



CIVIL ENGINEERING ASSOCIATES, INC.

10 Mansfield View Lane
South Burlington, VT 05403

Phone: 802-864-2323

Fax: 802-864-2271

E-Mail: jmilbank@cea-vt.com

November 2, 2015

Britney Tenney
Town of Charlotte
P.O. Box 119
Charlotte, Vermont 05445

RECEIVED

NOV 02 2015

CHARLOTTE
PLANNING & ZONING

**Re: Jack and Nancy Barnes
210 Holmes Road
Charlotte, Vermont 05445**

Dear Britney:

Please find enclosed a completed General Permit and Conditional Use application, application fee, adjoining list, letter of basis for design, and plans for the proposed shoreline stabilization project 210 Holmes Road Charlotte, Vermont. Concurrently CEA is applying for a Shoreland Permit with The State of Vermont DEC Watershed Management Division.

The applicants are proposing to construct a large stone retaining wall along the shoreline that has been impacted by erosion. The proposed large stone retaining wall is anticipated to be constructed using Whitcomb Quarry Stone or equivalent. The existing shoreline is eroded with many failures along this length of shoreline that will be stabilized as part of this project. The proposed wall will be very similar to several recently constructed walls along this section of Lake Champlain. The wall will stabilize a series of large slides on the Barnes Property. All disturbed areas will be topsoiled, seeded and mulched and compromised trees will be replaced with new plantings. (See attached site plan)

If you should have any questions or should need any additional information, please feel free to contact me.

Respectfully,

Jack Milbank.



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November 2, 2015

Britney Tenney
Town of Charlotte
P.O. Box 119
Charlotte, Vermont 05445

**Re: Jack and Nancy Barnes
210 Holmes Road
Charlotte, Vermont 05445**

Dear Britney:

This letter supports the technical basis for the design of the proposed seawall at the Barnes residence at 210 Holmes Road. This property has approximately 550' of shoreline on Lake Champlain making it susceptible to wind and wave action from high water and high winds. The record high water levels during the spring of 2011 impacted the shoreline which resulted in severe undercutting and erosion from wave action which has continued to get worse over time.

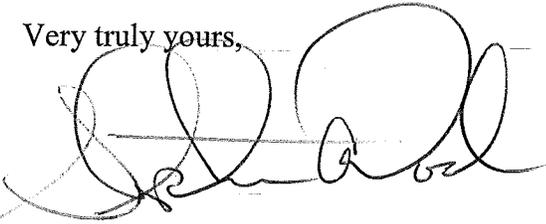
Over the past several years, Civil Engineering Associates, Inc. (CEA) has developed a methodology for addressing lakeshore erosion on Lake Champlain. Particularly for slopes or banks that are relatively steep and/or high and dominantly consist of susceptible soil materials rather than bedrock, we have developed a design that incorporates elements of "armoring" the slope with large quarry stones and backfilling with smaller shot-rock for drainage. The exposed surface visible from the lake is a natural stone product produced by local quarries. These large stones, which are up to five or six feet in maximum dimension, are nested together to provide a relatively continuous surface and sufficient mass to resist most ice and wave action. The fact that they are assembled as natural elements permits some movement of the stones without degrading the structural integrity of the surface armoring and protection of the soils behind the wall. One additional feature of this wall system is the use of a filter fabric (geotextile) layer between the native soil and the shot rock backfill to inhibit the migration (erosion) of the native soil through the coarser materials.

Britney Tenney
November 2, 2015
Page 2

For the exposure conditions at 210 Holmes Road, it is our opinion that a biotechnical solution is not feasible. Wave and wind action are severe enough in storm conditions that using vegetation in combination with other inert materials would not provide sufficient protection against erosion in this environment.

The details of our design are incorporated in the set of drawings submitted with this letter. Should you have any questions or wish to discuss the project in greater detail please let me or Jack Milbank know.

Very truly yours,

A handwritten signature in black ink, appearing to read 'S. Vock', written over a horizontal line.

Stephen A. Vock, P.E.
Principal / Project Engineer

SAV / jlm
Cc: file

ZONING BOARD OF ADJUSTMENT - APPLICATION

TOWN OF CHARLOTTE

Office Use Only #ZBA- _____

Planning & Zoning

Date Received: _____

P.O. Box 119

159 Ferry Road

Charlotte, VT 05445

Phone: 802-425-3533

Fax: 802-425-4241

Note: Decisions of the Zoning Board of Adjustment may be appealed to the Vermont Environmental Court within 30 days of the date of the Board's written decision. Zoning Permits will not be issued so as to become effective prior to the end of that appeal period.

E-Mail: Gloria@townofcharlotte.com

Hearing Date: _____

Receipt # _____ Application Fee \$~~500~~ ²⁵⁰ _____ Appeal Fee \$500 _____ Telecommunications Facilities Fee \$2,000 _____

*APPLICANT/REPRESENTATIVE (if different from owner) *

Name Jack & Nancy Barnes Name STEVE VOKE PE
Address 210 Holmes Road Address CIVIL ENGINEERING ASSOCIATES
Charlotte VT 05445 10 MANUSFORD VIEW LANE
SOUTH DURLINGTON, VT
Phone (802) 238-8485 Phone 802 864 2723 x 313

*Representative must submit a letter from the owner of the property authorizing him/her to represent them for permits, hearings, etc.

Map 33 Block 50 Lot 4 Parcel ID # 00041-0210 Thompsons Point Lot # _____

Property address 210 Holmes Road

Zoning District SHR Lot size 9.8ac[±] Lot frontage 564'[±] % of Lot coverage (building) 1.2% (overall) 7% Building height N/A

Existing front yard setback 462'[±] Existing side yard setbacks 1. 104'[±] 2. 58'[±] Existing rear yard setback 160'[±]

This application references Zoning Bylaw section(s) _____

____ Plot Plan (a plot plan must be submitted showing the lot, existing structures and setbacks, easements, right-of-ways on or abutting the lot, septic primary and replacement areas, well, streams and any other information significant to this application) Submittals no larger than 11" x 17". All measurements must be accurate.

____ Use attached sheet to list all abutting property owners. Include those across any street, private road or right-of-way.

____ Applicant will be required to notify adjoining property owners, by certified mail or certificate of service, after a hearing date has been set.

____ Submit (1) original and (5) copies of complete application.

Application is for: (please check all that apply)

Conditional Use: ____ Variance: ____ Thompson's Point Seasonal Dist: ____ Appeal: ____ Other: describe) Shoreline stabilization

Describe your request: (When appropriate, make reference to attached documents, letters, photographs, etc.)

This application is for the proposed retaining wall to stabilize a severe slope along the shoreline

APPLICATION MUST BE RECEIVED AT LEAST 23 DAYS PRIOR TO THE HEARING DATE.

BE SURE TO COMPLETE ALL SECTIONS OF THE NECESSARY FORMS AND ATTACHMENTS. ONLY COMPLETE APPLICATIONS WILL BE ACCEPTED.

Signature of applicant(s) _____ Date _____

Information available from Town Lister and Tax Map.

<p>Name <u>Steven J. Hendrickson</u></p> <p>Address <u>2014 Reversible Trust</u> <u>1 Charles St. South Plz 2A</u></p> <p>Parcel # Map <u>33</u> Block <u>50</u> Lot <u>03</u> <u>Boston MA 02116</u></p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name <u>Van Rhee Van Der Kloot</u></p> <p>Address <u>4 Old Clubhouse Rd.</u> <u>Old Greenwich CT 06870</u></p> <p>Parcel # Map <u>33</u> Block <u>50</u> Lot <u>2</u></p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name <u>Hilary Naud</u></p> <p>Address <u>359 Holmes Rd</u> <u>Charlotte VT 05445</u></p> <p>Parcel # Map <u>33</u> Block <u>50</u> Lot <u>04-1</u></p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name <u>Hilary Maslow</u></p> <p>Address <u>359 Holmes Rd</u> <u>Charlotte VT 05445</u></p> <p>Parcel # Map <u>33</u> Block <u>50</u> Lot <u>06</u></p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name <u>Thomas C. Tiller Jr</u></p> <p>Address <u>27663 N. 103rd Place</u> <u>Scottsdale AZ 85262</u></p> <p>Parcel # Map <u>33</u> Block <u>50</u> Lot <u>07</u></p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>
<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>	<p>Name _____</p> <p>Address _____</p> <p>Parcel # Map _____ Block _____ Lot _____</p>

