Vermont Department of Environmental Conservation *Agency of Natural Resources*
Watershed Management Division
Essex Regional Office
111 West Street [cell/text] 802-777-5328
Essex Junction, VT 05452 [fax] 802-879-3871
www.watershedmanagement.vt.gov [email] chris.brunelle@state.vt.us

AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES

Pursuant to Section C.2.2 of the VT Stream Alteration General Permit

Project Number: SA-04-001-2016

Applicant Name: Town of Richford c/o John Nutting, Road Foreman

Mailing Address: POB 236, Richford 05476 Phone: 848-7751

Project Location: South Richford Road, Loveland Brook Email: laurao@richfordvt.org

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:

1. Applicant is authorized to replace a hydraulically inadequate existing 6' dia. CMP with a new 12' wide x 7' tall precast concrete box buried 2' below stream bed with a resulting 12' wide x 5' tall single cell hydraulic opening.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit.
3. The proposed activity will meet the terms and conditions of the General Permit provided:
   a) The project will be completed as shown on the plan(s) dated 9/8/15, prepared by Ruggiano Engineering, titled Town of Richford, South Richford Road, C-1 Existing Conditions, C-2 Proposed Site Plan, and C-3 Details.
   b) The project will not adversely affect the public safety by increasing flood hazards.
   c) The project will not significantly damage fish life or wildlife.
   d) The project will not significantly damage the rights of riparian owners.
   e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
   f) The project is conducted in a manner which minimizes or avoids any discharge of sediment or other pollutants to surface waters in violation of the VT Water Quality Standards.
   g) The ANR River Management Engineer is notified by phone/text (777-5328) or email (chris.brunelle@state.vt.us) when construction begins and when the project is complete.
   h) In-stream working dates for all GP activities are from June 1st through October 1st, any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
   i) This authorization has been posted for ten days public comment. This authorization constitutes final approval.
4. Do not work on the property of others without their permission.

If there are any changes in the project plan(s) or deviation in construction from the plan(s) affecting the watercourse, the Permittee must notify the River Management Engineer immediately.

If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

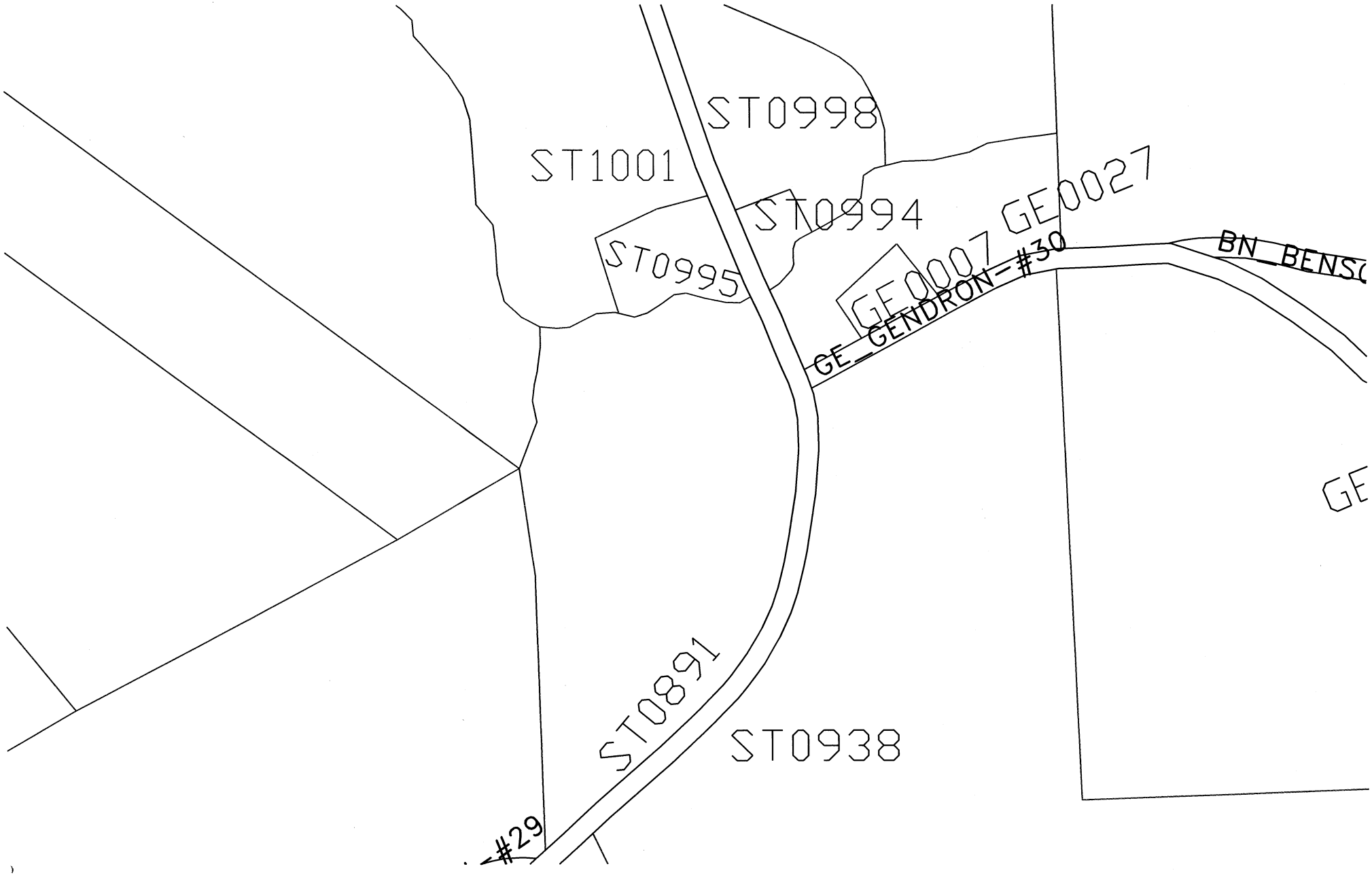
Signed this 2nd day of February, 2016
Alyssa B. Schuren, Commissioner
Department of Environmental Conservation

