOVE SNOW OR ICE TO LESS THAN 1" THICKNESS PRIOR TO STABILIZATION.

ORDER OF OPERATIONS ARE DESCRIBED IN THE EROSION PREVENTION AND SEDIMENTATION PLAN NARRATIVE, SECTION III.

DURING WINTER CONSTRUCTION AND IN AREAS WITHIN 100' OF RECEIVING WATER, REINFORCE SILT FENCING OR REPLACE WITH PERIMETER DIKES, SWALES OR OTHER PRACTICES RESISTANT TO THE FORCES OF SNOW LOADS.

**CONSTRUCTION NOTE:**

PROPOSED PHASE EXCLUDES ANY WORK ASSOCIATED WITH INDIVIDUAL LOT DWELLINGS, DRIVEWAYS, GRADING OR UTILITIES

**PHASE 3 - TASK LEGEND**

- TASK ONE - 22.6 ACRES  
CLEAR AND GRUB, INSTALL SILT FENCE AND NEW LANDSCAPING
- TASK TWO - 11.1 ACRE  
CONSTRUCTION OF ROADWAY AND ROADSIDE SWALES, SEED & MULCH

**EPSC PLAN ONLY**  
NOT FOR CONSTRUCTION  
DATE: 2/26/20

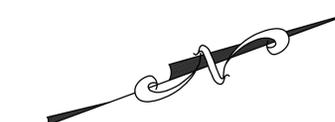
REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
REVISION: 01-23-20 - VARIOUS CHANGES TO PHASES & AREAS

**EPSC CONSTRUCTION PLAN - PHASE 3**  
RIDGE AT STOWE HOLLOW  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD, STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
454 MOUNTAIN ROAD, SUITE 4  
STOWE, VERMONT 05672  
WWW.MUMLEYENGINEERING.COM  
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PROJECT NO. ....18045  
DRAWN BY.....WEH  
CHECKED BY.....TRM  
SCALE.....1" = 40'  
DATE.....01/17/20

SHEET NO.  
**ER-4**  
4 OF 6 SHEETS



**INSPECTION AND MAINTENANCE SCHEDULE:**  
 THE ON SITE PLAN COORDINATOR WILL MAKE INSPECTIONS OF EARTH DISTURBANCES AND ALL EROSION PREVENTION AND SEDIMENT CONTROL STRUCTURES. THESE INSPECTIONS WILL TAKE PLACE DAILY FOR ACTIVE AREAS AND WEEKLY FOR STABILIZED AREAS.

**ON-SITE COORDINATOR:**  
 SELECTED CONTRACTOR TO BE DETERMINED. SELECTED CONTRACTOR WILL NOTIFY VT DEC WITH CONTACT INFORMATION.

**PHASE 4**  
 SCALE: 1" = 40'  
 Graphic Scale



THE FOLLOWING EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE PROPOSED TO ENSURE SITE STABILITY AND MINIMIZE EROSION DURING PROJECT CONSTRUCTION:

**CATCH BASIN INLET PROTECTION:**  
 THE SITE IS GRADED TO DIRECT MOST FLOW TO CATCHMENT BASINS FOR CONVEYANCE TO THE PERMANENT STORMWATER DETENTION POND. CATCHMENT BASINS WILL BE INSTALLED AS THE ROAD IS BUILT. STORMWATER RUNOFF FROM THE CONSTRUCTION SITE WILL BE DRAINED TO THESE CATCHMENT BASINS. TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE NETWORK, EXCAVATED DROP TYPE STORM DRAIN INLET PROTECTION HAS BEEN SPECIFIED AT ALL CATCHMENT BASINS. THESE SHOULD BE INSTALLED AS THE CATCHMENT BASINS ARE INSTALLED, LEAVING ELEVATION AROUND THE INLET BELOW FINISHED GRADE TO CREATE THE EXCAVATED AREA WHICH WILL SLOW FLOW AND ALLOW SEDIMENTS TO SETTLE. SIZE IS BASED ON A MINIMUM OF 900 CU.FT PER DRAINAGE AREA ACRE. EXCAVATED AREA WILL BE CLEANED WHEN 50% OF STORAGE VOLUME IS FILLED.

**STONE SUB-BASE:**  
 FOLLOWING THE COMPLETION OF ROUGH GRADING OF THE ROAD A CRUSHED STONE SUB-BASE WILL BE INSTALLED. THE STONE SUB BASE WILL ALSO PROVIDE A TEMPORARY STABILIZED SURFACE FOR EQUIPMENT OPERATION, MATERIALS STORAGE, AND CONTRACTOR PARKING DURING THE EARLY STAGES OF SITE WORK.

**STONE CHECK DAMS:**  
 STONE CHECK DAMS WILL BE INSTALLED WITHIN SWALES TO PROVIDE SEDIMENT ENTRAPMENT AND REDUCTION IN FLOW VELOCITIES.

**SILT FENCE:**  
 IN ORDER TO PROVIDE BARRIERS TO SEDIMENT MOVEMENT AND FROM CRITICAL SOIL DISTURBANCE AREAS, SILT FENCING WILL BE INSTALLED PARALLEL TO PROPOSED SITE CONTOURS AND WILL BE TOED-IN TO NATIVE SOILS. SILT FENCE WILL REMAIN UNTIL ADEQUATE VEGETATION ENSURES NO FURTHER EROSION OF DISTURBED SLOPES. SILT FENCING WILL BE USED SURROUNDING TEMPORARY SOIL STOCKPILES AND SURROUNDING INDIVIDUAL HOMESITES DURING CONSTRUCTION. USE AT LEAST 100 FEET OF FENCING FOR EVERY 1/4 ACRE OF DISTURBED AREA UPGRADIENT. INSTALL SILT FENCE AHEAD OF GROUND FREEZING DURING WINTER CONSTRUCTION.

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COMPLETE STABILIZATION OF EACH TASK IS NECESSARY BEFORE BEGINNING NEXT TASK. SEE ER-3 STABILIZATION PLAN.

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**CONSTRUCTION NOTE:**  
 PROPOSED PHASE EXCLUDES ANY WORK ASSOCIATED WITH INDIVIDUAL LOT DWELLINGS, DRIVEWAYS, GRADING OR UTILITIES

**PHASE 4 - TASK LEGEND**

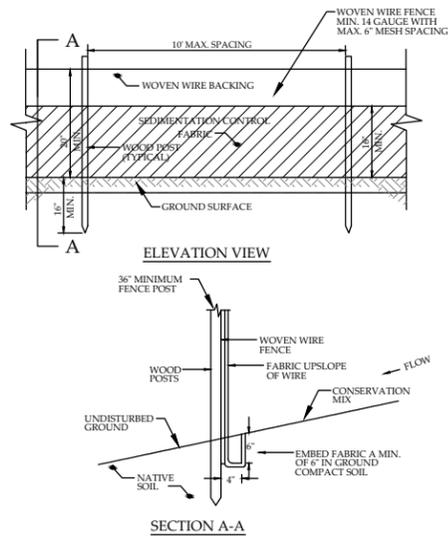
	TASK ONE - ±32 ACRES CONSTRUCTION OF INDIVIDUAL LOTS
	TASK TWO - ±1.2 ACRE CONSTRUCTION OF INDIVIDUAL WASTEWATER SYSTEMS

**EPSC PLAN ONLY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20

REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
 REVISION: 01-23-20 - VARIOUS CHANGES TO PHASES & AREAS

**EPSC CONSTRUCTION PLAN - PHASE 4**  
 RIDGE AT STOWE HOLLOW  
 STOWE HOLLOW ROAD LLC  
 STOWE HOLLOW ROAD, STOWE, VERMONT

<p><b>MUMLEY ENGINEERING, INC.</b>          454 MOUNTAIN ROAD, SUITE 4          STOWE, VERMONT 05672          WWW.MUMLEYENGINEERING.COM          COPYRIGHT © 2020 - MUMLEY ENGINEERING, INC.</p>	PROJECT NO. ....18045 DRAWN BY.....WEH CHECKED BY.....TRM SCALE.....1" = 40' DATE.....01/17/20	SHEET NO. <b>ER-5</b> 5 OF 6 SHEETS
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**1 SILT FENCE DETAIL**  
NOT TO SCALE

**CONSTRUCTION SPECIFICATIONS:**

SILT FENCING WILL BE APPLIED TO THE SITE SO THAT THERE WILL BE 100 FEET OF FENCING FOR EVERY 1/4 ACRE OF DISTURBED UPGRADIENT AREA.

THE GEOTEXTILE FABRIC SHALL MEET THE DESIGN CRITERIA FOR SILT FENCES, OF THE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL, PREPARED BY THE STATE OF VERMONT DEPT. OF ENVIRONMENTAL CONSERVATION, DATED 2006.

WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. WIRE FENCE REINFORCEMENT REQUIRED WITHIN 100 FT UPSLOPE OF RECEIVING WATERS.

FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.

WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTR X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.

PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OF APPROVED EQUIVALENT.

THE FABRIC SHALL NOT EXTEND MORE THAN 30" ABOVE THE ORIGINAL GROUND SURFACE AND WILL EXTEND TO A MINIMUM OF 12" INTO THE TRENCH. FILTER FABRIC SHALL NOT BE STAPLED INTO EXISTING TREES.

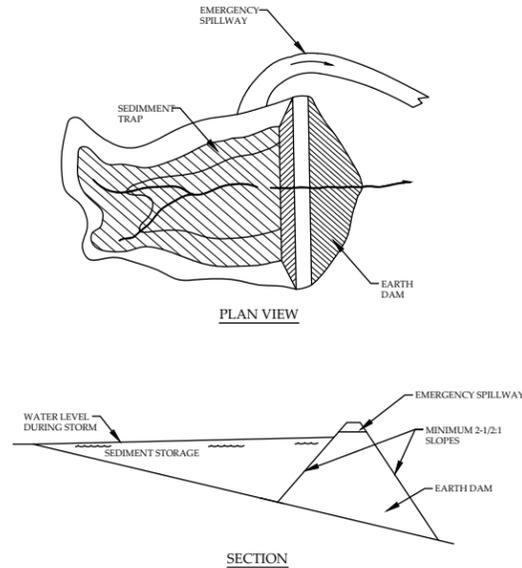
THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.

FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL, AND AT LEAST DAILY DURING PROLONGED RAINFALL, ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

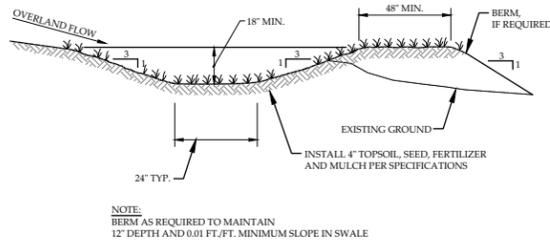
SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY. THE FABRIC SHALL BE REPLACED PROMPTLY.

SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER.

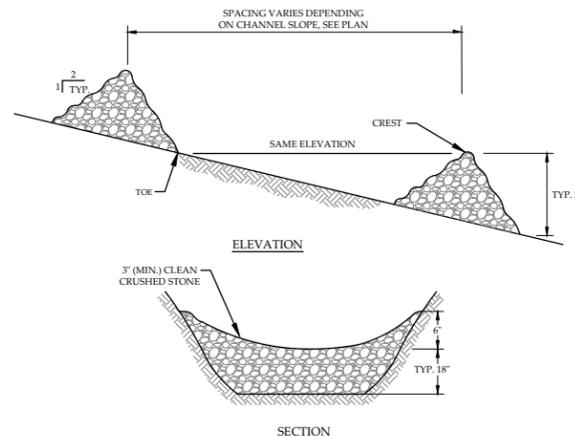
ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED, SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEED.



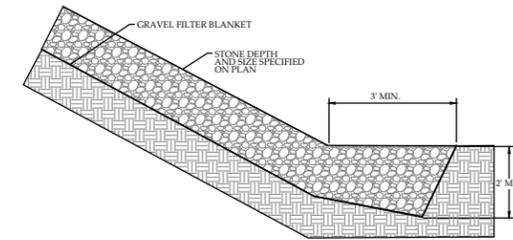
**2 TYPICAL SEDIMENT TRAP**  
NOT TO SCALE



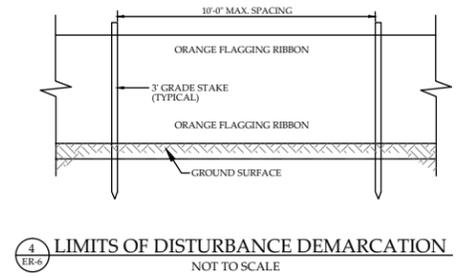
**5 DIVERSION SWALE/TEMPORARY SWALE**  
NOT TO SCALE



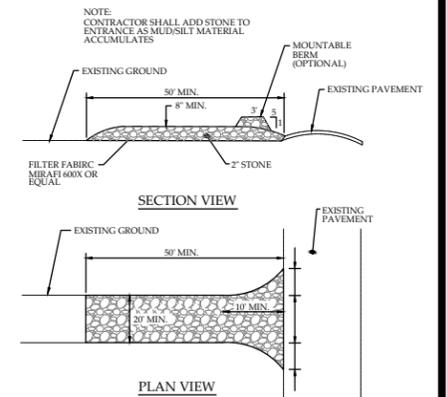
**6 STONE CHECK DAM**  
NOT TO SCALE



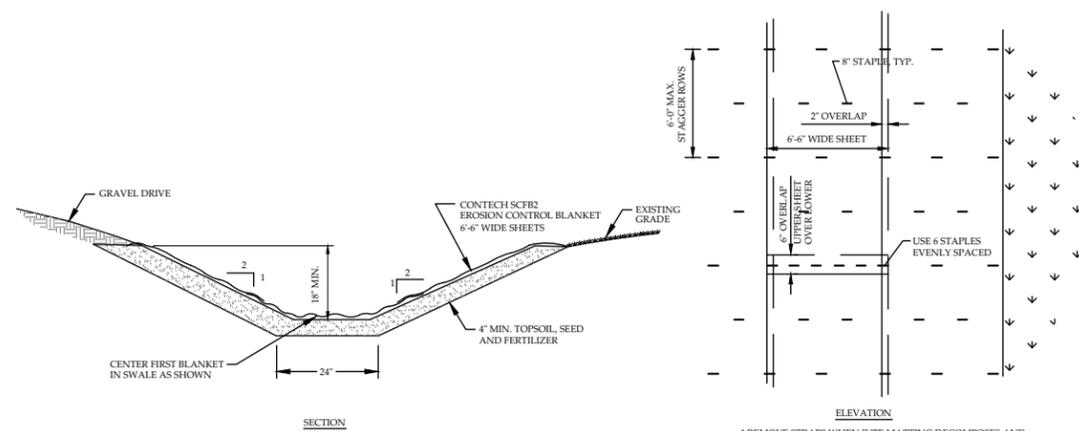
**7 RIPRAP SLOPE PROTECTION**  
NOT TO SCALE



**4 LIMITS OF DISTURBANCE DEMARCATION**  
NOT TO SCALE



**8 STABILIZED CONSTRUCTION ENTRANCE**  
NOT TO SCALE



**9 TYPICAL JUTE MATTING LINED SWALE**  
NOT TO SCALE

APPROVED MULCH MATERIALS AND APPLICATION RATES			
MULCHES	RATES		NOTES
	PER ACRE	PER 1000 S.F.	
STRAW OR HAY	1 1/2 TONS	70-90 LBS	FREE FROM WEEDS AND COARSE MATTER MUST BE ANCHORED. SPREAD WITH MULCH BLOWER OR BY HAND.
WOOD FIBER	1000-2000 LBS	25-50 LBS	FIBERS 4mm OR LONGER DO NOT USE ALONE IN WINTER OR DURING HOT, DRY WEATHER. APPLY AS SLURRY
CORN STALKS	4-6 TONS	185-275 LBS	CUT OR SHREDDED IN 4-6 INCH LENGTHS. AIR-DRIED. DO NOT USE IN FINE TURF AREAS. APPLY WITH MULCH BLOWER, OR BY HAND.
WOOD CHIPS	4-6 TONS	185-275 LBS	FREE OF COARSE MATTER, AIR DRIED. TREAT WITH 12 LBS. NITROGEN PER TON. DO NOT USE IN FINE TURF AREAS. APPLY WITH MULCH BLOWER, CHIP HANDLER OR BY HAND.
BARK CHIPS SHREDDED BARK	50-70 CU. YDS.	1-2 CU. YDS	FREE OR COARSE MATTER. AIR DRIED. DO NOT USE IN FINE TURF AREAS. APPLY WITH MULCH BLOWER, CHIP HANDLER OR BY HAND.
OTHER MATERIALS	WITH ENGINEERS APPROVAL		

- NOTES:**
- AREAS WHICH HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED SHALL BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCH ANCHORING WILL BE USED ON SLOPES GREATER THAN 3 PERCENT AND CONCENTRATED FLOW AREAS SUCH AS DIVERSION AND WATERWAY CHANNELS.
  - AREAS WHICH CANNOT BE SEEDED WITHIN THE SEEDING DATES SHOULD BE MULCHED TO PROVIDE TEMPORARY PROTECTION TO THE SOIL SURFACE. AN ORGANIC MULCH OTHER THAN WOOD FIBER ALONE SHALL BE USED AND THE AREA THEN SEEDED AS SOON AS SEEDING DATES PERMIT.
  - DOUBLE MULCH RATE FOR WINTER CONSTRUCTION ACTIVITIES.