TABLE 5.1 DEVELOPMENT REVIEW APPLICATION MATERIALS

Required Information (unless waived)	Conditional Use Review	Applicant's checklist
1. Names, addresses of property owner(s) of record and persons preparing the application	✓	
2. Names, addresses of the owner(s) of record of adjoining and facing properties; proof of notification	✓	
3. Project description [maximum one page summary]	✓	
4. Site location map showing project location in relation to town roads, surface drainage and adjoining and facing parcels	✓	
5. Legal deeds, decisions, and all recorded plats relative to the property/application	✓	
6. Town data overlay map (provided by the town) with a sketch of the project footprint(s)	✓	
7. Site plan, drawn to scale, prepared by a registered land surveyor, civil engineer, architect, landscape architect and/or other person(s) approved by the Board or Commission, showing as applicable:	✓	
a. Date, scale, north arrow, title block, preparer information	✓	
b. Legal property boundaries	✓	
c. Zoning district boundaries (inc. designated flood hazard areas)	✓	
d. Required setbacks and designated building envelope, if any	✓	
e. Site features and vegetation in the vicinity of the project: prime agricultural soils, active agricultural areas, surface waters, wetlands, shorelines and associated setback and buffer areas, critical wildlife habitat areas, prominent ridgelines and hill tops, steep slopes (15% to 25%, 25%+); structures (e.g., buildings, walls, fence lines, signs), including known historic sites and structures; existing parking, loading and service areas, roads and driveways, utility corridors, water supply and wastewater system locations; rights-of-way and easements.	✓	
f. Proposed structures (footprints); land use; roads, driveways, and pedestrian walkways; parking, loading and service areas; utility corridors; water supply and wastewater system locations; rights-of-way and easements	✓	
g. Proposed site grading and drainage	✓	
h. Proposed landscaping, screening, lighting and signage	✓	
i. Channel, floodway and base elevations		
8. Photographs of the site	✓	
9. Preliminary architectural elevations (for new structures, additions)		
10. Draft legal documents (e.g., proposed easements, improvement or maintenance agreements)	✓	
11. Construction schedule, including the sequence and timing of proposed site development and related improvements	✓	
12. The following information, as applicable for a particular use or zoning district, or as requested by the Board or Commission to determine conformance with these regulations:		
a. Landscaping plan (including landscaping material specifications)	✓	
b. Lighting plan (including lighting fixture specifications)	✓	
c. Shoreland management plan	✓	
d. Stormwater management and erosion control plan	✓	
e. Traffic impact analysis (current and proposed traffic volumes, capacities, levels of service, proposed improvements)	✓	
f. Environmental impact analysis (analysis of potential environmental impacts, proposed mitigation measures)	✓	
g. Visual impact analysis (analysis of potential visual impacts, proposed mitigation measures)	✓	
h. FEMA Elevation Certificate		
i. FEMA Floodproofing Certificate [nonresidential buildings]		
j. Hydraulic analysis [for development located within the floodway]		
k. Description of any proposed watercourse alterations or relocations		

CHAPTER V. DEVELOPMENT REVIEW

Section 5.1 Coordination of Review

(A) **Subdivision Review.** Subdivision review under Chapter VI, where required, will precede site plan, conditional use or flood hazard area review. In the event that a condition of site plan, conditional use or flood hazard area approval is inconsistent with the conditions of subdivision approval, the more restrictive shall apply. A subdivision amendment may be required as appropriate.

(B) **Site Plan & Conditional Use Review.** For development that requires both conditional use and site plan approval, the Board of Adjustment and the Planning Commissions will conduct joint hearings if practical. Otherwise, conditional use review by the Board of Adjustment under Section 5.4 will normally precede site plan review by the Planning Commission under Section 5.5.

(C) **Flood Hazard Area Review.** For development that requires both conditional use review under Section 5.4 and flood hazard area review under Section 5.6, the Board of Adjustment may combine conditional use and flood hazard area review into one conditional use review process, as long as applicable notice, hearing, review standards and recording requirements under each are met. For development that requires both site plan review under Section 5.5 and flood hazard area review, flood hazard area review shall precede site plan review, and the Planning Commission shall incorporate applicable conditions of flood hazard area review under site plan review.

Section 5.2 Development Review Application

(A) An applicant for site plan, conditional use and/or flood hazard area review must submit the appropriate application form, the required fee, and the information specified in Table 5.1. An application may not be considered complete until all necessary materials have been submitted.

(B) The Planning Commission or Board of Adjustment may waive one or more required application materials if they determine that such information is unnecessary for a comprehensive review of the application.

(C) In accordance with the Act [§4440(d)], the Commission or Board may request additional information as needed, including independent technical analyses to be paid for by the applicant, to determine conformance with these regulations.

Section 5.3 Appeals and Reconsideration

An applicant or interested party may request that the Board of Adjustment or Planning Commission reconsider any decision issued under this chapter by reopening the hearing in accordance with Section 9.9(E). The Board or Commission may also reopen a hearing on their own motion.

Section 5.4 Conditional Use Review

(A) **Applicability.** Any use or structure requiring conditional use approval shall not be issued a zoning permit by the Zoning Administrator until the Board of Adjustment grants such approval in accordance with the Act [§4414(3)], and the following standards and procedures.

(B) **Review Process.** Upon determination that an application is complete, a public hearing will be warned in accordance with Section 9.9(C). In accordance with the Act [§4464(b)] and Section 9.9(E), the Board shall act to approve, approve with conditions, or disapprove on each matter of an application for conditional use review; and shall issue a written decision within 45 days of the date of the final public hearing to include findings, conditions of approval, and provisions for appeal to Environmental Court. Failure to act within the 45 day period shall be deemed approval, effective on the 46th day.

Section 5.4 Conditional Use Review

(A) Applicability. Any use or structure requiring conditional use approval shall not be issued a zoning permit by the Zoning Administrator until the Board of Adjustment grants such approval in accordance with the Act [§4414(3)], and the following standards and procedures.

(B) Review Process. Upon determination that an application is complete, a public hearing will be warned in accordance with Section 9.9(C). In accordance with the Act [§4464(b)] and Section 9.9(E), the Board shall act to approve, approve with conditions, or disapprove on each matter of an application for conditional use review; and shall issue a written decision within 45 days of the date of the final public hearing to include findings, conditions of approval, and provisions for appeal to Environmental Court. Failure to act within the 45 day period shall be deemed approval, effective on the 46th day.

(C) General Standards. In accordance with the Act [§4414(3)], the Board shall determine that the proposed conditional use shall not result in an undue adverse effect on any of the following:

- (1) **The capacity of existing or planned community facilities and services.** The Board shall consider the demand for community facilities and services that will result from the proposed development in relation to the existing and planned capacity of such services and facilities, and the adopted municipal capital budget and program currently in effect. The Board may request information or testimony from appropriate local officials to help evaluate potential project impacts on existing and proposed community facilities and services. Conditions may be imposed regarding the provision of services and facilities, and/or the timing and phasing of development in relation to anticipated municipal capital expenditures or improvements, to minimize any adverse impacts to community facilities and services.

no new demand for community facilities and services
are to be incurred as part of this project.

- (2) **Character of the area affected.** The Board shall consider the design, location, scale, and intensity of the proposed development in relation to the character of adjoining and other properties likely to be affected by the proposed use. Conditions may be imposed as appropriate to ensure that the proposed development is compatible with the character of the area, as defined by zoning district purpose statements, and specifically stated policies and standards of the municipal plan. Conditions may be imposed as necessary to eliminate or mitigate adverse impacts, including but not limited to conditions on the design, scale, intensity or operation of the proposed use.

The shoreline stability retaining wall propose is to
be constructed with similar large stones as surrounding
lots.

- (3) **Traffic on roads and highways in the vicinity.** The Board shall consider the potential impact of traffic generated by the proposed development on the capacity, safety, efficiency, and maintenance of roads, highways, intersections, and bridges in the vicinity. A traffic impact assessment may be required. Conditions may be imposed as necessary to ensure that a proposed development will not result in unsafe conditions for pedestrians or motorists, including but not limited to physical improvements on or off site, or the use of accepted traffic management strategies.

no additional traffic should be incurred as part of
this project.

- (4) **Bylaws in effect.** The Board shall determine whether the proposed development conforms to other municipal bylaws and ordinances currently in effect, including but not limited to road, water or wastewater ordinances. The Board shall not approve a proposed development that does not meet the requirements of other bylaws and ordinances in effect at the time of application.

This project proposes the stabilization of a severe slide on the subjects property. No other development is proposed.

- (5) **The use of renewable energy resources.** The Board will consider whether the proposed development will interfere with the sustainable use of renewable energy resources by either diminishing their future availability on the subject parcel, or by interfering with neighboring property owners' access to such resources (e.g., for solar or wind power). Conditions may be imposed as appropriate to ensure access to and the long-term availability of renewable energy resources.

The proposed project will stabilize a severe slide on the parcel.

(D) Specific Review Standards. In addition to general standards under subsection 5.4(C), the Board may also consider the following and impose conditions as appropriate to reduce or mitigate the adverse impacts of a proposed development:

- (1) **Conformance with the Town Plan.** Whether applications conform to policies and objectives of the *Charlotte Town Plan*, and do not adversely affect significant natural, cultural or scenic features identified in the town plan, including natural areas, wildlife habitat, productive forests and farmland, surface waters, wetlands, water supplies and aquifers, historic sites, and scenic views or vistas in the vicinity of the proposed development.

The proposed ^{large stone} Retaining wall will stabilize the existing slope from future slides.