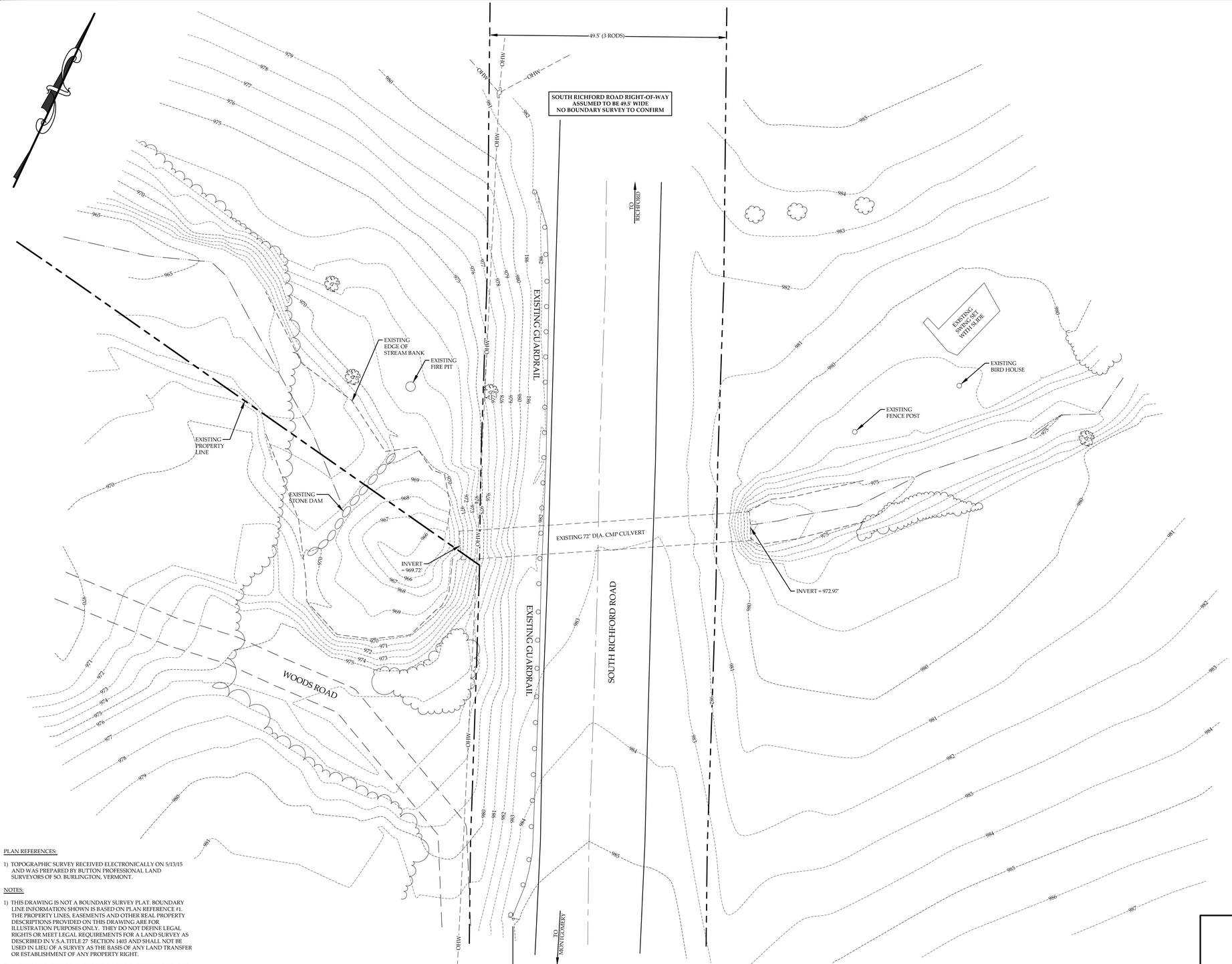
This authorization expires October 1, 2016.

