

Stormwater Pollution Prevention Plan
for
Vermont Railway, Inc.
Shelburne Transload Facility
Shelburne, Vermont

Permit Number 7514-9003

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1.0 Introduction

This Stormwater Pollution Prevention Plan ("SWPPP") addresses ongoing operations at the Vermont Railway, Inc. ("VTR") Shelburne Transload Facility ("Project") located at 4744 Shelburne Road in Shelburne, VT 05482. This SWPPP has been developed and updated as required under Vermont's Multi-Sector General Permit ("MSGP") (General Permit 3-9003) issued by the Vermont Department of Environmental Conservation ("DEC") in August 2011. Although the MSGP expired in August 2016, DEC has notified entities subject to MSGP jurisdiction that the prior permit has been administratively continued and that prior authorizations will remain in full force and effect until a replacement permit is issued.

This SWPPP describes the facility and its operations, develops an inventory of potential pollutant sources ("PPSs"), identifies controls and best management practices ("BMPs") for reducing the discharge of pollutants in stormwater runoff, and outlines measures for implementing and reviewing this plan. A Notice of Intent ("NOI") for coverage under the NPDES MSGP 3-9003 for Stormwater Discharges Associated with Industrial Activity was submitted to DEC concurrent with the development of this SWPPP. DEC issued an Authorization to discharge on November 21, 2016 (Permit No. 7514-9003).

The original SWPPP was developed on July 8, 2016 prior to commencement of site operations. A previous update was completed on November 17, 2016 after project construction completion and prior to beginning active operations. Additional improvements at the facility require further modification of this SWPPP to address changes to BMPs that will be used to manage the site. There have been no overall changes to PPSs; however, additional detail regarding PPSs and associated BMPs is provided in this update. Site improvements and any associated modifications to the SWPPP do not require filing an updated NOI, so long as the applicable industrial sector does not change.

2.0 Pollution Prevention Team

The Pollution Prevention Team (PPT) is in charge of developing, implementing, and revising the SWPPP and ensuring that it is in compliance with the general permit.

Leader: Brion Muzzy

Office Phone: (802) 658-2550

Title: Operations Manager

Cell Phone: (802) 363-8645

Responsibilities: Site Operations

Member: Matt Young

Office Phone: (802) 775-4356

Title: Rules Coordinator and Hazmat Specialist

Cell Phone/Beeper: (802) 380-5986

Responsibilities: Site Operations

Member: Brian Barrett

Office Phone: (802) 863-1311

Title: Operator

Cell Phone/Beeper: (802) 355-1730

Responsibilities: Site Operations

Member: Shayne M. Leggett

Office Phone: (802) 775-4356

Title: Burlington Operations

Cell Phone/Beeper: (802) 324-7778

Responsibilities: Site Operations

IN CASE OF AFTER HOUR EMERGENCY
24-HOUR EMERGENCY DISPATCH 888-265-2735

3.0 Site Description

3.1 Facility Information

Street Address: 4744 Shelburne Road

City: Shelburne State: Vermont Zip: 05482

Latitude: 44° 23'23.7" N Longitude: 73° 13'43.6" W

SIC Code: 4011 (Railroads, Line-Haul Operating) MSGP Sector: P

Phone: (802) 658-2550

Fax: (802) 658-2553

3.2 Narrative Site Description

The VTR facility is used for the **delivery, off-loading, storage and distribution** of rail transported salt. These activities occur **year-round**. A rail spur that ties into the existing railroad follows the southern edge of the site and is used to deliver salt. Salt is offloaded from **bottom hopper cars** into an offloading pit. From the offloading pit the salt is conveyed to trucks which are then transported off site or dumped inside one of the salt storage sheds. Adjacent to the offloading pit is a scale, and the end of the rail spur contains a split track that is used for storing rail cars. A second scale and a temporary office trailer are located east of the southern interior wetland.

3.2.1 Area of Site, Impervious Area, Buildings

- The overall parcel size is **35.59 acres**, which includes developed impervious areas such as buildings, paved driveways and loading areas, as well as vegetated buffers and other undeveloped areas.
- Total impervious cover is approximately 5.59 acres which includes buildings, paved areas, and driveways, resulting in site coverage of 16 percent impervious area.
- The facility consists of three buildings: two salt storage sheds (140 feet by 360 feet) and a temporary office trailer (Table 1).
- Additional structures at the site include a scale for weighing over-the-road trucks, a salt offloading pit to receive product from bottom dump hopper cars, a conveyor roof covering

the area where trucks receive the offloaded salt and three Conex boxes (20 feet by 8 feet) for covered storage of maintenance equipment and materials (Table 1).

- The locations of the structures are shown on the Stormwater Pollution Prevention Plan Site Map (Figure 2).

Table 1: Building and Structure Inventory	
Building Description	Building Function
Salt Storage Shed (north)	Covered Salt Storage
Salt Storage Shed (south)	Covered Salt Storage
Temporary Office Trailer	Office
Structure Description	Structure Function
Scale	Weigh over-the-road trucks
Salt Offloading Pit	Unload product from rail cars
Three Storage Trailers (Conex Boxes)	Maintenance equipment and liquid drum storage (motor oil, hydraulic oil)
Truck Loading Structure	Truck salt-filling area from pit conveyer and vehicle maintenance area
Double-walled skid tank(s) (future)	Refueling diesel equipment

3.2.2 Hours of Operation, Vehicles, Outdoor Activities

- The facility is staffed year-round and typical operating hours are from 5:00 a.m. to 7:00 p.m., 7 days a week. The facility may operate 24 hours per day and 7 days per week if required.
- Vehicles used in daily operations of the facility include:
 - Truck and trailer transports (30 during the winter season and approximately 6 during the summer season).
 - Three front end loaders
 - 10 railcars located on-site for offloading.
- Primary outdoor activities consist of:
 - Salt offloading and loading

3.2.3 Stormwater System

The stormwater collection and treatment system has been designed to meet the requirements of the Vermont Stormwater Management Rule (2011) and of DEC General permit 3-9015.

This facility has two discharge points (S/N 001 and S/N 002), both of which receive water quality treatment via infiltration and vegetative filtering before reaching Class II wetlands and the LaPlatte River.

S/N 001 discharges stormwater from impervious surfaces within the loading area, including, paved surfaces, the salt storage sheds and office trailer. Runoff from these areas is directed to perimeter swales that convey flows to a stormwater pond, where it receives water quality treatment and water volume control before discharging to a stone sediment trap at the ground surface. Stormwater from the gravel parking area at the eastern portion of the site is also directed to S/N 001 via a grassed treatment swale that runs along the perimeter of the facility.

S/N 002 discharges stormwater collected from a segment of the access road at the eastern portion of the site. Runoff from this area flows through a grass-lined swale designed to provide water quality treatment before being discharged via a level spreader. The level spreader is designed to dissipate energy and provide non-erosive velocities before it discharges to the ground surface.

Additional information regarding the stormwater management system is provided in Appendix A.

3.3 General Location Map

A general location map (Figure 1) is provided which illustrates the site boundaries on a topographic map background, with receiving waters and other significant landmarks within a one-mile radius.

3.4 Site Map

The VTR facility Stormwater Pollution Prevention Plan Site Map (Figure 2) depicts the following features, in accordance with permit instructions:

- Delineation of all impervious surfaces including buildings, driveways, and loading areas.
- Access roads
- Rail cars and tracks
- All surface water bodies

- Direction of stormwater flow
- Location of existing structural stormwater controls including:
 - Vegetated swales
 - Retention / detention ponds
 - Flow diversion structures: None in the vicinity
 - Sediment traps: None in the vicinity
- All areas which may be pollutant sources and are exposed to precipitation (including areas identified in section 3.7 of this plan)
 - Loading/offloading areas
 - Material handling areas
 - Fueling stations
 - Liquid storage tanks
 - Machinery: None in the vicinity
 - Areas of exposed soil: None in the vicinity
- Past significant leaks or spills (as identified in section 3.8 of this plan):

No significant leaks or spills have been identified that originated at the Transload facility. However, an adjacent parcel (former Harbour Industries, 4740 Shelburne Road) has been identified as a hazardous waste site (DEC Site #77-0074) due to subsurface contamination associated with prior industrial manufacturing activities. The groundwater plume resulting from this contamination has been identified as crossing through the southeastern portion of the parcel. However, the dataset is limited and at the request of VTR, DEC has required the responsible party ("RP") to conduct a more comprehensive investigation both on the site of origin and off-site, including the Transload facility, to further evaluate the nature and extent of all phases of contamination and evaluate remedial alternatives for site cleanup.
- Location and description of each non-stormwater discharge: None in the vicinity
- Location and source of run-on from adjacent properties containing significant quantities of pollutants: None in the vicinity. The railroad embankment prevents stormwater runoff from entering the site.

3.5 Description of Receiving Waters

Primary receiving waters: LaPlatte River

Secondary receiving water: Shelburne Bay

3.5.1 Discharge Points and Applicable Vermont Water Quality Standards

Discharge Points flowing to primary receiving waters: S/N 001, S/N 002

Applicable Vermont Water Quality Standards: Class B, Warm Water Fishery



Impaired Status: The LaPlatte River is listed on the 2016 Clean Water Action Section 303 (d),
Part D – Impaired surface waters with completed and approved TMDLs. The River is impaired
for *E. coli* bacteria with an approved TMDL as of September 30, 2011 and impaired for mercury
in walleye, with an approved TMDL as of December 20, 2007.

3.6 Precipitation Information

Below is precipitation information in the area of the site. Additional detail is provided in Table 2.

- Location: Division 2 (Western)
- Average annual precipitation: 39 inches
- Wettest months: July and August
- Expected rainfall in the wettest month: 4.07 inches in July and 4.29 inches in August
- Types/intensity of storms: short duration downpours, day-long drizzles, day long intermittent rainfall.
- Facility activities are only affected by severe precipitation events, in which case the facility may choose not to operate.



Table 2: Rainfall Depths (inches) for Various Storm Events in Chittenden County, Vermont.			
1-Year, 24-Hour	2-Year, 24-Hour	10-Year, 24-Hour	100-Year, 24-Hour
2.1	2.3	3.2	5.2

3.7 Inventory of Exposed Materials and Potential Pollutant Sources

Table 3: Inventory of Site Areas and Activities Exposed to Stormwater				
Map Key	Activity/ Area of the facility	Significant Materials	Amount (Approx.)	Discharge Point
PPS-1	Salt offloading/loading and handling area	Salt	varies	S/N 001
PPS-2	Vehicle Fueling / Maintenance	Oil, Hydraulic Fluid, Diesel Fuel	varies	S/N 001
PPS-3	Truck/trailer/equipment parking	Sediment and/or Oil	varies	S/N 001

Table 4: Significant Materials Used Onsite		
Trade Name Material	Chemical/ Physical Description	Stormwater Pollutants
Sodium chloride/magnesium chloride (Rock Salt)	Solid crystalline powder	Chloride
Hydraulic oil	Colored liquid with petroleum odor	Petroleum
Motor oil	Colored liquid with petroleum odor	Petroleum
Diesel fuel	Colored liquid with petroleum odor	Petroleum

3.8 Inventory of Past Spills and Leaks

Table 5: Inventory of Past Spills and Leaks				
Date	Source/Cause of Spill	Material	Quantity	Discharge Point
9/14/17	Leaking equipment	Motor Oil	<1 quart (drips on floor)	N/A – Leak area cleaned with sorbents and drummed

4.0 Non-Stormwater Discharges

4.1 Certification of Non-Stormwater Discharges

A worksheet for describing non-stormwater discharge testing and certification can be found in Appendix B, Worksheet 1 at the end of this document. This worksheet is blank as no non-stormwater discharges are present.

If non-stormwater discharges are identified in the future, outfalls which could not be evaluated will be listed in Appendix B, Worksheet 2.

4.2 Allowable Non-Stormwater Discharges

There are no non-stormwater discharges at the site.

5.0 Best Management Practice (BMP)

Identification

5.1 Source Protection BMPS

Stormwater controls and BMPs to prevent (preferable) or control pollutants in stormwater discharges from the site have been chosen with the following considerations: appropriateness for identified potential pollutant sources, feasibility of on-site implementation, and cost. Refer to Tables 6 through 10.

Good Housekeeping:

Good housekeeping practices are implemented to minimize the risk of stormwater contact with potential pollutant sources by keeping exposed areas clean and orderly. Good housekeeping practices which are implemented at the site include, but are not limited to:

- Ensure all outdoor dumpsters, trash cans, and other waste containers are adequately covered.
- Recycle, or properly dispose of waste materials regularly. Do not dispose of waste in unapproved areas (i.e., do not pour fluids on the ground).
- Store potential pollutant materials (i.e., oils, hazardous waste, chemicals etc.) inside in the appropriate, sealed, and labeled containers.
- Regularly maintain equipment and vehicles and inspect for leaks.
- Include the inspection of all containers, drums, and tanks stored outdoors as part of the routine facility inspection.
- Loading and offloading areas will be swept regularly in addition to sweeping up any spills.

Minimizing Exposure:

Visiting industrial vehicles are inspected regularly for leaks. Hazardous materials are handled and stored inside a contained area, and waste materials disposed of promptly.

Preventative Maintenance:

All stormwater management devices (stormwater detention and treatment pond, grass-lined swales, level spreader, and stone outlets) and facility equipment are inspected monthly and

regularly receive maintenance, as needed, to prevent system failures and reduced performance that could cause contamination of stormwater runoff.

Spill Prevention and Response:

The risk of pollutant release is reduced through the following measures:

- Hazardous material handling procedures are followed by all personnel handling any such materials.
- Containers are regularly inspected and maintained as needed (see MSGP Section 5.1.5 Schedules and Procedures). Emergency spill kits are available where materials are commonly handled.
- Material handlers are trained in spill prevention and response procedures.

Table 6. Vehicle and Equipment Storage Areas		
BMP	Implementation Date	Responsible Party
Use drip pans under vehicles/equipment when necessary	Ongoing	PPT (see Section 2.0)
Indoor storage of vehicles and equipment	Ongoing	PPT (see Section 2.0)
Use absorbents, roofing or covering storage areas	Ongoing	PPT (see Section 2.0)
Clean pavement surfaces to remove oil and grease	Ongoing	PPT (see Section 2.0)

Table 7. Material Storage Areas		
BMP	Implementation Date	Responsible Party
Maintain all material storage vessels (e.g., for used oil, oil filters, spent solvents, paint wastes, hydraulic fluids)	Ongoing	PPT (see Section 2.0)
Label storage vessels (e.g., "Used Oil", "Spent Solvents", etc.)	Ongoing	PPT (see Section 2.0)
Store materials indoors	Ongoing	PPT (see Section 2.0)
Minimize runoff of stormwater to the area	Ongoing	PPT (see Section 2.0)
Use dry cleanup methods	Ongoing	PPT (see Section 2.0)
Treat and/or recycle the collected stormwater runoff	Ongoing	PPT (see Section 2.0).

Table 8. Vehicle and Equipment Maintenance Areas		
BMP	Implementation Date	Responsible Party
Use drip pans	Ongoing	PPT (see Section 2.0)
Keep an organized inventory of materials used in the shop	Ongoing	PPT (see Section 2.0)
Drain all parts of fluid prior to disposal	Ongoing	PPT (see Section 2.0)
Prohibit wet clean up practices if they would result in the discharge of pollutants to the stormwater drainage systems	Ongoing	PPT (see Section 2.0)
Use dry cleanup methods	Ongoing	PPT (see Section 2.0)
Treat and/or recycle the collected stormwater runoff	Ongoing	PPT (see Section 2.0)
Minimize run on/runoff of stormwater to maintenance areas	Ongoing	PPT (see Section 2.0)

Table 9. Active Operations and Material Offloading/Loading Areas		
BMP	Implementation Date	Responsible Party
Inspect rail spur within 50 feet of salt pit and clean up salt spillage on rail ties and within ballast.	Ongoing	PPT (see Section 2.0)
Pump water out of railcar offloading pit via septic waste hauling contractor.	As required	PPT (see Section 2.0)

Table 10. Site-wide BMPs		
BMP	Implementation Date	Responsible Party
All applicable environmental permit updates will be obtained and complied onsite.	Ongoing	PPT (see Section 2.0)
All spills will be cleaned up immediately using dry methods. Spill areas are never washed down with water.	Ongoing	PPT (see Section 2.0)
Domestic trash containers and dumpsters will be tightly covered when not in use.	Ongoing	PPT (see Section 2.0)
Domestic trash will be removed offsite on a weekly basis.	Ongoing	PPT (see Section 2.0)
Stabilize exposed soil with seed/mulch and or gravel where feasible.	Ongoing	PPT (see Section 2.0)
Clean out accumulated sediment from paved areas before sediment is exported/tracked off-site.	Ongoing	PPT (see Section 2.0)
Maintain vegetated areas onsite, correct erosion as needed.	Ongoing	PPT (see Section 2.0)

5.2 Spill Response

Spill response procedures are implemented when a hazardous material is released to land or water and meets the following criteria:

1. A spill of two (2) gallons or more;
2. A spill that is less than two (2) gallons, but poses a threat to human health or the environment; or
3. A spill that exceeds a CERCLA reportable quantity.

The appropriate spill response procedures, which are adapted from the DEC Environmental Fact Sheet: Hazardous Material Spill Response (2006), are as follows:

1. Hazard Assessment and Initial Response:
 - a. For spills that can be safely managed without assistance:
 - i. Stop the spill at its source

- ii. Prevent spilled material from entering storm drains, waterways, drainage ditches, etc.
 - iii. Contain spilled material using a barrier (absorbent pads or socks), temporary dike or trench
- b. For all other spills, a cleanup contractor will likely be hired since they have the training and equipment necessary to safely respond to dangerous hazardous material spills.

2. Report the Spill

Any hazardous material spill to the land or water that meets the following criteria must be immediately reported to the Department of Environmental Conservation (DEC) Spill Response Team (spill team) by calling the 24-hour Hazardous Materials **Spills Hotline at 1-800-641-5005**. *If there is any question about whether a spill is reportable, call.*

- a. A spill of 2 gallons or more;
- b. A spill that is less than 2 gallons, but poses a threat to human health or the environment (for example, a gallon of gasoline spilled to a wetland); or
- c. A spill that exceeds a CERCLA reportable quantity

Any person who has knowledge of a spill and who may be subject to liability for that spill, is responsible for reporting the spill. In addition to reporting to the DEC, any spill of hazardous material that impacts (or threatens) surface water (e.g., lakes, streams, wetlands, must also be reported to the U.S. Coast Guard via the National Response Center at **1-800-424-8802**.

3. Clean up and Follow up

Any business or municipality which may be responsible for a spill must:

- a. Ensure that the spill is cleaned up to the extent that it no longer presents a threat to human health or the environment
- b. Make a hazardous waste determination for all spill cleanup materials
- c. Ensure that contaminated soil/water/debris is collected and managed appropriately
- d. For any reportable spill, submit a written follow-up report within 10 days if requested, detailing how the spill was cleaned up and how waste was managed.

The SWPPP will be modified within 14 days of knowledge of a spill, to include information regarding the nature, date, and cause of the release. The plan will be modified with measures to prevent reoccurrence and to improve response.

5.3 Vehicle and Equipment Washing

No vehicle or equipment washing occurs at the site.

5.4 Sediment and Erosion Control

There are not any areas of erosion, the site is fully stabilized with vegetation or impervious surfaces. Post-construction erosion and sediment control is accomplished through the use of the permanent stormwater system as well as approved EPSC measures listed in the Vermont Standards and Specifications for Erosion and Sediment Control (2008).

5.5 Structural BMPs

Structure:	West pond (stormwater detention pond)
Date of Implementation:	October 2016
Discharge Point:	S/N 001
Area(s) Treated:	Impervious areas, including salt storage sheds, office trailer, Conex box and double-walled fuel tank (PPS-1 and PPS-2)
Pollutants Removed:	Sediment, nutrients, salt
Maintenance Requirement(s):	Inspection, removal of accumulated sediment and debris, and correction of erosion, if any. Any additional maintenance as needed.
Inspection / Maintenance Frequency:	Inspect quarterly as part of quarterly visual monitoring (see Section 7.1), Maintain as needed, at least annually.
Reporting Requirements:	Annually, as part of comprehensive site evaluation (see Section 8.0).

Structure:	Northeast grassed treatment channel
Date of Implementation:	October 2016
Discharge Point:	S/N 001
Area(s) Treated:	Impervious areas, including gravel parking area (PPS-3)
Pollutants Removed:	Sediment, nutrients
Maintenance Requirement(s):	Inspection, removal of accumulated sediment and debris, and correction of erosion, if any. Any additional maintenance as needed.
Inspection / Maintenance Frequency:	Inspect quarterly as part of quarterly visual monitoring (see Section 7.1), Maintain as needed, at least annually.
Reporting Requirements:	Annually, as part of comprehensive site evaluation (see Section 8.0).

Structure:	Rail spur grassed channel and level spreader
Date of Implementation:	October 2016
Discharge Point:	S/N 002
Area(s) Treated:	Impervious project areas, including access drive and vehicle storage area (PPS-3)
Pollutants Removed:	Sediment, nutrients 
Maintenance Requirement(s):	Inspection, removal of accumulated sediment and debris, and correction of erosion, if any. Any additional maintenance as needed.
Inspection / Maintenance Frequency:	Inspect quarterly as part of quarterly visual monitoring (see Section 7.1), Maintain as needed, at least annually.
Reporting Requirements:	Annually, as part of comprehensive site evaluation (see Section 8.0).

Structure:	Truck loading structure
Date of Implementation:	November 2016
Discharge Point:	N/A
Area(s) Treated:	Offloading area
Pollutants Removed:	Chloride
Maintenance Requirement(s):	Ensure structure integrity/watertightness
Inspection / Maintenance Frequency:	As needed
Reporting Requirements:	Annually, as part of comprehensive site evaluation (see Section 8.0).

Structure:	Curbing around perimeter of wetland 2015-4
Date of Implementation:	Temporary sand bags installed October 2017; permanent curbing scheduled for November 2017
Discharge Point:	Direct runoff away from wetland and towards Stormwater Pond
Area(s) Treated:	Impervious areas adjacent to scale
Pollutants Removed:	Sediment, nutrients, chloride
Maintenance Requirement(s):	Inspection, removal of accumulated sediment and debris, and correction of erosion, if any. Any additional maintenance as needed.
Inspection / Maintenance Frequency:	Inspect quarterly as part of quarterly visual monitoring (see Section 7.1), Maintain as needed, at least annually.
Reporting Requirements:	Annually, as part of comprehensive site evaluation (see Section 8.0).