- (2) **Additional Restrictions.** All conditional uses shall comply with the dimensional, density, siting and associated standards for the district(s) in which the use or development is located, including overlay districts, however the Board may require increased setbacks and buffers, or reduced lot coverage or densities of development to avoid or mitigate adverse impacts to adjoining properties or significant natural, cultural or scenic features in the vicinity of the site.

The propose project is for shoreline stabilization of a severe ~~severe~~ slide and to prevent future slides.

- (3) **Performance Standards.** The Board shall consider whether the proposed development will meet applicable performance standards under Section 3.13, and may impose conditions on the installation, operation, storage or maintenance of devices or materials necessary to meet these standards. In determining appropriate performance standards, the Board may consult with state officials, and consider accepted industry standards. In addition, the Board may limit hours of operation so that the use shall be consistent with the character of the area. Evening or night operations shall be permitted only if noise levels, lighting and traffic will not unreasonably interfere with surrounding uses.

Section 3.12 Performance Standards

(A) The following performance standards must be met and maintained for uses in all districts, except for agriculture and forestry, as measured at the property line. In determining compliance, the burden of proof shall fall on the applicant. The Town or a complainant shall be required to provide reasonable proof if challenging compliance after a permit has been issued. The Planning Commission or Board of Adjustment may require periodic reporting as a permit condition to confirm ongoing compliance. No use, under normal conditions, shall cause or result in:

- (1) **noise in excess of 70 decibels, or which otherwise represents a significant increase in noise levels in the vicinity of the use so as to be incompatible with the surrounding area; or within the Commercial/Light Industrial District, noise in excess of 75 decibels;**
- (2) **clearly apparent vibration which, when transmitted through the ground, is discernable at property lines without the aid of instruments;**
- (3) **smoke, dust, noxious gases, or other forms of air pollution which constitute a nuisance or threat to neighboring landowners, businesses or residents; which endanger or adversely affect public health, safety or welfare; which cause damage to property or vegetation; or which are offensive and uncharacteristic of the affected area;**
- (4) **releases of heat, cold, moisture, mist, fog or condensation which are detrimental to neighboring properties and uses, or the public health, safety, and welfare;**
- (5) **electromagnetic disturbances or electronic transmissions or signals which will repeatedly and substantially interfere with the reception of radio, television, or other electronic signals, or which are otherwise detrimental to public health, safety and welfare, except from facilities which are specifically licensed and regulated through the Federal Communications Commission (FCC).**
- (6) **glare, lumen, light or reflection which constitutes a nuisance to other property owners or tenants, which impairs the vision of motor vehicle operators, or which is otherwise detrimental to public health safety and welfare;**
- (7) **liquid or solid waste or refuse which cannot be disposed of by available methods without undue burden to municipal or public disposal facilities, which pollutes surface or ground waters, or which is otherwise detrimental to public health, safety and welfare; or**
- (8) **undue fire, safety, explosive, radioactive emission or other hazard which endangers the public, public facilities, or neighboring properties, or which results in a significantly increased burden on municipal facilities and services.**

Section 3.13 Sign Requirements

(A) **Applicability.** No signs of a fixed or permanent nature shall be allowed in any zoning district except as specifically provided herein.

(B) **Submission.** A permit is not required for a sign, however the following information shall be submitted to the Zoning Administrator in advance of construction:

- (1) A plot plan (does not need to be survey) showing the proposed location of sign with distances to property lines, structures, rights-of-way and setbacks.

Section 3.12

Performance Standards

(A) The following performance standards must be met and maintained for uses in all districts, except for agriculture and forestry, as measured at the property line. In determining compliance, the burden of proof shall fall on the applicant. The Town or a complainant shall be required to provide reasonable proof if challenging compliance after a permit has been issued. The Planning Commission or Board of Adjustment may require periodic reporting as a permit condition to confirm ongoing compliance. No use, under normal conditions, shall cause or result in:

- (1) noise in excess of 70 decibels, or which otherwise represents a significant increase in noise levels in the vicinity of the use so as to be incompatible with the surrounding area; or within the Commercial/ Light Industrial District, noise in excess of 75 decibels;

noise will not exceed the above stated standards.

- (2) clearly apparent vibration which, when transmitted through the ground, is discernable at property lines without the aid of instruments;

apparent vibration should not be a factor as part of this project.

- (3) smoke, dust, noxious gases, or other forms of air pollution which constitute a nuisance or threat to neighboring landowners, businesses or residents; which endanger or adversely affect public health, safety or welfare; which cause damage to property or vegetation; or which are offensive and uncharacteristic of the affected area;

No excessive noxious gases, or other forms of air pollution are proposed as part of this project. This project is for the proposed shoreline stabilization only.

- (4) releases of heat, cold, moisture, mist, fog or condensation which are detrimental to neighboring properties and uses, or the public health, safety, and welfare;

No release of heat, cold, moisture, mist, fog or condensation should be part of this project.

- (5) **electromagnetic disturbances or electronic transmissions or signals which will repeatedly and substantially interfere with the reception of radio, television, or other electronic signals, or which are otherwise detrimental to public health, safety and welfare, except from facilities which are specifically licensed and regulated through the Federal Communications Commission (FCC).**

N/A

- (6) **glare, lumen, light or reflection which constitutes a nuisance to other property owners or tenants, which impairs the vision of motor vehicle operators, or which is otherwise detrimental to public health safety and welfare;**

N/A

- (7) **liquid or solid waste or refuse which cannot be disposed of by available methods without undue burden to municipal or public disposal facilities, which pollutes surface or ground waters, or which is otherwise detrimental to public health, safety and welfare; or**

N/A

- (8) **undue fire, safety, explosive, radioactive emission or other hazard which endangers the public, public facilities, or neighboring properties, or which results in a significantly increased burden on municipal facilities and services.**

N/A

Section 3.15 [section (G) on page 35] worksheet

(G) **Lakeshore Buffers.** A vegetated buffer zone shall be maintained within 100 feet of the shoreline of Lake Champlain in order to minimize runoff and pollution, and to maintain bank stability and environmental quality. Within 100 feet of the shoreline, the following shall apply:

(1) There shall be no cutting or removal of trees or shrubs except with administrative review and approval by the Zoning Administrator; such review will determine whether the proposed cutting or removal is in conformance with any approved wildlife habitat plan or shoreland management plan.

All proposed removal of trees or shrubs will be dead and diseased or compromised trees

(2) Limited pruning of branches of trees and shrubs is allowed to maintain cleared openings or views legally in existence as of the effective date of these regulations. Such openings or views shall not be enlarged except as allowed herein.

no enlargement of views are proposed as part of this shoreline stabilization project

(3) Nothing in this section shall prohibit the cutting and removal of storm-damaged, diseased or dead trees which pose a hazard as determined by the Zoning Administrator.

All proposed trees to be removed are diseased dead or damaged

(4) There shall be no dredging, draining or filling of land along the shoreline, or in wetland areas, and no cutting or removal of wetland vegetation shall be permitted, except in conformance with a shoreland management plan approved by the Board of Adjustment.

The project proposes a large stone retaining wall with slope stabilization and the addition of fill at a 2:1 slope.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.ceavt.com

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DRAWN

MAB

CHECKED

JLM

APPROVED

XXX

OWNER:

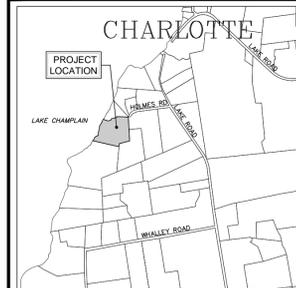
**JACK & NANCY
BARNES**

210 HOLMES ROAD
CHARLOTTE, VERMONT 05445

PROJECT:

**SHORELINE
PROTECTION**

210 HOLMES ROAD
CHARLOTTE, VT



LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION
11/24/2015	JLM	ADD TREE REPLACEMENT NOTE

**PROPOSED SITE
PLAN**

DATE
11/02/2015

SCALE
1" = 20'

PROJ. NO.
15175

DRAWING NUMBER

C1.0

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- - - - - 100' EXISTING CONTOUR
- EXISTING FENCE
- E --- EXISTING ELECTRIC
- ST --- EXISTING STORM
- W --- EXISTING WATER
- EXISTING SWALE
- EXISTING SHUT OFF
- EXISTING UTILITY POLE
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND
- CONCRETE MONUMENT FOUND
- PROJECT BENCHMARK

LAKE CHAMPLAIN

ALL WORK TO BE PERFORMED
ABOVE THE 98' CONTOUR

PROPOSED LARGE STONE
RETAINING WALL
(T.O.W. = 108±)

TIE WALL INTO
EXISTING LEDGE

EXISTING TREES TO
BE REMOVED AND
REPLACED IN KIND W/
2" CALIPER NURSERY
STOCK

PROTECT EXISTING
TREES DURING
CONSTRUCTION

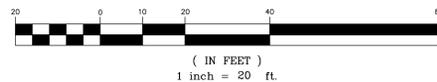
PROJECT BENCHMARK
SW ANCHOR BOLT
EL. = 159.8'