**10 MULCHING GUIDELINES**  
NOT TO SCALE

**EPSC PLAN ONLY**  
NOT FOR CONSTRUCTION  
DATE: 1/17/20

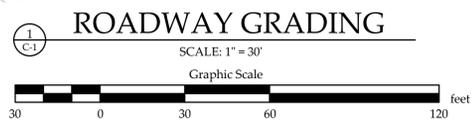
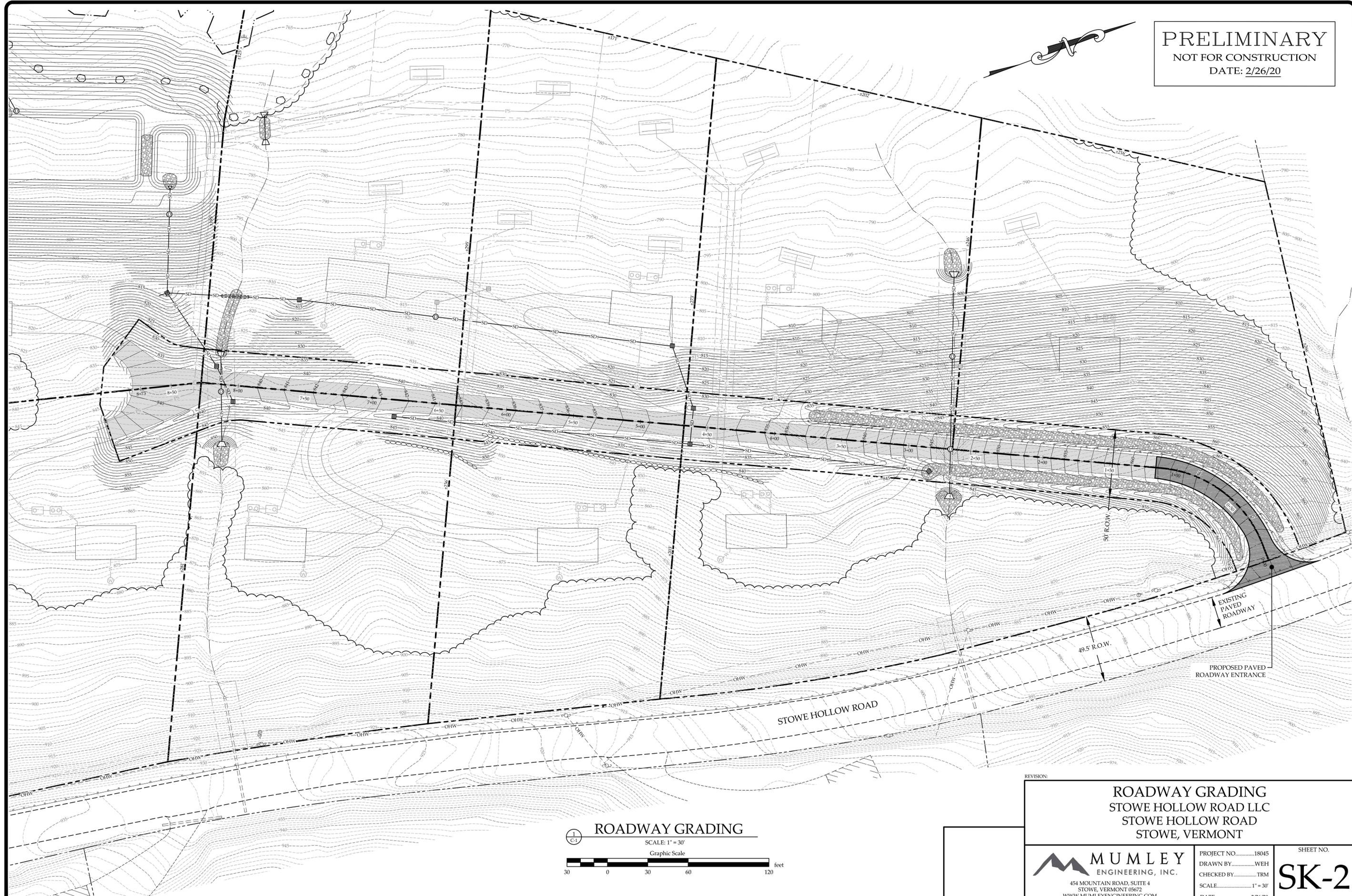
**EPSC DETAILS**  
RIDGE AT STOWE HOLLOW  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD, STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
454 MOUNTAIN ROAD, SUITE 4  
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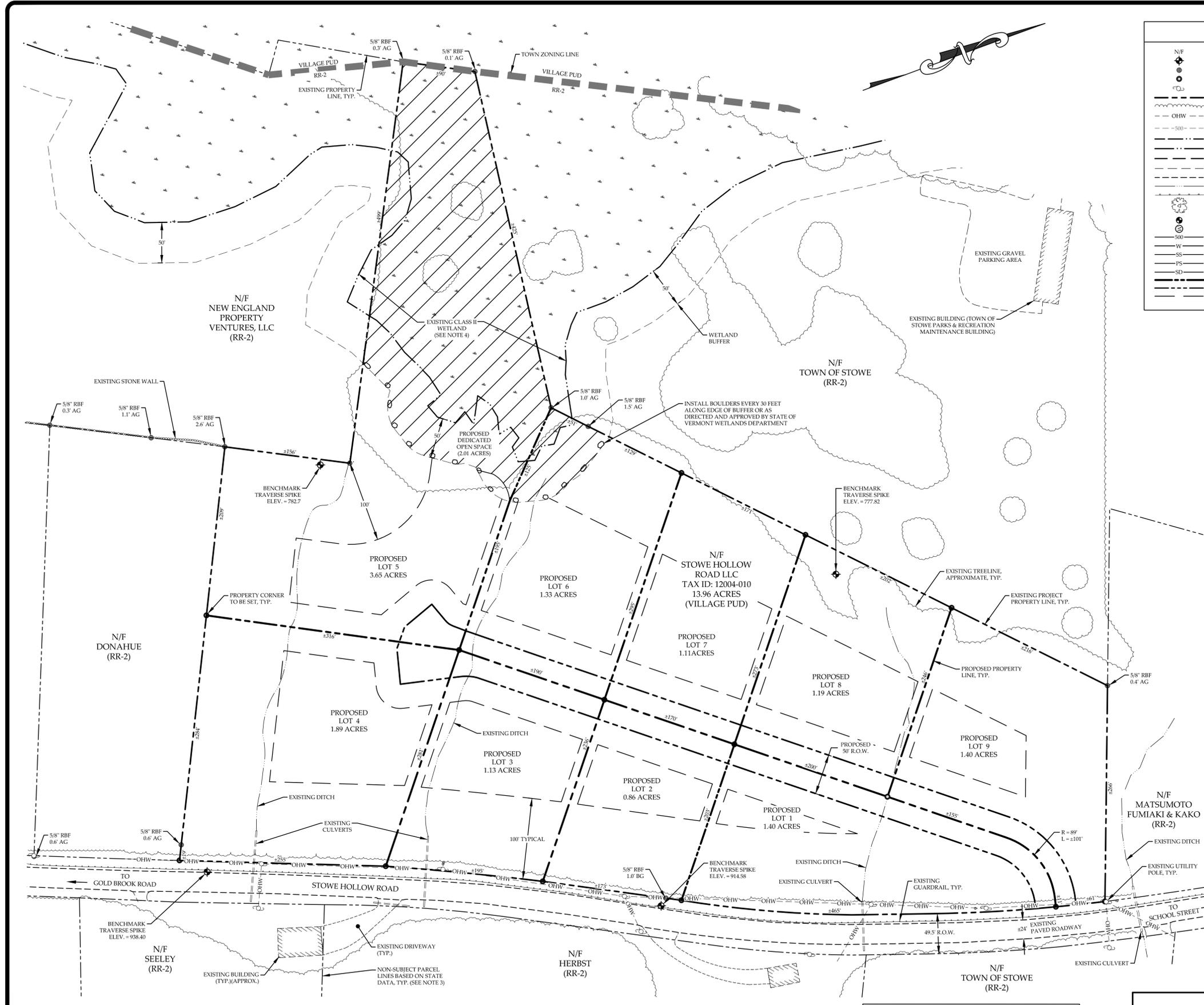
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SHEET NO.  
**ER-6**  
6 OF 6 SHEETS

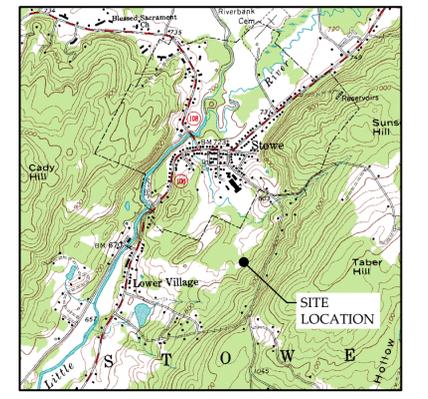
**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20



REVISION:		<b>ROADWAY GRADING</b> STOWE HOLLOW ROAD LLC STOWE HOLLOW ROAD STOWE, VERMONT	
<b>MUMLEY</b> ENGINEERING, INC. 454 MOUNTAIN ROAD, SUITE 4 STOWE, VERMONT 05672 WWW.MUMLEYENGINEERING.COM COPYRIGHT © 2019, MUMLEY ENGINEERING, INC.		PROJECT NO.....18045 DRAWN BY.....WEH CHECKED BY.....TRM SCALE.....1" = 30' DATE.....2/26/20	SHEET NO. <b>SK-2</b> 2 OF 2 SHEETS



LEGEND	
(Symbol)	NOW OR FORMERLY OWNED BY
(Symbol)	ELEVATION BENCHMARK
(Symbol)	REBAR TO BE SET
(Symbol)	EXISTING UTILITY POLE & GUY WIRE
(Symbol)	EXISTING PROPERTY LINE
(Symbol)	EXISTING TREE LINE
(Symbol)	EXISTING OVERHEAD WIRES
(Symbol)	EXISTING CONTOUR
(Symbol)	EXISTING SOILS
(Symbol)	EXISTING WETLANDS VCGI
(Symbol)	EXISTING WETLAND BUFFER
(Symbol)	EXISTING EDGE OF GRAVEL
(Symbol)	EXISTING EDGE OF PAVEMENT
(Symbol)	EXISTING STREAM / DITCH
(Symbol)	EXISTING GAUDDRAIL
(Symbol)	EXISTING TREES
(Symbol)	TEST PIT LOCATION
(Symbol)	PROPOSED DRILLED WELL
(Symbol)	PROPOSED CONTOUR
(Symbol)	PROPOSED WATER LINE
(Symbol)	PROPOSED GRAVITY SEWER LINE
(Symbol)	PROPOSED PRESSURE SEWER LINE
(Symbol)	PROPOSED STORM DRAIN PIPE
(Symbol)	PROPOSED PROPERTY LINE
(Symbol)	PROPOSED RIGHT OF WAY / EASEMENT
(Symbol)	PROPOSED BUILDING SETBACKS



NORTH  
SITE LOCATION MAP  
NOT TO SCALE

- LIST OF DRAWINGS
- C-1 PROPOSED SUBDIVISION LAYOUT
  - C-2 PROPOSED SITE PLAN
  - C-3 PARTIAL SITE PLAN
  - C-4 PARTIAL SITE PLAN
  - C-5 ROADWAY PLAN & PROFILE
  - C-6 LANDSCAPING PLAN
  - C-7 WASTEWATER SYSTEMS
  - C-8 STORMWATER SYSTEMS
  - C-9 DETAILS
  - C-10 DETAILS

**PURPOSE OF PLAN:**  
TO SUBDIVIDE AN EXISTING VACANT ±14 ACRE PARCEL INTO NINE (9) SINGLE-FAMILY RESIDENTIAL LOTS.

**ZONING NOTES:**  
DISTRICT: STOWE VILLAGE PUD (RESIDENTIAL)  
ZONING REQUIREMENTS:  
SETBACKS:  
FRONT = 30 FT  
REAR = 40 FT  
SIDE = 10 FT  
PERIMETER GREENBELT = 100 FT  
MINIMUM LOT SIZE = 10,000 SF (0.23 ACRES)  
MINIMUM PROPOSED LOT SIZE = 0.88 ACRES  
MAXIMUM BUILDING COVERAGE = 15%  
PROPOSED BUILDING COVERAGE = 4%  
MAXIMUM BUILDING HEIGHT = 28 FT  
PROPOSED IMPERVIOUS AREA = 0.98 ACRES

**TRAFFIC ANALYSIS:**  
ITE 9TH EDITION FOR SINGLE-FAMILY DETACHED HOUSING (USE #210):  
WEEKDAY: 9 DWELLING UNITS \* 9.52 TRIPS PER UNIT = 86 TRIPS DAILY  
WEEKDAY PEAK HOUR (PM): 9 DWELLING UNITS \* 1.00 TRIPS PER UNIT = 9 TRIPS PEAK HOUR

**PLAN REFERENCES:**

- 1) A BOUNDARY SURVEY OF SUBJECT PARCEL PROVIDED BY BUTTON LAND SURVEYORS ON JUNE 11, 2019.
- 2) LOCATIONS OF UTILITY POLES, ROADS, DRIVES, CULVERTS, STREAMS, TEST PITS, PARTIAL TOPOGRAPHIC INFORMATION PROVIDED BY BUTTON LAND SURVEYORS ON JUNE 11, 2019.
- 3) OTHER TOPOGRAPHIC DATA & PARCEL LINES USED FOR ABUTTING PROPERTIES TAKEN FROM THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION, ON SEPTEMBER 11, 2018.
- 4) WETLAND LIMITS WITHIN PROPERTY AREA CONDUCTED BY ARROWWOOD ENVIRONMENTAL ON 9/23/19. CONFIRMED BY SHANNON MORRISON, STATE OF VERMONT, ON 10/2/19. LOCATION RECORDED VIA GPS BY MUMLEY ENGINEERING, INC. ON 10/20/19.