6.0 BMP Implementation

6.1 *Routine Inspections*

Facility inspections will continue to be performed monthly by qualified personnel with at least one member of the Pollution Prevention Team. All inspections will occur while the facility is in operation. At least once each calendar year, the routine facility inspection will be conducted during a period when a stormwater discharge is occurring. A sample inspection form and records of past inspections are kept in this SWPPP in Appendix C. During an inspection, the following will be documented/inspected (at a minimum).

1. The inspection date and time
2. The name(s) and signature(s) of the inspector(s)
3. Weather information and a description of any discharges occurring at the time of the inspection
4. Any previously unidentified discharges of pollutants from the site
5. Any control measures needing maintenance or repairs
6. Any incidents of noncompliance observed
7. Storage areas for vehicles/equipment awaiting maintenance
8. Fueling areas
9. Indoor and outdoor vehicle/equipment maintenance areas
10. Material storage areas
11. Loading/offloading areas
12. Any additional control measures needed to comply with the permit requirements

If structural BMPs are found to be functioning incorrectly, maintenance will be performed before the next anticipated storm event, or as necessary to maintain effectiveness of the stormwater controls.

6.2 Employee Training

An employee training program has been developed and implemented to educate employees about the requirements of the SWPPP. Training includes background on the components and goals of the SWPPP as well as training in the following topics:

- Introduction of Pollution Prevention Team and discuss need for the SWPPP
- Spill response procedure
- Review of past spills
- Review of good housekeeping procedures
- Proper material handling procedures
- Proper disposal or recycling of domestic waste materials
- Be sure employees know where cleaning materials and spill kits are located
- Review sources of stormwater pollutants used on-site
- Familiarize employees with drainage routes near areas where industrial materials are handled
- Proper handling (collection, storage, and disposal) of potential pollutants and hazardous materials
- Maintenance of structural BMPs
- Used oil and spent solvent management
- Fueling procedures
- General good housekeeping practices
- Proper painting procedures
- Used battery management
- Minimizing stormwater run on/runoff

All employees involved in stormwater management, hazardous materials handling, and buildings and grounds maintenance attended the initial training session on December 2, 2016 and must attend annually thereafter. New employees will be trained within 30 days of their hire date. Records of attendance are kept with this plan using Appendix D, found at the end of this plan.

7.0 Monitoring Requirements

To evaluate the effectiveness of the SWPPP, the following monitoring activities are conducted on the stormwater discharge from the Project. Monitoring results are used to regularly reassess the impact of pollutant sources and the need for BMPs. The SWPPP is updated and improved throughout the term of the permit, as per Section 5.4 of the MSGP. The results of the monitoring inform these updates.

7.1 *Quarterly Visual Monitoring*

As required by the MSGP, Section 4.2, the stormwater discharge point on the site is examined each quarter by qualified personnel for evidence of contamination during a runoff event. Monitoring takes place within the first 30 minutes of a precipitation or snowmelt event if possible, but no more than 60 minutes after onset. Precipitation events must be greater than 0.1 inches in magnitude and occur at least 72 hours after the last runoff producing event. The examiner will document the presence or lack of:

- color
- odor
- turbidity
- solids
- foam
- oil sheen
- other obvious forms of contamination

Results of quarterly visual monitoring are recorded on forms included in Appendix E.

7.2 *Benchmark Monitoring*

No sector-specific benchmark monitoring is required for this site under the requirements for Sector P facilities. Discharge points are visually inspected quarterly per section 7.1 of this SWPPP and all areas of the facility where industrial materials or activities are exposed to stormwater are inspected at least once a month per Section 6.1 above.

7.3 *Effluent Limitations*

No effluent limitations are associated with this site.

7.4 Monitoring Associated with Discharges to Impaired Waters

The LaPlatte River (VT05-11) is identified on the Clean Water Action Section 303(d) list of Impaired Waters due to high concentrations of bacteria (*E. coli*) associated with agricultural runoff. The Transload Facility does not involve agricultural operations and is not be anticipated to significantly increase bacteria loading in the watershed. The LaPlatte River is also impaired for mercury, which is associated with atmospheric deposition and is not affected by the Project. No monitoring is proposed for *E. coli* or mercury.

7.5 Supplemental Monitoring

Although the LaPlatte River is not identified as being impaired for phosphorous, it discharges to a portion of Lake Champlain that is impaired for phosphorous and has an approved total maximum daily load ("TMDL"). Due to atmospheric deposition, the increased amount of impervious surface at the site may result in higher concentrations of phosphorous in stormwater runoff from the site. Similarly, although the LaPlatte River has not been identified as impaired for chloride, the industrial material handled at the site (rock salt or sodium chloride) could result in the discharge of stormwater containing elevated concentrations of chloride.

In order to evaluate these potential pollutants, a monitoring program is conducted to evaluate water quality in the LaPlatte River as well as stormwater runoff discharged from the facility. This monitoring is conducted in accordance with the Quality Assurance Project Plan ("QAPP") developed and updated for the Project which describes the water quality sampling methodology and identifies sampling locations. This water quality monitoring is performed at on-site stormwater discharge locations and groundwater monitoring wells as well as within the LaPlatte River in the vicinity of the site. The QAPP and results from these monitoring efforts are inserted into Appendix F.

8.0 Compliance Evaluation

A comprehensive site evaluation is performed every year by qualified personnel as required by the MSGP, Section 4.3. This inspection includes all exposed industrial areas identified in Table 3 of Section 3.7 of this plan for evidence of stormwater pollution. The results of the plan are documented in a report containing at minimum: the date, the person(s) making the inspection, the scope of the inspection / locations inspected, observations relating to the discharge of pollutants from the facility, BMPs needing maintenance, BMPs which failed to operate as designed, locations where additional BMPs are needed, corrective actions taken, and any updates to the SWPPP. Copies of past inspection reports are also maintained in Appendix G.

9.0 Endangered Species

According to the publically-available information in the Vermont Agency of Natural Resources ("ANR") Natural Resources Atlas and the associated Natural Heritage Inventory, 21 element occurrences ("EOs") of uncommon, rare, threatened, or endangered species were identified within 1 mile of the site based on a June 15, 2015 database query. Of these, two species are protected in Vermont: the channel darter (*Percina copelandi*, Endangered) and the obedient plant (*Physostegia virginiana*, Threatened). The channel darter record notes that this species has only been observed more than 1 mile upstream from the site, but the ANR Atlas polygon drawn for the occurrence was extended all the way downstream to the mouth of the LaPlatte River. The obedient plant, last observed around 1994, is mapped on the western side of the LaPlatte River to the west of the site, and it was included as a target species for VHB's field investigation on July 16 and 17, 2015. It was not observed during the field survey. A complete description of VHB's methodology and findings regarding rare, threatened, and endangered species is included in Appendix H.

In addition to the above and after the Project's application for a Construction General Permit, ANR indicated that two state-protected species have been found in the LaPlatte River upstream from the site: stonecat (*Noturus flavus*) and speckled pocketbook (*Lampsilis ovata*) for which there was concern relating to the site. As of a database query on February 2, 2016, VHB confirmed that the state endangered stonecat is recorded more than 1 mile upstream from the site, however the EO database did not include any record of the speckled pocketbook within at least 2 miles of the Project. Based on the EO reporting by the Vermont Fish and Wildlife Department ("FWD") for the closest known upstream occurrence of the stonecat, there would likely not be suitable habitat in the LaPlatte River at or below the Project site. Despite the lack of EO database records, FWD has indicated that potential habitat for the speckled pocketbook may exist at or below the site.

In response to this information, two steps have been taken in order to address this concern and to demonstrate that the site meets MSGP Section 1.2.4.5 Criterion D, and was therefore eligible for coverage under the MSGP. The first was to perform a detailed field survey of the LaPlatte River in the vicinity of the Project to identify what organisms are present. Following coordination with FWD, field surveys were conducted under endangered and threatened species takings permits to identify state-designated endangered mussel and fish species present within the LaPlatte River. The results of these surveys are

included in Appendix H. The second was to conduct an evaluation of the potential pollutant load that would be associated with runoff from the facility to demonstrate the range of conditions that may be expected during the operation of the facility. The result of this evaluation is included in Appendix I – LaPlatte River Chloride Loading Analysis.

Appendix H provides documentation and supporting materials regarding endangered species, including a copy of the initial RTE assessment memorandum submitted in conjunction with the 3-9020 application, e-mail correspondence with DEC, the Response to Comments letter submitted during the 3-9020 application process, endangered and threatened species takings permits ER-2016-23 (state-designated mussel survey permit) and ER-2016-28 (state-designated stonecat survey permit), post-survey reports for the mussel and stonecat surveys, and an evaluation of chloride water quality criteria as it relates to the protection of state-designated mussel species in the LaPlatte River.

10.0 General Requirements

10.1 Record Keeping and Reporting

A copy of the original SWPPP was sent to the Stormwater Section and the original with updates is maintained onsite. Records pertaining to inspections, monitoring, maintenance, employee trainings, compliance evaluations, and spills are kept onsite with the SWPPP. These records must be retained for at least five years after the expiration of the permit. This plan will be made available upon request to the Agency, operator of a municipal separate storm sewer receiving the discharge, and to the public if requested in writing to do so.

10.2 Maintaining the Updated SWPPP

This SWPPP has been amended to include changes that have occurred to the facility layout and to include additional BMPs based on monitoring results. Future amendments may be required if Agency personnel determine that the SWPPP is not effective at controlling stormwater pollutant discharges. A history of amendments are kept with this plan in Section 11.

10.3 Certification

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

Name  (print): David Wolfson Title: president.

Signature: _____ Date 10/18/2017

Signed: _____

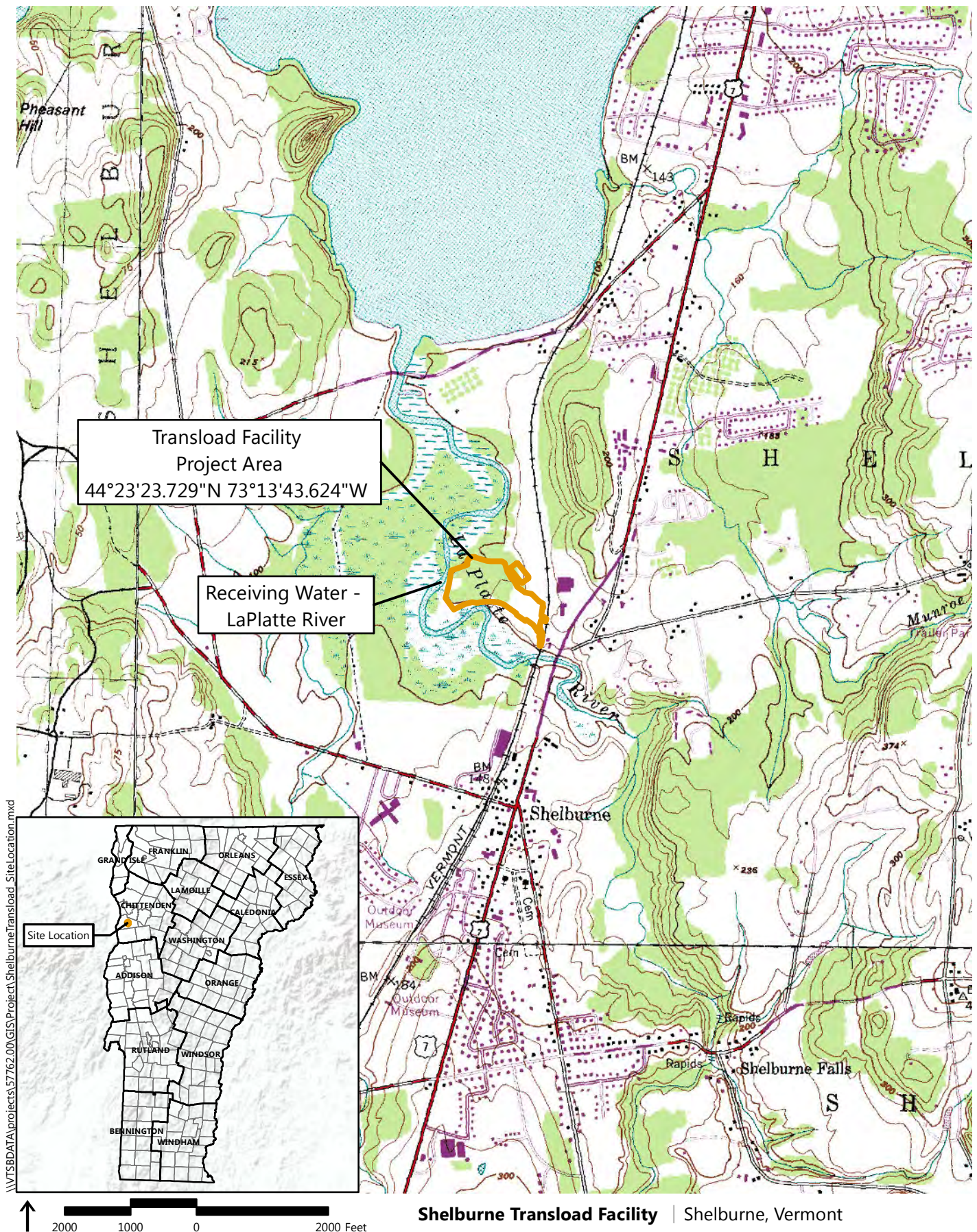
11.0 Summary of Updates

Date Plan Amended	Summary of Updates
November 3, 2017	• Updated overall verb tense of document to reflect that the facility is operational. • Updated pollution prevention team members and contact information. • Updated building and structure inventory and site plans to include existing site conditions. • Updated BMPs to further reduce pollutants from entering the groundwater system. • Updated QAPP to include additional monitoring points. • Updated routine inspection table to match BMPs with PPS areas. • Updated description of former Harbour Industries plume flowing onto the site based on recent DEC requirements.

Plans

This section contains the following information:

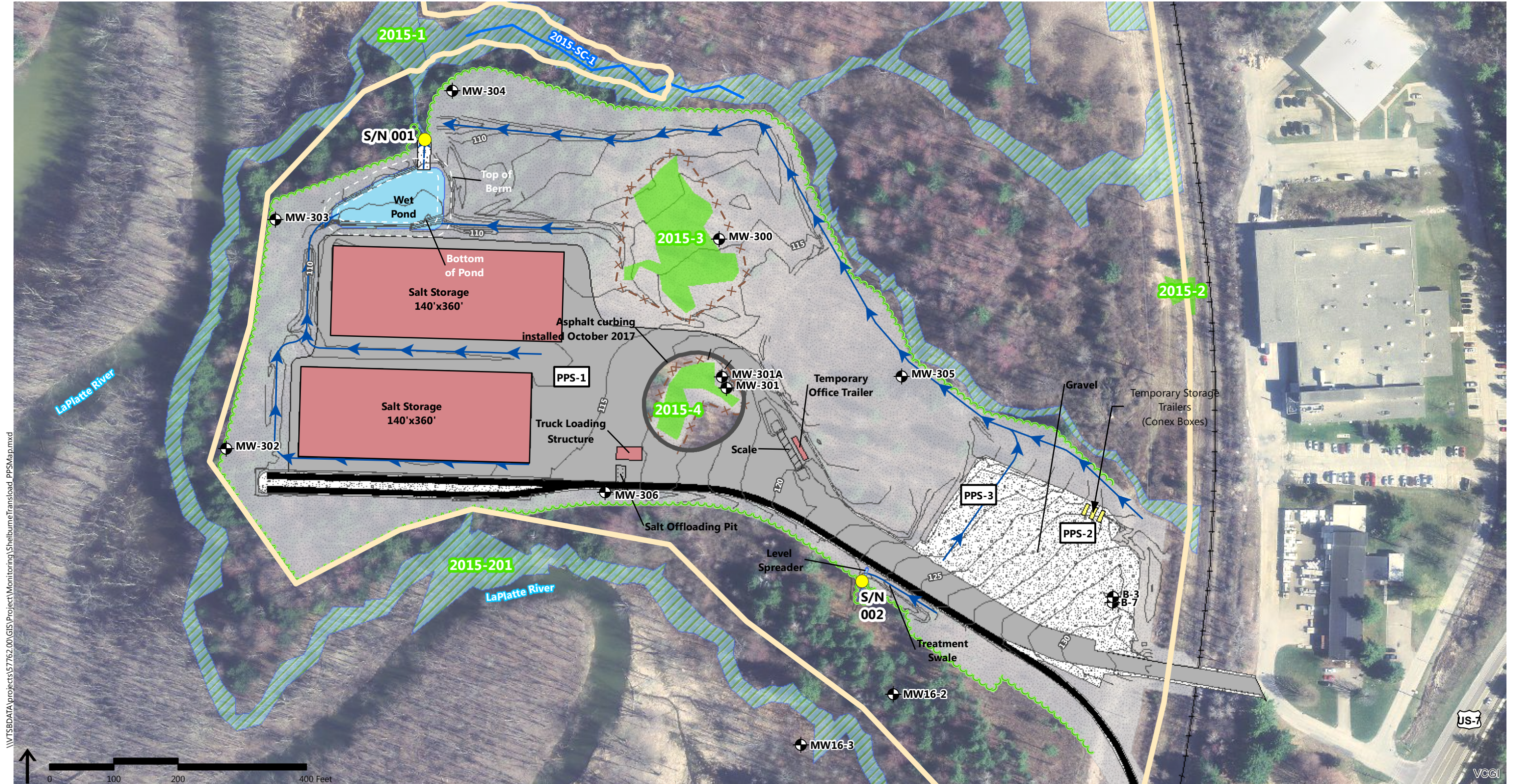
- Site Location Map dated July 8, 2016 (VHB)
- Potential Pollutant Source Map dated October 30, 2017 (VHB)
- Shelburne Transload Facility Site Plans dated October 16, 2017 (VHB)



Site Location Map

Project Area

USGS Topo Background (1996)



Project Parcel (VCGI)	Proposed Facility Feature (VHB)	Gravel	Railroad (VTrans)
1 ft. Contour (As-Built) (VHB)	Asphalt Curbing	Pavement	
Monitoring Well (VHB/KAS)	Bottom of Pond; Top of Berm	Stormwater Treatment Pond	
Stormwater Discharge Point (VHB)	Fence	Rail Siding	
Delineated Stream (VHB)	Parking	RipRap	
Delineated Wetland (VHB)	Stormwater Swale	Scale	
Class II	Tree Line	Unloading Pit	
Class III	Building	Pervious Area	

Shelburne Transload Facility

Shelburne, Vermont

Sources:
Background Imagery by VCGI (2016)
VCGI (Vermont Center for Geographic Information - 2011)
VTrans (Vermont Agency of Transportation - 2014)
VHB - 2015-2017

**Potential Pollutant
Source Map
October 2017 Update**

Site Plans

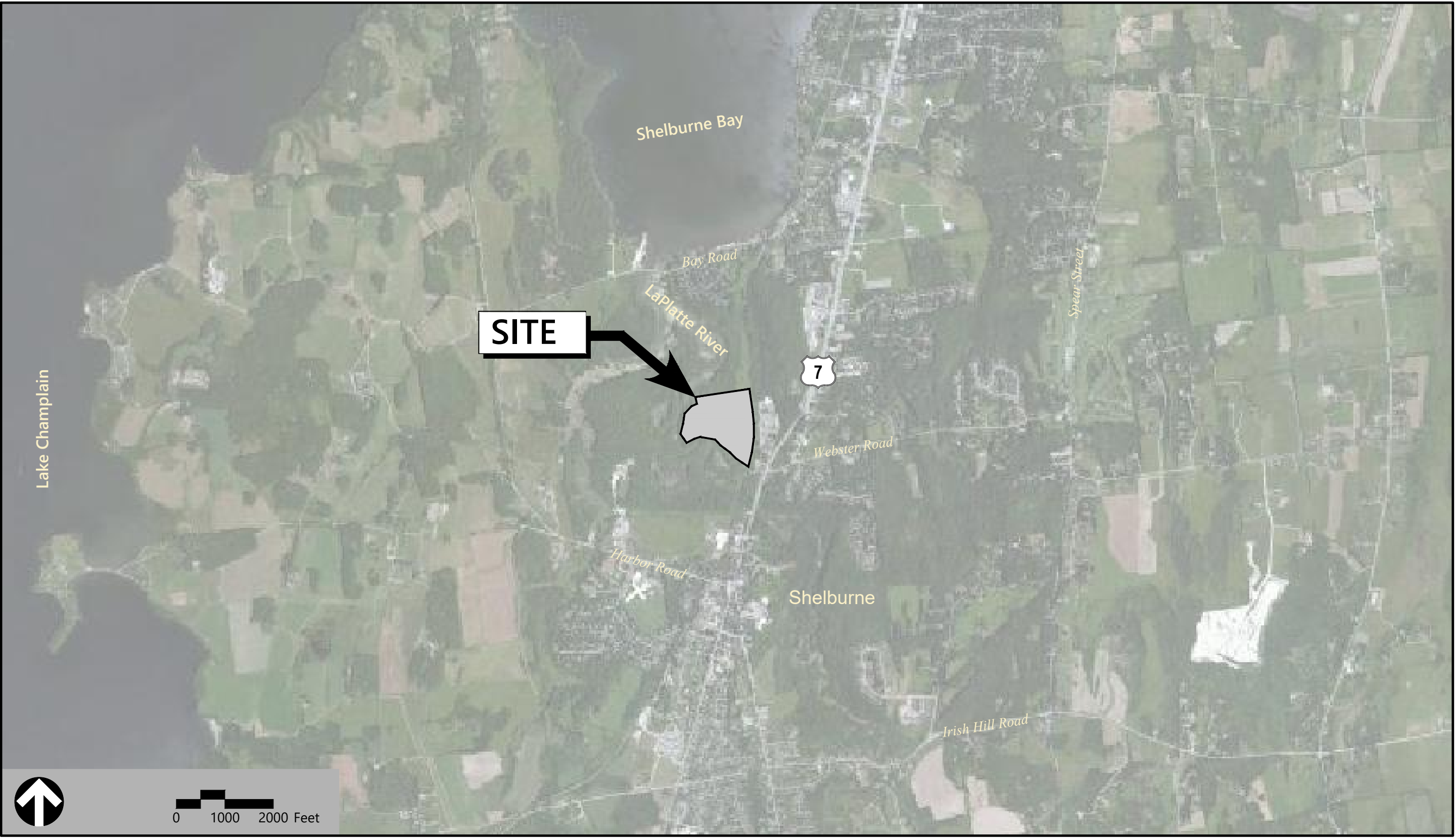
Issued for	Multi Sector General Permit
Date Issued	Jul. 08, 2016
Latest Issue	Oct. 16, 2017