250' AREA OF INTEREST LINE (STATE OF VERMONT)
FROM 95.5' CONTOUR

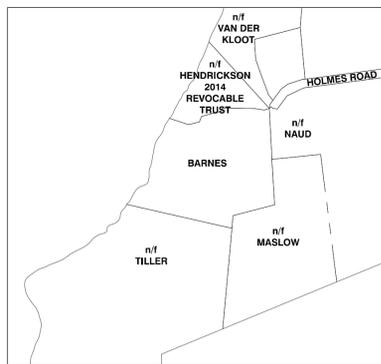
NOTES

- UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
- THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
- PROPERTY LINE INFORMATION IS BASED ON A PLAN ENTITLED "PAMELA L. & WILLET S. FOSTER W - WESTWIND FARMS SUBDIVISION" DATED JUNE 18, 1979, VOLUME 3, PAGE 40. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
- SITE INFORMATION IS BASED ON A FIELD SURVEY PERFORMED BY CIVIL ENGINEERING ASSOCIATES, INC AUGUST 2015. SURVEY ORIENTATION IS "GRID NORTH", VERMONT COORDINATE SYSTEM OF 1983 (HORIZONTAL) AND LAKE CHAMPLAIN LAKE ELEVATION ESTABLISHED FROM THE UNITED STATES GEOLOGICAL SURVEY GAUGING STATION 04294500 LOCATED IN BURLINGTON, VERMONT. (DATUM NGVD 29, VERTICAL)

GRAPHIC SCALE



LOCUST MAP
1" = 500'



SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.cca-vt.com

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DRAWN
GAC
CHECKED
JLM
APPROVED
XXX

OWNER:
JACK & NANCY BARNES

210 HOLMES ROAD
CHARLOTTE, VERMONT 05445

PROJECT:

SHORELINE PROTECTION

210 HOLMES ROAD
CHARLOTTE, VT



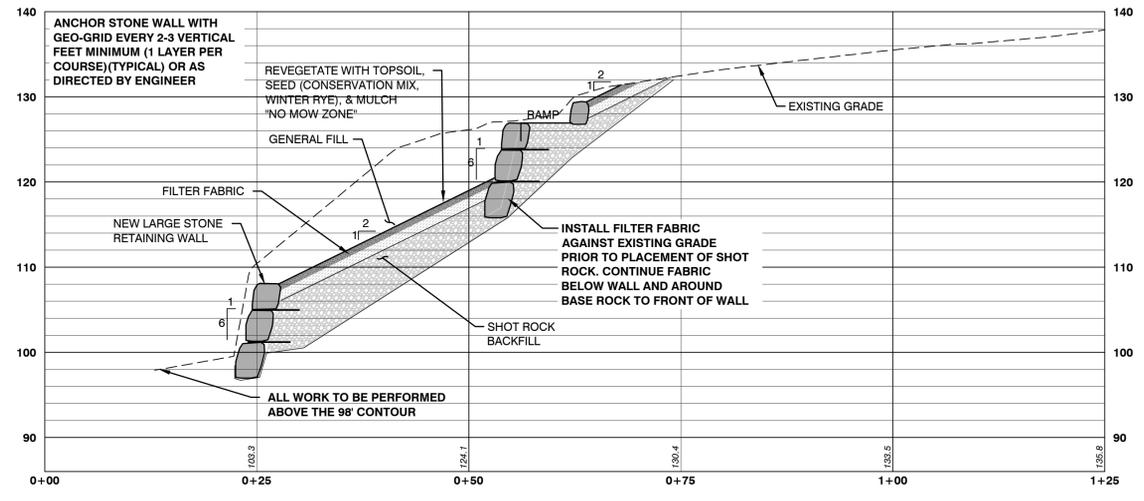
LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

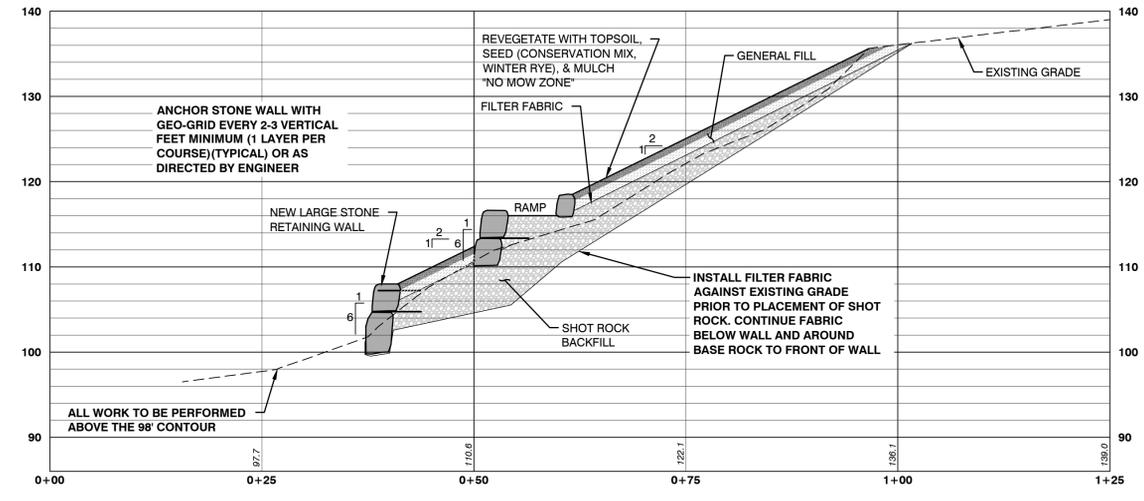
SECTIONS

DATE
11/02/2015
SCALE
1" = 10'
PROJ. NO.
15175

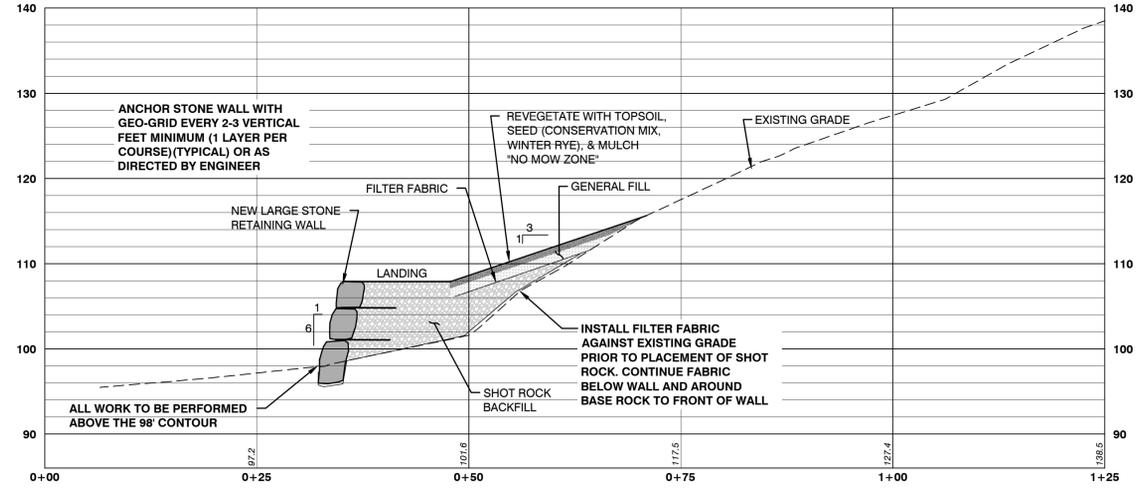
DRAWING NUMBER
C1.1



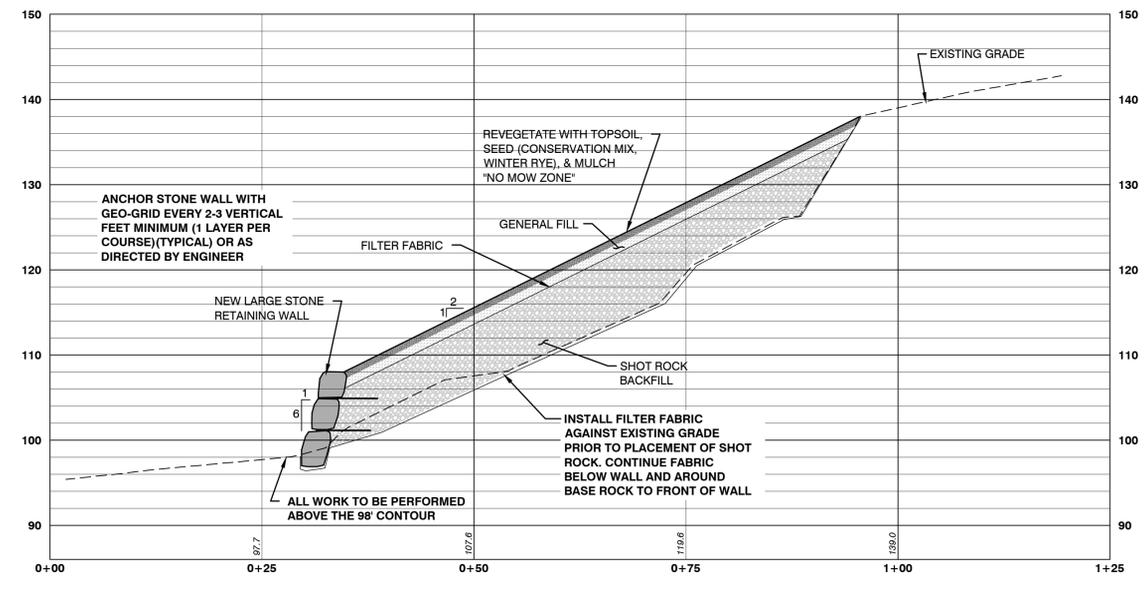
SECTION A 0+20
SCALE 1" = 10'