Christopher Brunelle

by: _____
Christopher Brunelle, River Management Engineer

UNCERTIFIED COPY
Data Subject To Change
Richford, VT 05476



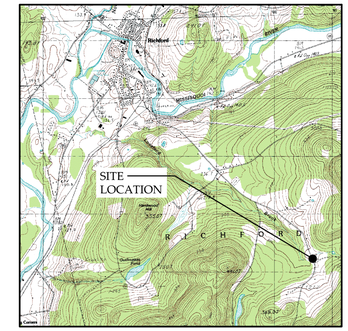


1 C-1 EXISTING SITE PLAN

SCALE: 1" = 10'

Graphic Scale

10 0 10 20 40 feet



NORTH

SITE LOCATION MAP

NOT TO SCALE

LIST OF DRAWINGS

C-1 EXISTING CONDITIONS PLAN
C-2 PROPOSED SITE PLAN
C-3 DETAILS

LEGEND

N/F	NOW OR FORMERLY OWNED BY
	ELEVATION BENCHMARK
	EXISTING SIGN
	EXISTING UTILITY POLE & GUY WIRE
	EXISTING STONE DAM
	EXISTING TREE LINE
	EXISTING SWALE CENTERLINE
	EXISTING TOE OF STREAM BANK
	PROPOSED TOE OF STREAM BANK
	EXISTING ROAD CENTERLINE
	EXISTING PROPERTY LINE
	EXISTING RIGHT OF WAY
	PROPOSED PERMANENT EASEMENT
	PROPOSED TEMPORARY EASEMENT
OHW	EXISTING OVERHEAD WIRES
900	EXISTING CONTOUR
900	PROPOSED CONTOUR
SL	PROPOSED SILT FENCE

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN REFERENCES:

1) TOPOGRAPHIC SURVEY RECEIVED ELECTRONICALLY ON 5/13/15 AND WAS PREPARED BY BUTTON PROFESSIONAL LAND SURVEYORS OF SO. BURLINGTON, VERMONT.

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.