**NOTES:**

- 1) THIS DRAWING IS NOT A BOUNDARY SURVEY PLAT. BOUNDARY LINE INFORMATION SHOWN IS BASED ON PLAN REFERENCE #1. THE PROPERTY LINES, EASEMENTS AND OTHER REAL PROPERTY DESCRIPTIONS PROVIDED ON THIS DRAWING ARE FOR ILLUSTRATION PURPOSES ONLY. THEY DO NOT DEFINE LEGAL RIGHTS OR MEET LEGAL REQUIREMENTS FOR A LAND SURVEY AS DESCRIBED IN V.S.A. TITLE 27, SECTION 1403 AND SHALL NOT BE USED IN LIEU OF A SURVEY AS THE BASIS OF ANY LAND TRANSFER OR ESTABLISHMENT OF ANY PROPERTY RIGHT.
- 2) THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES OR UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION. APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK.
- 3) THIS TOPOGRAPHIC SURVEY WAS CONDUCTED WITHOUT THE BENEFIT OF "DIG SAFE" MARKINGS. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND ARE NOT WARRANTED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT "DIG SAFE" BEFORE COMMENCING ANY WORK AND SHALL PRESERVE ALL EXISTING UTILITIES NOT SPECIFIED TO BE REMOVED OR ABANDONED AS PART OF THE PROJECT.

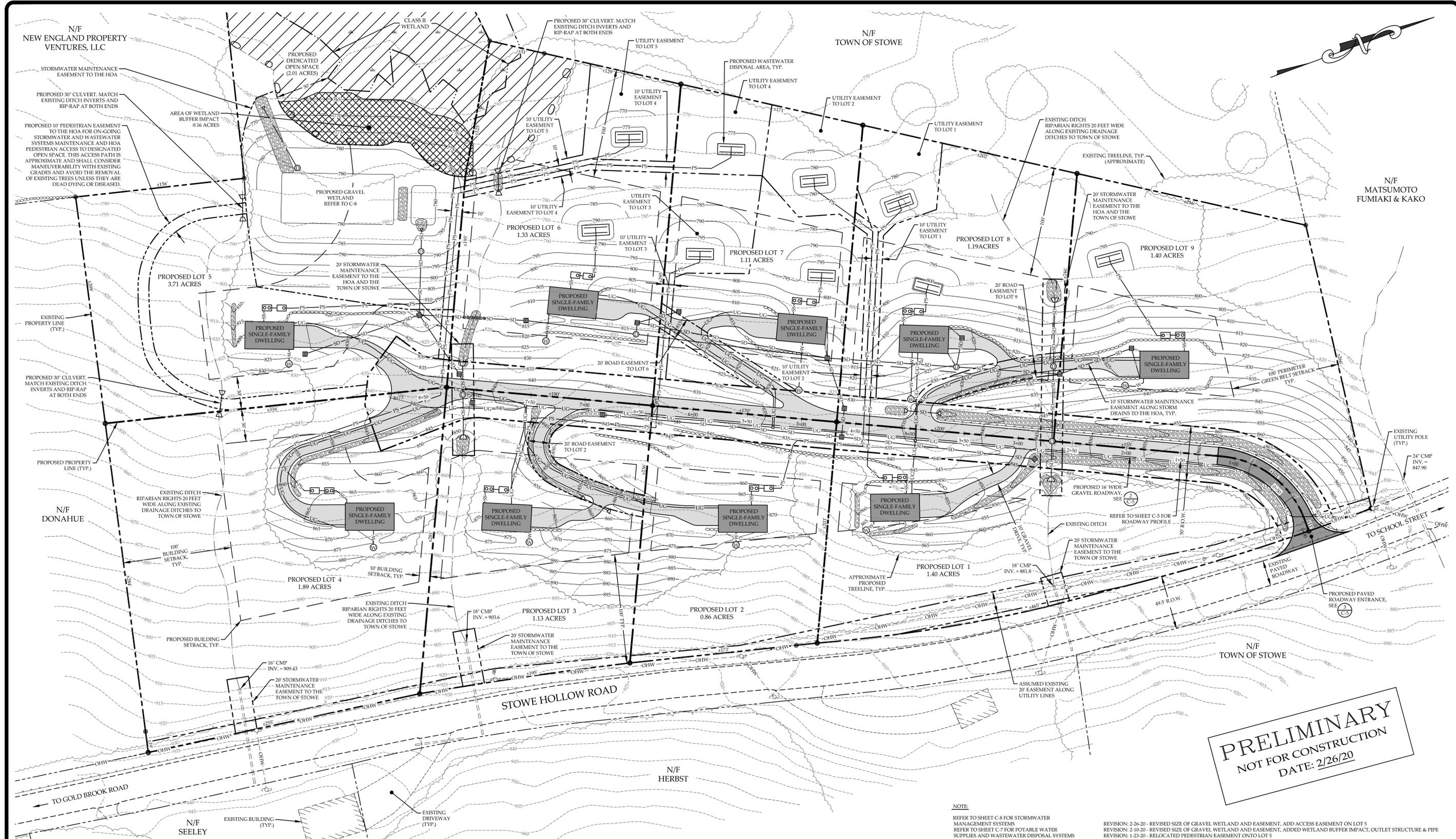
**OWNER OF RECORD:**  
STOWE HOLLOW ROAD LLC  
474 STOWE HOLLOW ROAD  
STOWE, VT 05672

REVISION: 2-26-20 - REVISED BUILDING SETBACKS

<b>PROPOSED SUBDIVISION LAYOUT</b> STOWE HOLLOW ROAD LLC STOWE HOLLOW ROAD STOWE, VERMONT	
	PROJECT NO. ....18045 DRAWN BY.....WEH CHECKED BY.....TRM SCALE.....1" = 60' DATE.....1/17/20
454 MOUNTAIN ROAD, SUITE 4 STOWE, VERMONT 05672 WWW.MUMLEYENGINEERING.COM COPYRIGHT © 2020, MUMLEY ENGINEERING, INC.	<b>C-1</b> SHEET NO. 1 OF 10 SHEETS

**PROPOSED SUBDIVISION LAYOUT**  
SCALE: 1" = 60'  
Graphic Scale  
60 0 60 120 240 feet

**PRELIMINARY**  
NOT FOR CONSTRUCTION  
DATE: 2/26/20



**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20

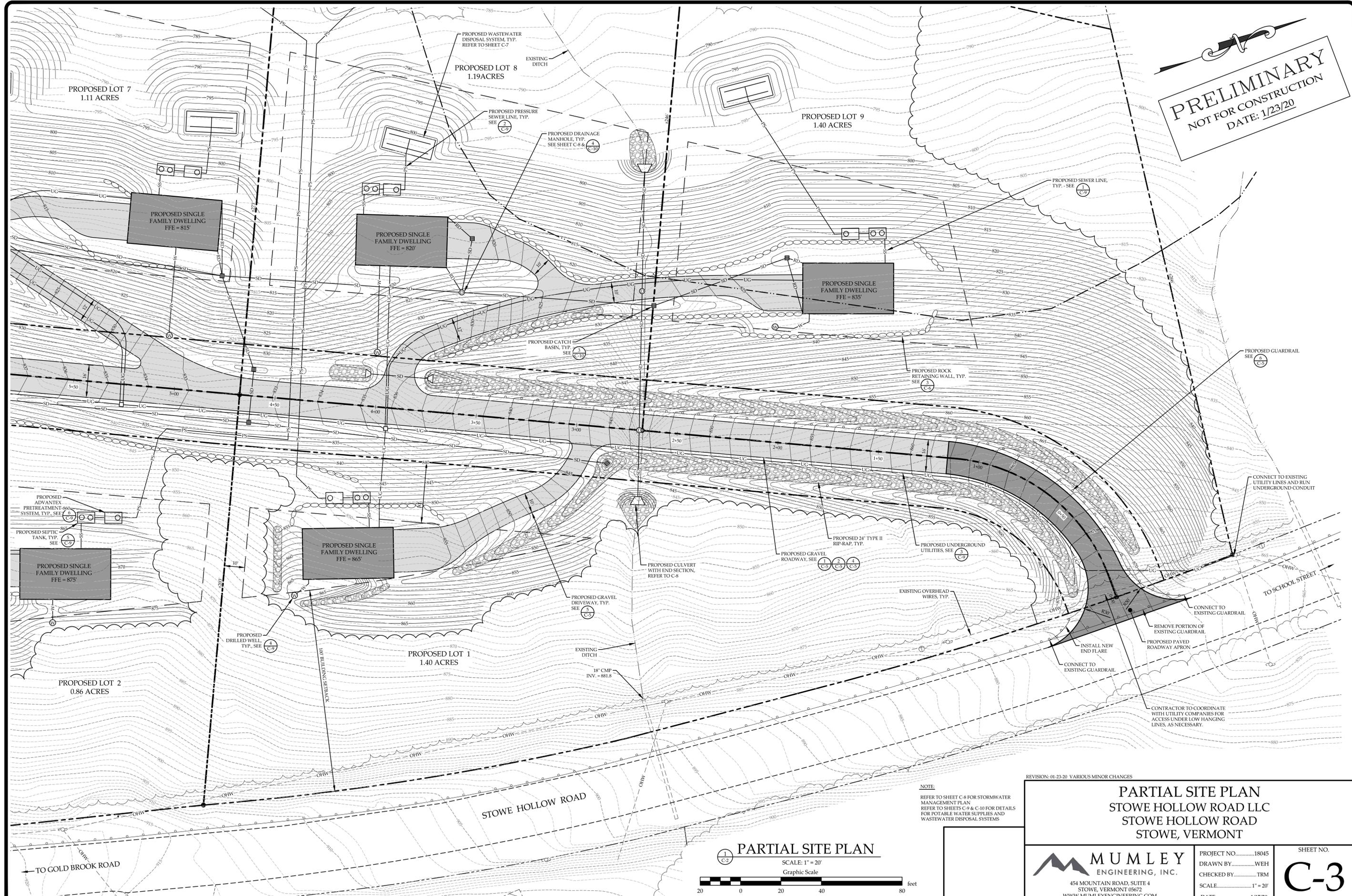
**PROPOSED SITE PLAN**  
 SCALE: 1" = 40'  
 Graphic Scale

**NOTE:**  
 REFER TO SHEET C-8 FOR STORMWATER MANAGEMENT SYSTEMS  
 REFER TO SHEET C-7 FOR POTABLE WATER SUPPLIES AND WASTEWATER DISPOSAL SYSTEMS

REVISION: 2-26-20 - REVISED SIZE OF GRAVEL WETLAND AND EASEMENT, ADD ACCESS EASEMENT ON LOT 5  
 REVISION: 2-10-20 - REVISED SIZE OF GRAVEL WETLAND AND EASEMENT, ADD WETLAND BUFFER IMPACT, OUTLET STRUCTURE & PIPE  
 REVISION: 1-23-20 - RELOCATED PEDESTRIAN EASEMENT ONTO LOT 5

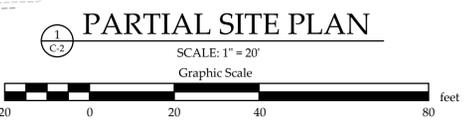
<b>PROPOSED SITE PLAN</b> STOWE HOLLOW ROAD LLC STOWE HOLLOW ROAD STOWE, VERMONT	
 <b>MUMLEY</b> ENGINEERING, INC. 454 MOUNTAIN ROAD, SUITE 4 STOWE, VERMONT 05672 WWW.MUMLEYENGINEERING.COM COPYRIGHT © 2020 - MUMLEY ENGINEERING, INC.	PROJECT NO. ....18045 DRAWN BY.....WEH CHECKED BY.....TRM SCALE.....1" = 40' DATE.....1/17/20
SHEET NO. <b>C-2</b> 2 OF 10 SHEETS	

**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 1/23/20



**NOTE:**  
 REFER TO SHEET C-8 FOR STORMWATER  
 MANAGEMENT PLAN  
 REFER TO SHEETS C-9 & C-10 FOR DETAILS  
 FOR POTABLE WATER SUPPLIES AND  
 WASTEWATER DISPOSAL SYSTEMS

REVISION: 01-23-20 VARIOUS MINOR CHANGES

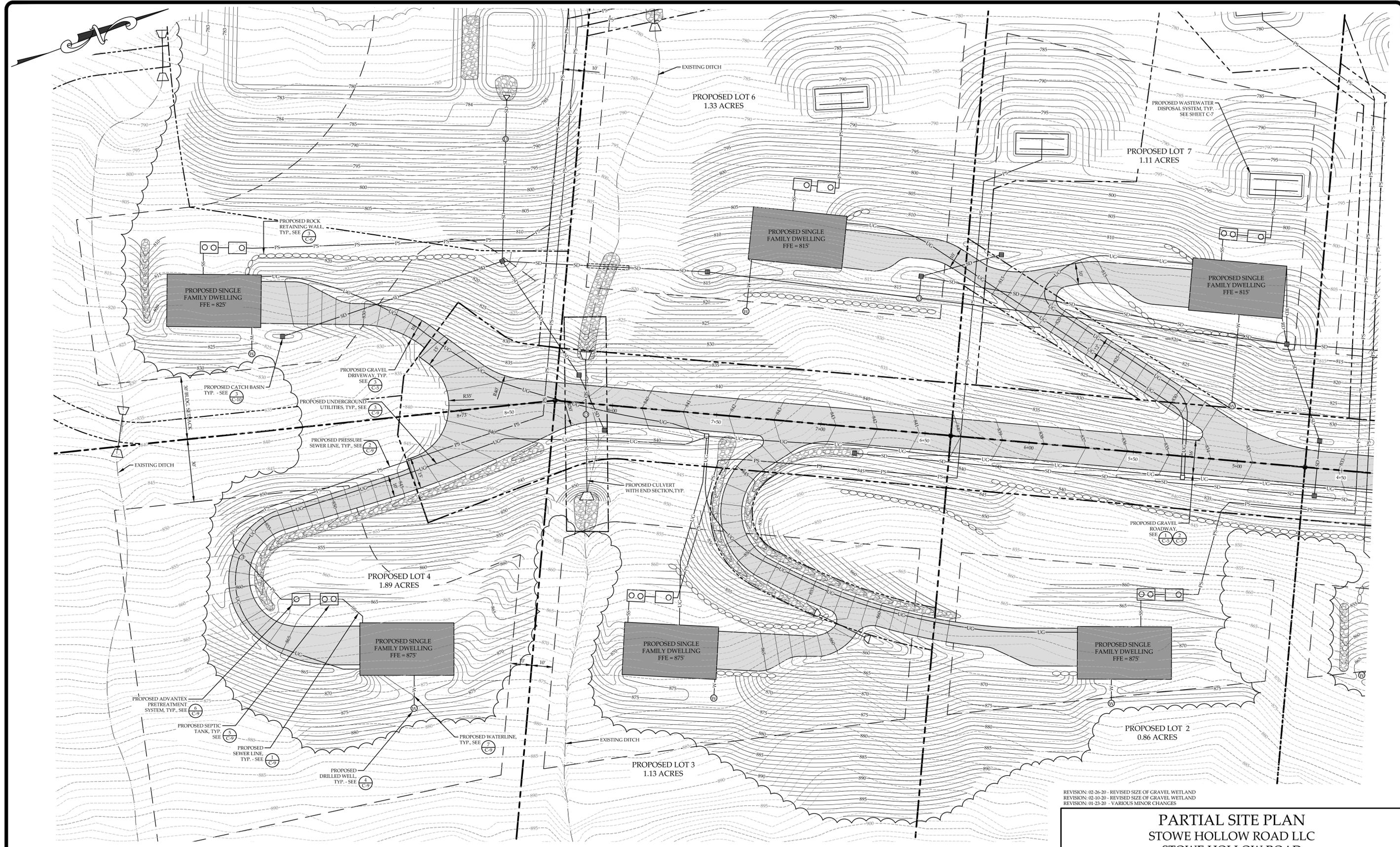


**PARTIAL SITE PLAN**  
 STOWE HOLLOW ROAD LLC  
 STOWE HOLLOW ROAD  
 STOWE, VERMONT

**MUMLEY**  
 ENGINEERING, INC.  
 454 MOUNTAIN ROAD, SUITE 4  
 STOWE, VERMONT 05672  
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PROJECT NO. ....18045  
 DRAWN BY.....WEH  
 CHECKED BY.....TRM  
 SCALE.....1" = 20'  
 DATE.....1/17/20