SECTION B 0+64
SCALE 1" = 10'

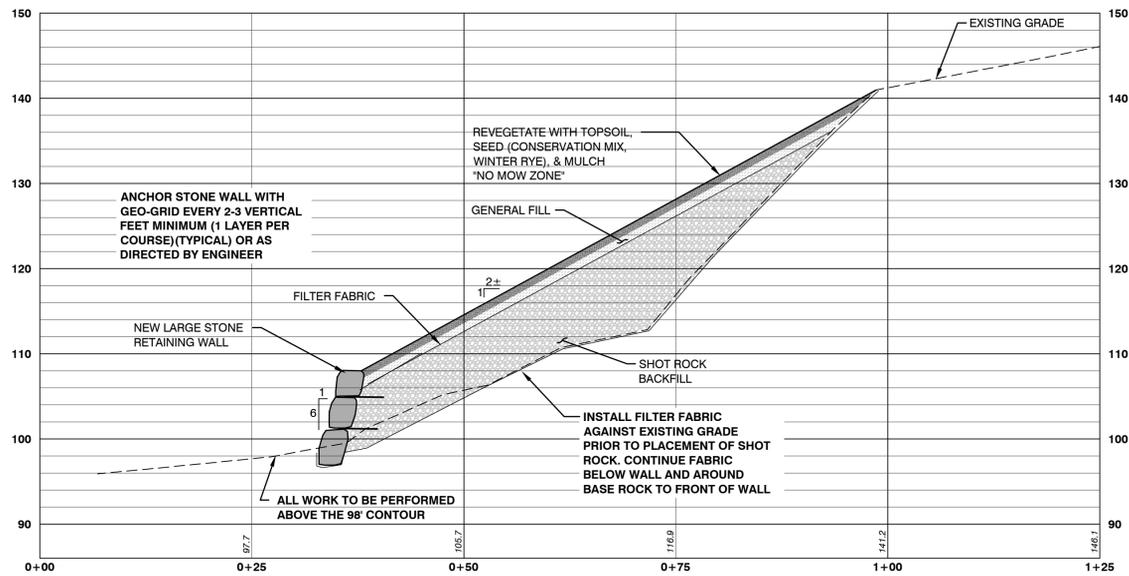


SECTION C 1+17
SCALE 1" = 10'

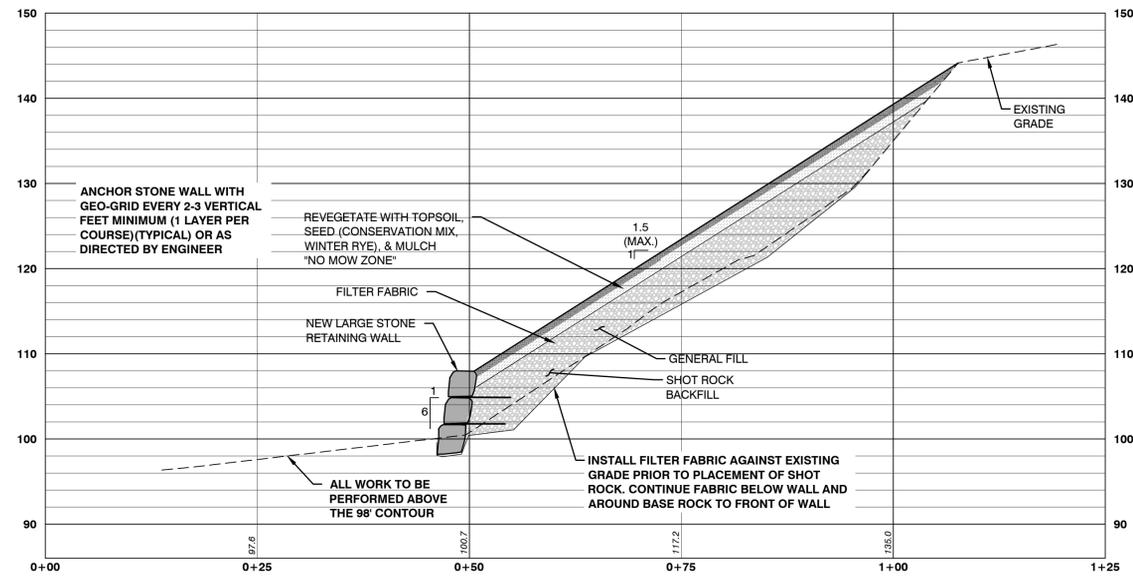


SECTION D 1+85
SCALE 1" = 10'

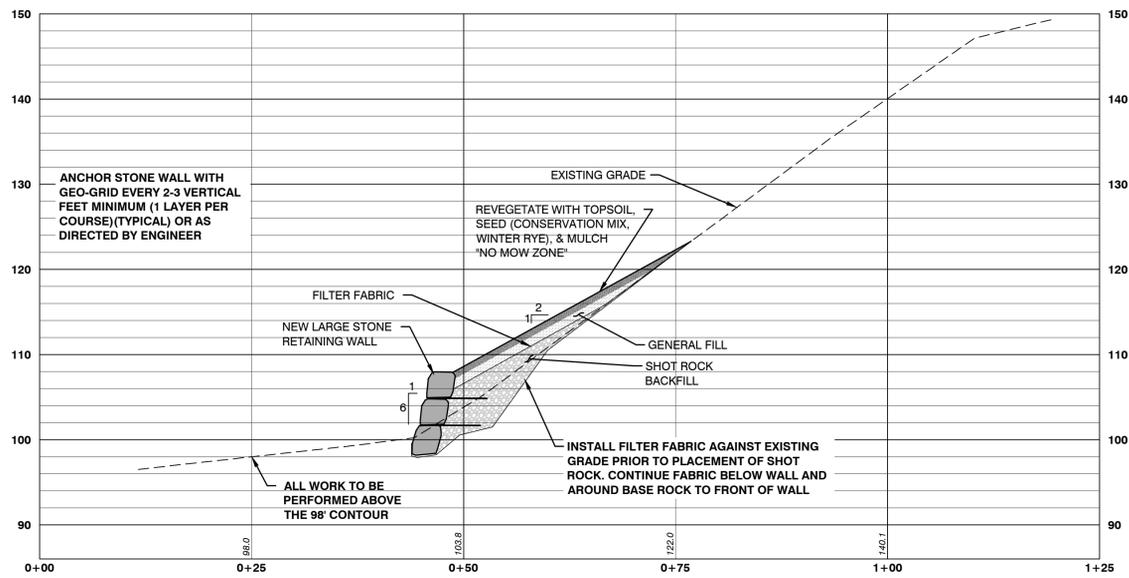
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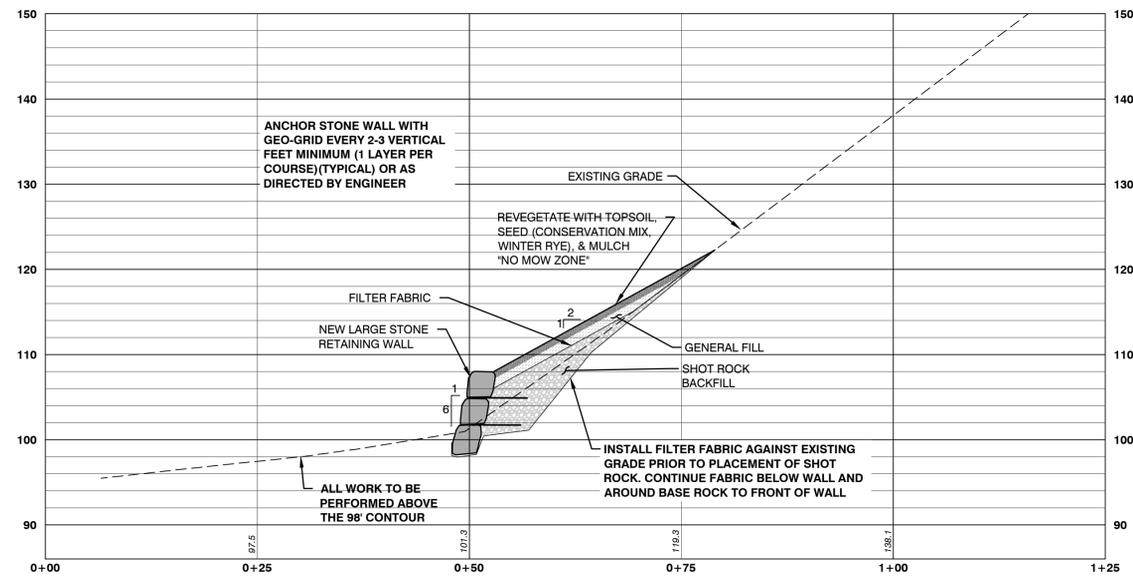
SECTION E 2+62
SCALE 1" = 10'