Shelburne Transload Facility

Parcel 06-01-13
West of VT Route 7
Town of Shelburne, VT

Owner

Vermont Railways
One Railway Lane
Burlington, VT 05401

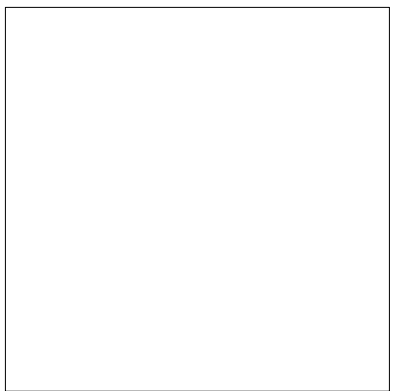


Sheet Index		
No.	Drawing Title	Latest Issue
C-1	Legend And General Notes	Jul. 08, 2016
C-2	Layout and Materials Plan	Oct. 16, 2017
C-3	Grading and Drainage Plan	Oct. 16, 2017
C-4	Site Details	Jul. 08, 2016



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Legend					
Exist.	Prop.		Exist.	Prop.	
		PROPERTY LINE			CONCRETE
		PROJECT LIMIT LINE			HEAVY DUTY PAVEMENT
		RIGHT-OF-WAY/PROPERTY LINE			RIPRAP
		EASEMENT			CONSTRUCTION ENTRANCE
		BUILDING SETBACK	27.35 TC x	27.35 TC x	TOP OF CURB ELEVATION
		PARKING SETBACK	26.85 BC x	26.85 BC x	BOTTOM OF CURB ELEVATION
		BASELINE	132.75 x	132.75 x	SPOT ELEVATION
		CONSTRUCTION LAYOUT	45.0 TW x	45.0 TW x	TOP & BOTTOM OF WALL ELEVATION
		ZONING LINE	38.5 BW	38.5 BW	BORING LOCATION
		TOWN LINE			TEST PIT LOCATION
		LIMIT OF DISTURBANCE			MONITORING WELL
		WETLAND LINE WITH FLAG			UNDERDRAIN
		FLOODPLAIN	12'D	12'D	DRAIN
		BORDERING LAND SUBJECT TO FLOODING	6"RD	6"RD	ROOF DRAIN
		WETLAND BUFFER ZONE	12"S	12"S	SEWER
		NO DISTURB ZONE	FM	FM	FORCE MAIN
		200' RIVERFRONT AREA	OHW	OHW	OVERHEAD WIRE
			6"W	6"W	WATER
		GRAVEL ROAD	4"FP	4"FP	FIRE PROTECTION
		EDGE OF PAVEMENT	2"DW	2"DW	DOMESTIC WATER
		BITUMINOUS BERM	3"G	G	GAS
		BITUMINOUS CURB	E	E	ELECTRIC
		CONCRETE CURB	STM	STM	STEAM
		CURB AND GUTTER	T	T	TELEPHONE
		EXTRUDED CONCRETE CURB	FA	FA	FIRE ALARM
		MONOLITHIC CONCRETE CURB	CATV	CATV	CABLE TV
		PRECAST CONC. CURB			CATCH BASIN
		SLOPED GRAN. EDGING			DOUBLE CATCH BASIN
		VERT. GRAN. CURB			GUTTER INLET
		LIMIT OF CURB TYPE			DRAIN MANHOLE
		SAWCUT			TRENCH DRAIN
			E	E	PLUG OR CAP
			CO	CO	CLEANOUT
					FLARED END SECTION
					HEADWALL
		BUILDING			SEWER MANHOLE
		BUILDING ENTRANCE	CS	CS	CURB STOP & BOX
		LOADING DOCK	WV	WV	WATER VALVE & BOX
		BOLLARD	TSV	TSV	TAPPING SLEEVE, VALVE & BOX
		DUMPSTER PAD			SIAMESE CONNECTION
		SIGN	HYD	HYD	FIRE HYDRANT
		DOUBLE SIGN	WM	WM	WATER METER
			PV	PV	POST INDICATOR VALVE
			W	W	WATER WELL
		STEEL GUARDRAIL	GC	GC	GAS GATE
		WOOD GUARDRAIL	GM	GM	GAS METER
			E	EMH	ELECTRIC MANHOLE
		PATH	EM	EM	ELECTRIC METER
		TREE LINE			LIGHT POLE
		WIRE FENCE			TELEPHONE MANHOLE
		FENCE			TRANSFORMER PAD
		STOCKADE FENCE			UTILITY POLE
		STONE WALL			GUY POLE
		RETAINING WALL			GUY WIRE & ANCHOR
		STREAM / POND / WATER COURSE			HAND HOLE
		DETENTION BASIN	PB	PB	PULL BOX
		HAY BALES			MATCHLINE
		SILT FENCE			
		SILT SOCK / STRAW WATTLE			
		MINOR CONTOUR			
		MAJOR CONTOUR			
		PARKING COUNT			
		COMPACT PARKING STALLS			
		DOUBLE YELLOW LINE			
		STOP LINE			
		CROSSWALK			
		ACCESSIBLE CURB RAMP			
		ACCESSIBLE PARKING			
		VAN-ACCESSIBLE PARKING			

Abbreviations	
General	
ABAN	ABANDON
ACR	ACCESSIBLE CURB RAMP
ADJ	ADJUST
APPROX	APPROXIMATE
BIT	BITUMINOUS
BS	BOTTOM OF SLOPE
BWLL	BROKEN WHITE LANE LINE
CONC	CONCRETE
DYCL	DOUBLE YELLOW CENTER LINE
EL	ELEVATION
ELEV	ELEVATION
EXIST	EXISTING
FDN	FOUNDATION
FFE	FIRST FLOOR ELEVATION
GRAN	GRANITE
GD	GRADE TO DRAIN
LA	LANDSCAPE AREA
LOD	LIMIT OF DISTURBANCE
MAX	MAXIMUM
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PERF	PERFORATED
PROP	PROPOSED
REM	REMOVE
RET	RETAIN
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
SWEL	SOLID WHITE EDGE LINE
SWLL	SOLID WHITE LANE LINE
TS	TOP OF SLOPE
TP	TYPICAL
Utility	
CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
DCB	DOUBLE CATCH BASIN
DMH	DRAIN MANHOLE
CIP	CAST IRON PIPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
FM	FORCE MAIN
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
GI	GUTTER INLET
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT ELEVATION
I=	INVERT ELEVATION
LP	LIGHT POLE
MES	METAL END SECTION
PWW	PAVED WATER WAY
PVC	POLYVINYLCHLORIDE PIPE
PIV	POST INDICATOR VALVE
RCP	REINFORCED CONCRETE PIPE
R=	RIM ELEVATION
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UG	UNDERGROUND
UP	UTILITY POLE

Notes:	
General	Document Use
1. CONTRACTOR SHALL NOTIFY "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS BEFORE EXCAVATING.	1. THESE PLANS AND CORRESPONDING CADD DOCUMENTS ARE INSTRUMENTS OF PROFESSIONAL SERVICE, AND SHALL NOT BE USED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN FOR WHICH IT WAS CREATED WITHOUT THE EXPRESSED, WRITTEN CONSENT OF VHB. ANY UNAUTHORIZED USE, REUSE, MODIFICATION OR ALTERATION, INCLUDING AUTOMATED CONVERSION OF THIS DOCUMENT SHALL BE AT THE USER'S SOLE RISK WITHOUT LIABILITY OR LEGAL EXPOSURE TO VHB.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.	2. CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE DESIGNERS, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.
3. THESE PLANS SHALL BE USED FOR THE PURPOSES OF SITE GRADING, STORMWATER MANAGEMENT SYSTEM CONSTRUCTION AND RAILWAY HORIZONTAL AND VERTICAL LAYOUT.	3. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
4. PAVING AND GRAVEL LAYOUT IS BASED ON THE PLAN PROVIDED BY OWNER. VHB HAS REPLICATED THIS LAYOUT FOR REFERENCE PURPOSES ONLY IN THIS PLAN SET.	
5. GENERAL SPECIFICATIONS, MATERIALS AND EXECUTION SHALL BE GOVERNED BY VHB SPECIFICATIONS WHERE AVAILABLE. WHERE VHB SPECIFICATIONS ARE NOT PROVIDED, VERMONT AGENCY OF TRANSPORTATION 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION SHALL APPLY. IN CASES WHERE CONFLICTS EXIST, THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE FOR RESOLUTION OF THE CONFLICT PRIOR TO BEGINNING WORK ON THE ITEM IN QUESTION.	
6. WHERE AN EXISTING CONDITION IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION AND DIMENSIONS OF THE CONFLICTING CONDITION SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT. CONTRACTOR'S FAILURE TO NOTIFY PRIOR TO PERFORMING ADDITIONAL WORK RELEASES OWNER FROM OBLIGATIONS FOR ADDITIONAL PAYMENTS WHICH OTHERWISE MAY BE WARRANTED TO RESOLVE THE CONFLICT.	
7. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS, SIZES, AND MATERIALS WITHIN THE PROJECT AREA AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO BEGINNING WORK ON THE ITEM IN QUESTION.	
8. ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).	
9. AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE 6 INCHES LOAM AND SEED.	
10. WITHIN THE LIMITS OF THE BUILDING FOOTPRINT, THE SITE CONTRACTOR SHALL PERFORM EARTHWORK OPERATIONS REQUIRED UP TO SUBGRADE ELEVATIONS.	
11. WORK WITHIN THE LOCAL RIGHTS-OF-WAY SHALL CONFORM TO LOCAL MUNICIPAL STANDARDS. WORK WITHIN STATE RIGHTS-OF-WAY SHALL CONFORM TO THE LATEST EDITION OF THE STATE HIGHWAY DEPARTMENTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.	
12. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS.	
13. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.	
14. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.	
15. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.	
16. CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.	
17. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.	
18. CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO OWNER.	
19. THIS PROJECT DISTURBS MORE THAN ONE ACRE OF LAND AND FALLS WITHIN THE NPDES CONSTRUCTION GENERAL PERMIT (CGP) PROGRAM AND EPA JURISDICTION. PRIOR TO THE START OF CONSTRUCTION CONTRACTOR IS TO FILE A CGP NOTICE OF INTENT WITH THE EPA AND PREPARE A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE NPDES REGULATIONS. CONTRACTOR SHALL CONFIRM THE OWNER HAS ALSO FILED A NOTICE OF INTENT WITH THE EPA.	

Layout and Materials

- CONTRACTOR SHALL PROVIDE THE MANUFACTURER'S PRODUCT DATA AND/OR SHOP DRAWINGS FOR ALL SPECIFIED MATERIALS TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
- DIMENSIONS ARE FROM THE FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS OTHERWISE NOTED.
- SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, BUILDING ENTRANCES, STAIRWAYS, UTILITY PENETRATIONS, CONCRETE DOOR PADS, COMPACTOR PAD, LOADING DOCKS, BOLLARDS, ETC.
- PROPOSED BOUNDS AND ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL LICENSED SURVEYOR.
- PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING PAVEMENT ELEVATIONS AT INTERFACE WITH PROPOSED PAVEMENTS, AND EXISTING GROUND ELEVATIONS ADJACENT TO DRAINAGE OUTLETS TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.

Existing Conditions Information

- BASE PLAN: THE PROPERTY LINES SHOWN WERE DETERMINED BY AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, AND FROM PLANS OF RECORD. THE TOPOGRAPHY AND PHYSICAL FEATURES ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED ON THE GROUND BY VHB, DURING FALL 2015
 - A. DELINEATION OF THE WETLANDS AND PLACEMENT OF THE FLAGS WAS PERFORMED BY: VHB, 2015
 - B. FLAGS MARKING THE WETLANDS WERE LOCATED BY: VHB
- TOPOGRAPHY: ELEVATIONS ARE BASED ON [NGVD 1988 VERTICAL DATUM].
- GEOTECHNICAL DATA INCLUDING TEST PIT AND BORING LOCATIONS AND ELEVATIONS WERE OBTAINED FROM GEODESIGN.



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South Burlington, VT 05403
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Shelburne Transload Facility

Shelburne, Vermont			
No.	Revision	Date	Appr'd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
Issued for		Date	
Multi Sector General Permit		Jul. 08, 2016	

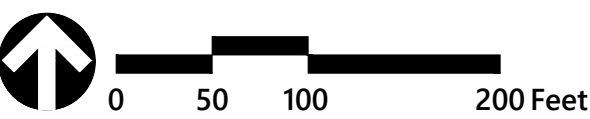
Not Approved For Construction

Drawing Title

Legend and General Notes

Drawing Number

C-1.00



CJH/MHK

SEB

U.S. ROUTE 7 (SHELburnE ROAD)

SHEETS C-2.01 & C-3.01

C-2.00

SHEET C-2.04

SHEET C-2.02

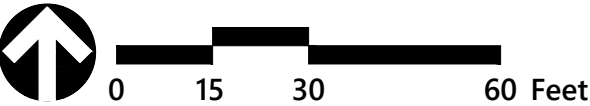




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Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
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Issued for	Multi Sector General Permit	Date	Jul. 08, 2016
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Not Approved For Construction

Drawing Title

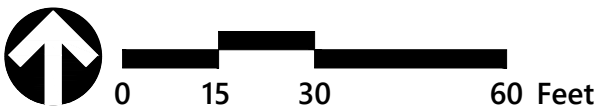
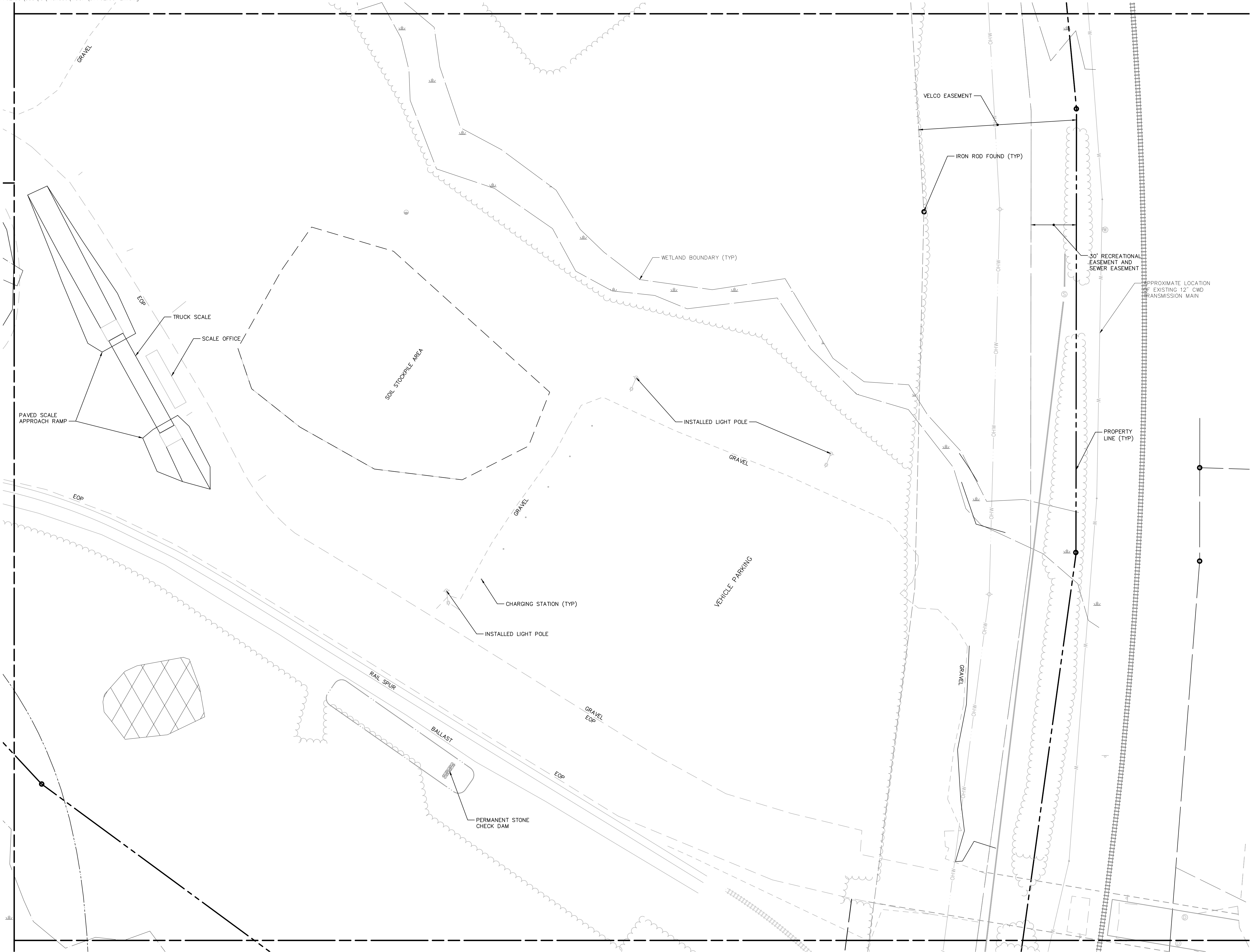
Layout and Materials
Plan (1 of 5)

Drawing Number

C-2.01

Sheet 3 of 14

Project Number
57762.00



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
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Issued for		Date	
Multi Sector General Permit		Jul. 08, 2016	

Not Approved For Construction

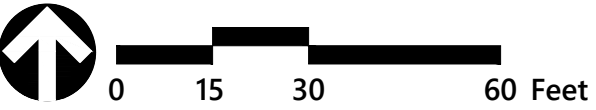
Drawing Title
Layout and Materials Plan (2 of 5)

Drawing Number

C-2.02

Sheet 4 of 14

Project Number
57762.00



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
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Issued for	Multi Sector General Permit	Date	Jul. 08, 2016
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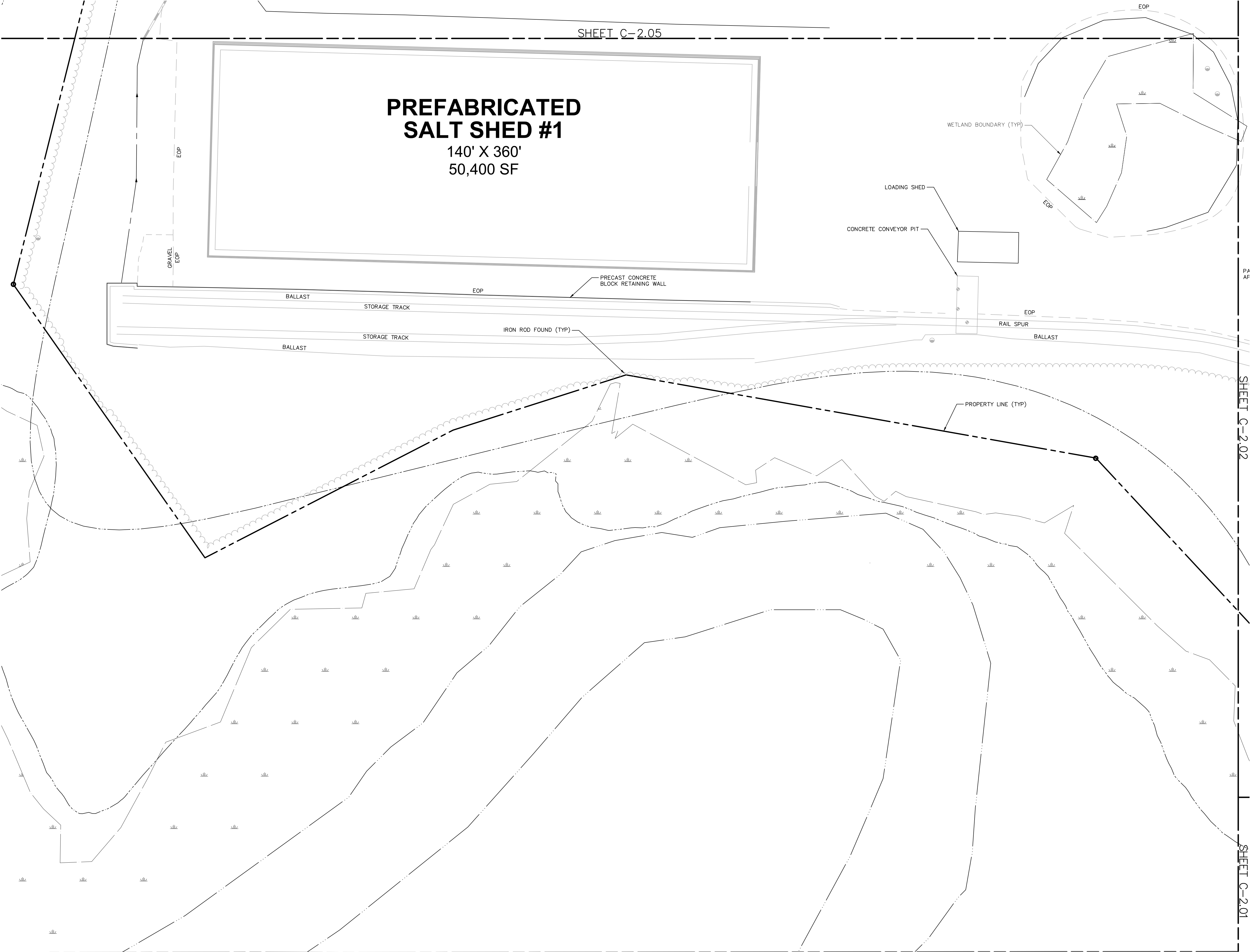
Not Approved For Construction
Drawing Title
Layout and Materials Plan (3 of 5)

Drawing Number

C-2.03

Sheet 5 of 14

Project Number
57762.00

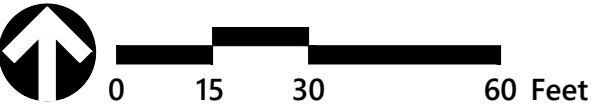


SHEET C-2.05



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802.497.6100



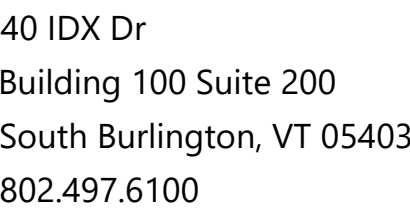
Shelburne Transload Facility

Shelburne, Vermont			
No.	Revision	Date	Appr'd.
1	As-Built	10/16/2017	CJH
Designed by CJH/MHK		Checked by SEB	
Issued for Multi Sector General Permit		Date Jul. 08, 2016	

Not Approved For Construction

Drawing Title

Layout and Materials Plan (4 of 5)



No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	Checked by
CJH/MHK	SEB

Not Approved For Construction

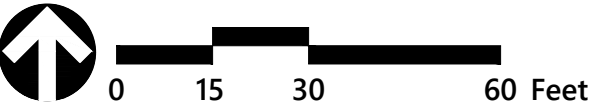
Drawing Number

Sheet 7 of 14

Project Number
57762.00

SHEET C-3.04

SHEET C-3.02



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
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Issued for	Multi Sector General Permit	Date	Jul. 08, 2016
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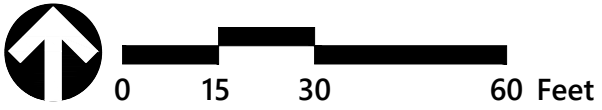
Not Approved For Construction
Drawing Title
Grading and Drainage Plan (1 of 5)