SHEET NO.  
**C-3**  
 3 OF 10 SHEETS



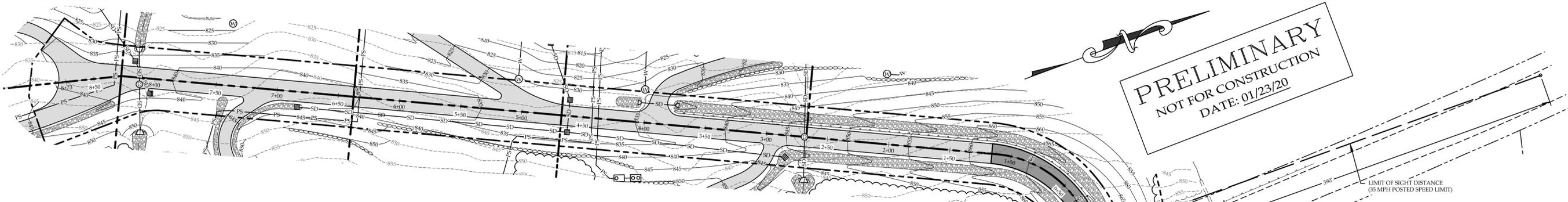
**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20

**PARTIAL SITE PLAN**  
 SCALE: 1" = 20'  
 Graphic Scale  
 0 20 40 80 feet

**NOTE:**  
 REFER TO SHEET C-8 FOR STORMWATER  
 MANAGEMENT PLAN  
 REFER TO SHEETS C-9 & C-10 FOR DETAILS  
 FOR POTABLE WATER SUPPLIES AND  
 WASTEWATER DISPOSAL SYSTEMS

REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND  
 REVISION: 02-10-20 - REVISED SIZE OF GRAVEL WETLAND  
 REVISION: 01-23-20 - VARIOUS MINOR CHANGES

<b>PARTIAL SITE PLAN</b> STOWE HOLLOW ROAD LLC STOWE HOLLOW ROAD STOWE, VERMONT		PROJECT NO. ....18045 DRAWN BY.....WEH CHECKED BY.....TRM SCALE.....1" = 20' DATE.....1/17/20	SHEET NO. <b>C-4</b> 4 OF 10 SHEETS
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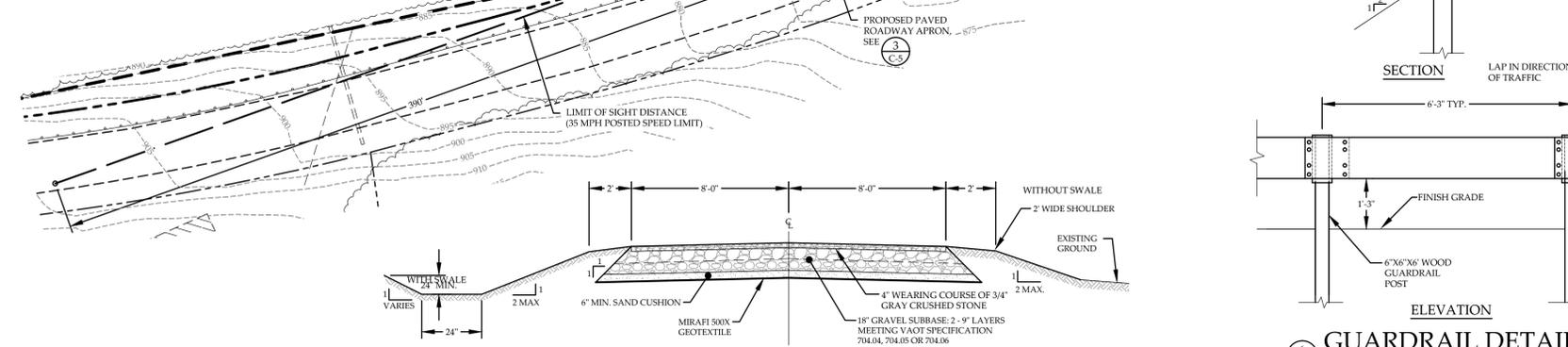
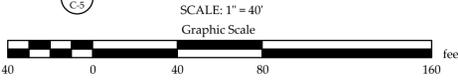


**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 01/23/20

**STOWE R.O.W. NOTES:**

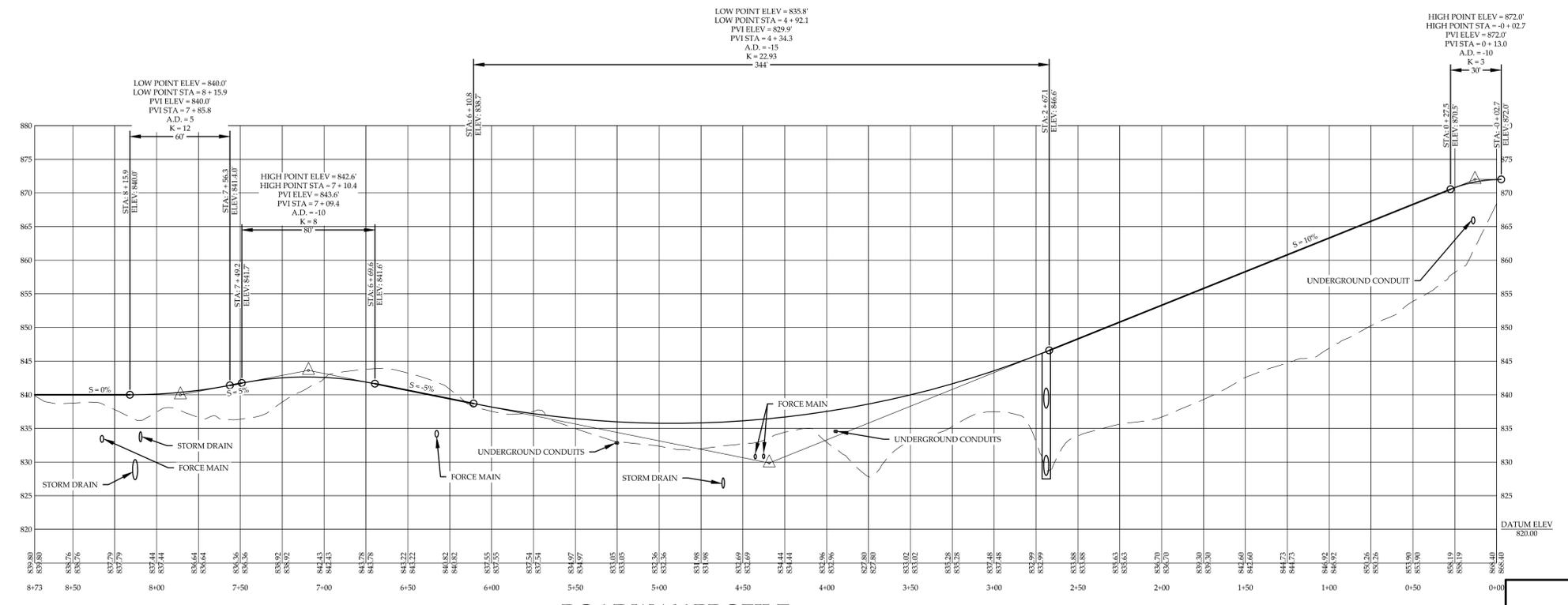
- PRIOR TO THE START OF THE WORK, OWNER/CONTRACTOR SHALL SUBMIT A CERTIFICATE OF INSURANCE ACCEPTABLE TO AND NAMING THE TOWN OF STOWE AS AN ADDITIONAL INSURED. MINIMUM COVERAGE SHALL INCLUDE \$1,000,000 COMBINED SINGLE LIMIT FOR EACH OCCURRENCE FOR COMMERCIAL GENERAL LIABILITY AND COMMERCIAL AUTOMOBILE LIABILITY AND VERMONT STATUTORY MINIMUMS FOR WORKERS COMPENSATION.
- EXCEPT IN THE CASE OF AN EMERGENCY AND/OR WITH SPECIFIC WRITTEN EXCEPTION OF PWD, ALL WORK WITHIN THE TOWN ROW SHALL BE PERFORMED DURING NORMAL DAYLIGHT HOURS, MONDAY-FRIDAY, APRIL 15-NOVEMBER 15, EXCEPT LEGAL HOLIDAYS.
- THE OWNER/CONTRACTOR SHALL HAVE A SUPERVISORY REPRESENTATIVE ACCEPTABLE TO PUBLIC WORKS DEPARTMENT (PWD) PRESENT ON THE PROJECT SITE AT ALL TIMES WORK IS BEING DONE WITHIN THE TOWN R.O.W. UNDER THE TOWN ROW PERMIT.
- THE OWNER/CONTRACTOR SHALL COMPLY WITH ALL ORDINANCES, STATUTES, LAW AND REGULATIONS CONTROLLING THE OCCUPANCY OF THE PUBLIC HIGHWAY R.O.W. IN THE EVENT OF CONFLICT, THE MOST RESTRICTIVE SHALL APPLY.
- THE OWNER/CONTRACTOR SHALL NOT DO ANY WORK OR PLACE ANY MATERIALS, EQUIPMENT OR OBSTRUCTIONS WITHIN THE R.O.W., EXCEPT AS SPECIFICALLY AUTHORIZED BY THE TOWN R.O.W. PERMIT.
- THE OWNER/CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND PROTECTION OF TRAFFIC FOR VEHICULAR AND PEDESTRIAN TRAFFIC IN THE R.O.W. AND TO ABUTTING PROPERTIES DURING THE WORK UNDER THE TOWN R.O.W. PERMIT. ALL MAINTENANCE & PROTECTION OF TRAFFIC PROVISIONS SHALL COMPLY WITH THE CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. INSTALL AND MAINTAIN SUFFICIENT TEMPORARY ADVANCED WARNING SIGNS, BARRIERS, FENCES, LIGHTS ECT. AND IMPLEMENT ANY OTHER TEMPORARY TRAFFIC CONTROL MEASURES REQUIRED. SEE SPECIAL CONDITIONS BELOW FOR ANY ADDITIONAL SPECIFIC REQUIREMENTS. PWD AND/OR THE STOWE POLICE DEPARTMENT RESERVE THE RIGHT TO REQUIRE THE IMPLEMENTATION OF ADDITIONAL MEASURES IF DEEMED NECESSARY FOR THE SAFETY OF THE TRAVELING PUBLIC DURING THE WORK UNDER THE TOWN R.O.W. PERMIT.
- ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH CURRENT OSHA AND VOSH HEALTH AND SAFETY STANDARDS FOR CONSTRUCTION. JOBSITE SAFETY IS SOLELY THE RESPONSIBILITY OF THE OWNER/CONTRACTOR. REVIEW OF THE WORK AND/OR LACK OF COMMENT BY THE TOWN SHALL NOT BE INTERPRETED AS APPROVAL OF THE PROVISIONS FOR JOBSITE SAFETY AND/OR COMPLIANCE WITH THE REQUISITE OSHA AND VOSH REQUIREMENTS.
- THE OWNER AND/OR CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS AND/OR REPLACEMENT OF ANY EXISTING SURFACE TREATMENTS AND/OR UTILITIES DAMAGED BY THE WORK UNDER THE TOWN R.O.W. PERMIT TO THE SATISFACTION OF DPW AND/OR THE AFFECTED UTILITY COMPANY, INCLUDING A WARRANTY PERIOD OF 12 MONTHS AFTER COMPLETION AND ACCEPTANCE OF THE WORK. DURING WHICH PERIOD THE TOWN CAN REQUIRE ADDITIONAL REMEDIAL REPAIRS OR REPLACEMENTS. IF THE OWNER AND/OR CONTRACTOR IS NOT RESPONSIVE TO THE TOWN'S REQUIREMENTS FOR ANY REPAIRS AND/OR REPLACEMENTS DEEMED REQUIRED, THE TOWN MAY COMPLETE THE WORK AND INVOICE THE OWNER FOR ALL COST INCURRED.
- THE OWNER SHALL BE RESPONSIBLE FOR ALL DAMAGES TO PERSONS OR PROPERTY RESULTING FROM ANY WORK DONE UNDER THIS PERMIT, EVEN IF THE WORK IS PERFORMED BY A CONTRACTOR. THE OWNER AND/OR CONTRACTOR AGREE TO INDEMNIFY AND HOLD THE TOWN HARMLESS FROM ANY CLAIMS FOR DAMAGES ASSOCIATED WITH THE WORK UNDER THE TOWN R.O.W. PERMIT.

**ROADWAY PLAN**

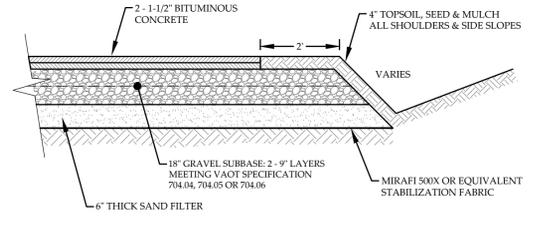
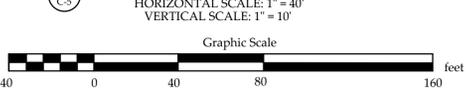