SECTION F 3+05
SCALE 1" = 10'



SECTION G 3+71
SCALE 1" = 10'



SECTION H 4+20
SCALE 1" = 10'

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.ceavt.com

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DRAWN

GAC

CHECKED

JLM

APPROVED

XXX

OWNER:

**JACK & NANCY
BARNES**

210 HOLMES ROAD
CHARLOTTE, VERMONT 05445

PROJECT:

**SHORELINE
PROTECTION**

210 HOLMES ROAD
CHARLOTTE, VT



LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

SECTIONS

DATE

11/02/2015

SCALE

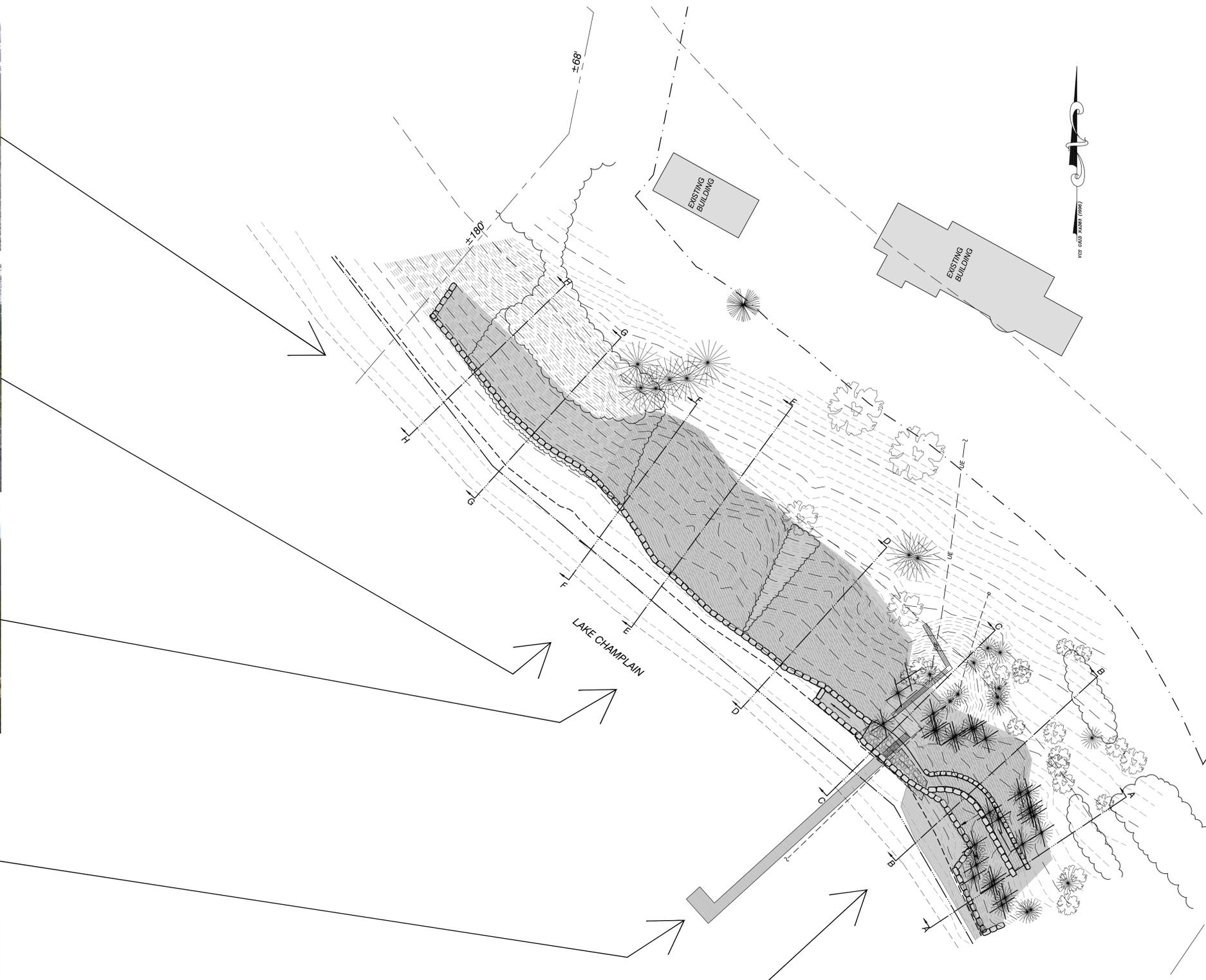
1" = 10'

PROJ. NO.

15175

DRAWING NUMBER

C1.2



SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
 10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
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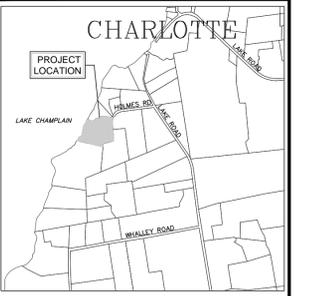
DRAWN GAC	
CHECKED JLM	
APPROVED XXX	

OWNER:
JACK & NANCY BARNES

210 HOLMES ROAD
 CHARLOTTE, VERMONT 05445

PROJECT:
SHORELINE PROTECTION

210 HOLMES ROAD
 CHARLOTTE, VT

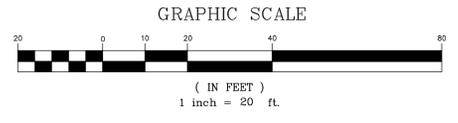


LOCATION MAP
 1" = 2000'

DATE	CHECKED	REVISION

SITE PHOTO PLAN

DATE 11/02/2015	DRAWING NUMBER C1.3
SCALE 1" = 20'	
PROJ. NO. 15175	



Introduction

This project is subject to the terms and conditions of the authorization from the State of Vermont to discharge construction related storm water runoff.

Coverage under the State Construction General Permit 3-9020 is required for any construction activity that disturbs 1 or more acres of land, or is part of a larger development plan that will disturb 1 or more acres.

This project has been deemed to qualify as a Low Risk Site which is subject to the erosion prevention and sediment control (EPSC) standards set for in the State of Vermont's **Low Risk Site Handbook for Erosion Prevention and Sediment Control**

The following narrative and implementation requirements represent the minimum standard for which this site is required to be maintained as regulated by the State of Vermont.

Any best management practices (BMPs) depicted on the project's EPSC Site plan which go beyond the Handbook requirements are considered to be integral to the management of the site and represent components of the municipal EPSC approval for the project which shall be implemented.

The EPSC plan depicts one snap shot in time of the site. All construction sites are fluid in their day to day exposures and risks as it relates to minimizing sediment loss from the site. **It is the responsibility of the Contractor to implement the necessary BMP's to comply with the Low Risk Handbook standards outlined on this sheet based on the interim site disturbance conditions which may or may not be shown on the EPSC Site Plan.**

Specific BMPs which are critical to allowing the project to be considered a Low risk site include the items checked below:

- Limit the amount of disturbed earth to two acres or less at any one time.
- There shall be a maximum of 7 consecutive days of disturbed earth exposure in any location before temporary or final stabilization is implemented.
- The project is to disturb less than two acres of soil with an erodibility higher than K=0.17.
- Limit the project soil disturbance to less than two acres with slopes greater than 5%.

1. Mark Site Boundaries

Purpose: Mark the site boundaries to identify the limits of construction. Delineating your site will help to limit the area of disturbance, preserve existing vegetation and limit erosion potential on the site.

How to comply: Before beginning construction, walk the site boundaries and flag trees, post signs, or install orange safety fence. Fence is required on any boundary within 50 feet of a stream, lake, pond or wetland, unless the area is already developed (existing roads, buildings, etc.)

2. Limit Disturbance Area

Purpose: Limit the amount of soil exposed at one time to reduce the potential erosion on site.

Requirements: The permitted disturbance area is specified on the site's written authorization to discharge. Only the acreage listed on the authorization form may be exposed at any given time.

How to comply: Plan ahead and phase the construction activities to ensure that no more than the permitted acreage is disturbed at one time. Be sure to properly stabilize exposed soil with seed and mulch or erosion control matting before beginning work in a new section of the site.

3. Stabilize Construction Entrance

Purpose: A stabilized construction entrance helps remove mud from vehicle wheels to prevent tracking onto streets.