Drawing Number

C-3.01

Sheet 8 of 14

Project Number
57762.00



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appd.
1	Resubmit to DEC Comments	8/7/2017	CEB

Designed by	CJH/MHK	Checked by	SEB
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Issued for	Multi Sector General Permit	Date	Jul. 08, 2016
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Not Approved For Construction

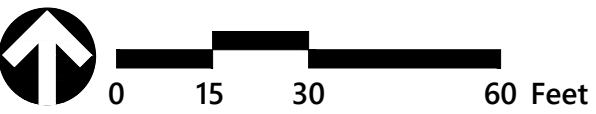
Grading and Drainage
Plan (2 of 5)

Drawing Number

C-3.02

Sheet 9 of 14

Project Number
57762.00



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appvd.
1	As-Built	10/16/2017	CJH

Designed by	CJH/MHK	Checked by	SEB
Issued for		Date	

Multi Sector General Permit Jul. 08, 2016

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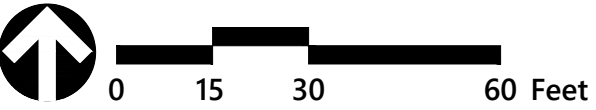
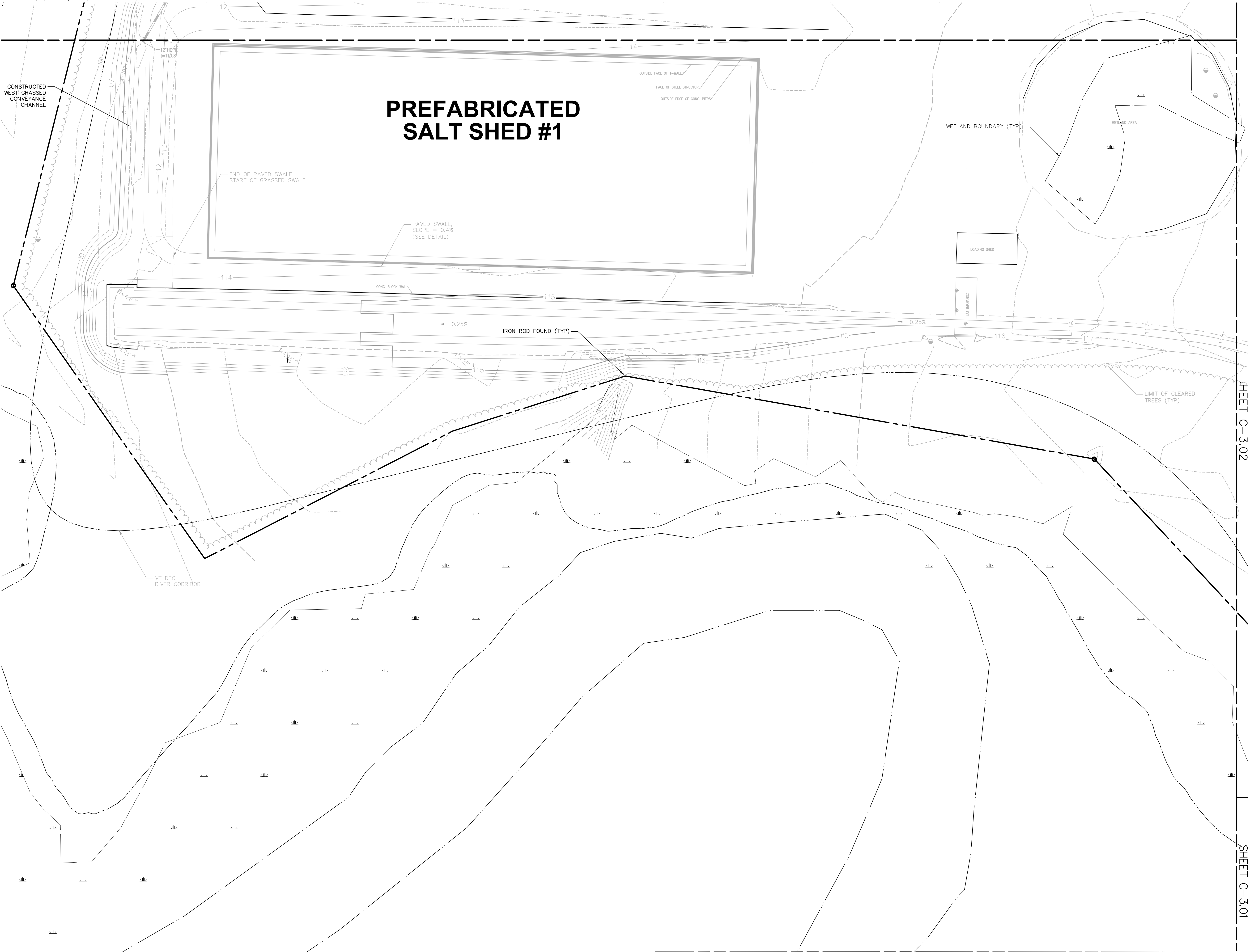
Grading and Drainage Plan (3 of 5)

Drawing Number

C-3.03

Sheet 10 of 14

Project Number 57762.00



Shelburne Transload Facility

Shelburne, Vermont

No.	Revision	Date	Appr'd.
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Issued for	Multi Sector General Permit	Date	Jul. 08, 2016

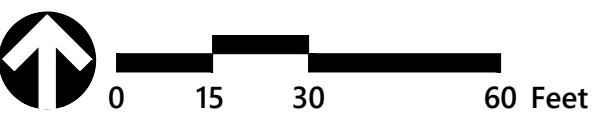
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Drawing Title
**Grading and Drainage
Plan (4 of 5)**

Drawing Number

C-3.04

Sheet 11 of 14

Project Number
57762.00



Shelburne, Vermont

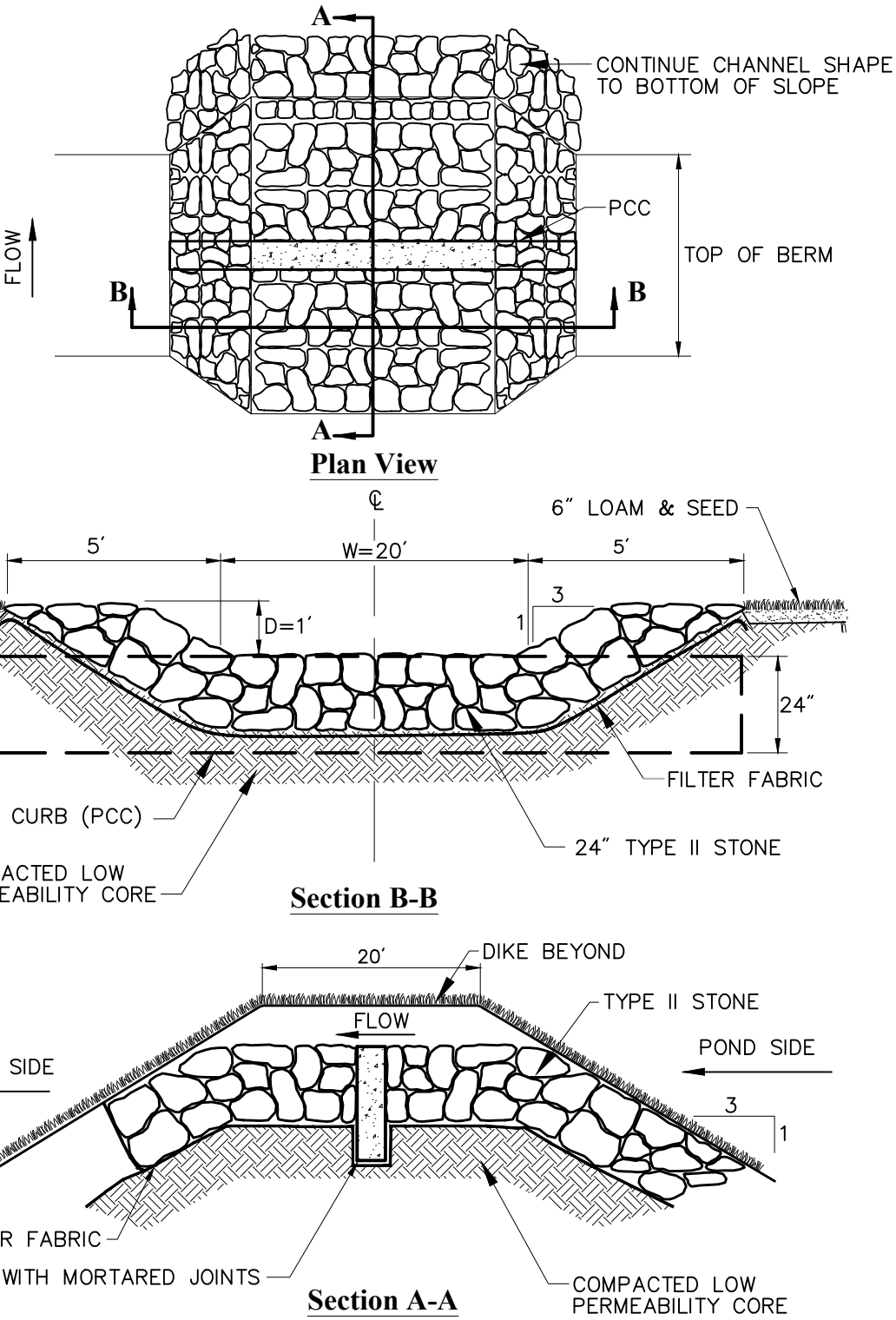
Designed by CJH/MHK	Checked by SEB
Issued for Multi Sector General Permit	Date Jul. 08, 2016

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Drawing Number

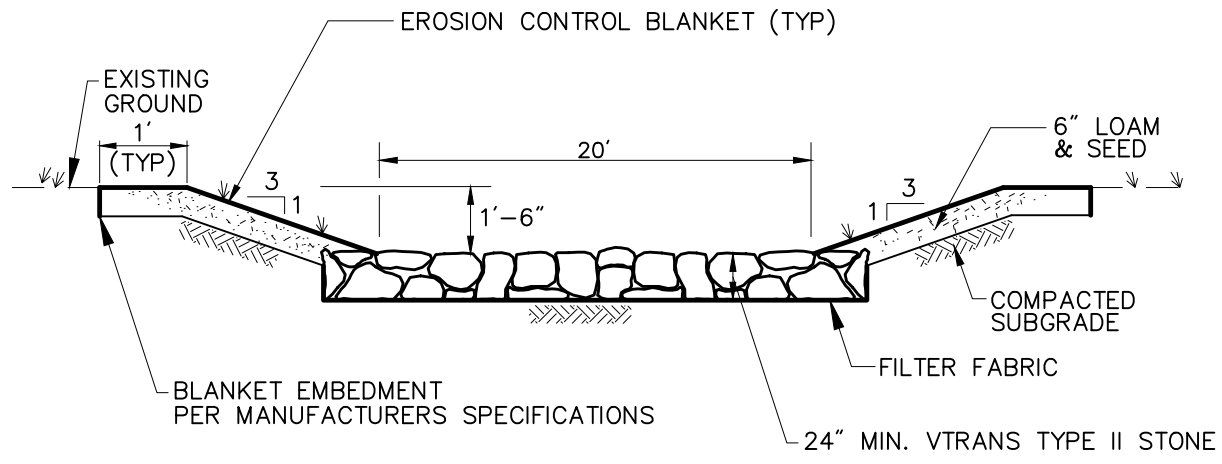
Sheet 12 of 14

Project Number
57762.00



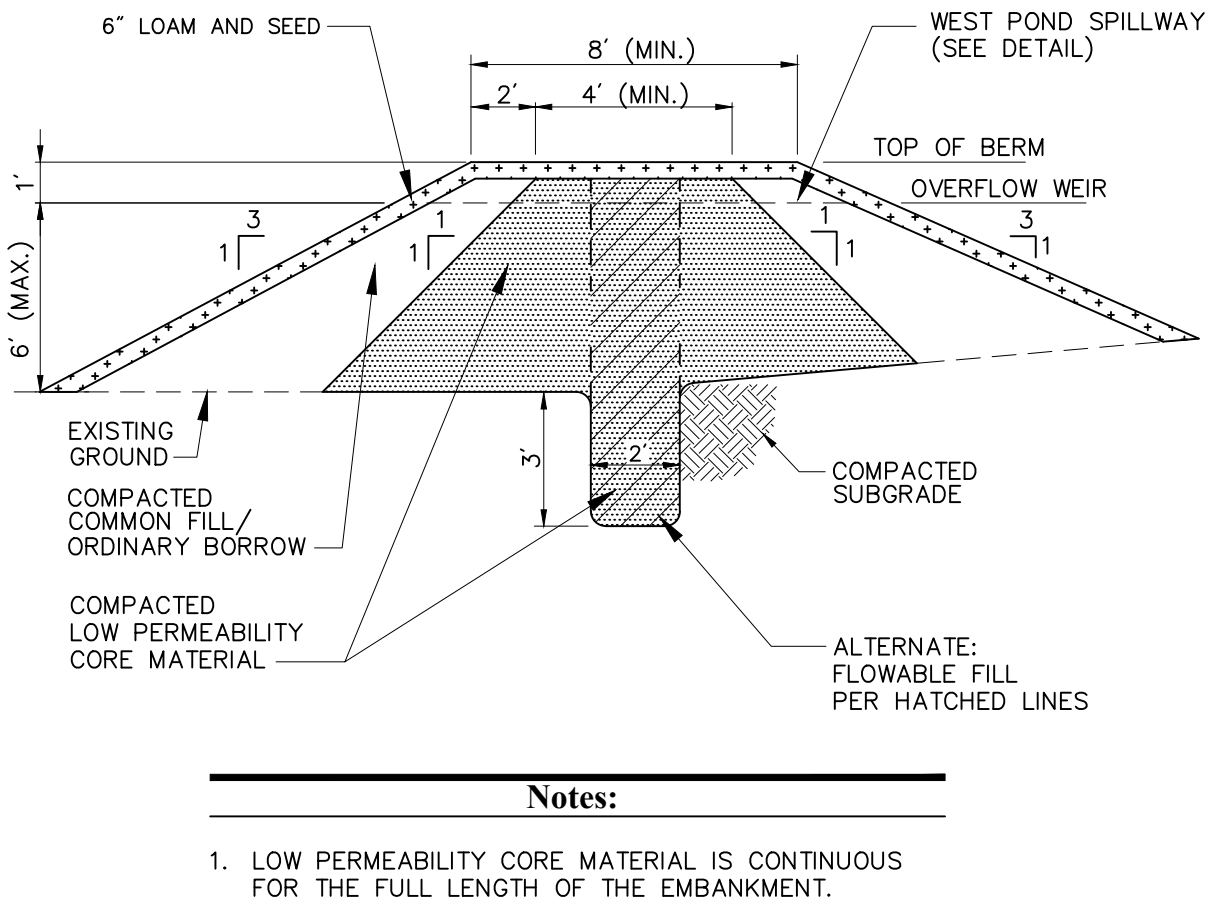
West Pond Spillway

N.T.S. Source: VHB 04/16 Rev



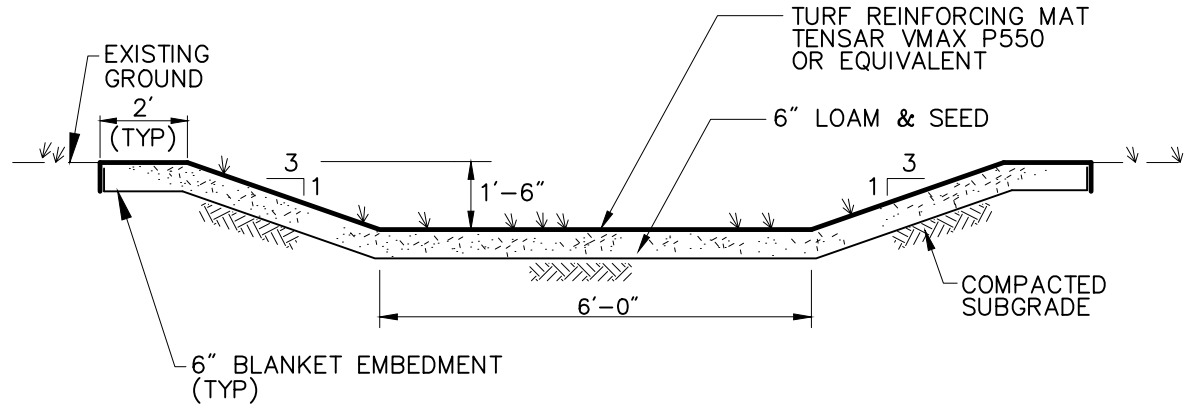
West Pond Discharge Conveyance Channel

N.T.S. Source: VHB 04/16



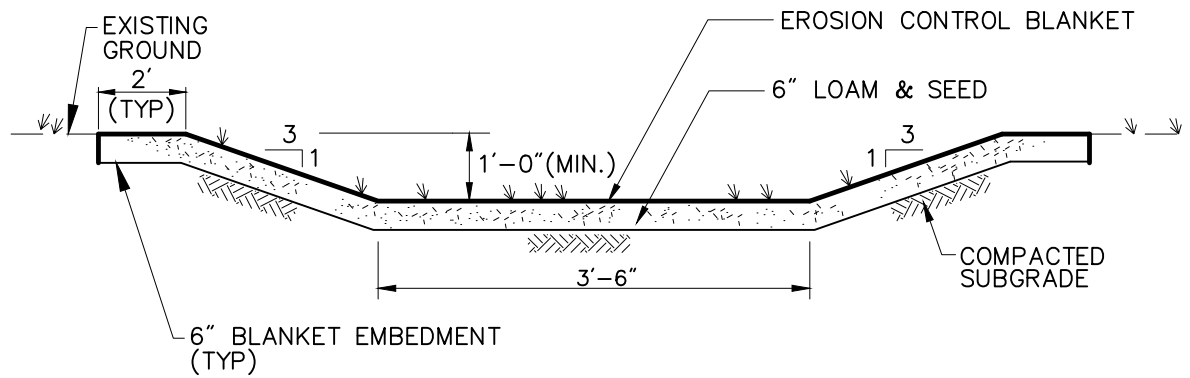
West Pond Detention Basin Berm Section

N.T.S. Source: VHB 10/08 REV LD_160



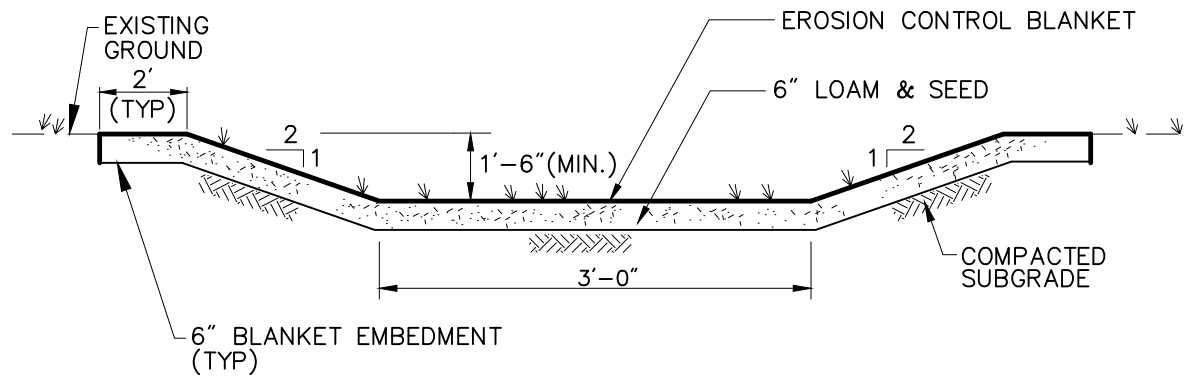
West Grassed Conveyance Channel

N.T.S. Source: VHB 04/16



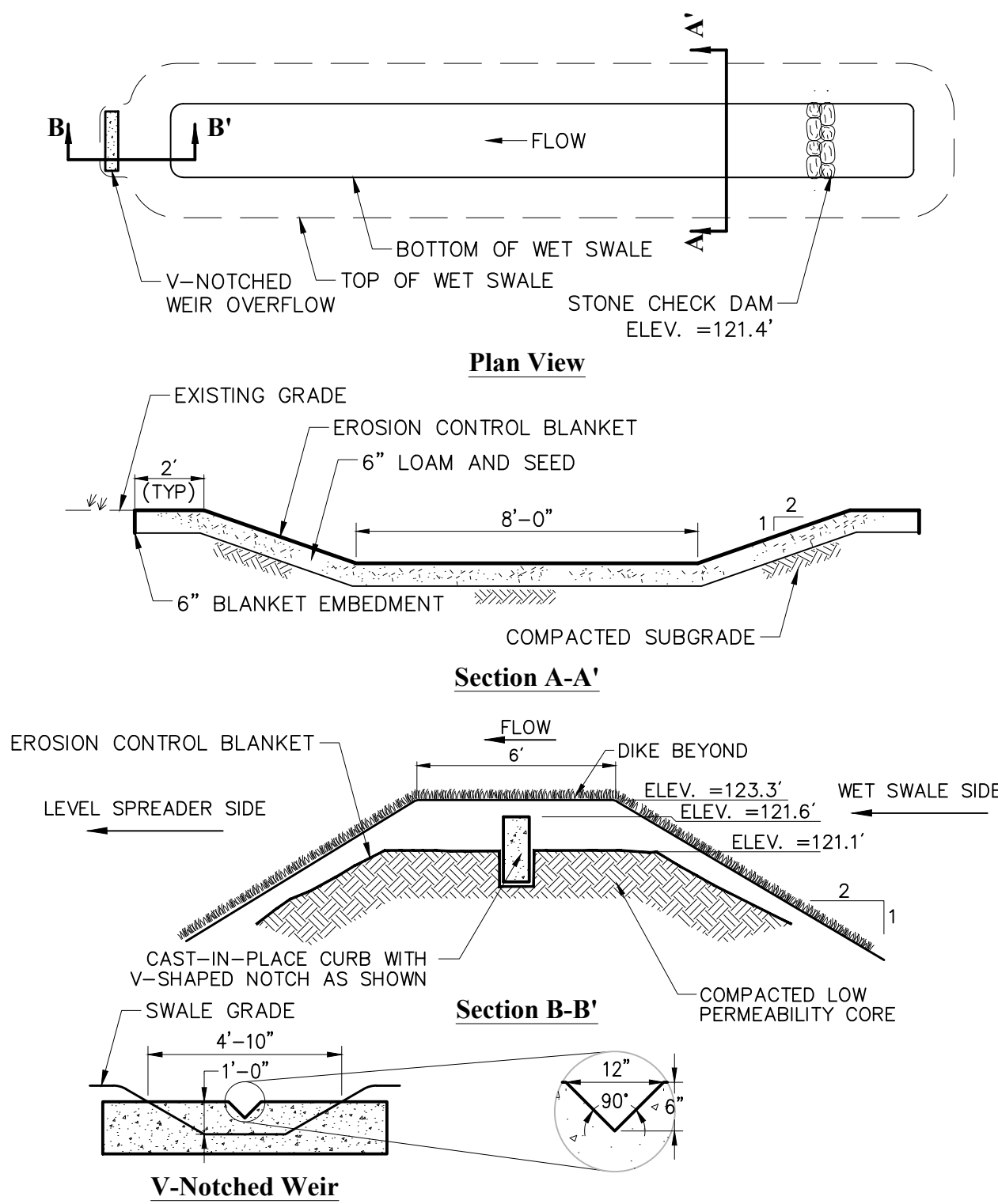
Gravel Parking Lot Grassed Conveyance Channel