**TYPICAL GRAVEL ROAD SECTION**  
 NOT TO SCALE

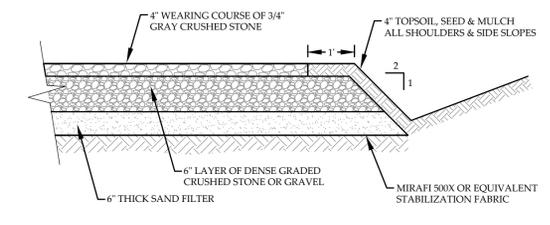
**GUARDRAIL DETAILS**  
 NOT TO SCALE



**ROADWAY PROFILE**



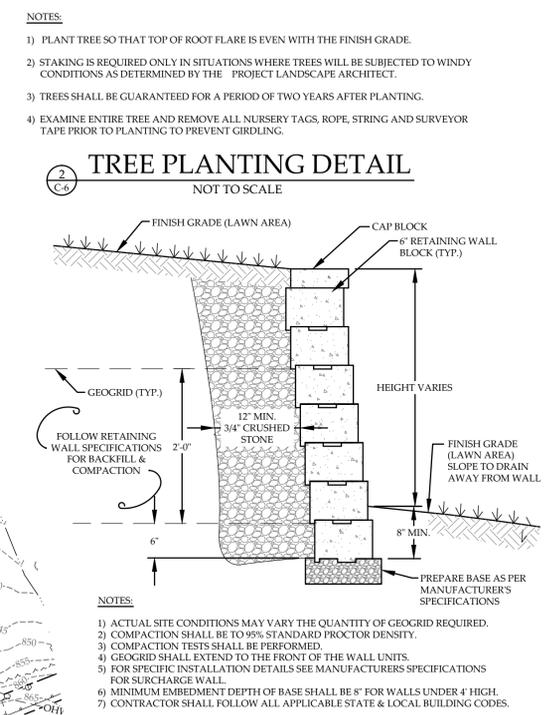
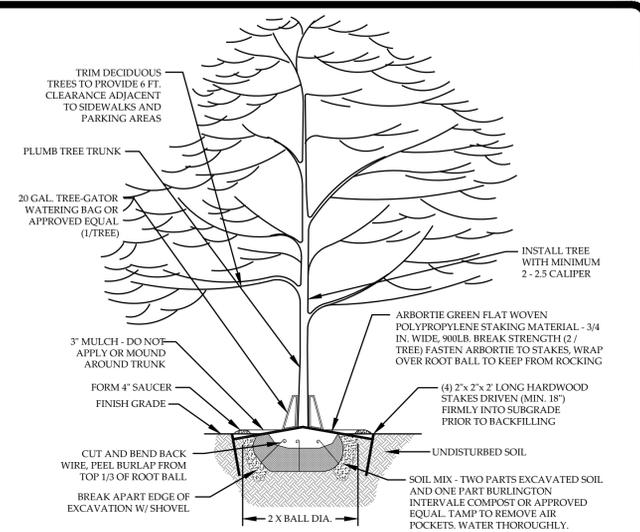
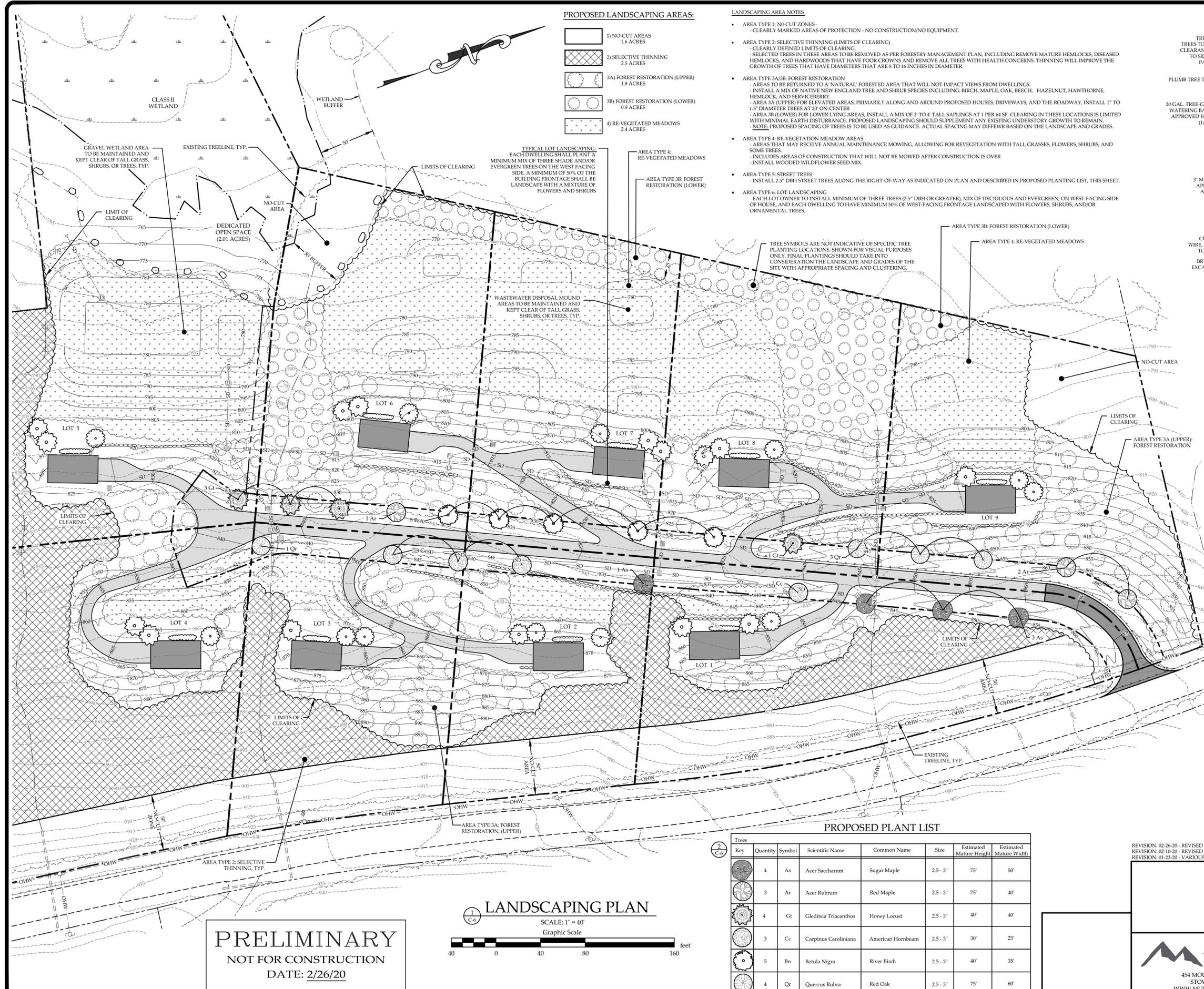
**TYPICAL PAVED ROADWAY SECTION**  
 NOT TO SCALE



**TYPICAL GRAVEL DRIVEWAY SECTION**  
 NOT TO SCALE

REVISION: 01-23-20 VARIOUS MINOR CHANGES

<b>ROADWAY PLAN &amp; PROFILE</b>		PROJECT NO. ....18045	SHEET NO.
STOWE HOLLOW ROAD LLC		DRAWN BY .....WEH	<b>C-5</b>
STOWE HOLLOW ROAD		CHECKED BY .....TRM	
STOWE, VERMONT		SCALE .....AS NOTED	5 OF 10 SHEETS
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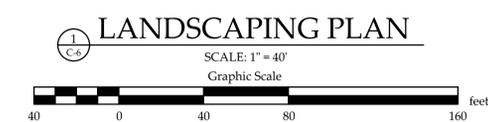
**LANDSCAPE AREAS TABLE**

ITEM	AREA (ACRES)	AREA (% OF TOTAL)
ENTIRE PARCEL	13.96	100%
TOTAL AREA OF DISTURBANCE	7.1	51%
AREA TYPE 1 - "NO CUT" AREAS	1.6	11%
AREA TYPE 2 - SELECTED THINNING	2.5	18%
AREA TYPE 3A - FOREST RESTORATION (UPPER)	1.8	13%
AREA TYPE 3B - FOREST RESTORATION (LOWER)	0.9	6%
AREA TYPE 4 - REVEGETATED MEADOWS	2.4	17%
AREA TYPE 5 - STREET TREES	0.7	5%
AREA TYPE 6 - LOT LANDSCAPING	0.5	4%
IMPERVIOUS AREAS	0.86	7%
REMAINING AREAS (MAINTAINED LOT AREAS)	0.9	6%
TOTAL PROPOSED CLEARING	7.1	51%
TOTAL PROPOSED LANDSCAPING AREAS	6.3	45%

**PROPOSED PLANT LIST**

Key	Quantity	Symbol	Scientific Name	Common Name	Size	Estimated Mature Height	Estimated Mature Width
As	4	As	Acer Saccharum	Sugar Maple	2.5 - 3"	75'	50'
Ar	3	Ar	Acer Rubrum	Red Maple	2.5 - 3"	75'	40'
Gt	4	Gt	Gleditsia Triacanthos	Honey Locust	2.5 - 3"	40'	40'
Cc	3	Cc	Carpinus Caroliniana	American Hornbeam	2.5 - 3"	30'	25'
Bn	5	Bn	Betula Nigra	River Birch	2.5 - 3"	40'	35'
Qr	4	Qr	Quercus Rubra	Red Oak	2.5 - 3"	75'	60'

**PRELIMINARY**  
NOT FOR CONSTRUCTION  
DATE: 2/26/20



REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND AND LANDSCAPING AREAS  
REVISION: 02-10-20 - REVISED SIZE OF GRAVEL WETLAND AND LANDSCAPING AREAS  
REVISION: 01-23-20 - VARIOUS MINOR CHANGES

**LANDSCAPING PLAN**  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD  
STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
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STOWE, VERMONT 05672  
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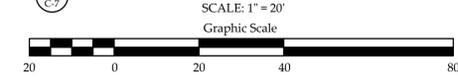
PROJECT NO.....18045  
DRAWN BY.....WEH  
CHECKED BY.....TRM  
SCALE.....1" = 40'  
DATE.....1/17/19

SHEET NO.  
**C-6**  
6 OF 10 SHEETS

**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 1/23/20

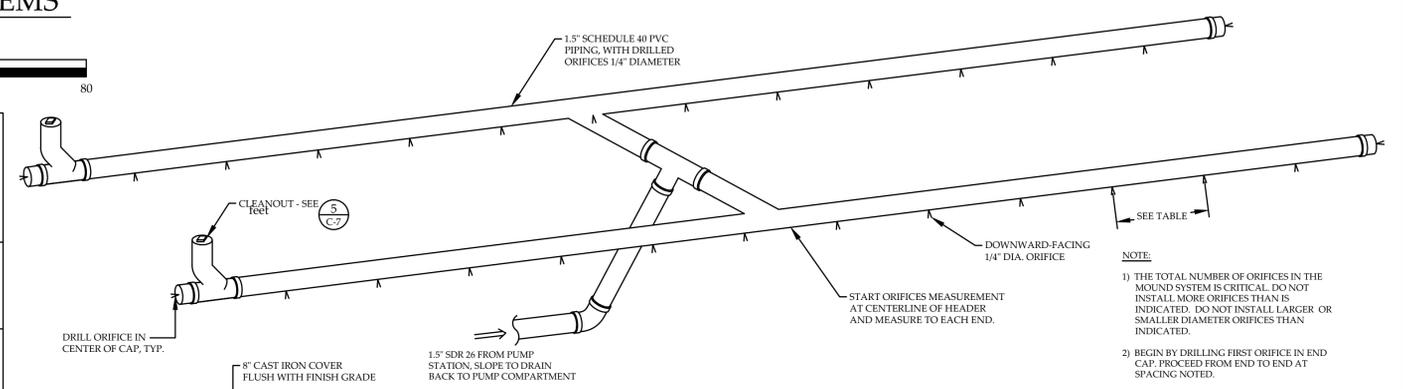


**WASTEWATER SYSTEMS**

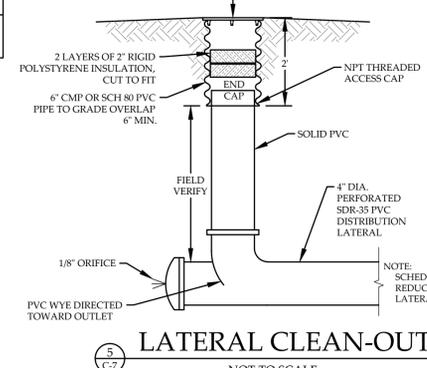


**ALLOWABLE MOUND SAND SIEVE ANALYSES**  
 MOUND SAND SHALL MEET ONE OF THE FOLLOWING SIEVE ANALYSES. INTERPOLATION OF ANALYSES IS NOT PERMITTED. REFER TO E.P.A. SECTION 1-517 (C). SUBMIT RESULTS OF SIEVE ANALYSIS TO ENGINEER PRIOR TO CONSTRUCTION. ONCE DELIVERED ON-SITE AND PLACED IN THE PREPARED MOUND SITE AREA, THE DESIGNER SHALL COLLECT A SAMPLE OF THE FILL MATERIAL FOR TESTING AND CONFIRMATION WITH THE SIEVE REQUIREMENTS.

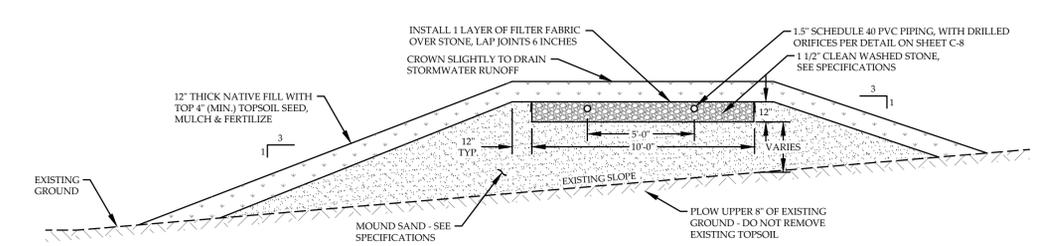
SIEVE NUMBER	OPENING (MM)	PERCENT PASSING, BY WEIGHT
3/8	9.500	85 - 100
40	0.420	25 - 75
60	0.250	0 - 30
100	0.149	0 - 10
200	0.074	0 - 5
4	4.750	95 - 100
8	2.380	80 - 100
16	1.190	50 - 85
30	0.590	25 - 60
50	0.297	10 - 30
100	0.149	2 - 10
3/8	9.500	85 - 100
40	0.420	30 - 50
200	0.074	0 - 5



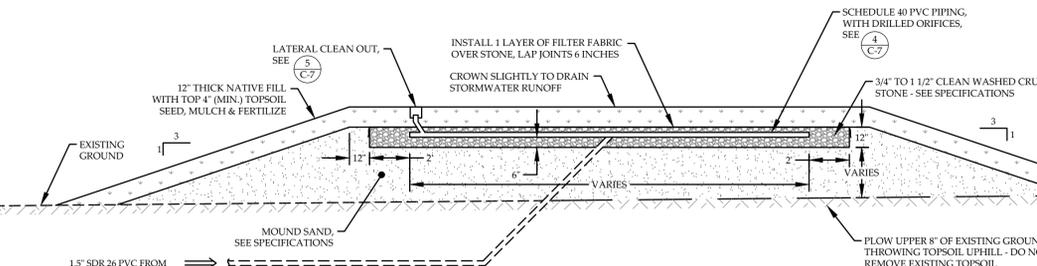
**INDIVIDUAL MOUND SYSTEM DISTRIBUTION LATERALS**  
 NOT TO SCALE



**LATERAL CLEAN-OUT**  
 NOT TO SCALE



**TYPICAL MOUND SECTION**  
 NOT TO SCALE



**TYPICAL MOUND SECTION**  
 NOT TO SCALE

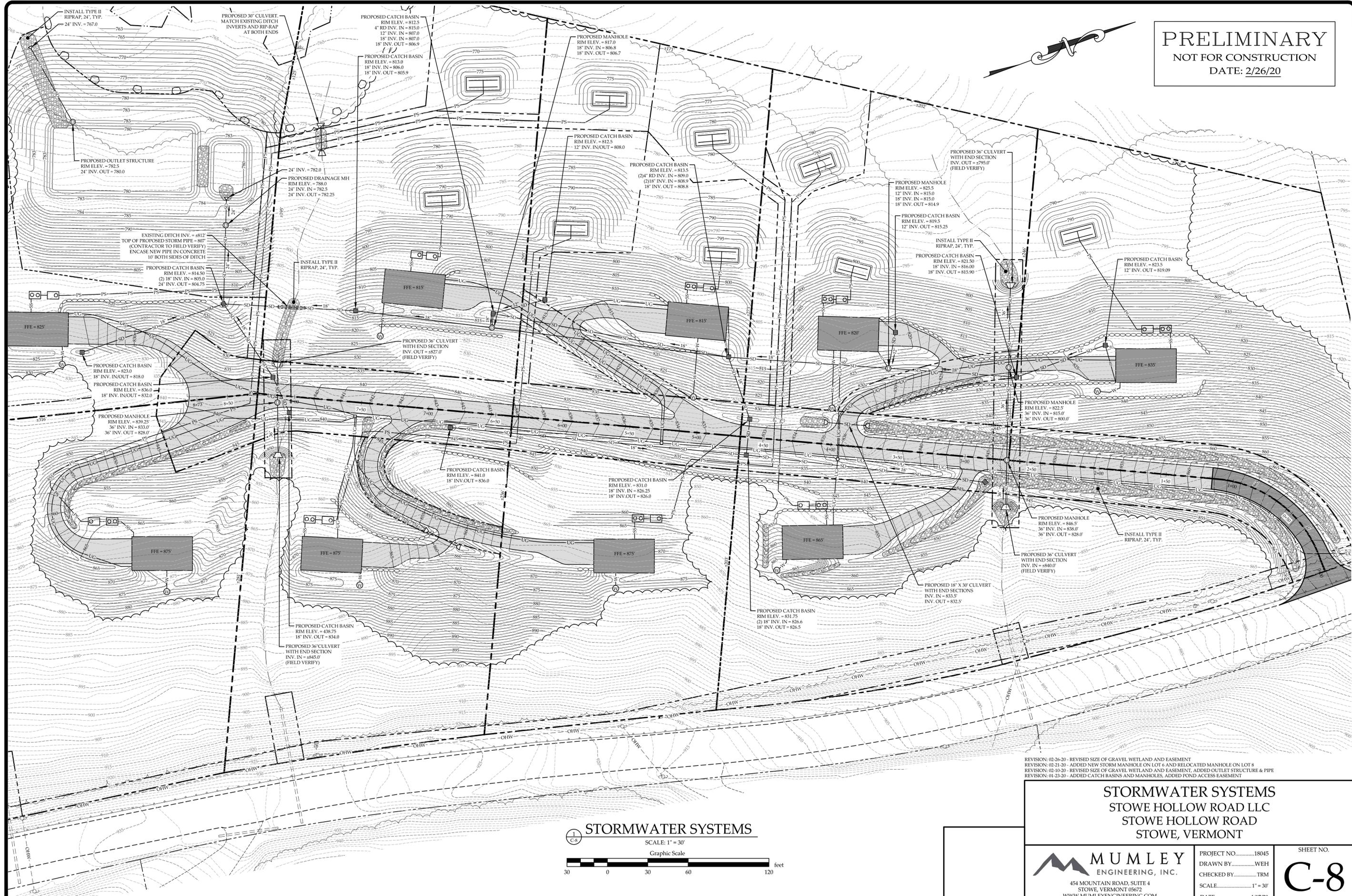
**WASTEWATER SYSTEMS**  
 STOWE HOLLOW ROAD LLC  
 STOWE HOLLOW ROAD  
 STOWE, VERMONT