EXISTING CONDITIONS PLAN
TOWN OF RICHFORD
SOUTH RICHFORD ROAD
RICHFORD, VERMONT

RUGGIANO engineering, inc.
5 LAKE STREET
ST. ALBANS, VERMONT 05478
PHONE - (802) 524-9300 FAX - (802) 524-9700
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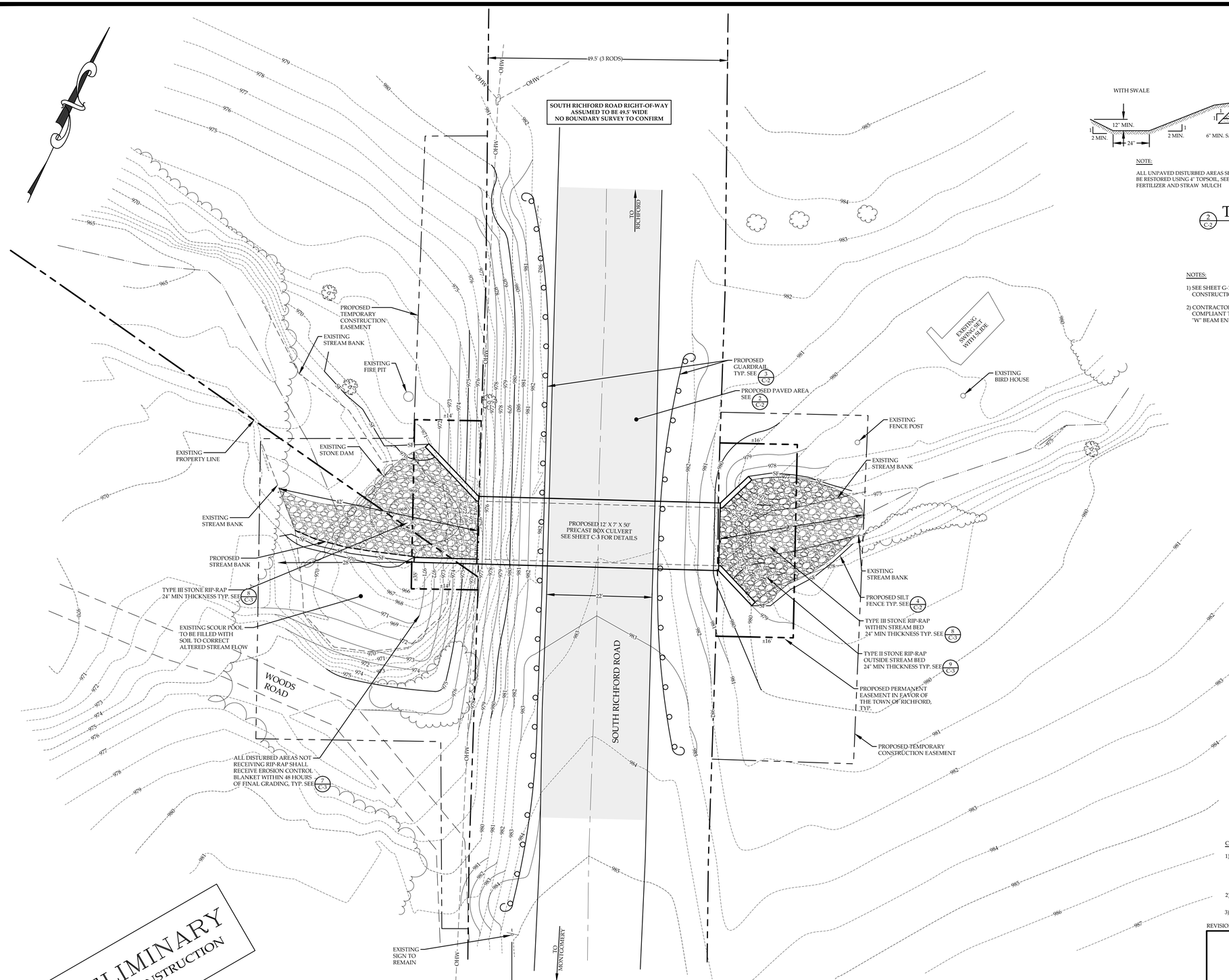
PROJECT NO.....15003
DRAWN BY.....JGE
CHECKED BY.....LEW
SCALE.....1" = 10'
DATE.....09/08/15

SHEET NO.
C-1
1 OF 3 SHEETS



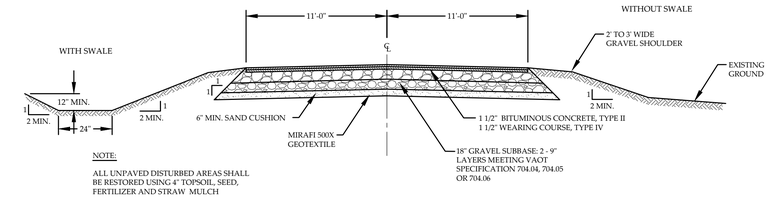
PRELIMINARY
NOT FOR CONSTRUCTION

1 / C-2 PROPOSED SITE PLAN

SCALE: 1" = 10'

Graphic Scale

10 0 10 20 40 feet



NOTE:

ALL UNPAVED DISTURBED AREAS SHALL BE RESTORED USING 4" TOPSOIL, SEED, FERTILIZER AND STRAW MULCH

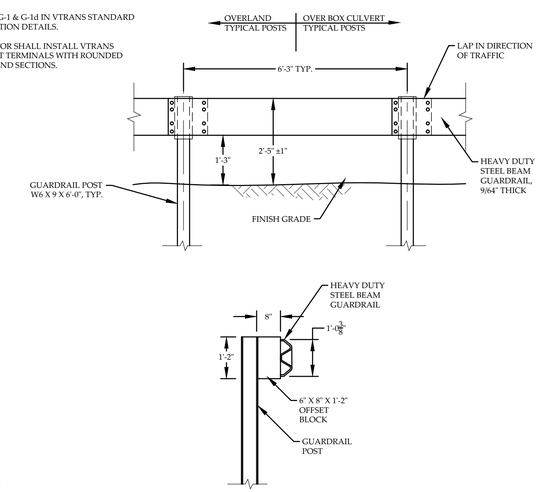
2 / C-2 TYPICAL PAVED ROAD SECTION

NOT TO SCALE

NOTES:

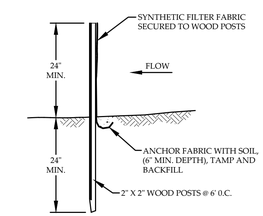
1) SEE SHEET G-1 & G-1d IN VTRANS STANDARD CONSTRUCTION DETAILS.

2) CONTRACTOR SHALL INSTALL VTRANS COMPLIANT TERMINALS WITH ROUNDED "W" BEAM END SECTIONS.



3 / C-2 GUARDRAIL DETAILS

NOT TO SCALE



4 / C-2 SILT FENCE DETAIL

NOT TO SCALE

CONSTRUCTION NOTES:

1) THE CONTRACTOR SHALL PROVIDE APPROPRIATE SIGNAGE INDICATING ROAD CLOSURE DURING CONSTRUCTION AND DETOURING VEHICULAR TRAFFIC AWAY FROM THE SITE, PRIOR TO ANY EXCAVATION OF THE ROADWAY. THE CONTRACTOR SHALL ALSO PROVIDE ADEQUATE SAFETY BARRIERS TO BLOCK THE ROADWAY AT THE LIMITS OF CONSTRUCTION. A SIGNAGE AND SAFETY PLAN SHALL BE APPROVED BY THE TOWN OF RICHFORD ROAD FOREMAN OR SELECTBOARD PRIOR TO THE START OF CONSTRUCTION.

2) THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION OF THE BROOK, INCLUDING UNCURED CONCRETE, AUTOMOTIVE , OR MACHINERY FLUIDS, ETC.

3) MEANS OF MAINTAING STREAM FLOWS DURING CONSTRUCTION SHALL BE DECIDED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

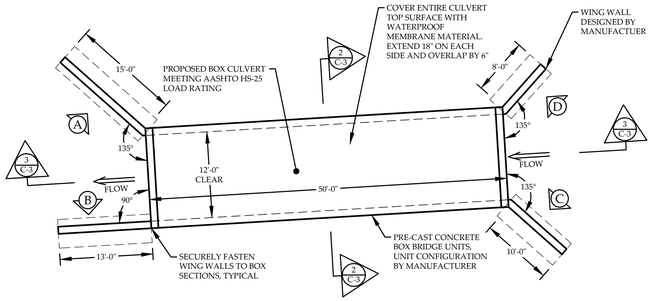
REVISION: 12/22/15 - REVISED GUARDRAIL DETAIL.

PROPOSED SITE PLAN
TOWN OF RICHFORD
SOUTH RICHFORD ROAD
RICHFORD, VERMONT

RUGGIANO engineering, inc.
5 LAKE STREET
ST. ALBANS, VERMONT 05478
PHONE - (802) 524-9300 FAX - (802) 524-9700
COPYRIGHT © 2015 - RUGGIANO ENGINEERING, INC.