N.T.S. Source: VHB 6/08 REV LD_171



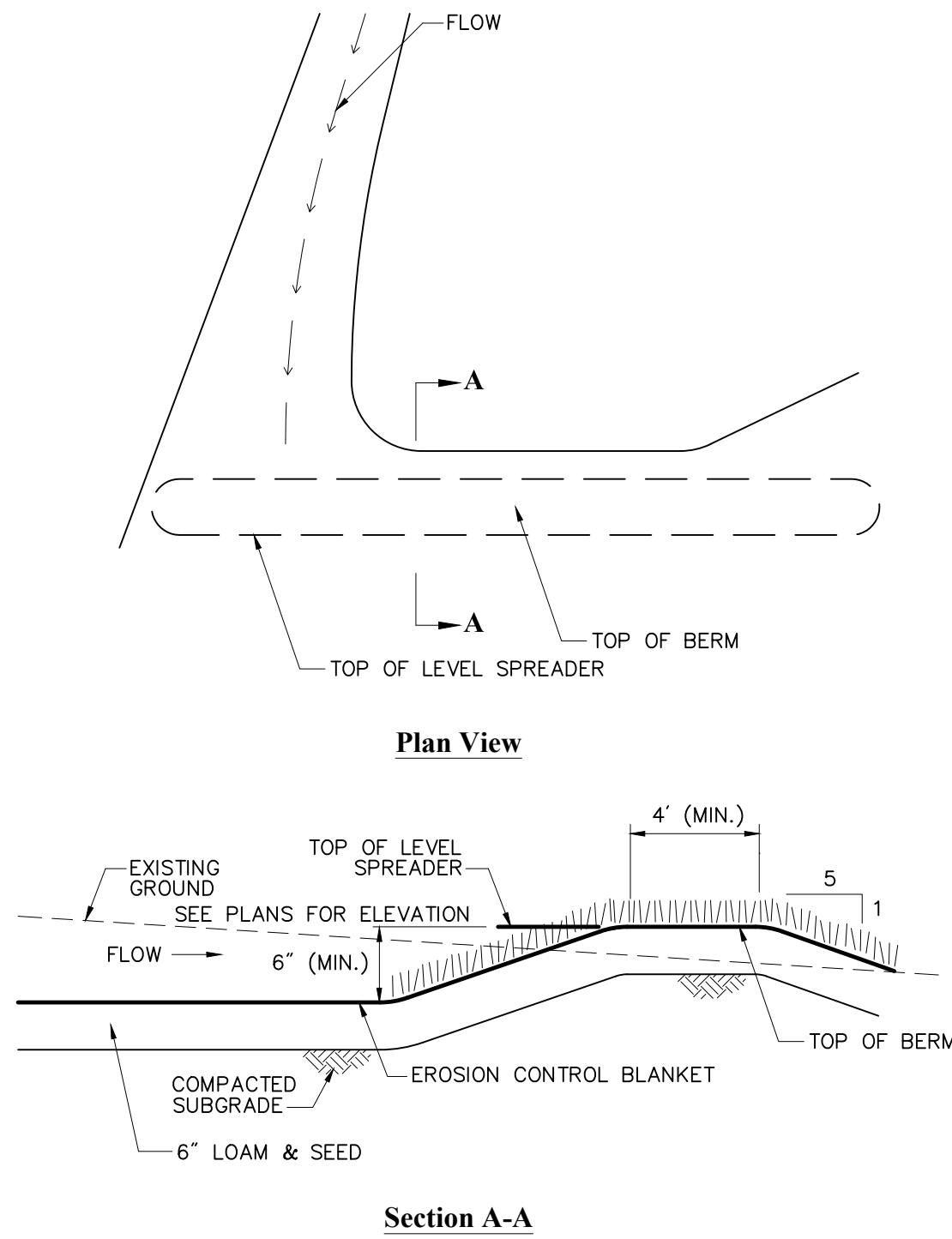
Northeast Grassed Treatment Channel

N.T.S. Source: VHB 6/08 REV LD_171



Access Road and Rail Spur Wet Swale

N.T.S. Source: VHB 08/16 LD_VT



Level Spreader Detail

N.T.S. Source: VHB 6/08 LD_172

Shelburne Transload Facility

Shelburne, Vermont

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Issued for		Date	

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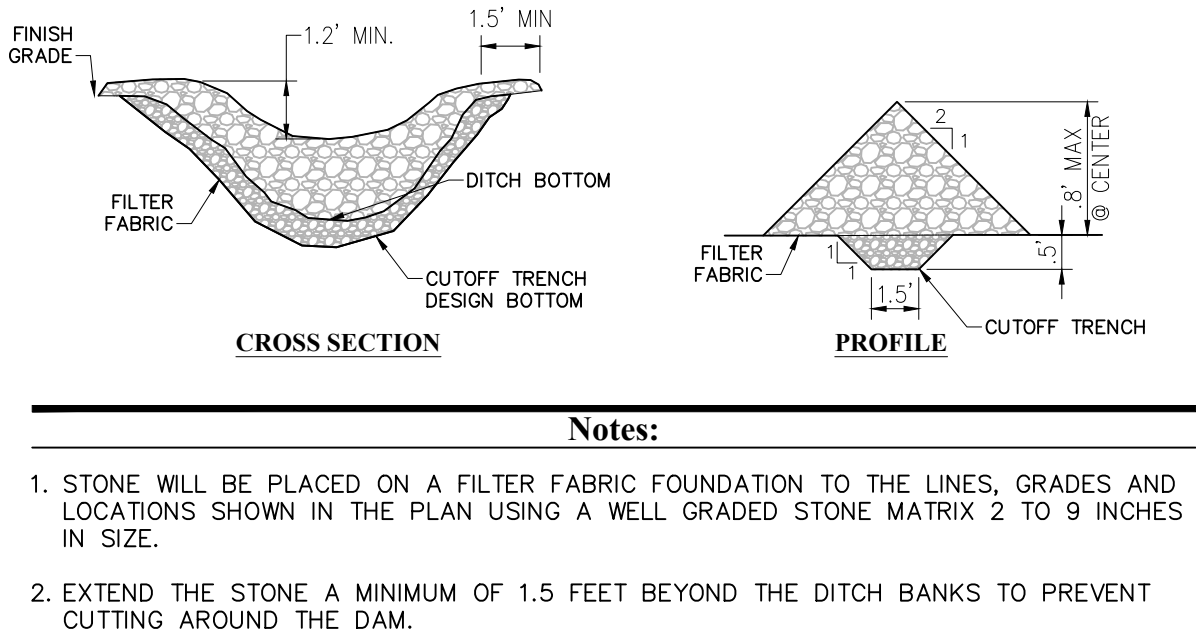
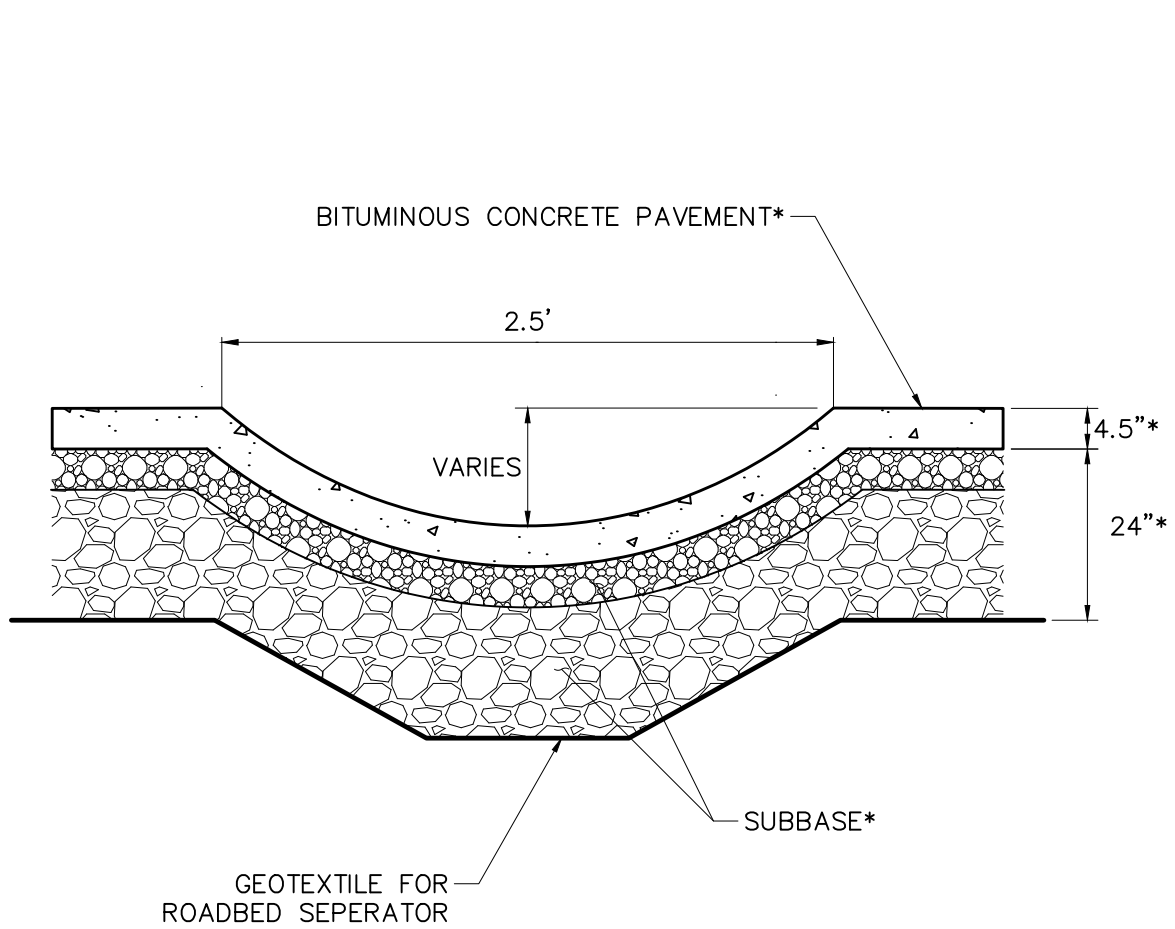
Drawing Title
Site Details
(1 of 2)

Drawing Number

C-4.01

Sheet 13 of 14

Project Number
57762.00

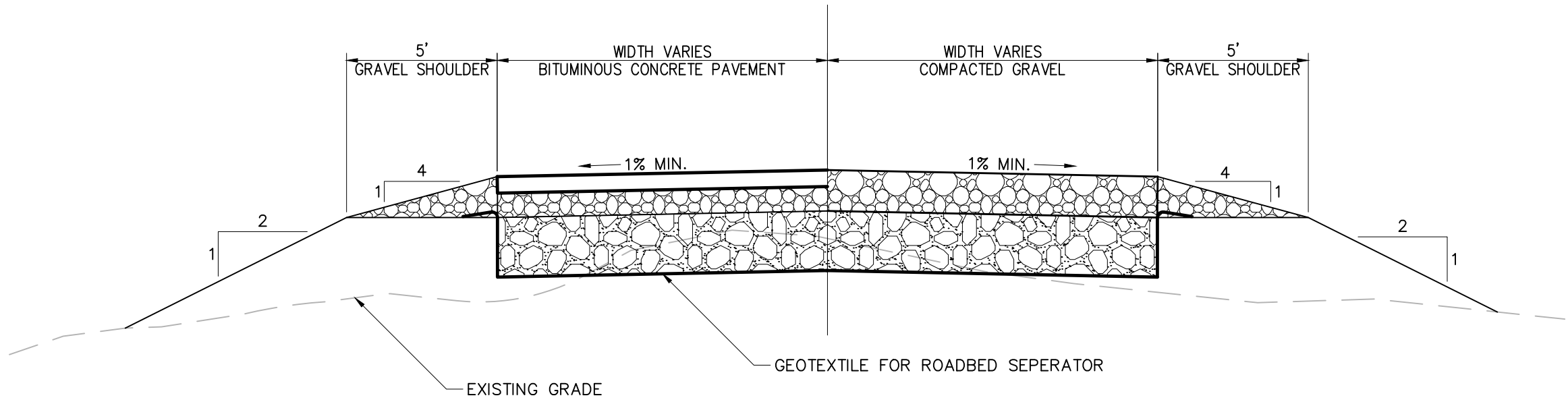


- Notes:**
- STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN USING A WELL GRADED STONE MATRIX 2 TO 9 INCHES IN SIZE.
 - EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.

* SEE BITUMINOUS CONCRETE PAVEMENT SECTION FOR ADDITIONAL DETAILS

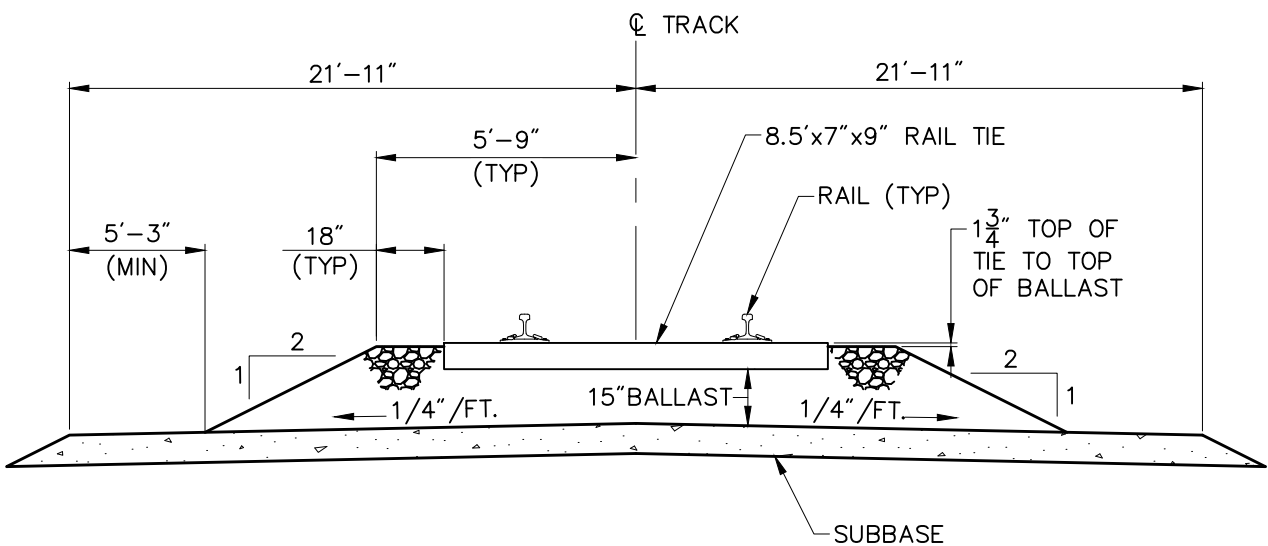
Paved Swale		
N.T.S.	Source: VHB	04/16 LD

Permanent Stone Check Dam		
N.T.S.	Source: VHB / VT S+S EPSC	08/16 REV LD_VT

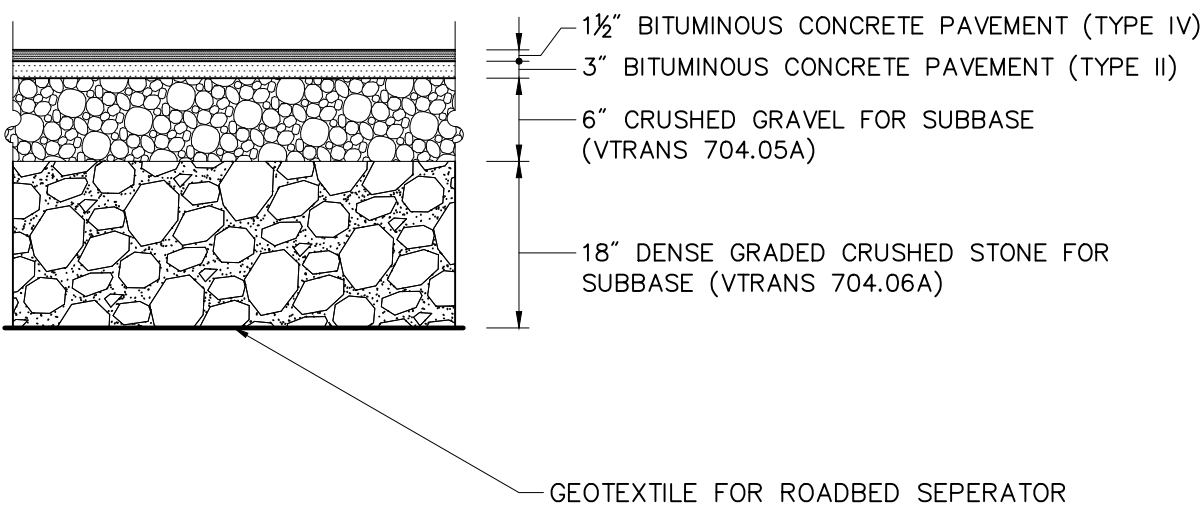


* SEE BITUMINOUS CONCRETE PAVEMENT SECTION FOR ADDITIONAL DETAILS

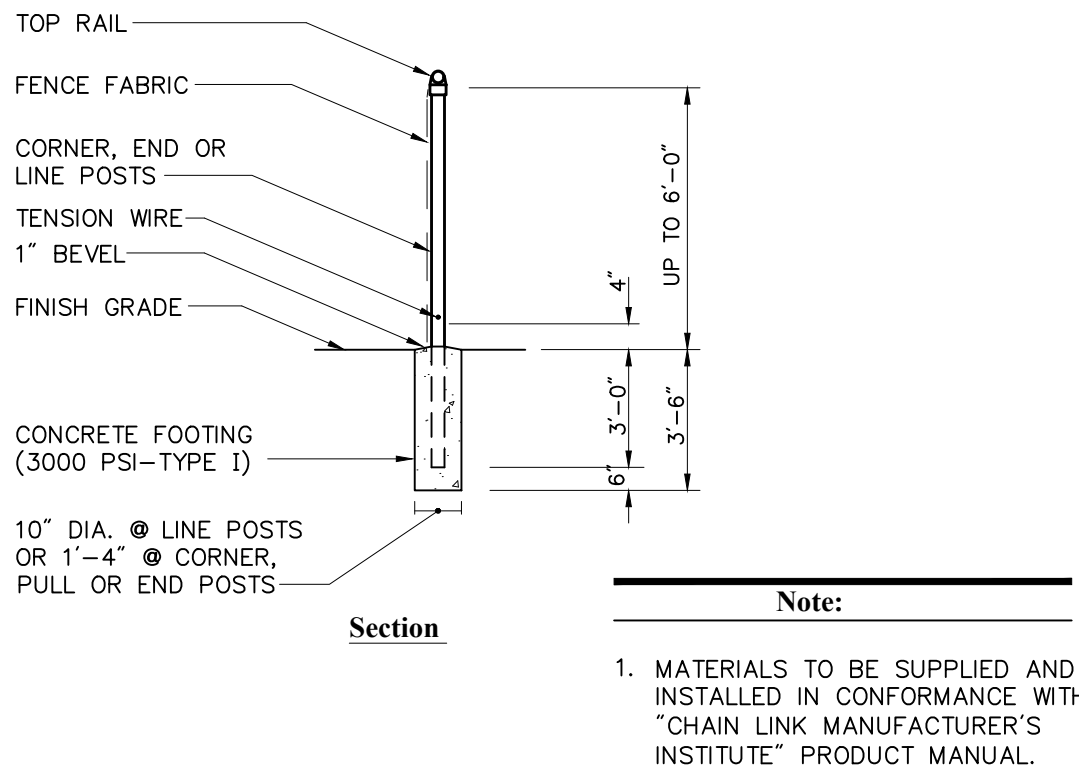
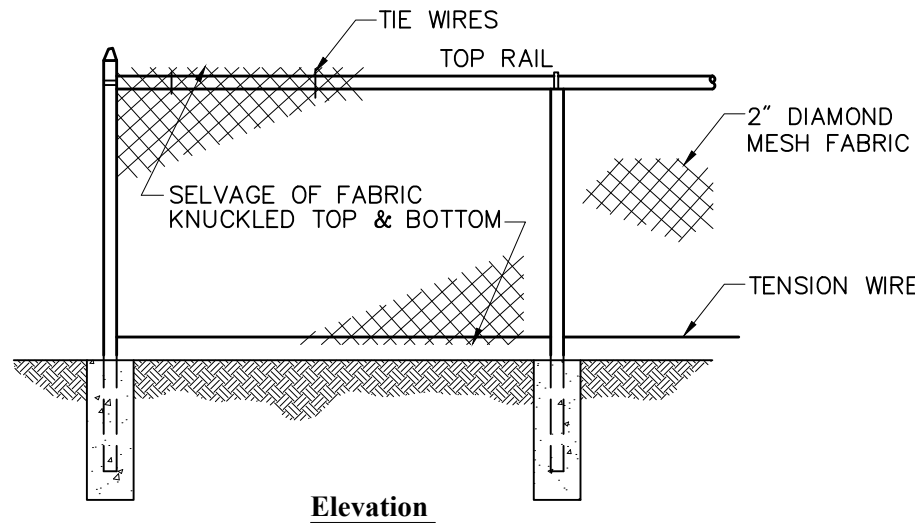
Drivable Surfaces Typical Sections		
N.T.S.	Source: VHB	04/16 LD



Typical Rail Section		
N.T.S.	Source: VHB	1/16 LD



Bituminous Concrete Pavement Section		
N.T.S.	Source: VHB	1/27 LD



Chain Link Fence up to 6'		
N.T.S.	Source: VHB	6/08 LD_481

Shelburne Transload Facility

Shelburne, Vermont

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Site Details
(2 of 2)

Drawing Number

C-4.02

Sheet 14 of 14

Project Number
57762.00

Appendix A: **Stormwater Management System**

This appendix contains the following information:

- Stormwater Technical Memorandum dated July 8, 2016



To: Shelburne Transload Project File

Date: July 8, 2016

Memorandum

Project #: 57762.00

From: Marla Keene
Tyler Shedd

Re: Shelburne Transload Facility Project
Stormwater Technical Memo

1.0 Introduction

On behalf of Vermont Railway, Inc., VHB has prepared this memorandum to provide technical information related to the construction and operational phases of the planned Shelburne Transload Facility Project ("Project"), as they apply to stormwater discharge permitting from the Vermont Department of Environmental Conservation ("DEC").