**MUMLEY ENGINEERING, INC.**  
 454 MOUNTAIN ROAD, SUITE 4  
 STOWE, VERMONT 05672  
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PROJECT NO. ....18045  
 DRAWN BY .....WEH  
 CHECKED BY .....TRM  
 SCALE .....1" = 20'  
 DATE .....1/17/20

SHEET NO.  
**C-7**  
 7 OF 10 SHEETS

**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 DATE: 2/26/20



REVISION: 02-26-20 - REVISED SIZE OF GRAVEL WETLAND AND EASEMENT  
 REVISION: 02-21-20 - ADDED NEW STORM MANHOLE ON LOT 6 AND RELOCATED MANHOLE ON LOT 8  
 REVISION: 02-10-20 - REVISED SIZE OF GRAVEL WETLAND AND EASEMENT, ADDED OUTLET STRUCTURE & PIPE  
 REVISION: 01-23-20 - ADDED CATCH BASINS AND MANHOLES, ADDED POND ACCESS EASEMENT

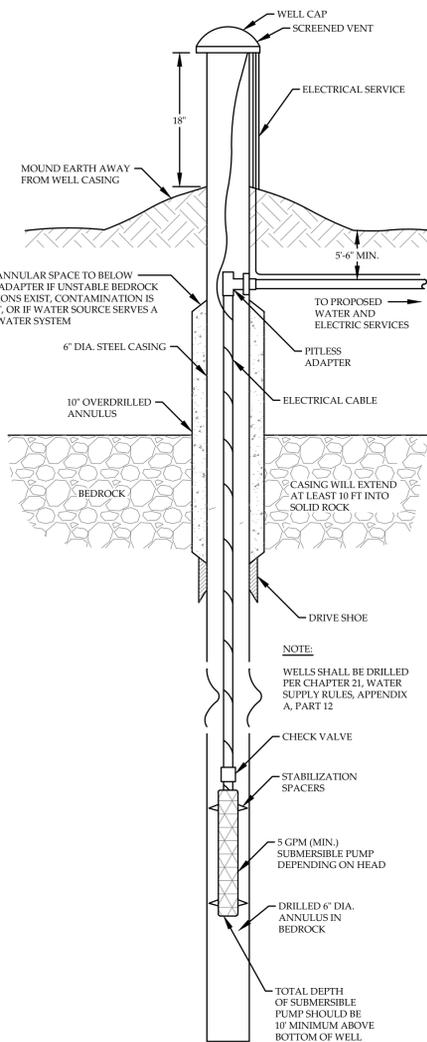
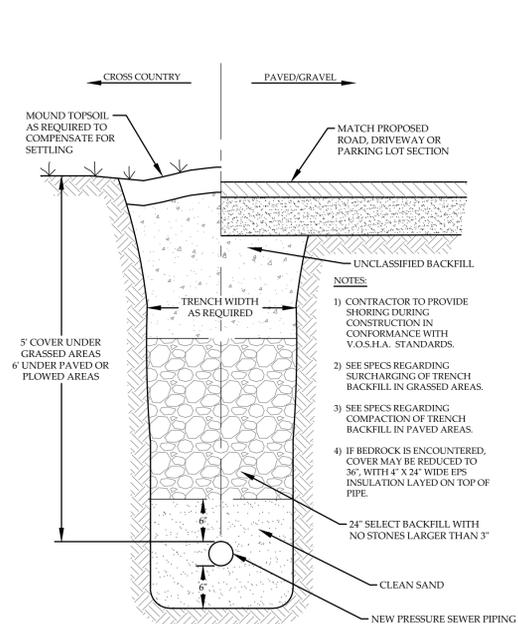
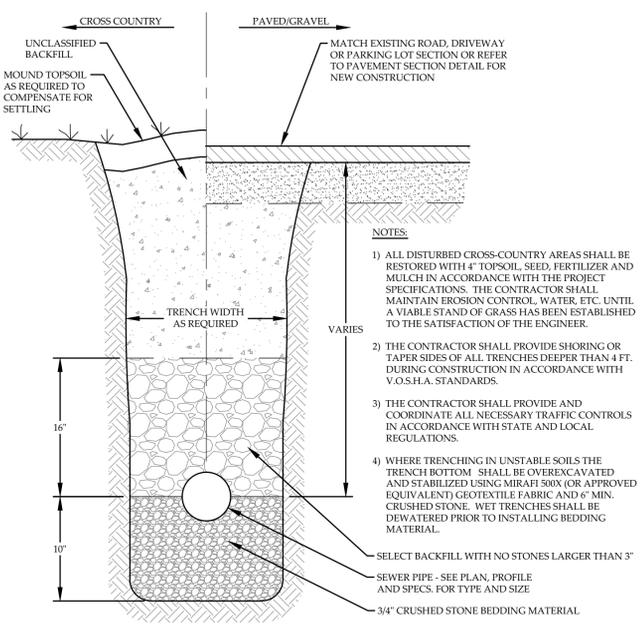
**STORMWATER SYSTEMS**  
 SCALE: 1" = 30'  
 Graphic Scale  
 0 30 60 120 feet

**STORMWATER SYSTEMS**  
 STOWE HOLLOW ROAD LLC  
 STOWE HOLLOW ROAD  
 STOWE, VERMONT

**MUMLEY**  
 ENGINEERING, INC.  
 454 MOUNTAIN ROAD, SUITE 4  
 STOWE, VERMONT 05672  
 WWW.MUMLEYENGINEERING.COM  
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PROJECT NO. ....18045  
 DRAWN BY.....TRM  
 CHECKED BY.....TRM  
 SCALE.....1" = 30'  
 DATE.....1/17/20

SHEET NO.  
**C-8**  
 8 OF 10 SHEETS



**CLEARING AND GRUBBING.**  
CLEARING, GRUBBING SHALL CONSIST OF CUTTING AND DISPOSING OF ALL TREES, DOWN TIMBER, BRUSH, BUSHES, AND DEBRIS FROM ALL AREAS AS SHOWN ON THE PLANS. EXCEPT FOR TREES, SHRUBS AND VEGETATION THAT ARE TO REMAIN STANDING, ALL TREES, SHRUBS, DOWN TIMBER, BRUSH AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF PRIOR TO GRADING OPERATIONS BEGINNING IN THE RESPECTIVE AREAS. IF IT IS DEEMED IMPRACTICAL TO FELL THE TREE AS A WHOLE, IT SHALL BE REMOVED IN SECTIONS ACCORDING TO STANDARD PRACTICES OF PROFESSIONAL TREE REMOVAL.

**GRUBBING.** GRUBBING SHALL CONSIST OF REMOVING AND DISPOSING OF ALL STUMPS, ROOTS, GRASS, TURF, DEBRIS, OR OTHER OBJECTIONABLE MATERIAL WITHIN THE CONSTRUCTION LIMITS, AND WITHIN FILL LIMITS WHERE THE EMBANKMENTS ARE TO BE MADE TO A DEPTH LESS THAN 5 FEET BELOW SUBGRADE. GRUBBING AREAS SHALL ALSO INCLUDE ANY OTHER AREAS SHOWN IN THE CONTRACT DOCUMENTS. THE GRUBBING SHALL PROGRESS IN SUCH A MANNER TO PREVENT EROSION AS DESCRIBED IN THESE PLANS. ANY VOIDS LEFT THROUGH GRUBBING OPERATIONS SHALL BE BACKFILLED WITH APPROVED EXCAVATED MATERIAL OR BORROW AND COMPACTED TO CONFORM TO THE SURROUNDING AREA.

**EXCAVATION AND EMBANKMENTS**  
THIS WORK SHALL CONSIST OF EXCAVATING AND GRADING ROADWAYS, WATERWAYS, CHANNELS, AND STEPS IN HILLSIDE EMBANKMENTS AND EXCAVATING UNSUITABLE MATERIAL FROM THE CONSTRUCTION AREA AND BENEATH EMBANKMENT AREAS, SURFACES, AND PAVEMENTS. THIS WORK SHALL CONSIST OF EXCAVATING SELECTED MATERIAL FOUND IN THE CONSTRUCTION AREA FOR SPECIFIC USE IN THE CONSTRUCTION; TRIMMING AND SHAPING OF SLOPES; AND DISPOSING OF ALL UNSUITABLE OR SURPLUS EXCAVATED MATERIAL. THE WORK SHALL ALSO CONSIST OF PLACING MATERIAL IN EMBANKMENTS AND THE GRADING OF ALL MATERIAL PLACED UP TO SUBGRADE TO THE TOLERANCE SPECIFIED IN THE PLANS.

**GENERAL CONSTRUCTION REQUIREMENTS.** PRIOR TO BEGINNING EXCAVATION, GRADING, AND EMBANKMENT OPERATIONS IN ANY AREA, ALL NECESSARY CLEARING AND GRUBBING THAT AREAS SHALL HAVE BEEN COMPLETED IN ACCORDANCE WITH CLEARING & GRUBBING DEFINED ABOVE. ALL SLOPES IN LAYER AND EMBANKMENT SECTIONS, DITCHES, AND WATERWAYS, WHETHER OLD OR NEWLY CONSTRUCTED, SHALL BE SATISFACTORILY CLEANED AND CLEARED OF OBSTRUCTIONS AND LEFT IN A NEAT AND TRIM CONDITION. THE CONSTRUCTION AREA SHALL ALWAYS BE MAINTAINED TO ENSURE PROPER DRAINAGE.

ALL SUITABLE MATERIAL REMOVED BY EXCAVATING SHALL BE USED IN THE FORMATION OF EMBANKMENTS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. ANY EXCAVATION THAT CANNOT BE UTILIZED IN EMBANKMENTS SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER. NO MATERIAL SHALL BE WASTED WITHOUT PERMISSION OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF ALL CONSTRUCTED EMBANKMENTS AND SHALL REPLACE, AT NO COST TO THE OWNER, ANY PORTIONS THAT HAVE BECOME DISPLACED AND THAT ARE NOT ATTRIBUTABLE TO THE UNAVOIDABLE MOVEMENT OF THE NATURAL GROUND UPON WHICH THE EMBANKMENT IS MADE OR TO AN ACT OF GOD.

UNLESS DIRECTED BY THE ENGINEER, BORROW MATERIAL SHALL NOT BE PLACED UNTIL ALL SUITABLE MATERIAL HAS BEEN EXCAVATED AND PLACED IN THE EMBANKMENTS, EXCEPT WHEN SAND BORROW OR GRANULAR BORROW IS SHOWN ON THE PLANS OR WHEN GRANULAR BORROW IS REQUIRED BY THE ENGINEER FOR USE UNDER EMBANKMENTS OR USED WITH MATERIAL FROM EXCAVATION IN MAKING EMBANKMENTS. SHOULD A SURPLUS OF EXCAVATED MATERIAL RESULT FROM THE CONTRACTOR PLACING MORE BORROW THAN REQUIRED, THE AMOUNT OF THIS SURPLUS WILL BE MEASURED BY THE ENGINEER AND 115% OF THE TOTAL SURPLUS WILL BE DEDUCTED FROM THE TOTAL QUANTITY REMOVED FROM THE BORROW SOURCE.

**EXCAVATION.** ANY LOOSE MATERIAL, RESULTING FROM BREAKAGE AND SLIDES SHALL BE REMOVED AND DISPOSED OF AS DIRECTED BY THE ENGINEER. EXCAVATED MATERIAL SHALL BE SORTED SO THAT THE BEST MATERIAL IS PLACED IN EMBANKMENTS BENEATH THE TRAVELED WAY. THE CONTRACTOR SHALL NOT EXCAVATE OR REMOVE ANY MATERIAL OUTSIDE THE LIMITS OF THE EXCAVATION SLOPE AND GRADE LINES SHOWN ON THE PLANS UNLESS AUTHORIZED IN WRITING BY THE ENGINEER. GRADING SHALL BE TO FULL CROSS-SECTION WIDTH AT SUBGRADE BEFORE PLACING OF ANY TYPE OF SUBBASE OR PAVEMENT. EXCEPT FOR PARTIAL EXCAVATION, GRADING SHALL BE UNIFORM AND THOROUGHLY INCORPORATED INTO THE SOIL BY DISCING, HARROWING, BLADING, OR OTHER APPROVED METHODS. THIS MANIPULATION MAY BE OMITTED FOR SAND AND GRAVEL.

THE CONTRACTOR SHALL STRIP LEDGE AND THEN NOTIFY THE ENGINEER THAT THE AREA IS READY FOR CROSS-SECTIONING PRIOR TO MAKING ANY ROCK EXCAVATION. THE CONTRACTOR MAY USE OTHER MEANS OF LOCATING THE ROCK LINE WITH THE APPROVAL OF THE ENGINEER. THE DEPTH OF THE ROCK LEFT WITHIN ANY ONE EXCAVATION AREA WILL BE APPROVED BY THE ENGINEER.

**DISPOSAL OF SURPLUS EXCAVATION AND WASTE MATERIAL.** ALL SURPLUS EXCAVATION AND WASTE MATERIAL SHALL BE DEPOSITED AS SHOWN ON THE PLANS OR AS AUTHORIZED IN WRITING BY THE ENGINEER. EXCAVATED MATERIAL SHALL NOT BE WASTED UNLESS AUTHORIZED BY THE ENGINEER. COMPACTION REQUIREMENTS FOR SURPLUS OR WASTE MATERIAL USED TO FLATTEN SLOPES OUTSIDE THE EMBANKMENT LIMITS SHOWN ON THE PLANS MAY BE WAIVED; HOWEVER, PLACEMENT PROCEDURES SHALL ENSURE A STABLE FILL SLOPE. WHEN SUFFICIENT ON-SITE DISPOSAL AREAS ARE NOT SHOWN ON THE PLANS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE DISPOSAL AREAS.

**EMBANKMENTS.**  
**PREPARATION OF EMBANKMENT AREA.** WHEN EMBANKMENTS ARE TO BE MADE ON A HILLSIDE, THE SLOPE OF THE ORIGINAL GROUND UPON WHICH THE EMBANKMENTS ARE TO BE CONSTRUCTED SHALL BE STEPPED AND PROPERLY DRAINED AS THE FILL IS CONSTRUCTED IN ACCORDANCE WITH THE PLANS OR AS DIRECTED BY THE ENGINEER.

**USE OF MATERIALS.** THE EXCAVATED ROCK, LEDGE, BOULDERS, AND STONE, EXCEPT WHERE REQUIRED IN THE CONSTRUCTION OF OTHER ITEMS OR OTHERWISE DIRECTED, SHALL BE USED IN THE CONSTRUCTION OF EMBANKMENTS TO THE EXTENT OF THE PROJECT REQUIREMENTS AND, GENERALLY, SHALL BE PLACED TO FORM THE BASE OF AN EMBANKMENT. WHEN SHOWN ON THE PLANS, CERTAIN PORTIONS OF ROCK EXCAVATION MAY BE RESERVED FOR SPECIAL USE SUCH AS ROCK FILL, FOR EMBANKMENT CONSTRUCTION AT LOCATIONS BELOW HIGH WATER, OR AT LOCATIONS SUSCEPTIBLE TO EROSION. FROZEN MATERIAL SHALL NOT BE USED IN THE CONSTRUCTION OF EMBANKMENTS. THE EMBANKMENTS OR SUCCESSIVE LAYERS OF THE EMBANKMENTS SHALL NOT BE PLACED UPON FROZEN MATERIAL. PLACEMENT OF MATERIAL OTHER THAN ROCK SHALL STOP WHEN THE SUSTAINED AMBIENT AIR TEMPERATURE, BELOW 32°F, PROHIBITS ATTAINMENT OF THE REQUIRED COMPACTION. IF THE MATERIAL IS OTHERWISE ACCEPTABLE, IT SHALL BE STOCKPILED AND RESERVED FOR FUTURE USE WHEN ITS CONDITION IS ACCEPTABLE TO THE ENGINEER FOR USE IN EMBANKMENTS.