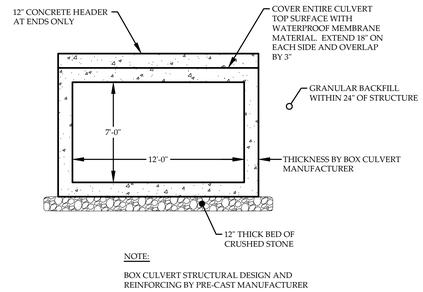
PROJECT NO.....15003
DRAWN BY.....JGE
CHECKED BY.....LEW
SCALE.....1" = 10'
DATE.....09/08/15

SHEET NO.
C-2
2 OF 3 SHEETS



1 C-3 CULVERT PLAN VIEW DETAIL

SCALE: 1" = 10'
Graphic Scale
10 0 10 20 40 feet



2 C-3 TYPICAL 4 SIDED BOX UNIT SECTION

SCALE: 1" = 5'
Graphic Scale
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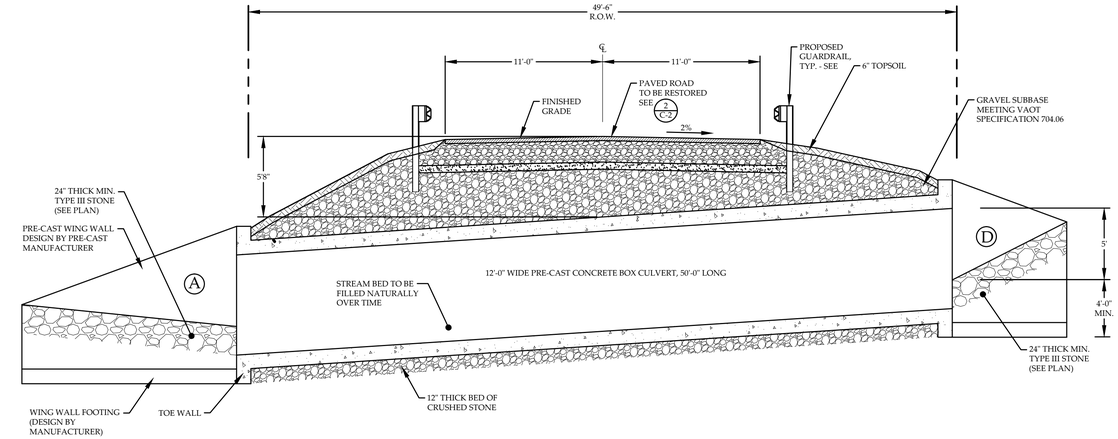
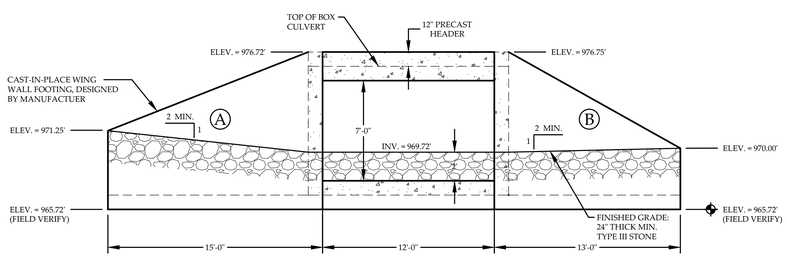


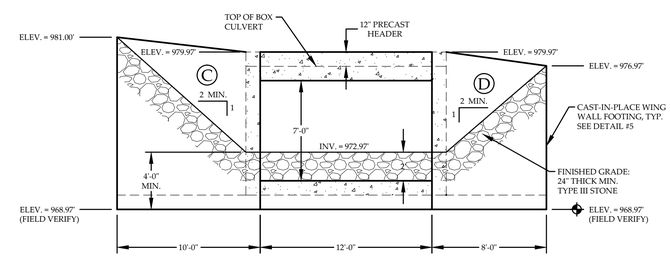
3 C-3 SECTION AT CROSSING

SCALE: 1" = 5'
Graphic Scale
5 0 5 10 20 feet



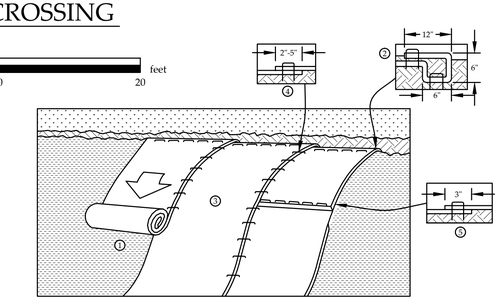
4 C-3 WEST END ELEVATIONS (OUTLET)

SCALE: 1" = 5'
Graphic Scale
5 0 5 10 20 feet



5 C-3 EAST END ELEVATIONS (INLET)

SCALE: 1" = 5'
Graphic Scale
5 0 5 10 20 feet



NOTES:

1) PREPARE SOIL BEFORE INSTALLING EROSION CONTROL BLANKET (ECB) INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER AND SEED.

2) BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE ECB IN A 6" DEEP, 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3) ROLL THE BLANKET DOWN THE SLOPE. BLANKET WILL UNROLL WITH THE APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKET MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

4) THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" OVERLAP DEPENDING ON BLANKET TYPE.

5) CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.

6) IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKET.

7 C-3 EROSION CONTROL BLANKET - SLOPE INSTALLATION

NOT TO SCALE

TYPE III STONE SHALL CONFORM TO THE SPECIFICATIONS WRITTEN IN THE 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION ISSUED BY THE VERMONT AGENCY OF TRANSPORTATION, SECTION 706.04, WHICH STATE:

"STONE FOR STONE FILL SHALL BE APPROVED, HARD, BLASTED, ANGULAR ROCK OTHER THAN SERPENTINE ROCK CONTAINING THE FIBROUS VARIETY CHRYSOTILE (ASBESTOS). THE LEAST DIMENSION OF THE STONE SHALL BE GREATER THAN 33 PERCENT OF THE LONGEST DIMENSION. THE STONE FILL SHALL BE REASONABLY WELL GRADED FROM THE SMALLEST TO THE MAXIMUM SIZE STONE SPECIFIED SO AS TO FORM A COMPACT MASS WHEN IN PLACE. THE LONGEST DIMENSION OF THE STONE SHALL VARY FROM 75 TO 1200 MM (3 TO 48 INCHES), AND AT LEAST 50 PERCENT OF THE VOLUME OF THE STONE IN PLACE SHALL HAVE A LEAST DIMENSION OF 400 MM (16 INCHES)."

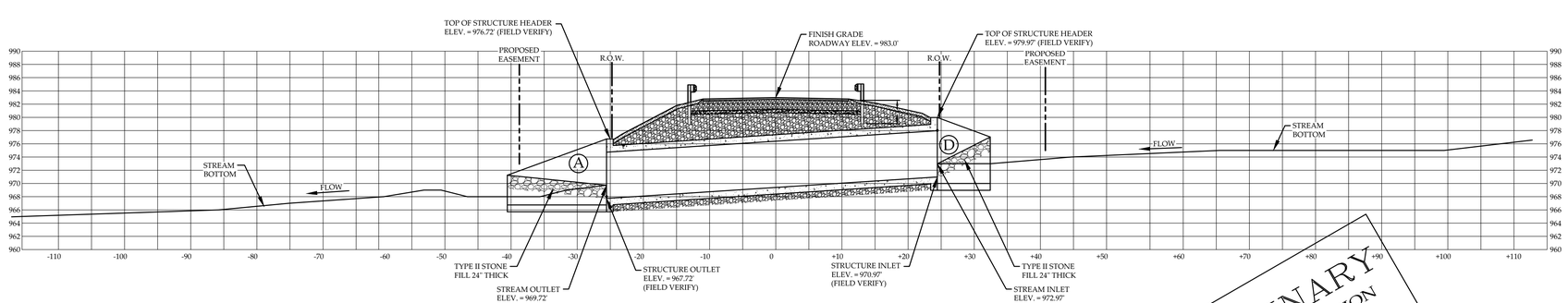
8 C-3 TYPE III STONE SPECIFICATIONS

VTRANS 2001 STANDARD SPECIFICATIONS SECTION 706.04 DEFINES TYPE II STONE:

"THE LONGEST DIMENSION OF THE STONE SHALL VARY FROM 50 TO 900 MM (2 TO 36 INCHES), AND AT LEAST 50 PERCENT OF THE VOLUME OF THE STONE IN PLACE SHALL HAVE A LEAST DIMENSION OF 300 MM (12 INCHES)."

VISIBLY SMALLER OR LARGER STONE WILL NOT BE ACCEPTED.