2.0 Project Overview

Vermont Railway, Inc. ("VTR") plans to construct a new rail offloading, storage and distribution facility to be located on Catamount Drive, Shelburne, VT. This facility will have bulk salt delivered by rail, which will be stored on-site, and distributed by trucking. On site, there will be a salt shed, truck scales and office facilities to support the operations. This memorandum addresses only the components of the project currently planned for construction; future project components are not addressed.

The Project is located on an undeveloped parcel of land west of US Route 7 and to the north of the LaPlatte River, on generally flat to moderately sloping terrain. As mapped by the Natural Resources Conservation service ("NRCS"), the underlying soil is primarily Adams and Windsor loamy sand, which has a NRCS Erodibility Index K-value of 0.15 and a hydrological soil group ("HSG") of A. The receiving waters are to the north of the Project site and include the LaPlatte River, which is tributary to the Shelburne Bay area of Lake Champlain. The LaPlatte River is impaired for *E. coli* and Shelburne Bay is impaired for PCB's in Lake Trout, while the larger receiving body of Lake Champlain is impaired for phosphorus. Neither the LaPlatte River nor Shelburne Bay are impaired for stormwater.

Project components to be constructed at this time include the following:

- Prefabricated salt storage building (140-feet by 360-feet)
- Office trailer
- Two truck weighing scales
- Parking for employees, 35-foot trucks, and 75-foot trucks

3.0 Operational Phase Stormwater discharge management

3.1 Summary of Vermont Stormwater Management Standards

This Project is owned by VTR and therefore subject to a federal preemption, which precludes the Project from being required to meet applicable criteria of the Vermont Stormwater Treatment Standards. However, the Project will be designed to meet the relevant standards of the 2002 Vermont Stormwater Management Manual in order to provide appropriate stormwater treatment and control, and to protect downstream natural resource areas (see Natural Resources Map in Appendix). Though the Vermont Stormwater Management Standards do not apply to this Project, VHB has performed a review of the stormwater standards and whether

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they would apply if the Project were not eligible for preemption, and how they would be met, as presented in Table 1.

Table 1: Vermont Stormwater Management Standards Project Applicability and Approach		
Criteria	Treatment Standard	Project Approach
Water Quality Volume	This standard is to capture 90 percent of the annual storm events, and remove 80 percent of total suspended solids (TSS), and 40 percent of the total phosphorus (TP) from stormwater runoff.	Stormwater runoff from paved and roof surfaces will be conveyed to either a grassed channel for water quality treatment or a pretreatment grass channel before entering a pond sized to have a permanent pool with a volume greater than the Water Quality Volume of 10,213 cubic feet.
Recharge	This standard is to preserve existing water table elevations post-development by detaining stormwater and allowing infiltration.	This standard would not be applicable because of stormwater runoff from hot spot land usage.
Channel Protection	This standard is to protect stream channels from degradation by means of 12 to 24 hours of extended detention storage for the 1-year, 24-hour rainfall event.	This standard would not be applicable because the LaPlatte River drainage area upstream of site is greater than 10 square miles and Site is less than 5-percent of the LaPlatte River drainage area.
Overbank Flood	This standard is to ensure that there will be no increase in flood threat downstream, by limiting the post-development peak discharge rate to no more than the pre-development rate for the 10-year, 24-hour rainfall event.	This standard would not be applicable because the LaPlatte River drainage area upstream of site is greater than 10 square miles.
Extreme Flood	This standard is to prevent flood damage from infrequent but very large storm events (100-year) and to maintain the boundaries of the 100-year floodplain.	This standard would not be applicable because the LaPlatte River drainage area upstream of site is greater than 10 square miles.

3.2 Description of Project Impervious Area and Flow Patterns

The development of this site involves the construction of 5.59 acres of impervious surfaces, which will be divided into four subwatersheds with below described characteristics. The areas of the Project subwatersheds are summarized in Table 2 below. Page 1 of the Attachment shows the Project subwatershed boundaries and stormwater treatment practices.

3.2.1 Subwatershed 1

Subwatershed 1 encompasses the gravel parking lot adjacent to the access road and the length of the water quality treatment swale and conveyance swale. The runoff from the gravel

parking lot will sheet flow across the parking lot and be captured by a conveyance swale and directed to a treatment swale ("North Swale"). The treatment swale runs northwest for 1,100 feet and discharges to the LaPlatte River. The treatment swale discharges into an existing into a naturally established channel that is tributary to the LaPlatte River.

3.2.2 *Subwatershed 2*

Subwatershed 2 encompasses the 450 feet of the access road, 200 feet of the rail spur, and the treatment swale ("South Swale"). Runoff from the access road sheet flows across the pavement and flows across the railroad, through the ballast, and into a grass treatment swale. A level spreader at the outlet of the treatment swale dissipates concentrated flows, which flow overland to the LaPlatte River.

3.2.3 *Subwatershed 3*

Subwatershed 3 encompasses the western half of the site, including the salt shed, unloading pit, scale, office trail, area for future salt storage shed, and the stormwater conveyance and treatment practices. Runoff from the paved driveway around the scale and office trailer are conveyed east to west by site grade to paved conveyance channels on either side of the salt shed. The paved conveyance channels flow to a grass channel for pretreatment before entering the treatment pond ("West Pond"). The pond detains the runoff before out letting via a stone lined overflow into a naturally established channel that is tributary to the LaPlatte River.

3.2.4 *Subwatershed 4*

Subwatershed 4 includes approximately 280 feet of the access road, a portion of the truck turning area east of the salt shed, 1,020 feet of rail spur and adjacent grading, and the pervious grading areas outside of the north and west treatment swales. Runoff from impervious surfaces within Subwatershed 4 flows by sheet flow to adjacent pervious areas where it is treated by overland vegetative filtering. All impervious surfaces and adjacent pervious surfaces within Subwatershed 4 meet the criteria for disconnection of non-rooftop runoff.

Table 2: Area of Post-Development Land Covers for Subwatersheds				
Project Subwatershed	Description	Impervious (ac)	Pervious (ac)	Total (ac)
Subwatershed 1	Gravel Lot	1.44	0.99	2.43
Subwatershed 2	Access Road	0.36	0.14	0.50
Subwatershed 3	Salt Shed	3.16	2.48	5.64
Subwatershed 4	Disconnected	0.29	3.68	3.97
	Total	5.59	7.31	12.54

Supporting computations for the stormwater management approach are included in the Attachment.

3.3 Soil Infiltration Potential

VHB performed a soil evaluation to determine the potential for infiltration of runoff via the stormwater practices. Based on review of geotechnical data and soil explorations conducted in the location of the stormwater treatment practices at the elevation of the bottom of the practices, it appears that the majority of the site, and in particular the locations of the stormwater treatment practices, is underlain by clay loam. The thickness of the clay loam layer was not determined, though geotechnical borings showed a depth greater than 100-feet below existing ground surfaces. Because the stormwater features will be located above this confining clay layer, the potential for stormwater runoff to infiltrate into the deep groundwater aquifer via the stormwater practices is limited. Instead, any stormwater runoff infiltrated into the upper soil layers will run along the top of the confining layer. The infiltrated water will then flow along the groundwater gradient with other infiltrated groundwater as perched infiltration. Because of the confining layer, it is unlikely that stormwater will penetrate to the deep aquifer.

The north grass channel, capturing flow from Subwatershed 1, will to be located in a combination of shallow cut and fill. In locations where the channel is in cut, it was confirmed by soil exploration that the planned cut will not penetrate the underlying clay loam confining layer. The soil underlying the north grass channel is silt loam. The south grass channel, capturing flow from the access road, will be located in a shallow cut. Geotechnical borings indicate that there bottom of the channel will be located above the confining layer. The west grass channel, capturing flow from Subwatershed 3, will be located in fill. The west stormwater pond will be located in cut, and it was confirmed that the planned cut will not penetrate the underlying clay loam confining layer. The material to be located at the bottom of the west stormwater pond is a coarse loamy sand.

4.0 List of Attachments

- Subwatershed Map
- North Grass Channel Worksheet
- WQv Worksheet for North Grass Channel
- HydroCAD (WQv, 1 yr, 10 yr) for North Grass Channel
- South Grass Channel Worksheet
- WQv Worksheet for South Grass Channel
- HydroCAD (WQv, 1 yr, 10 yr) for South Grass Channel
- West Pond Worksheet
- WQv Worksheet for West Pond
- Disconnection Worksheet

ATTACHMENT

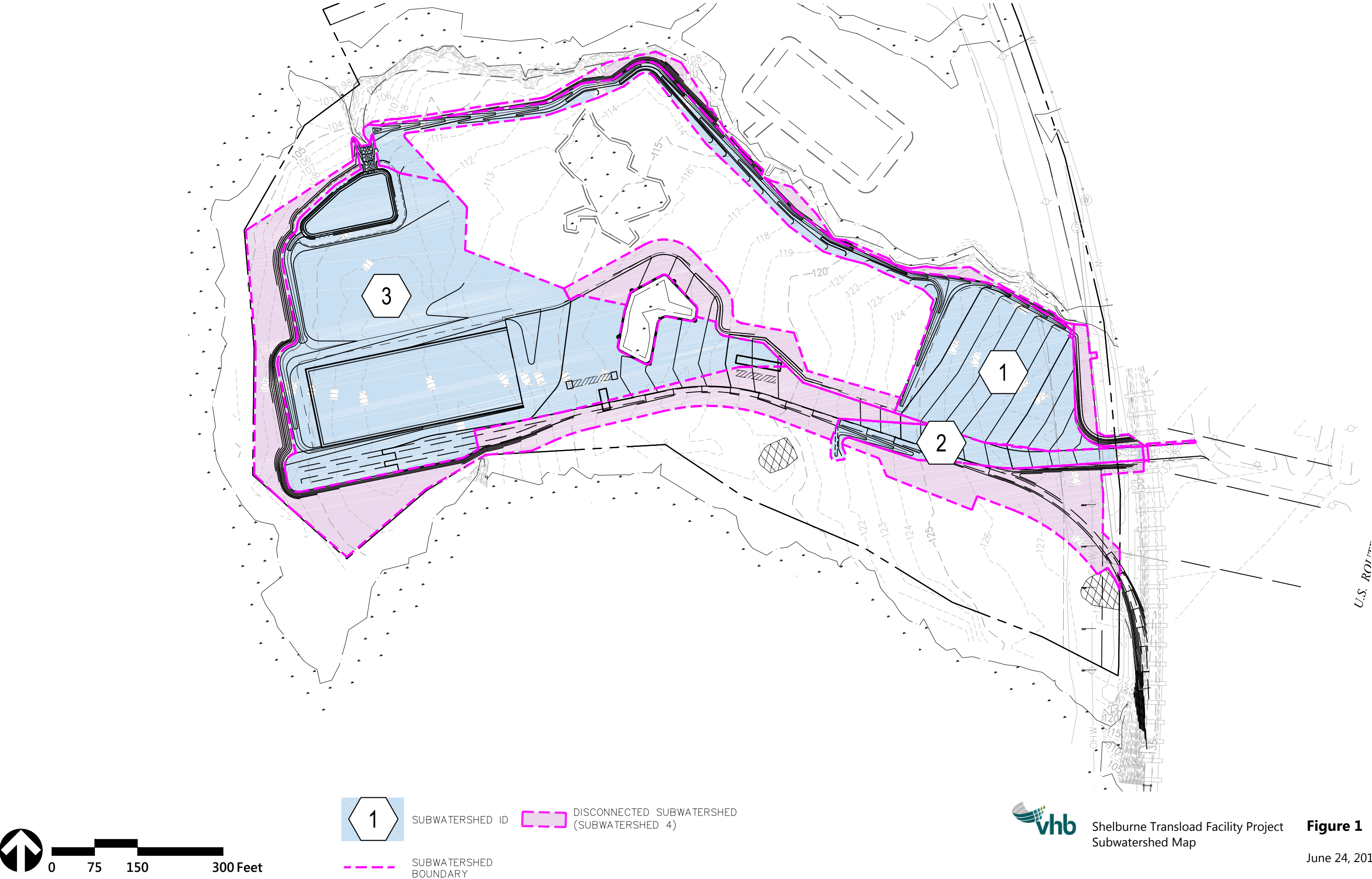


Figure 1
June 24, 2016

Grass Treatment Channel (O-3)

Grass Treatment Channel # 1

Line Treatment Standards

Indicate the treatment standards met for the site area draining to this practice:

- 1 WQv ☒
- 2 Rev ☐ This practice automatically meets Rev if you have met the WQv treatment standards
- 3 Cpv ☐
- 4 Qp10 ☐ { Grass channels are not typically appropriate to provide Cpv, Qp10 or Qp100 except under ideal conditions.
- 5 Qp100 ☐

Modified Curve Number

Modified CN*

- 6 What is the modified curve number (CN) for both on and off-site areas draining to this facility? 96

Water Quality Volume (WQv)

WQv (Cubic Feet)

- 7 Provide the WQv for both on and off-site area draining to this facility (from WQv worksheets)? 4631

WQ Peak (Cfs)

- 8 What is the peak discharge rate associated with the WQ storm? 1.24

Feasibility (2.7.5.A)

Response

Attachment location

- 9 Is the maximum longitudinal slope of the channel 4% or less? yes

Conveyance (2.7.5.B)

Response

Attachment location

- 10 Is the peak velocity for the 1-year storm non-erosive? yes
- 11 Are the channel slopes less than or equal to the 2:1 maximum? yes
- 12 Does the channel safely convey the 10-year storm with a minimum of 6 inches of freeboard? yes
- 13 Was the Manning's n value adjusted for the depth of water in the channel for larger storm events? yes

Pretreatment (2.7.5.C)

Response

Attachment location

- 14 Has pre-treatment been provided for non-rooftop runoff? no runoff is via sheet flow

Treatment (2.7.5.D)

Channel Width (Feet)

- 15 What is the bottom width of the channel? (no greater than 8 feet, but no less than 2 feet) 3

Response

Attachment location

- 16 Is the average residence time of the WQv peak discharge at least 10 minutes? yes
- 17 Is the velocity of the WQv peak discharge less than 1 foot/second? yes
- 18 Is the depth of the WQv peak discharge 4 inches or less? no approximately 5 inches
- 19 Were check dams used to meet the requisite treatment design criteria? no

Cold Climate Design Considerations (2.7.5.G)

Response

Attachment location

- 20 Have the potential impacts of Vermont's severe winter climate been addressed in your design? yes

Grass Channel: Cpv, Qp10 and Qp100

Page 2

Channel Protection Treatment Standard (Cpv)		Response
21	Check which detention time standard must be used, based on the fisheries designation of the receiving water:	☐ 12 hours for cold water ☐ 24 hours for warm water

		Response	Attachment location
22	Did you use the Storage Volume Estimation Method? If yes, skip to Line 25.*	yes / no	

*Please review the guidance sheet "Channel Protection Storage Volume Estimation" and attach the specified information. This method is not appropriate if more than a one subwatershed drains to the practice. Using the center of mass detention time calculated by a hydrologic model that accounts for pond routing is the preferred method.

23	What storage volume (cubic feet) necessary to meet the Channel Protection Standard?	
24	What is the calculated average release rate (cfs)?	
25	What is the controlled peak release rate (cfs) during the 1-year storm as indicated by the model?	

Overbank Flood Protection Treatment Standard (Qp10)		Response	Attachment location
25	Have you demonstrated that Qp10 post is less than or equal to Qp10 pre at the discharge point?*	yes / no	

*Please include runoff and routing calculations of the 10-year storm event.

Extreme Flood Protection Treatment Standard (Qp100)		Response	Attachment location
26	Have you demonstrated that Qp100 post is less than or equal to Qp100 pre at the discharge point?*	yes / no	

*Please include runoff and routing calculations of the 100-year storm event.

*Grass channels provide rate-based treatment and must be designed to provide 10 minutes of residence time for the peak WQ discharge (a 0.9 inch storm). Traditional methods underestimate the volume and rate of runoff for storms of less than 2 inches. Modified curve numbers must be used. Because this practice is rate-based, both on and off-site water reaching the grass channel must be included in the calculations. This additional water will affect the velocity and residence time of the water in the channel. The average residence time for the peak discharge corresponds to the residence time calculated at the peak/maximum velocity, which is reported as the minimum residence time.

Attachment location: Please indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application

For the area draining to*:

North Grass Channel

Located in drainage area for S/N:

001

WQ Volume and Modified Curve Number Calculation for Water Quality Treatment in Flow-Based Practice

Use this worksheet to calculate your WQv if you need to determine the Peak Q for the WQ storm (i.e. designing a grass channel, flow-splitter or other flow based practice) and you are not using any of the site design credits in section 3 of the 2002 VSWMM. See page 2 for "Calculating Peak WQ Discharge Rate (0.9" storm) using the Modified Curve Number." Please note that in the case of grass channels you must include any off-site area draining to the practice as this will affect the peak discharge rate which will ultimately affect the hydraulics, and thus residence time, in your channel.

Water Quality Volume Calculations

Line		value/calculation	units
1	Area draining to practice A=	2.43	acres
2	Impervious area	1.44	acres
3	Percent Impervious Area = [(line 2/line 1) * 100] = I =	59.26	% (whole #)
4	Precipitation P =	0.9	inches
5	Runoff coefficient calculation = $(0.05 + (0.009 * I))$ Rv =	0.583	
6	WQ Volume (in watershed inches) Calculation = $(P * Rv) =$	0.525	Qa (watershed inches, a.k.a. inches of runoff)
7	Minimum WQ Volume ¹	0.2	watershed inches
8	Enter the greater of line 6 or line 7 WQv =	0.525	watershed inches
9	WQ Volume Calculation = $(\text{line } 8 * A) / 12 =$ WQv =	0.106	ac. ft.
10	WQ Volume Calculation = $(\text{line } 9 * 43560) =$ WQv =	4631	cu. ft.

Notes:

1: Sites with low impervious cover (~19%) but that do not employ a **significant** use of the stormwater design credits in Section 3 of the VSWMM are required to treat the minimum water quality volume of 0.2 watershed inches. Sites that have a **significant** portion of their impervious cover addressed via the stormwater credits (section 3 of the VSWMM) will be able to reduce this WQv and will only be required to treat the volume calculated on the "WQ Volume (with credit reduction)" worksheet which will be less than the 0.2 watershed inches.

* Enter the name of the STP (both type and label) which has been designed to treat this particular WQv (e.g. Wet Pond #2)

For the area draining to*:

North Grass Channel

Located in drainage area for S/N:

001

Calculating Peak WQ Peak Discharge Rate (0.9" storm) using the Modified Curve Number

Because NRCS methods underestimate the peak discharge for rainfall events of less than 2", simply plugging in 0.9" of rainfall into your hydrologic model with the standard curve numbers will not produce the correct peak discharge during the WQv storm, nor will it produce a volume of runoff equivalent to that which you have calculated using the WQv formula ($WQv = P \cdot Rv \cdot A / 12$). In order to calculate the peak discharge for the 0.9" storm, a modified curve number must be calculated. This modified curve number is based on the runoff (in inches) calculated using the short cut method formula ($WQv = P \cdot Rv$) that is also the basis of the familiar WQv calculations provided in the 2002 VSWMM (and on the WQv calculation worksheets). Essentially, the curve number that is calculated using the methods below is the curve number that will generate the volume of runoff calculated using the WQv formula.

Above, you should have calculated the **WQv in watershed inches draining to the facility/practice** for which you need to calculate the WQ-peak discharge. As provided in the guidance listed on the grass channel worksheet, please remember that the WQv calculation should include runoff from on-site as well as **off-site area** draining to the grass channel since this will have an impact on the channel hydraulics and thus the velocity and residence time.

Steps:

1. Transfer information from WQv calculation worksheets.

Enter the Qa (line 8 from WQv sheet)

Qa = 0.525 inches

Enter the area (site +off-site draining to practice) used in calculating the percent impervious (I)

A = 2.4 acres

2. Use the following equation to calculate a corresponding curve number

where P = 0.9 inches

$$CN = 1000 / (10 + (5 \cdot P) + (10 \cdot Qa) - (10 \cdot (Qa^2 + (1.25 \cdot Qa \cdot P))^{0.5}))$$

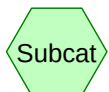
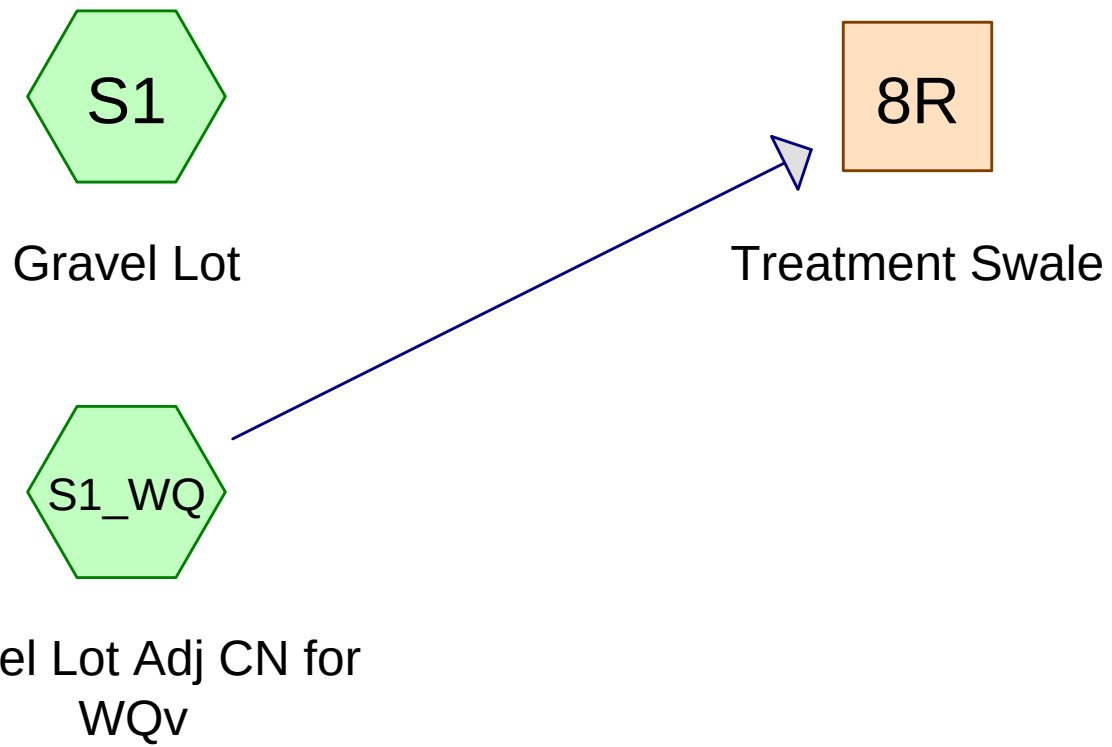
CN = 95.8

3. If you are using **hand hydrologic runoff calculations**, use the computed CN above along with your calculated time of concentration and the drainage area (A) to calculate the peak discharge (Qwg) for the water quality storm using the TR-55 Graphical Peak Discharge Method.