**PROCEDURE FOR PLACING AND SPREADING.** MATERIAL FROM EXCAVATION ON THE PROJECT SHALL BE USED TO THE EXTENT AVAILABLE AND WHEN NOT AVAILABLE SHALL BE OBTAINED FROM SOURCES OF GRANULAR BORROW OR ROCK BORROW WHEN AUTHORIZED IN WRITING BY THE ENGINEER. WHEN TRUCKS ARE USED TO PLACE EARTH FROM EXCAVATION OR BORROW, THE MATERIAL SHALL BE DEPOSITED ON THE LAYER OF EMBANKMENT BEING CONSTRUCTED, BLADED OR DOZED INTO PLACE, AND SHAPED AND COMPACTED. DUMPING DIRECTLY ONTO PREVIOUSLY CONSTRUCTED LAYERS WILL NOT BE PERMITTED. EMBANKMENTS OF EITHER EARTH OR ROCK MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS OF UNIFORM THICKNESS AND ACROSS THE FULL SECTION WIDTH. WHEN IT IS IMPRACTICAL TO CONSTRUCT A FULL WIDTH LAYER ACROSS AN EMBANKMENT, PARTIAL WIDTH LAYERS MAY BE AUTHORIZED, PROVIDED THE FULL WIDTH PROCEDURE IS RESUMED AS SOON AS PRACTICAL. LOGS, STUMPS, WASTE MATERIAL, AND OVERSIZED COBBLESTONES OR BOULDERS SHALL NOT BE PLACED WITHIN THE STRUCTURAL EMBANKMENT AREA. THEY MAY BE PLACED OUTSIDE THE STRUCTURAL EMBANKMENT AREA AT LOCATIONS DIRECTED BY THE ENGINEER OR, WHEN AUTHORIZED, DISPOSED OF AS SURPLUS MATERIAL.

INITIAL LAYERS SHALL BEGIN AT THE DEEPEST PART OF THE FILL. EXCEPT FOR THE FIRST LAYER OF FILL OVER SWAMPY GROUND AND CLEARED AREAS, THE LOOSE LAYER THICKNESS SHALL BE LIMITED TO CONDITIONS NECESSARY TO OBTAIN A FULL WIDTH LAYER. AUTHORIZED LAYERS IN EXCESS OF 8 INCHES BUT NOT MORE THAN 24 INCHES DEEP SO THAT THE ENGINEER CAN DETERMINE MOISTURE, DENSITY, AND STABILITY, SOLELY AT THE CONTRACTOR'S EXPENSE. EFFECTIVE SPREADING EQUIPMENT SHALL BE USED ON EACH LAYER TO OBTAIN UNIFORM THICKNESS. COBBLESTONES OR BOULDERS HAVING THEIR LEAST DIMENSION GREATER THAN THE LOOSE LAYER THICKNESS BEING PLACED SHALL BE REMOVED PRIOR TO COMPACTION.

EACH LAYER SHALL BE COMPACTED AS SPECIFIED, AND, IF NECESSARY, STABILIZED PRIOR TO A SUCCESSIVE LAYER BEING PLACED. EACH LAYER SHALL BE KEPT CROWNED TO SHED WATER. AS THE COMPACTION OF EACH LAYER PROGRESSES, CONTINUOUS LEVELING AND MANIPULATING WILL BE REQUIRED TO ENSURE UNIFORM DENSITY, A UNIFORM AND SATISFACTORY MOISTURE CONTENT, AND ACCEPTABLE STABILITY. THE LAST LIFT CONSTRUCTED EACH DAY SHALL BE GRADED, CROWNED, AND ROLLED TO ENSURE ADEQUATE DRAINAGE.

WHEN A4, A5, A6, OR A7 COHESIVE SOILS, AS IDENTIFIED IN TABLE 703.01A OF THE 2018 VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, HAVE EXCESS MOISTURE AND CANNOT EFFECTIVELY BE AIR DRIED OR DRIED BY MANIPULATION, THE CONTRACTOR MAY LAYER OR MIX THE MATERIAL WITH DRY AL2 OR A3 GRANULAR SOILS TO OBTAIN ACCEPTABLE COMPACTION AND STABILITY. THE CONTRACTOR IS RESPONSIBLE FOR MAKING PRUDENT USE OF AVAILABLE GRANULAR EXCAVATION FROM THE PROJECT PRIOR TO BRINGING AUTHORIZED USE OF GRANULAR BORROW. THE COMBINED LOOSE THICKNESS OF MIXED OR LAYERED MATERIALS PRIOR TO COMPACTION SHALL NOT EXCEED 16 INCHES. DURING THE CONSTRUCTION OF THE EMBANKMENTS, IF BULGING, CRACKING, OR UNSTABLE MOVEMENT OCCURS, THE PLACING OF THE FILL MATERIAL SHALL BE STOPPED, RETARDED, OR CORRECTED TO ALLOW THE MATERIAL TO STABILIZE AS DIRECTED BY THE ENGINEER. RUTTING, ROLLING, SHOVING, OR OTHER DISPLACEMENT IN EXCESS OF 6 INCHES UNDER THE ACTION OF CONSTRUCTION EQUIPMENT MAY BE CONSIDERED EVIDENCE OF STABILITY PROBLEMS. WHEN SOFT OR WET CLAY OR SILT EXCAVATION IS BEING USED BETWEEN LAYERS OF REASONABLY CLEAN STABLE ROCK FILL, THE ROCK EMBANKMENT LAYERS SHALL NOT EXCEED 24 INCHES IN LOOSE MEASUREMENT. THE CLAY OR SILT LAYERS SHALL NOT EXCEED 6 INCHES IN LOOSE MEASUREMENT.

IF EMBANKMENTS ARE TO BE CONSTRUCTED BY USING ROCK EXCAVATION, ALL REASONABLE PRECAUTION MUST BE TAKEN TO ENSURE A SOLID EMBANKMENT. THE FILL SHALL BE MADE IN UNIFORM LAYERS CONSISTENT WITH THE SIZE OF THE ROCK BEING USED, BUT NOT TO EXCEED 24 INCHES IN THICKNESS. INDIVIDUAL PIECES OF ROCK OR BOULDERS WITH THEIR LEAST DIMENSION EXCEEDING THE THICKNESS OF THE LAYER BEING PLACED SHALL BE REMOVED. ROCK OF ANY SIZE OR LARGER SHALL BE PLACED OUTSIDE THE STRUCTURAL EMBANKMENT AREA IN SUCH A MANNER THAT ALL VOIDS ARE FILLED. ROCK SHALL NOT BE DUMPED OVER THE END OF A FILL. ROCK SHALL BE DEPOSITED ON THE FILL AND DISTRIBUTED BY BLADING OR DOZING TO ENSURE PROPER PLACEMENT IN THE EMBANKMENT. SO THAT VOIDS, POCKETS, AND BRIDGING ARE REDUCED TO A MINIMUM.

**COMPACTION.** EACH LAYER BETWEEN THE DESIGN EMBANKMENT LIMITS SHOWN ON THE PLANS SHALL BE UNIFORMLY COMPACTED USING COMPACTION EQUIPMENT TO NOT LESS THAN 90% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T99, METHOD C. FIELD DENSITY DETERMINATION WILL BE MADE IN ACCORDANCE WITH AASHTO T191, SAND CONE METHOD, AND AASHTO T310, NUCLEAR METHOD, OR OTHER APPROVED PROCEDURES. FIELD MOISTURE DETERMINATION WILL BE MADE IN ACCORDANCE WITH AASHTO T99 OR MEASURED IN ACCORDANCE WITH AASHTO T208, NUCLEAR METHOD. LOCATIONS WITHIN THE EMBANKMENT LIMITS WHERE WASTE MATERIALS HAVE BEEN PLACED SHALL BE COMPACTED TO THE EXTENT THAT STABILITY IS ENSURED.

ALL FILL MATERIAL SHALL BE COMPACTED AT A MOISTURE CONTENT DETERMINED BY THE ENGINEER TO BE SUITABLE FOR OBTAINING THE REQUIRED DENSITY. THE MOISTURE CONTENT IN EACH LAYER UNDER CONSTRUCTION SHALL NOT EXCEED 2% ABOVE THE OPTIMUM MOISTURE CONTENT, AND IT SHALL BE LESS THAN THAT QUANTITY THAT WILL CAUSE THE EMBANKMENT TO BECOME UNSTABLE DURING COMPACTION. THE ENGINEER WILL CONSIDER SPONGINESS, SHOVING, OR OTHER DISPLACEMENT UNDER HEAVY EQUIPMENT SUFFICIENT EVIDENCE OF A LACK OF STABILITY UNDER THIS REQUIREMENT. AND THE CONTRACTOR SHALL STOP AND FURTHER PLACEMENT OF MATERIAL IN THE AREA AFFECTED TO ALLOW THE MATERIAL TO STABILIZE.

WHEN THE MOISTURE CONTENT OF THE MATERIAL IN THE LAYER UNDER CONSTRUCTION IS LESS THAN THE AMOUNT NECESSARY TO OBTAIN THE REQUIRED COMPACTION BY MECHANICAL COMPACTION METHODS, WATER SHALL BE ADDED BY PRESSURE DISTRIBUTORS OR OTHER APPROVED EQUIPMENT. WATER MAY ALSO BE ADDED BY EXCAVATION OR BORROW PITS. THE WATER SHALL BE UNIFORMLY AND THOROUGHLY INCORPORATED INTO THE SOIL BY DISCING, HARROWING, BLADING, OR OTHER APPROVED METHODS. THIS MANIPULATION MAY BE OMITTED FOR SAND AND GRAVEL.

WHEN THE MOISTURE CONTENT OF THE MATERIAL IS IN EXCESS OF 2% ABOVE THE OPTIMUM MOISTURE CONTENT, DRY MATERIAL SHALL BE THOROUGHLY INCORPORATED INTO THE MATERIAL OF THE WET MATERIAL. THE MATERIAL SHALL BE AERATED BY DISCING, HARROWING, BLADING, ROTARY MIXING, OR OTHER APPROVED METHOD, OR COMPACTION OF THE LAYER OF WET MATERIAL SHALL BE DEFERRED UNTIL THE LAYER HAS DRIED TO THE REQUIRED MOISTURE CONTENT BY EVAPORATION.

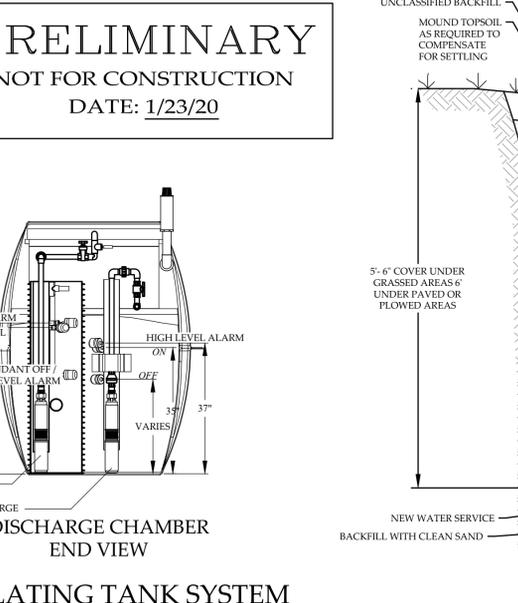
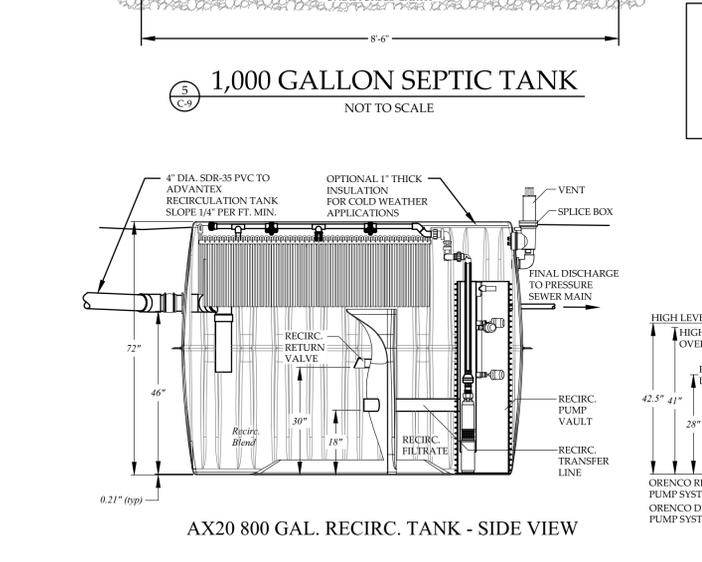
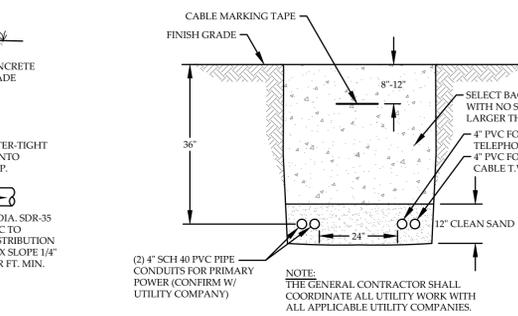
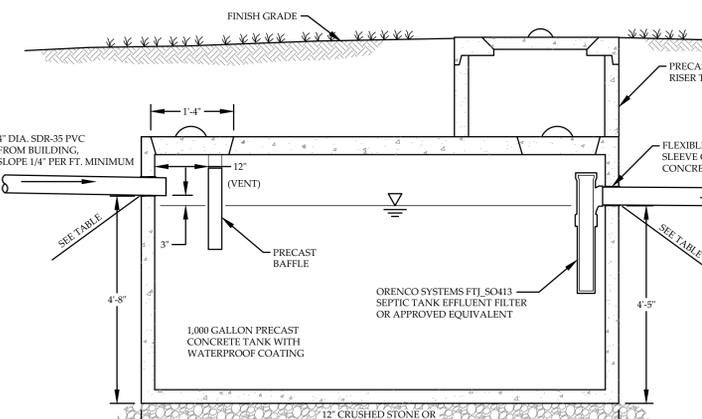
THE DENSITY REQUIREMENTS DO NOT APPLY TO THOSE PORTIONS OF EMBANKMENTS CONSTRUCTED OF MATERIAL SO COARSE THAT IT CANNOT BE PROPERLY TESTED WITH A CONVENTIONAL DENSITY TESTING APPARATUS. INSTEAD, THE MATERIAL SHALL BE COMPACTED TO THE SATISFACTION OF THE ENGINEER.

IN AREAS INACCESSIBLE TO POWER ROLLING, THE EMBANKMENT MATERIAL SHALL BE PLACED IN UNIFORM HORIZONTAL LAYERS OF NOT MORE THAN 6 INCHES IN DEPTH AND COMPACTED BY MEANS OF APPROVED MECHANICAL TAMPERS TO THE DENSITY REQUIREMENTS SPECIFIED ABOVE. THE USE OF HAND TAMPS WILL NOT BE PERMITTED.