9 C-3 TYPE II STONE SPECIFICATIONS



6 C-3 STREAM PROFILE

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 10'
Graphic Scale
10 0 10 20 40 feet

PRELIMINARY
NOT FOR CONSTRUCTION

REVISION: 12/22/15 - REVISED GUARDRAIL DESIGN

DETAILS
TOWN OF RICHFORD
SOUTH RICHFORD ROAD
RICHFORD, VERMONT

RUGGIANO engineering, inc.
5 LAKE STREET
ST. ALBANS, VERMONT 05478
PHONE - (802) 524-9300 FAX - (802) 524-9700
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PROJECT NO.....15003
DRAWN BY.....JGE
CHECKED BY.....LEW
SCALE.....AS NOTED
DATE.....09/08/15

SHEET NO.
C-3
3 OF 3 SHEETS

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Randy Reed, District Project Manager, District 8

FROM: Leslie Russell, P.E., Hydraulics Project Engineer LGR

DATE: 28 January 2009

SUBJECT: Richford TH 2 BR 20 – South Richford Road – over Loveland Brook

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We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use.

Hydrology

This site has a hilly to mountainous drainage basin. It is mostly forested with some clearings and ponds. The total contributing drainage area is about 1.2 sq. mi. There is an overall length of 10,585' from the divide to the site, with a 1550' drop in elevation, giving an average slope of 14.6%. Slope at the site is estimated to be 3% or more. Using several hydrologic methods, we determined the following design flow rates:

Recurrence Interval in Years	Flow Rate in Cubic Feet per Second (CFS)
Q2.33	150
Q10	250
Q25	300 - Town Highway Design Flow
Q50	375
Q100	425 - Check flow

Existing Structure

The existing 6' corrugated metal pipe provides a waterway opening of about 28.3 sq. ft. Our calculations show this structure to be hydraulically inadequate. Headwater to depth ratios are not within the state standards. Water overtops the roadway below the Q25 flow. There is a large scour pool at the outlet. The culvert is collapsing in the middle. There is heavy bank erosion in various spots downstream of the culvert.

Recommendations

In sizing a new structure we attempted to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. Based on these considerations the following would best fit the site:

- A concrete box with a 12' wide by 7' high inside opening, with 12 inch high bed retention sills in the bottom. The box invert should be buried 24" deep so that the top of the sills are 12" below the channel bottom. That will result in a 12' wide x 5' high waterway opening, or 60-sq. ft. of waterway area. Sills should be spaced no more than 8'-0" apart throughout the structure with one baffle placed at the inlet and one at the outlet. We also recommend that the bed retention sills be cast in a V-shape with a 10:1 lateral slope to create a low flow channel in the center if the bed material in the structure is washed out. The spaces between the sills should be filled with stone graded to match the natural stream bed material. This structure will result in a headwater depth at Q25 = 4.5' and at Q100 = 5.8'.

GE0027 Girard Camille + Estelle
27 Gendron Road
Richford

ST0994 Berger Andre + Barbara
994 South Richford Road
Richford

ST0995 Mason Daniel J. + Monica L.
P.O. Box 644
Richford

ST0891 Gendron James
104 Berkshire Ctr Road
Enosburg Falls, Vt 05450

- A corrugated metal pipe arch with a span of 142" and a rise of 91" with the invert buried 24" deep. That will result in a 142" wide X 67" high arch which has a waterway opening of 55.0 sq. ft. and would be hydraulically adequate. Install bed retention sills as described above. This structure would result in approximate headwater depths at Q25 = 5.1' and Q100 = 6.8'.

- Other structures with a minimum span of 12' and at least 60 sq. ft. of waterway area that fit the site could be considered.

General Comments

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

If a new pipe arch is installed we recommend it have a minimum of 3 ft of cover and a maximum cover to meet specific structure specifications. Pipe manufacturers can be contacted for certain pipe specifications. All structures must be able to handle HS-25 loading. Additionally, we recommend pipes have cradle or full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

It is always desirable for any new structure to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel.

Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

The Agency of Natural Resources (ANR), Corps of Engineers or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The Stream Alteration Engineer should be contacted with respect to those concerns before ordering a new structure.

Please keep in mind that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

Please contact us if you have any questions or if we may be of further assistance.

LGR

cc: Chris Brunelle, A.N.R. Stream Alteration Engineer
Mike Hedges, VTRANS, Structures Engineer
Hydraulics Project File via NJW
Hydraulics Chrono File

TOWN OF RICHFORD
SOUTH RICHFORD ROAD
BRIDGE 20