OR

3. If you are using a computer aided hydrologic model, simply revise the curve number for your subwatershed(s) draining to the practice using the curve number calculated above; the computed curve number should be applied to the total area (A) used in the WQv calculation. As a check, you should note that now when you run the 0.9" storm, your runoff depth should be roughly equal to Qa (WQ runoff in inches) and your total runoff volume roughly equal to your WQv (in ac. ft.). If this is not the case, make sure that the time span for your modelling run is long enough to capture the entire storm. Small variations are likely due to having to round your computed CN to a whole number. Remember that for storms larger than 2", you do not need to use the modified curve number and you should calculate your composite curve number based on the accepted values for different types of land-use (see TR-55).

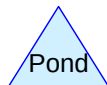
* Enter the name of the STP (both type and label) which has been designed to treat this particular WQv (e.g. Wet Pond #2)



Subcat



Reach



Pond



Link

Routing Diagram for BMP Size - Gravel Lot BMP
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BMP Size - Gravel Lot BMP

Type II 24-hr WQv Rainfall=0.90"

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Page 2

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S1: Gravel Lot

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=0.32"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=82 Runoff=1.55 cfs 0.065 af

Subcatchment S1_WQ: Gravel Lot Adj CN

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=0.54"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=96 Runoff=2.61 cfs 0.110 af

Reach 8R: Treatment Swale

Avg. Flow Depth=0.40' Max Vel=0.61 fps Inflow=2.61 cfs 0.110 af

n=0.126 L=1,125.0' S=0.0124 '/' Capacity=11.26 cfs Outflow=0.93 cfs 0.110 af

Total Runoff Area = 4.860 ac Runoff Volume = 0.174 af Average Runoff Depth = 0.43"
100.00% Pervious = 4.860 ac 0.00% Impervious = 0.000 ac

BMP Size - Gravel Lot BMP

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Type II 24-hr WQv Rainfall=0.90"

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Page 3

Summary for Subcatchment S1: Gravel Lot

Runoff = 1.55 cfs @ 11.93 hrs, Volume= 0.065 af, Depth= 0.32"

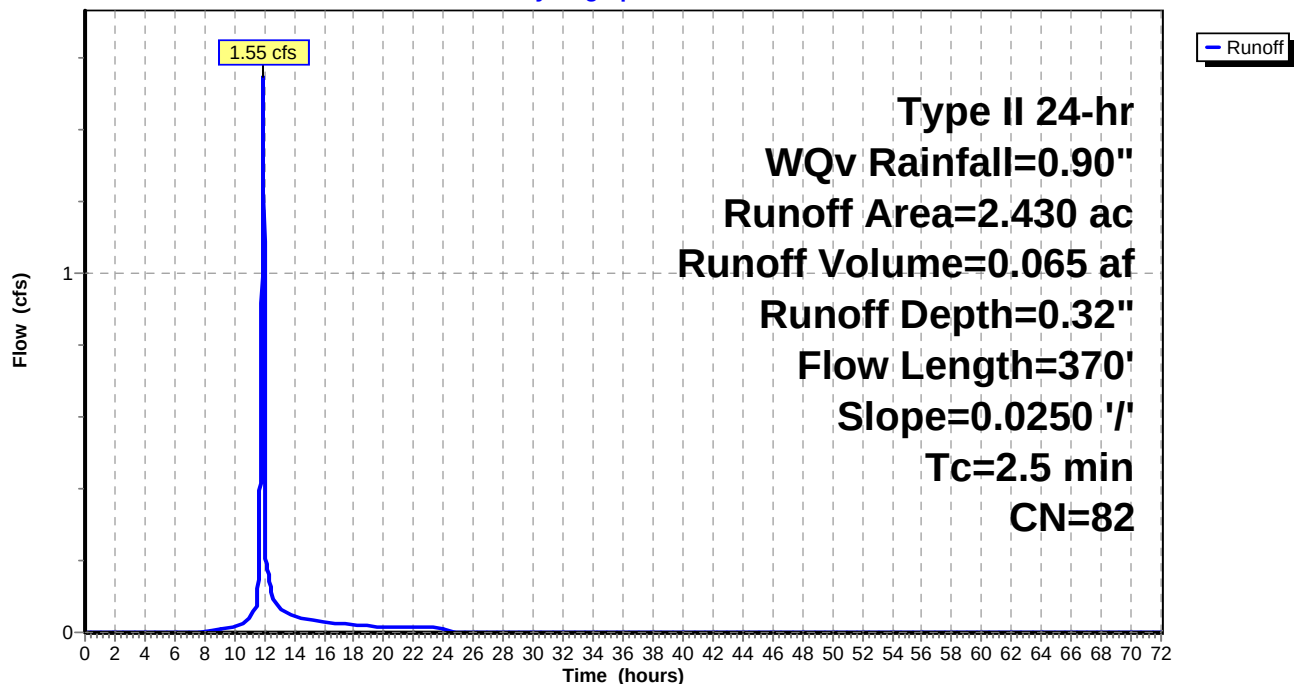
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=0.90"

Area (ac)	CN	Description
1.440	96	Gravel surface, HSG B
0.990	61	>75% Grass cover, Good, HSG B
2.430	82	Weighted Average
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1: Gravel Lot

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr WQv Rainfall=0.90"

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Summary for Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Runoff = 2.61 cfs @ 11.93 hrs, Volume= 0.110 af, Depth= 0.54"

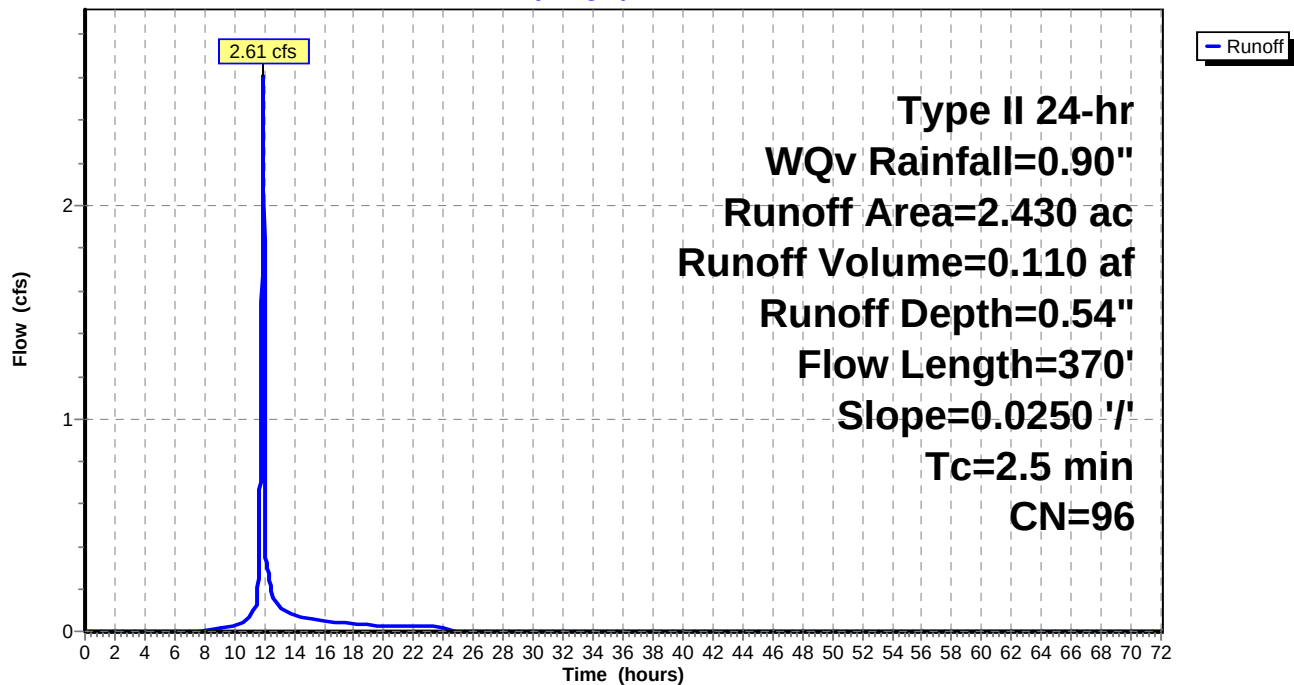
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=0.90"

Area (ac)	CN	Description
* 2.430	96	Gravel surface, HSG B
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr WQv Rainfall=0.90"

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Summary for Reach 8R: Treatment Swale

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth = 0.54" for WQv event
 Inflow = 2.61 cfs @ 11.93 hrs, Volume= 0.110 af
 Outflow = 0.93 cfs @ 12.02 hrs, Volume= 0.110 af, Atten= 64%, Lag= 5.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.61 fps, Min. Travel Time= 30.7 min

Avg. Velocity = 0.13 fps, Avg. Travel Time= 143.0 min

Peak Storage= 1,707 cf @ 12.02 hrs

Average Depth at Peak Storage= 0.40'

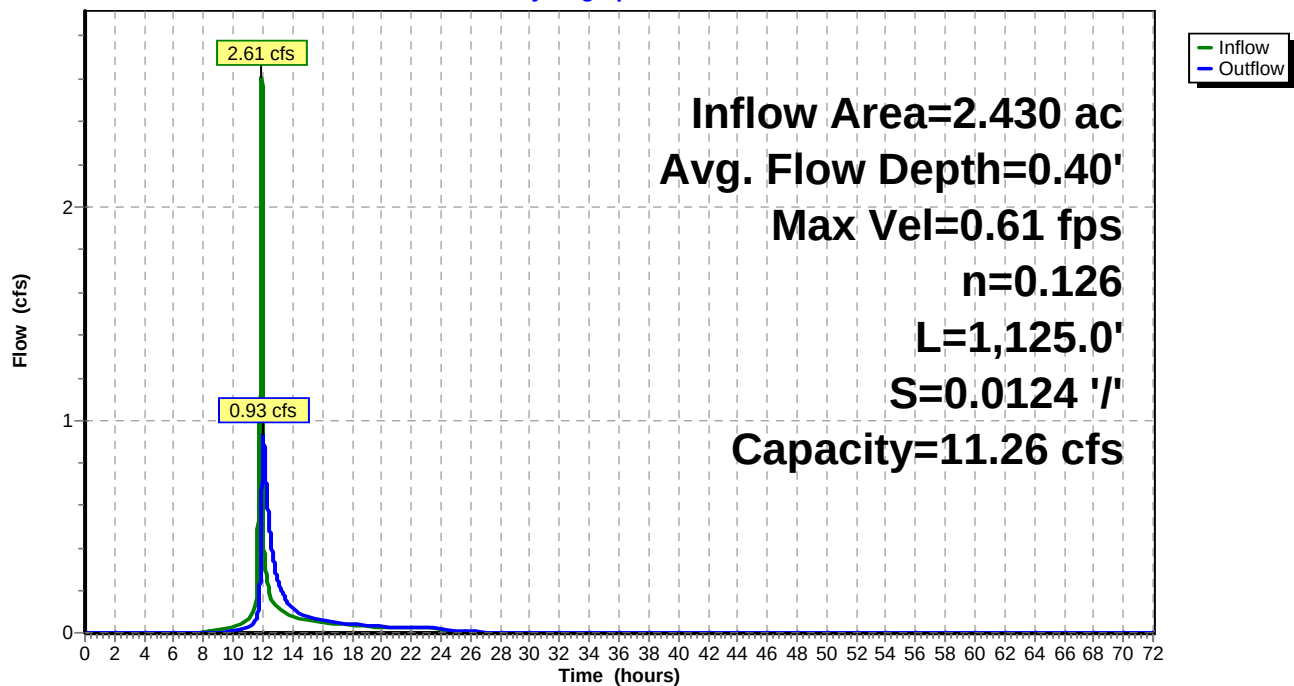
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 11.26 cfs

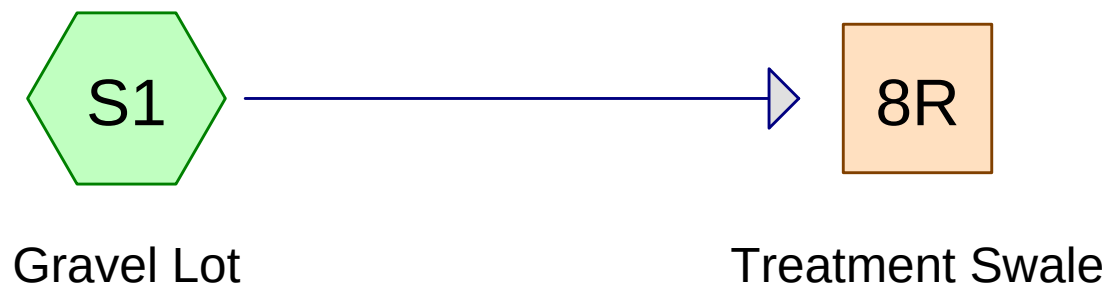
3.00' x 1.50' deep channel, n= 0.126

Side Slope Z-value= 2.0 '/' Top Width= 9.00'

Length= 1,125.0' Slope= 0.0124 '/'

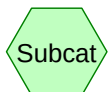
Inlet Invert= 121.00', Outlet Invert= 107.00'

**Reach 8R: Treatment Swale****Hydrograph**



S1_WQ

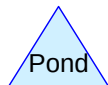
Gravel Lot Adj CN for
WQv



Subcat



Reach



Pond



Link

Routing Diagram for BMP Size - Gravel Lot BMP
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BMP Size - Gravel Lot BMP*Type II 24-hr 1-yr Rainfall=2.10"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S1: Gravel Lot

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=1.03"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=82 Runoff=4.45 cfs 0.208 af

Subcatchment S1_WQ: Gravel Lot Adj CN

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=1.67"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=96 Runoff=7.50 cfs 0.338 af

Reach 8R: Treatment Swale

Avg. Flow Depth=0.56' Max Vel=0.93 fps Inflow=4.45 cfs 0.208 af

n=0.100 L=1,125.0' S=0.0124 '/' Capacity=14.18 cfs Outflow=2.18 cfs 0.208 af

Total Runoff Area = 4.860 ac Runoff Volume = 0.547 af Average Runoff Depth = 1.35"
100.00% Pervious = 4.860 ac 0.00% Impervious = 0.000 ac

BMP Size - Gravel Lot BMP

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Type II 24-hr 1-yr Rainfall=2.10"

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Summary for Subcatchment S1: Gravel Lot

Runoff = 4.45 cfs @ 11.93 hrs, Volume= 0.208 af, Depth= 1.03"

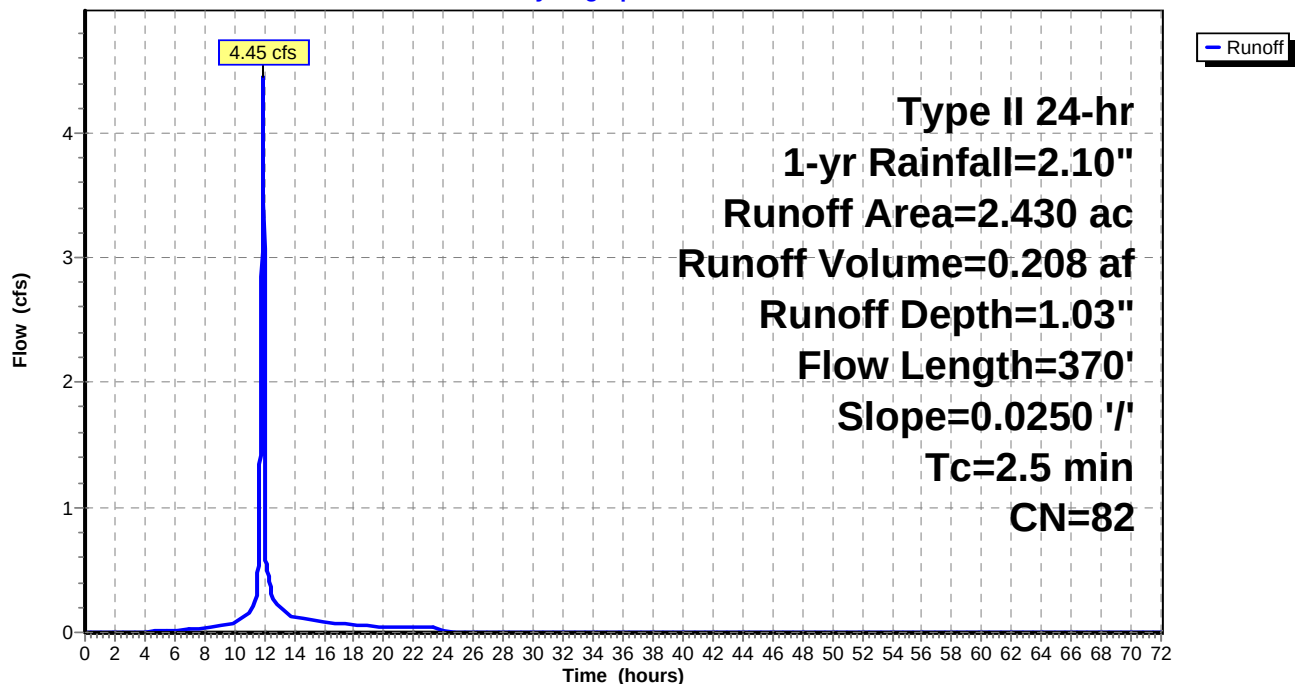
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.10"

Area (ac)	CN	Description
1.440	96	Gravel surface, HSG B
0.990	61	>75% Grass cover, Good, HSG B
2.430	82	Weighted Average
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1: Gravel Lot

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr 1-yr Rainfall=2.10"

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Summary for Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Runoff = 7.50 cfs @ 11.93 hrs, Volume= 0.338 af, Depth= 1.67"

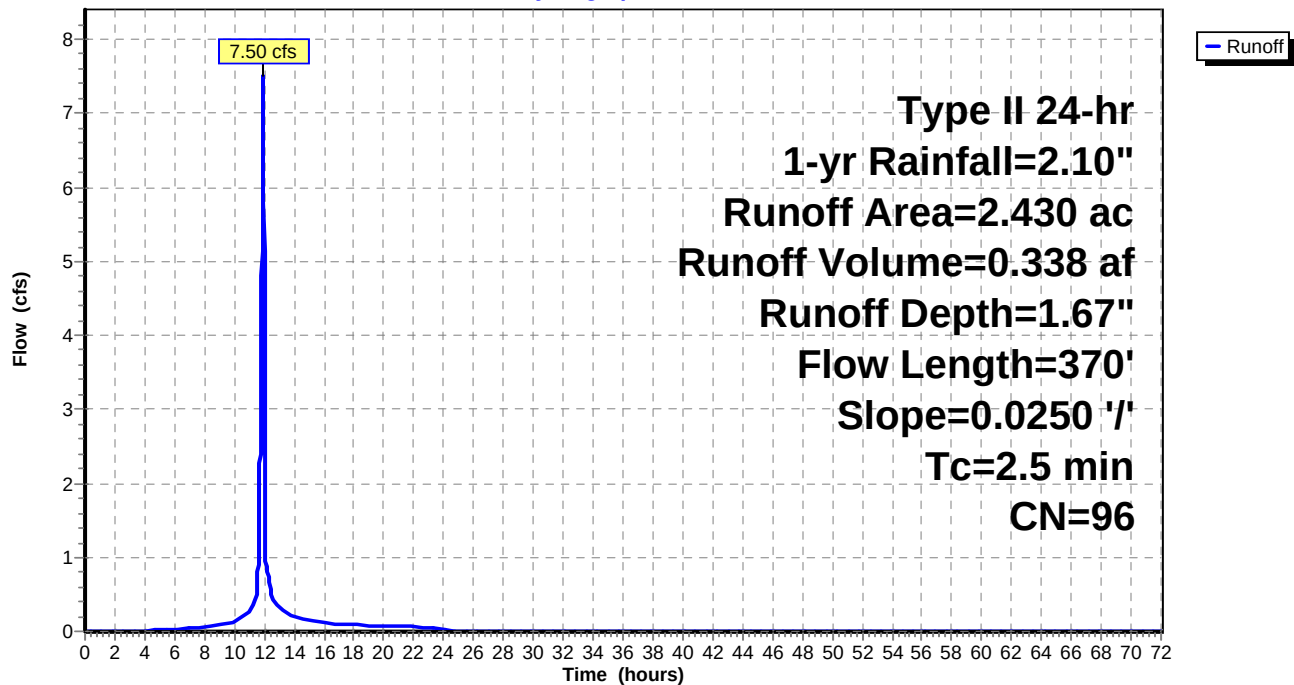
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.10"

Area (ac)	CN	Description
* 2.430	96	Gravel surface, HSG B
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr 1-yr Rainfall=2.10"

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Summary for Reach 8R: Treatment Swale

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth = 1.03" for 1-yr event
 Inflow = 4.45 cfs @ 11.93 hrs, Volume= 0.208 af
 Outflow = 2.18 cfs @ 12.00 hrs, Volume= 0.208 af, Atten= 51%, Lag= 4.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.93 fps, Min. Travel Time= 20.1 min

Avg. Velocity = 0.19 fps, Avg. Travel Time= 98.3 min

Peak Storage= 2,624 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.56'