Requirements: If there will be any vehicle traffic off of the construction site, you must install a stabilized construction entrance before construction begins.

How to Install
Rock Size: Use a mix of 1 to 4 inch stone
Depth: 8 inches minimum
Width: 12 feet minimum
Length: 40 feet minimum (or length of driveway, if shorter)
Geotextile: Place filter cloth under entire gravel bed

Maintenance: Redress with clean stone as required to keep sediment from tracking onto the street.

4. Install Silt Fence

Purpose: Silt fences intercept runoff and allow suspended sediment to settle out.

Requirements: Silt fence must be installed:
 • on the downhill side of the construction activities
 • between any ditch, swale, storm sewer inlet, or waters of the State and the disturbed soil
 *Hay bales must not be used as sediment barriers due to their tendency to degrade and fall apart.

Where to place:

- Place silt fence on the downhill edge of bare soil. At the bottom of slopes, place fence 10 feet downhill from the end of the slope (if space is available).
- Ensure the silt fence catches all runoff from bare soil.
- Maximum drainage area is ¼ acre for 100 feet of silt fence.
- Install silt fence across the slope (not up and down hills)
- Install multiple rows of silt fence on long hills to break up flow.
- Do not install silt fence across ditches, channels, or streams or in stream buffers.

How to install silt fence:

- Dig a trench 6 inches deep across the slope
- Unroll silt fence along the trench
- Ensure stakes are on the downhill side of the fence
- Join fencing by rolling the end stakes together
- Drive stakes in against downhill side of trench
- Drive stakes until 16 inches of fabric is in trench
- Push fabric into trench; spread along bottom
- Fill trench with soil and pack down

Maintenance:

- Remove accumulated sediment before it is halfway up the fence.
- Ensure that silt fence is trenched in ground and there are no gaps.

5. Divert Upland Runoff

Purpose: Diversion berms intercept runoff from above the construction site and direct it around the disturbed area. This prevents clean water from becoming muddied with soil from the construction site.

Requirements: If storm water runs onto your site from upslope areas and your site meets the following two conditions, you must install a diversion berm before disturbing any soil.
 1. You plan to have one or more acres of soil exposed at any one time (excluding roads).
 2. Average slope of the disturbed area is 20% or steeper.

How to install:

1. Compact the berm with a shovel or earth-moving equipment.
2. Seed and mulch berm or cover with erosion control matting immediately after installation.
3. Stabilize the flow channel with seed and straw mulch or erosion control matting. Line the channel with 4 inch stone if the channel slope is greater than 20%.
4. Ensure the berm drains to an outlet stabilized with riprap. Ensure that there is no erosion at the outlet.
5. The diversion berm shall remain in place until the disturbed areas are completely stabilized.

6. Slow Down Channelized Runoff

Purpose: Stone check dams reduce erosion in drainage channels by slowing down the storm water flow.

Requirements: If there is a concentrated flow (e.g. in a ditch or channel) of storm water on your site, then you must install stone check dams. Hay bales must not be used as check dams.

How to install:
Height: No greater than 2 feet. Center of dam should be 9 inches lower than the side elevation
Side slopes: 2:1 or flatter
Stone size: Use a mixture of 2 to 9 inch stone
Width: Dams should span the width of the channel and extend up the sides of the banks
Spacing: Space the dams so that the bottom (toe) of the upstream dam is at the elevation of the top (crest) of the downstream dam. This spacing is equal to the height of the check dam divided by the channel slope.
Spacing (in feet) = Height of check dam (in feet)/Slope in channel (ft/ft)

Maintenance: Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. If significant erosion occurs between check dams, a liner of stone should be installed.

7. Construct Permanent Controls

Purpose: Permanent storm water treatment practices are constructed to maintain water quality, ensure groundwater flows, and prevent downstream flooding. Practices include detention ponds and wetlands, infiltration basins, and storm water filters.

Requirements: If the total impervious* area on your site, or within the common plan of development, will be 1 or more acres, you must apply for a State Storm water Discharge Permit and construct permanent storm water treatment practices on your site. These practices must be installed before the construction of any impervious surfaces.

How to comply: Contact the Vermont Storm water Program and follow the requirements in the Vermont Storm water Management Manual. The Storm water Management Manual is available at: www.vtwaterquality.org/stormwater.htm
 *An impervious surface is a manmade surface, including, but not limited to, paved and unpaved roads, parking areas, roofs, driveways, and walkways, from which precipitation runs off rather than infiltrates.

8. Stabilize Exposed Soil

Purpose: Seeding and mulching, applying erosion control matting, and hydroseeding are all methods to stabilize exposed soil. Mulches and matting protect the soil surface while grass is establishing.

Requirements: All areas of disturbance must have temporary or permanent stabilization within 7, 14, or 21 days of initial disturbance, as stated in the project authorization. After this time, any disturbance in the area must be stabilized at the end of each work day.

The following exceptions apply:

- Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade.

How to comply: Prepare bare soil for seeding by grading the top 3 to 6 inches of soil and removing any large rocks or debris.

Seeding Rates for Temporary Stabilization
 April 15 - Sept. 15 -- Ryegrass (annual or perennial): 20 lbs/acre
 Sept. 15 - April 15 -- Winter rye: 120 lbs/acre

Seeding Rates for Final Stabilization: Choose

Choose from:	Variety	Lbs./acre	Lbs./1000 sq. ft.
Birdsfoot trefoil	Empire/Pardue	51	0.1
or			
Common white clover	Common	5	0.2
plus			
Tall Fescue	KY-31/Rebel	10	0.25
plus			
Redtop	Common	2	
or			
Ryegrass (perennial)	Pennfine/Linn	5	0.1

1. Mix 2.5 each of Empire and Pardue OR 2.5 lbs. of Birdsfoot and 2.5 lbs. white clover per acre

Mulching Rates

April 15 - Sept.15 -- Hay or Straw: 1 inch deep (1-2 bales/1000 s.f.)
 Sept.15 - April 15 -- Hay or Straw: 2 in. deep (2-4 bales/1000 s.f.)

Erosion Control Matting

As per manufacturer's instructions

Hydroseed

As per manufacturer's instructions

9. Winter Stabilization

Purpose: Managing construction sites to minimize erosion and prevent sediment loading of waters is a year-round challenge. In Vermont, this challenge becomes even greater during the late fall, winter, and early spring months. 'Winter construction' as discussed here, describes the period between October 15 and April 15, when erosion prevention and sediment control is significantly more difficult. Rains in late fall, thaws throughout the winter, and spring melt and rains can produce significant flows over frozen and saturated ground, greatly increasing the potential for erosion.

Requirements for Winter Shutdown: For those projects that will complete earth disturbance activities prior to the winter period (October 15), the following requirements must be adhered to:
 1. For areas to be stabilized by vegetation, seeding shall be completed no later than September 15 to ensure adequate growth and cover.
 2. If seeding is not completed by September 15, additional non-vegetative protection must be used to stabilize the site for the winter period. This includes use of Erosion Control Matting or netting of a heavy mulch layer. Seeding with winter rye is recommended to allow for early germination during wet spring conditions.
 3. Where mulch is specified, apply roughly 2 inches with an 80-90% cover. Mulch should be tracked in or stabilized with netting in open areas vulnerable to wind.

Requirements for Winter Construction: If construction activities involving earth disturbance continue past October 15 or begin before April 15, the following requirements must be adhered to:

1. Enlarged access points, stabilized to provide for snow stockpiling.
2. Limits of disturbance moved or replaced to reflect boundary of winter work.
3. A snow management plan prepared with adequate storage and control of meltwater, requiring cleared snow to be stored down slope of all areas of disturbance and out of storm water treatment structures.
4. A minimum 25 foot buffer shall be maintained from perimeter controls such as silt fence.
5. In areas of disturbance that drain to a water body within 100 feet, two rows of silt fence must be installed along the contour.
6. Drainage structures must be kept open and free of snow and ice dams.
7. Silt fence and other practices requiring earth disturbance must be installed ahead of frozen ground.
8. Mulch used for temporary stabilization must be applied at double the standard rate, or a minimum of 3 inches with an 80-90% cover.
9. To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day, with the following exceptions:
 - 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.
 - Disturbed areas that collect and retain runoff, such as house foundations or open utility trenches.
10. Prior to stabilization, snow or ice must be removed to less than 1 inch thickness.
11. Use stone to stabilize areas such as the perimeter of buildings under construction or where construction vehicle traffic is anticipated. Stone paths should be 10 to 20 feet wide to accommodate vehicular traffic.

10. Stabilize Soil at Final Grade

Purpose: Stabilizing the site with seed and mulch or erosion control matting when it reaches final grade is the best way to prevent erosion while construction continues.

Requirements: Within 48 hours of final grading, the exposed soil must be seeded and mulched or covered with erosion control matting.

How to comply: Bring the site or sections of the site to final grade as soon as possible after construction is completed. This will reduce the need for additional sediment and erosion control measures and will reduce the total disturbed area. For seeding and mulching rates, follow the specifications under Rule 8, Stabilizing Exposed Soil.