**SUBGRADE.**  
THE SUBGRADE SHALL BE CONSTRUCTED TO THE LINES, GRADES, AND CROSS-SECTIONS SHOWN ON THE PLANS. AFTER ALL DRAINAGE STRUCTURES HAVE BEEN INSTALLED AND THE SUBGRADE HAS BEEN SHAPED CORRECTLY, THE SUBGRADE SHALL BE BROUGHT TO A FIRM, UNYIELDING SURFACE COMPACTED TO ATTAIN AT LEAST 95% OF THE MAXIMUM DRY DENSITY. THIS DENSITY WILL BE DETERMINED BY AASHTO T99, METHOD C. A POWER GRADER OR OTHER APPROVED EQUIPMENT SHALL BE USED DURING THE PLACEMENT AND COMPACTION TO OBTAIN THE SPECIFIED CROSS-SECTION. AREAS OF SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL THAT WILL NOT COMPACT READILY SHALL BE REMOVED, REPLACED WITH A SUITABLE MATERIAL, AND PROPERLY COMPACTED AS DIRECTED BY THE ENGINEER. ALL LOOSE ROCK OR BOULDERS ENCOUNTERED AT SUBGRADE IN THE EARTH EXCAVATION SHALL BE REMOVED OR BROKEN OFF TO A DEPTH NOT LESS THAN 12 INCHES BELOW THE SUBGRADE.

IN EXCAVATION AREAS, THE GROUND SHALL NOT BE EXCAVATED OR DISTURBED BELOW THE SUBGRADE EXCEPT AS SHOWN IN THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE ENGINEER. ALL DITCHES AND DRAINS SHALL BE CONSTRUCTED SO THEY WILL EFFECTIVELY DRAIN THE CONSTRUCTION AREA BEFORE THE PLACEMENT OF ANY SUBBASE OR SURFACE COURSE MATERIAL. IN HANDLING MATERIALS, TOOLS, AND EQUIPMENT, THE CONTRACTOR SHALL PROTECT THE SUBGRADE FROM DAMAGE. VEHICLES SHOULD NOT TRAVEL IN A SINGLE TRACK AND FORM RUTS. IF RUTS ARE FORMED, THE SUBGRADE SHALL BE RESHAPED AND COMPACTED. ANY POCKETS OF CLAY, SAND, OR SOFT MATERIAL THAT MAY HAVE BEEN LEFT IN THE SUBGRADE SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL AND PROPERLY COMPACTED AT THE CONTRACTOR'S EXPENSE.

THE SUBGRADE SHALL BE KEPT IN A CONDITION THAT IT WILL DRAIN. SUBBASE, BASE, OR SURFACE MATERIAL SHALL NOT BE DEPOSITED ON THE SUBGRADE UNTIL THE SUBGRADE HAS BEEN CHECKED AND APPROVED BY THE ENGINEER. AFTER THE SUBGRADE HAS BEEN APPROVED, THE CONTRACTOR SHALL NOT PERFORM HAULING OR MOVE EQUIPMENT THAT WILL DISTORT THE CROSS-SECTION OF THE SUBGRADE. A TOLERANCE OF 1/2 INCH ABOVE OR BELOW THE FINISHED SUBGRADE WILL BE ALLOWED PROVIDED THAT THIS TOLERANCE IS NOT MAINTAINED FOR A DISTANCE LONGER THAN 5 FEET AND THAT THE REQUIRED CROSS-SECTION IS MAINTAINED. GRADING SHALL BE DONE WITH A POWER GRADER OR OTHER APPROVED EQUIPMENT TO CONFORM TO THE REQUIREMENTS AS SPECIFIED ABOVE.



**PRELIMINARY**  
NOT FOR CONSTRUCTION  
DATE: 1/23/20

REVISION: 01-23-20 - CHANGED PUMP STATION DETAIL TO ADVANTEX RECIRCULATION TANK

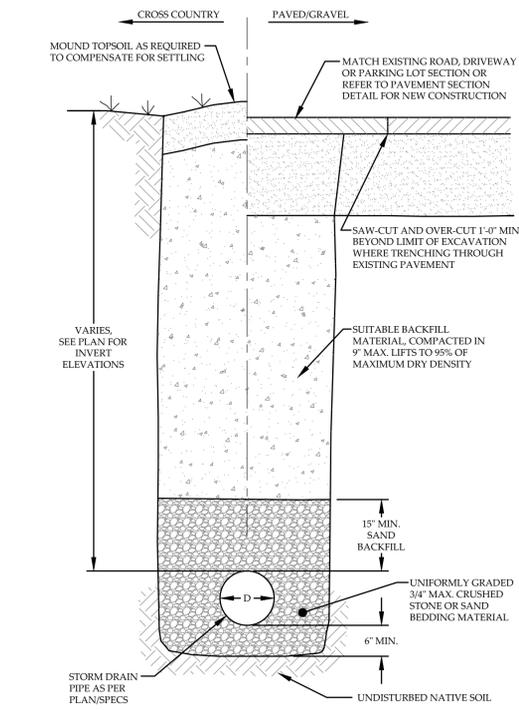
**DETAILS**  
STOWE HOLLOW ROAD LLC  
STOWE HOLLOW ROAD  
STOWE, VERMONT

**MUMLEY**  
ENGINEERING, INC.  
454 MOUNTAIN ROAD, SUITE 4  
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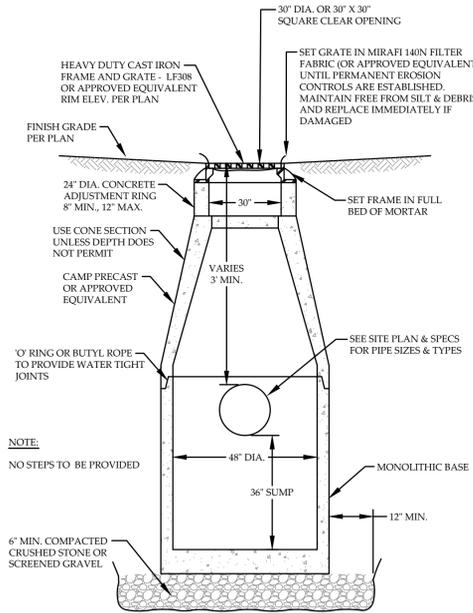
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DRAWN BY.....WEH  
CHECKED BY.....TRM  
SCALE.....AS NOTED  
DATE.....1/17/20  
SHEET NO. **C-9**  
9 OF 10 SHEETS

**NOTES:**

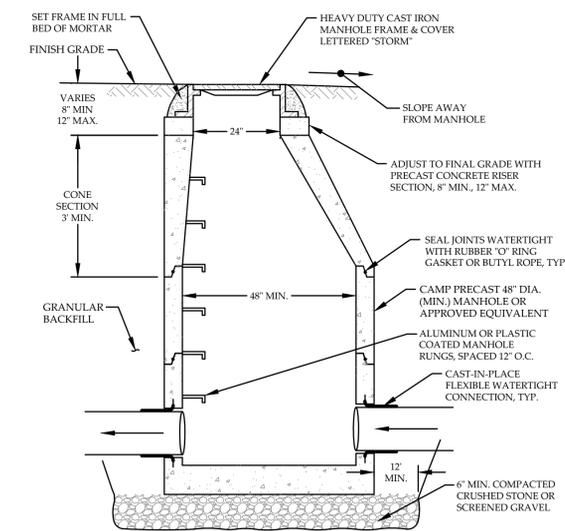
- 1) ALL DISTURBED CROSS-COUNTRY AREAS SHALL BE RESTORED WITH 4" TOPSOIL, SEED, FERTILIZER AND MULCH IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. THE CONTRACTOR SHALL MAINTAIN EROSION CONTROL, WATER, ETC. UNTIL A VIABLE STAND OF GRASS HAS BEEN ESTABLISHED TO THE SATISFACTION OF THE ENGINEER.
- 2) THE CONTRACTOR SHALL PROVIDE SHORING OR TAPER SIDES OF ALL TRENCHES DEEPER THAN 4 FT. DURING CONSTRUCTION IN ACCORDANCE WITH V.O.S.H.A. STANDARDS.
- 3) THE CONTRACTOR SHALL PROVIDE AND COORDINATE ALL NECESSARY TRAFFIC CONTROLS IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS.
- 4) WHERE TRENCHING IN UNSTABLE SOILS THE TRENCH BOTTOM SHALL BE OVEREXCAVATED AND STABILIZED USING MIRAFI 500X (OR APPROVED EQUIVALENT) GEOTEXTILE FABRIC AND 6" MIN. CRUSHED STONE. WET TRENCHES SHALL BE DEWATERED PRIOR TO INSTALLING BEDDING MATERIAL.



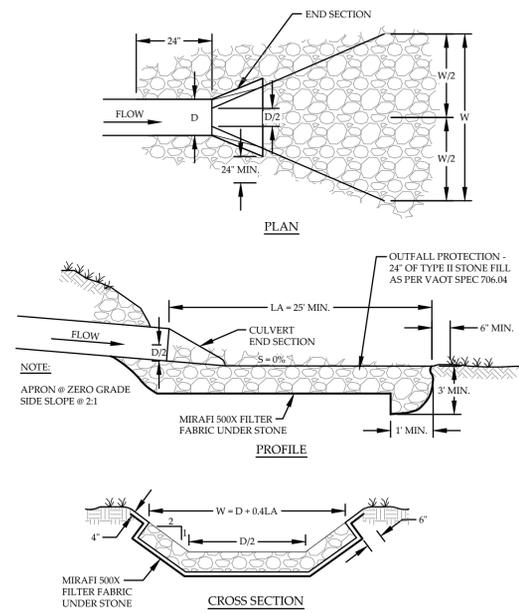
**2** TYPICAL STORM DRAIN TRENCH  
NOT TO SCALE



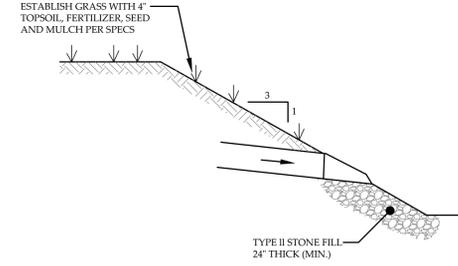
**3** TYPICAL CATCH BASIN  
NOT TO SCALE



**4** TYPICAL STORM DRAIN MANHOLE  
NOT TO SCALE



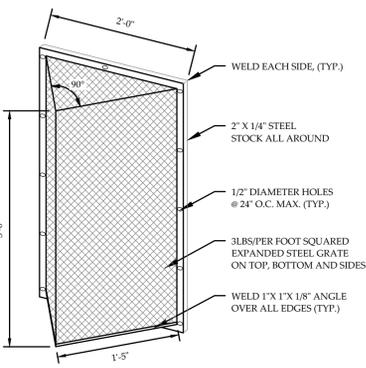
**5** CULVERT OUTLET DETAIL  
NOT TO SCALE



**NOTE:**  
OWNER MAY LINE SEDIMENT FOREBAY WITH BITUMINOUS PAVEMENT OR CONCRETE FOR EASE OF SEDIMENT REMOVAL.

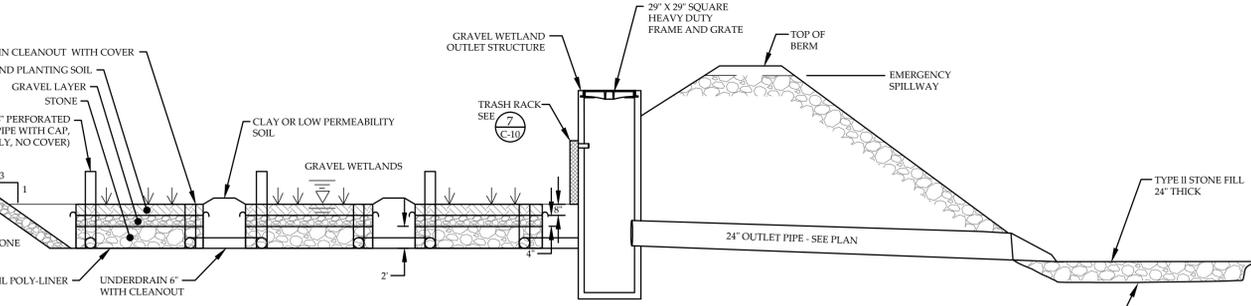
**NOTES:**  
THE GRAVEL WETLANDS SHOULD BE REGULARLY INSPECTED FOR BUILD-UP OF SEDIMENT. SEDIMENT SHOULD BE REMOVED WHEN GREATER THAN A 6" DEPTH OF SEDIMENT HAS ACCUMULATED.  
VEGETATION SHALL BE MAINTAINED IN ALL AREAS THAT DO NOT RECEIVE RIP RAP, PAVEMENT OR CONCRETE.  
PROPER SEDIMENT CONTROL SHALL BE PLACED AND MAINTAINED DURING CONSTRUCTION ACTIVITIES TO MINIMIZE THE AMOUNT OF SEDIMENT REACHING THE GRAVEL WETLANDS.  
ALL EROSION AND SEDIMENT CONTROLS SHOULD BE INSPECTED ON A REGULAR BASIS AND AFTER ANY SIGNIFICANT STORM EVENT AND REPAIRED AS NECESSARY. INSTALL ADDITIONAL EROSION CONTROL, SUCH AS STONE CHECK DAMS, RIP RAP, ETC. AS REQUIRED.  
NO WOODY VEGETATION >2 INCHES IN DIAMETER SHALL BE PLANTED OR ALLOWED TO GROW ON OR WITHIN 15 FEET OF THE DAM OR THE TOE OF THE EMBANKMENT, OR 25 FEET OF THE PRINCIPLE SPILLWAY, EXCLUDING AREAS WITHIN STREAM BUFFER THAT FALL OUT OF THE MAINTENANCE AREA, WHICH ARE NOT TO BE DISTURBED.

**6** GRAVEL WETLAND SECTION  
NOT TO SCALE

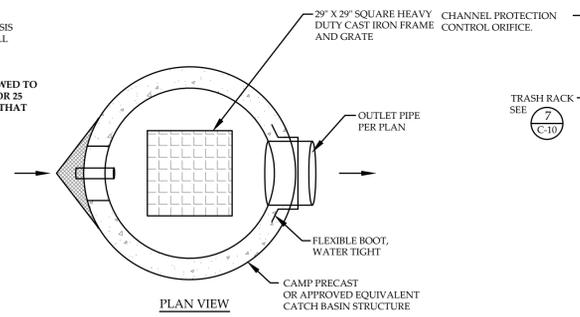


- NOTES FOR TRASH RACK**
1. TRASH RACK TO BE CENTERED OVER OPENING.
  2. STEEL TO CONFORM TO ASTM A-36.
  3. ALL SURFACES TO BE COATED WITH COLD GALVANIZING COMPOUND AFTER WELDING.
  4. TRASH RACK TO BE FASTENED TO THE WALL WITH 1/2" MASONRY ANCHORS. TRASH RACK TO BE REMOVABLE.

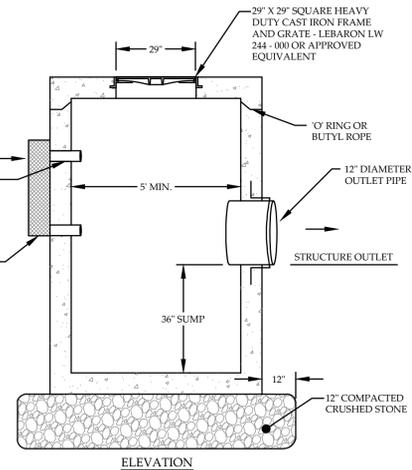
**7** WETLAND TRASH RACK  
NOT TO SCALE



**6** GRAVEL WETLAND SECTION  
NOT TO SCALE



**8** WETLAND STRUCTURE  
NOT TO SCALE



**8** WETLAND STRUCTURE  
NOT TO SCALE

**PRELIMINARY**  
NOT FOR CONSTRUCTION  
DATE: 2/10/20

REVISION: 02-07-20 - REVISED GRAVEL WETLAND SECTION & REMOVED FOOTING DRAIN DETAIL  
REVISION: 01-23-20 - REMOVED DRY DETENTION BASIN DETAILS

<b>DETAILS</b>		PROJECT NO. ....18045	SHEET NO.
STOWE HOLLOW ROAD LLC		DRAWN BY.....WEH	<b>C-10</b>
STOWE HOLLOW ROAD		CHECKED BY.....TRM	
STOWE, VERMONT		SCALE.....AS NOTED	10 OF 10 SHEETS
MUMLEY ENGINEERING, INC.		DATE.....1/17/20	
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