11. Dewatering Activities

Purpose: Treat water pumped from dewatering activities so that it is clear when leaving the construction site.

Requirements: Water from dewatering activities that flows off of the construction site must be clear. Water must not be pumped into storm sewers, lakes, or wetlands unless the water is clear.

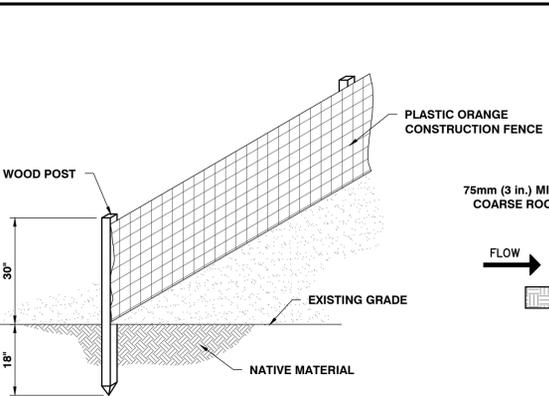
How to comply: Using sock filters or sediment filter bags on dewatering discharge hoses or pipes, discharge water into silt fence enclosures installed in vegetated areas away from waterways. Remove accumulated sediment after the water has dispersed and stabilize the area with seed and mulch.

12. Inspect Your Site

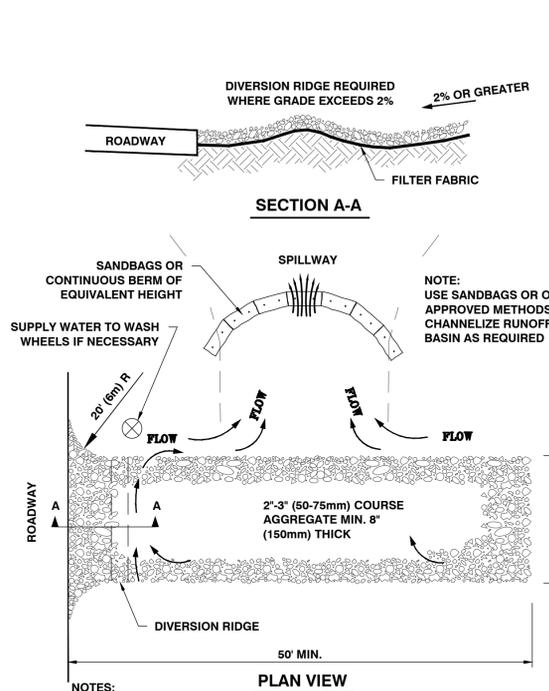
Purpose: Perform site inspections to ensure that all sediment and erosion control practices are functioning properly. Regular inspections and maintenance of practices will help to reduce costs and protect water quality.

Requirements: Inspect the site at least once every 7 days and after every rainfall or snow melt that results in a discharge from the site. Perform maintenance to ensure that practices are functioning according to the specifications outlined in this handbook.

In the event of a noticeable sediment discharge from the construction site, you must take immediate action to inspect and maintain existing erosion prevention and sediment control practices. Any visibly discolored storm water runoff to waters of the State must be reported. Forms for reporting discharges are available at: www.vtwaterquality.org/stormwater.htm



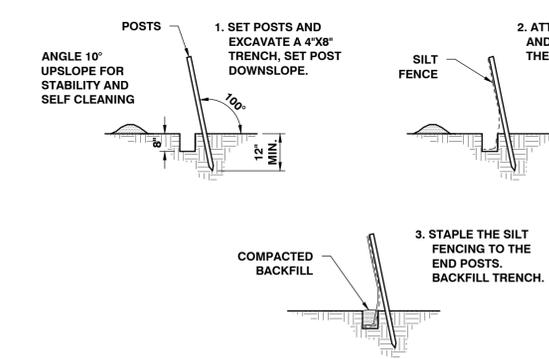
CONSTRUCTION FENCE DETAIL
N.T.S.



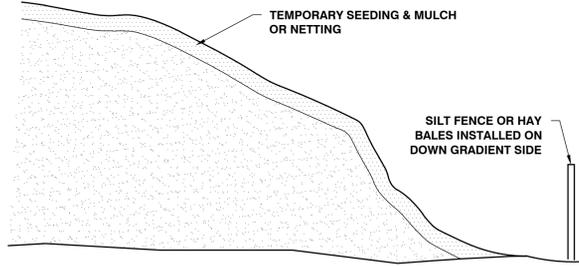
D-50 OF ROCK (MM)	DOWNSTREAM FLOWLINE SLOPE OF STRUCTURE (m/m)					
	0.35	0.30	0.25	0.20	0.15	0.10
75	15	18	20	25	33	48
150	30	36	41	50	66	100

- NOTES:**
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN UP OF ANY MEASURES USED TO TRAP SEDIMENT.
 2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
 3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

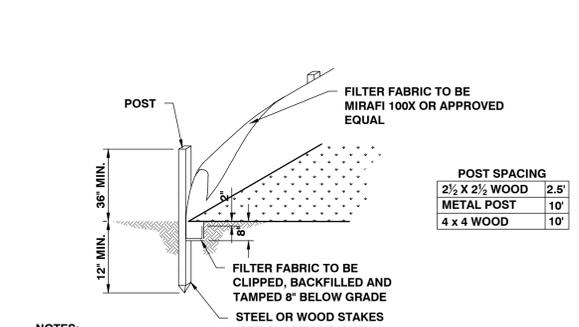
STABILIZED CONSTRUCTION ENTRANCE
N.T.S.



SILT FENCE CONSTRUCTION DETAIL
N.T.S.



TEMPORARY STOCKPILE DETAIL
N.T.S.



- NOTES:**
1. INSTALL MIRIFI ENVIROFENCE, OR APPROVED EQUAL OR AS DETAILED HEREIN.
 2. INSTALL SILT FENCES AT TOES OF ALL UNPROTECTED SLOPES AND AS PARALLEL TO CONTOURS AS POSSIBLE. THIS INCLUDES ALL FILLED OR UNPROTECTED SLOPES CREATED DURING CONSTRUCTION. NOT NECESSARILY REFLECTED ON THE FINAL PLANS. CURVE THE ENDS OF THE FENCE UP INTO THE SLOPE. REMOVE SEDIMENT WHEN ACCUMULATED TO HALF THE HEIGHT OF THE FENCE. SILT FENCES ARE TO BE MAINTAINED UNTIL SLOPES ARE STABILIZED.
 3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6", FOLDED AND STAPLED.

SILT FENCE DETAIL
N.T.S.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
 10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
 802-864-2323 FAX: 802-864-2271 web: www.ceaa-vt.com

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CHECKED	SAV
APPROVED	SAV

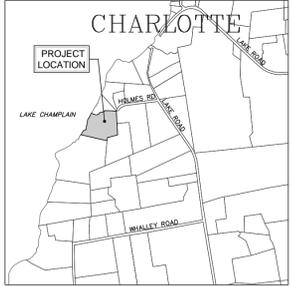
OWNER:
JACK & NANCY BARNES

210 HOLMES ROAD
 CHARLOTTE, VERMONT 05445

PROJECT:

SHORELINE PROTECTION

210 HOLMES ROAD
 CHARLOTTE, VT



LOCATION MAP
1" = 200'

DATE	CHECKED	REVISION

EROSION CONTROL NOTES & DETAILS

DATE	11/02/2015	DRAWING NUMBER	C2.0
SCALE	AS SHOWN		
PROJ. NO.	15175.00		

BARNES Property

Rough QUANTITY ESTIMATES

Excavated Section	Distance ft	Excavated S.F.	Total
A	50	570	28,500
B	50	188	9,400
C	30	0	0
D	95	45	4,275
E	50	32	1,600
F	75	65	4,875
G	50	48	2,400
H	55	58	3,190
TOTAL			54,240

EXCAVATE 2200 cy
 maybe used for general fill

Shot Rock Section	Distance ft	Shot Rock S.F.	Total
A	50	212	10,600
B	50	220	11,000
C	30	133	3,990
D	95	397	37,715
E	50	414	20,700
F	75	273	20,475
G	50	68	3,400
H	55	75	4,125
TOTAL			112,005

Shot Rock 4,300 cy

General Fill Section	Distance ft	General Fill S.F.	Total
A	50	40	2,000
B	50	50	2,500
C	30	20	600
D	95	66	6,270
E	50	62	3,100
F	75	55	4,125
G	50	22	1,100
H	55	20	1,100
TOTAL			20,795

General Fill (Assume 1')
 750 cy

Top Soil Section	Distance ft	Top Soil S.F.	Total
A	50	25	1,250
B	50	50	2,500
C	30	17	510
D	95	50	4,750
E	50	55	2,750
F	75	48	3,600
G	50	22	1,100
H	55	20	1,100
TOTAL			17,560

Top Soil (Assume 6")
 285 cy

DIMENSIONAL STONES TOTAL = 6200 SF