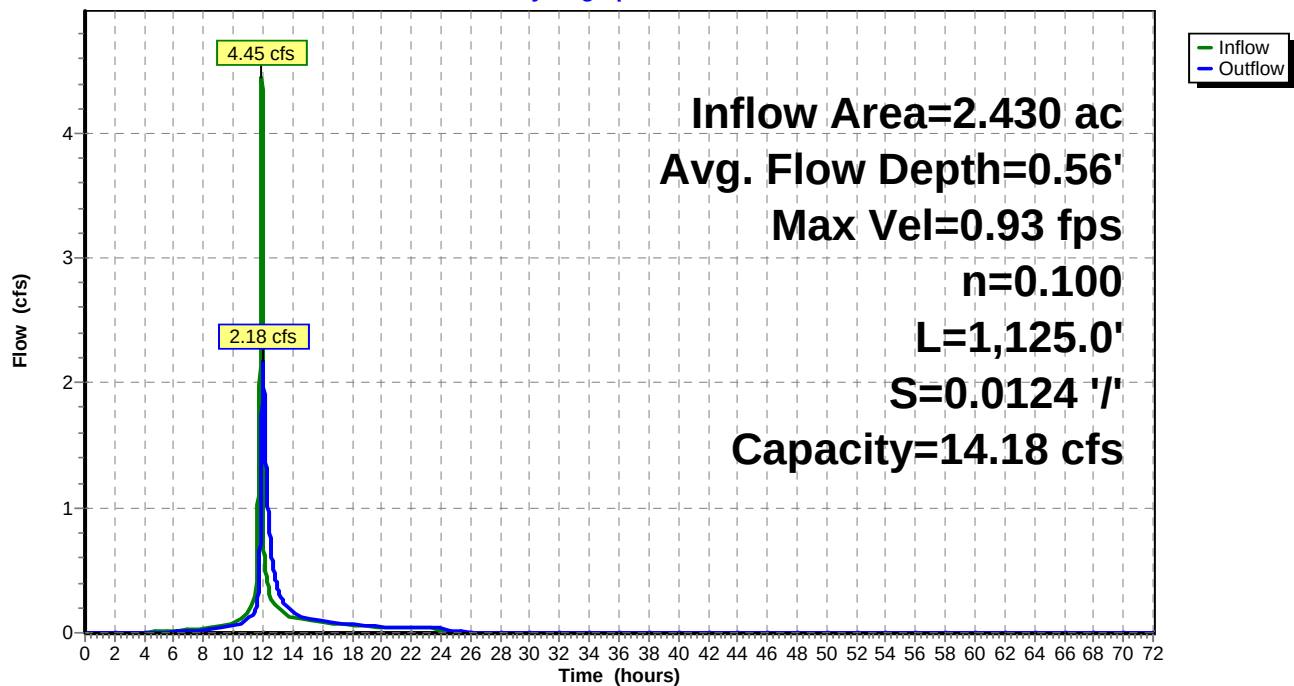
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 14.18 cfs

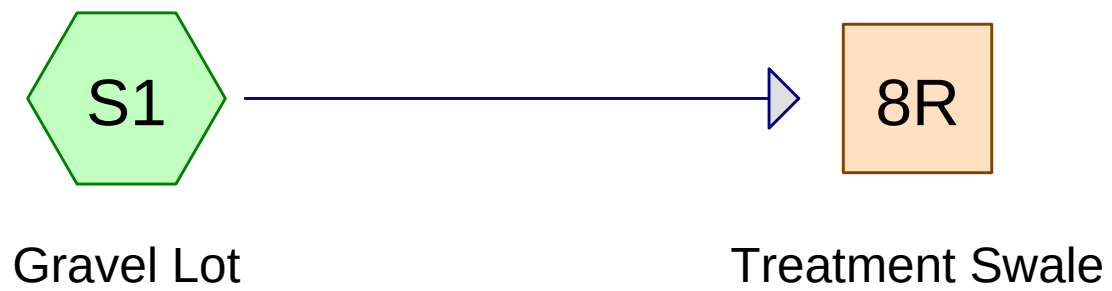
3.00' x 1.50' deep channel, n= 0.100

Side Slope Z-value= 2.0 '/' Top Width= 9.00'

Length= 1,125.0' Slope= 0.0124 '/'

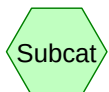
Inlet Invert= 121.00', Outlet Invert= 107.00'

**Reach 8R: Treatment Swale****Hydrograph**



S1_WQ

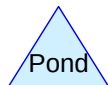
Gravel Lot Adj CN for
WQv



Subcat



Reach



Pond



Link

Routing Diagram for BMP Size - Gravel Lot BMP
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BMP Size - Gravel Lot BMP*Type II 24-hr 10-yr Rainfall=3.20"*

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Page 2

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S1: Gravel Lot

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=1.81"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=82 Runoff=7.76 cfs 0.367 af

Subcatchment S1_WQ: Gravel Lot Adj CN

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=2.75"

Flow Length=370' Slope=0.0250 '/' Tc=2.5 min CN=96 Runoff=11.91 cfs 0.557 af

Reach 8R: Treatment Swale

Avg. Flow Depth=0.72' Max Vel=1.44 fps Inflow=7.76 cfs 0.367 af

n=0.074 L=1,125.0' S=0.0124 '/' Capacity=19.17 cfs Outflow=4.64 cfs 0.367 af

Total Runoff Area = 4.860 ac Runoff Volume = 0.923 af Average Runoff Depth = 2.28"
100.00% Pervious = 4.860 ac 0.00% Impervious = 0.000 ac

BMP Size - Gravel Lot BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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Summary for Subcatchment S1: Gravel Lot

Runoff = 7.76 cfs @ 11.93 hrs, Volume= 0.367 af, Depth= 1.81"

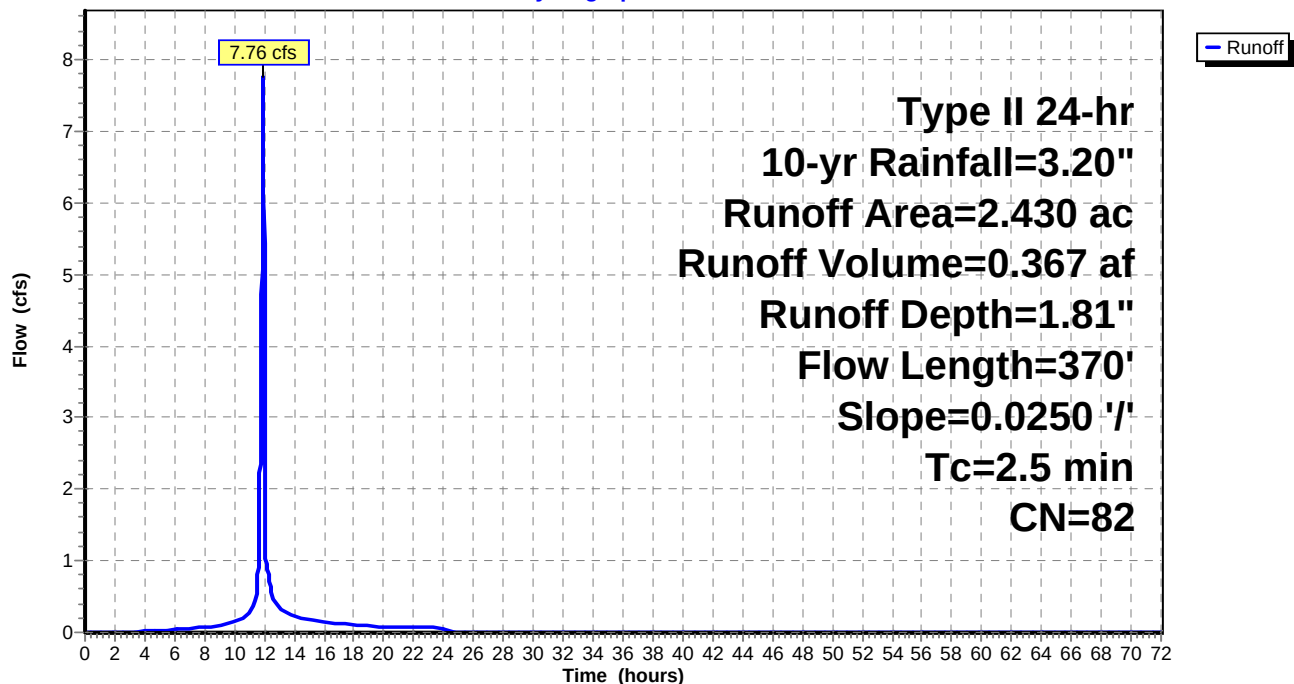
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.20"

Area (ac)	CN	Description
1.440	96	Gravel surface, HSG B
0.990	61	>75% Grass cover, Good, HSG B
2.430	82	Weighted Average
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1: Gravel Lot

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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Summary for Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Runoff = 11.91 cfs @ 11.93 hrs, Volume= 0.557 af, Depth= 2.75"

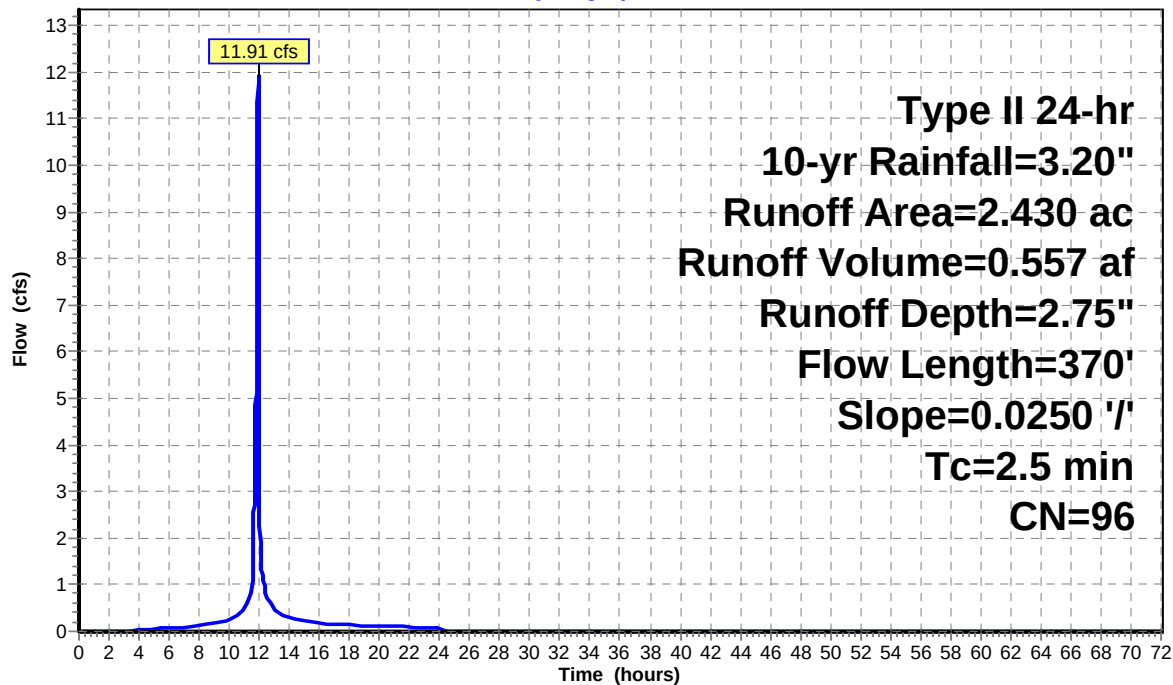
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.20"

Area (ac)	CN	Description
* 2.430	96	Gravel surface, HSG B
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0250	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	320	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	370	Total			

Subcatchment S1_WQ: Gravel Lot Adj CN for WQv

Hydrograph



BMP Size - Gravel Lot BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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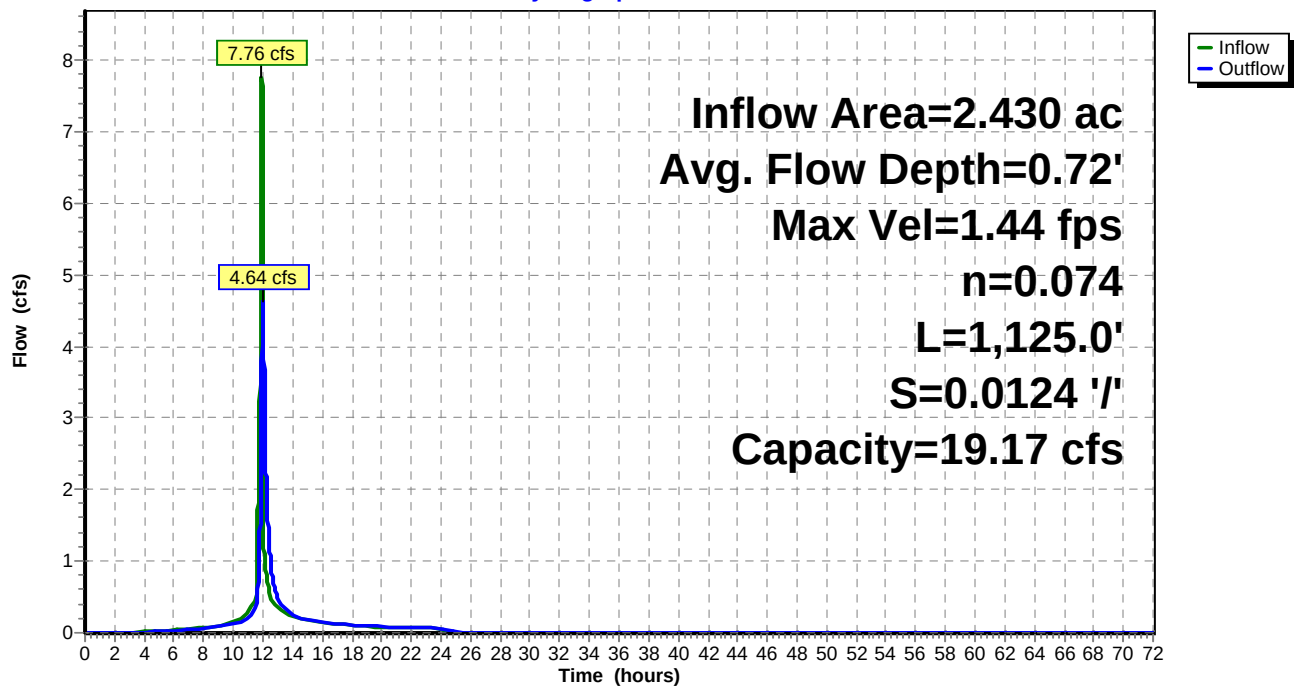
Summary for Reach 8R: Treatment Swale

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth = 1.81" for 10-yr event
 Inflow = 7.76 cfs @ 11.93 hrs, Volume= 0.367 af
 Outflow = 4.64 cfs @ 11.99 hrs, Volume= 0.367 af, Atten= 40%, Lag= 3.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Max. Velocity= 1.44 fps, Min. Travel Time= 13.0 min
 Avg. Velocity = 0.30 fps, Avg. Travel Time= 63.2 min

Peak Storage= 3,620 cf @ 11.99 hrs
 Average Depth at Peak Storage= 0.72'
 Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 19.17 cfs

3.00' x 1.50' deep channel, n= 0.074
 Side Slope Z-value= 2.0 '/' Top Width= 9.00'
 Length= 1,125.0' Slope= 0.0124 '/'
 Inlet Invert= 121.00', Outlet Invert= 107.00'

**Reach 8R: Treatment Swale****Hydrograph**

Grass Treatment Channel (O-3)

Grass Treatment Channel # 2

Line Treatment Standards

Indicate the treatment standards met for the site area draining to this practice:

- 1 WQv ☒
- 2 Rev ☐ This practice automatically meets Rev if you have met the WQv treatment standards
- 3 Cpv ☐
- 4 Qp10 ☐ { Grass channels are not typically appropriate to provide Cpv, Qp10 or Qp100 except under ideal conditions.
- 5 Qp100 ☐

Modified Curve Number		Modified CN*
6	What is the modified curve number (CN) for both on and off-site areas draining to this facility?	97

Water Quality Volume (WQv)		WQv (Cubic Feet)
7	Provide the WQv for both on and off-site area draining to this facility (from WQv worksheets)?	1140

		WQ Peak (Cfs)
8	What is the peak discharge rate associated with the WQ storm?	0.5

Feasibility (2.7.5.A)		Response	Attachment location
9	Is the maximum longitudinal slope of the channel 4% or less?	yes	

Conveyance (2.7.5.B)		Response	Attachment location
10	Is the peak velocity for the 1-year storm non-erosive?	yes	
11	Are the channel slopes less than or equal to the 2:1 maximum?	yes	
12	Does the channel safely convey the 10-year storm with a minimum of 6 inches of freeboard?	yes	
13	Was the Manning's n value adjusted for the depth of water in the channel for larger storm events?	yes	

Pretreatment (2.7.5.C)		Response	Attachment location
14	Has pre-treatment been provided for non-rooftop runoff?	no	runoff is via sheet flow

Treatment (2.7.5.D)		Channel Width (Feet)
15	What is the bottom width of the channel? (no greater than 8 feet, but no less than 2 feet)	4

		Response	Attachment location
16	Is the average residence time of the WQv peak discharge at least 10 minutes?	yes	
17	Is the velocity of the WQv peak discharge less than 1 foot/second?	yes	
18	Is the depth of the WQv peak discharge 4 inches or less?	yes	
19	Were check dams used to meet the requisite treatment design criteria?	no	

Cold Climate Design Considerations (2.7.5.G)		Response	Attachment location
20	Have the potential impacts of Vermont's severe winter climate been addressed in your design?	yes	

Grass Channel: Cpv, Qp10 and Qp100

Page 2

Channel Protection Treatment Standard (Cpv)		Response	
21	Check which detention time standard must be used, based on the fisheries designation of the receiving water:	☐ 12 hours for cold water ☐ 24 hours for warm water	
		Response	Attachment location
22	Did you use the Storage Volume Estimation Method? If yes, skip to Line 25.* *Please review the guidance sheet "Channel Protection Storage Volume Estimation" and attach the specified information. This method is not appropriate if more than a one subwatershed drains to the practice. Using the center of mass detention time calculated by a hydrologic model that accounts for pond routing is the preferred method.	yes / no	
23	What storage volume (cubic feet) necessary to meet the Channel Protection Standard?		
24	What is the calculated average release rate (cfs)?		
25	What is the controlled peak release rate (cfs) during the 1-year storm as indicated by the model?		
Overbank Flood Protection Treatment Standard (Qp10)		Response	Attachment location
25	Have you demonstrated that Qp10 post is less than or equal to Qp10 pre at the discharge point?*	yes / no	
*Please include runoff and routing calculations of the 10-year storm event.			
Extreme Flood Protection Treatment Standard (Qp100)		Response	Attachment location
26	Have you demonstrated that Qp100 post is less than or equal to Qp100 pre at the discharge point?*	yes / no	
*Please include runoff and routing calculations of the 100-year storm event.			

*Grass channels provide rate-based treatment and must be designed to provide 10 minutes of residence time for the peak WQ discharge (a 0.9 inch storm). Traditional methods underestimate the volume and rate of runoff for storms of less than 2 inches. Modified curve numbers must be used. Because this practice is rate-based, both on and off-site water reaching the grass channel must be included in the calculations. This additional water will affect the velocity and residence time of the water in the channel. The average residence time for the peak discharge corresponds to the residence time calculated at the peak/maximum velocity, which is reported as the minimum residence time.

Attachment location: Please indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application

For the area draining to*:

South Grass Channel

Located in drainage area for S/N:

002

WQ Volume and Modified Curve Number Calculation for Water Quality Treatment in Flow-Based Practice

Use this worksheet to calculate your WQv if you need to determine the Peak Q for the WQ storm (i.e. designing a grass channel, flow-splitter or other flow based practice) and you are not using any of the site design credits in section 3 of the 2002 VSWMM. See page 2 for "Calculating Peak WQ Discharge Rate (0.9" storm) using the Modified Curve Number." Please note that in the case of grass channels you must include any off-site area draining to the practice as this will affect the peak discharge rate which will ultimately affect the hydraulics, and thus residence time, in your channel.

Water Quality Volume Calculations

Line		value/calculation	units
1	Area draining to practice A=	0.50	acres
2	Impervious area	0.36	acres
3	Percent Impervious Area = [(line 2/line 1) * 100] = I =	72.00	% (whole #)
4	Precipitation P =	0.9	inches
5	Runoff coefficient calculation = (0.05 + (0.009*I)) Rv =	0.698	
6	WQ Volume (in watershed inches) Calculation = (P * Rv) =	0.628	Qa (watershed inches, a.k.a. inches of runoff)
7	Minimum WQ Volume ¹	0.2	watershed inches
8	Enter the greater of line 6 or line 7 WQv =	0.628	watershed inches
9	WQ Volume Calculation = (line 8 * A)/12 = WQv =	0.026	ac. ft.
10	WQ Volume Calculation = (line 9 * 43560) = WQv =	1140	cu. ft.

Notes:

1: Sites with low impervious cover (~19%) but that do not employ a **significant** use of the stormwater design credits in Section 3 of the VSWMM are required to treat the minimum water quality volume of 0.2 watershed inches. Sites that have a **significant** portion of their impervious cover addressed via the stormwater credits (section 3 of the VSWMM) will be able to reduce this WQv and will only be required to treat the volume calculated on the "WQ Volume (with credit reduction)" worksheet which will be less than the 0.2 watershed inches.

* Enter the name of the STP (both type and label) which has been designed to treat this particular WQv (e.g. Wet Pond #2)

For the area draining to*:	South Grass Channel
Located in drainage area for S/N:	002

Calculating Peak WQ Peak Discharge Rate (0.9" storm) using the Modified Curve Number

Because NRCS methods underestimate the peak discharge for rainfall events of less than 2", simply plugging in 0.9" of rainfall into your hydrologic model with the standard curve numbers will not produce the correct peak discharge during the WQv storm, nor will it produce a volume of runoff equivalent to that which you have calculated using the WQv formula ($WQv = P \cdot Rv \cdot A/12$). In order to calculate the peak discharge for the 0.9" storm, a modified curve number must be calculated. This modified curve number is based on the runoff (in inches) calculated using the short cut method formula ($WQv = P \cdot Rv$) that is also the basis of the familiar WQv calculations provided in the 2002 VSWMM (and on the WQv calculation worksheets). Essentially, the curve number that is calculated using the methods below is the curve number that will generate the volume of runoff calculated using the WQv formula.

Above, you should have calculated the **WQv in watershed inches draining to the facility/practice** for which you need to calculate the WQ-peak discharge. As provided in the guidance listed on the grass channel worksheet, please remember that the WQv calculation should include runoff from on-site as well as **off-site area** draining to the grass channel since this will have an impact on the channel hydraulics and thus the velocity and residence time.

Steps:

1. Transfer information from WQv calculation worksheets.

Enter the Q_a (line 8 from WQv sheet)

$Q_a =$ inches

Enter the area (site +off-site draining to practice) used in calculating the percent impervious (I)

$A =$ acres

2. Use the following equation to calculate a corresponding curve number

where $P =$ inches

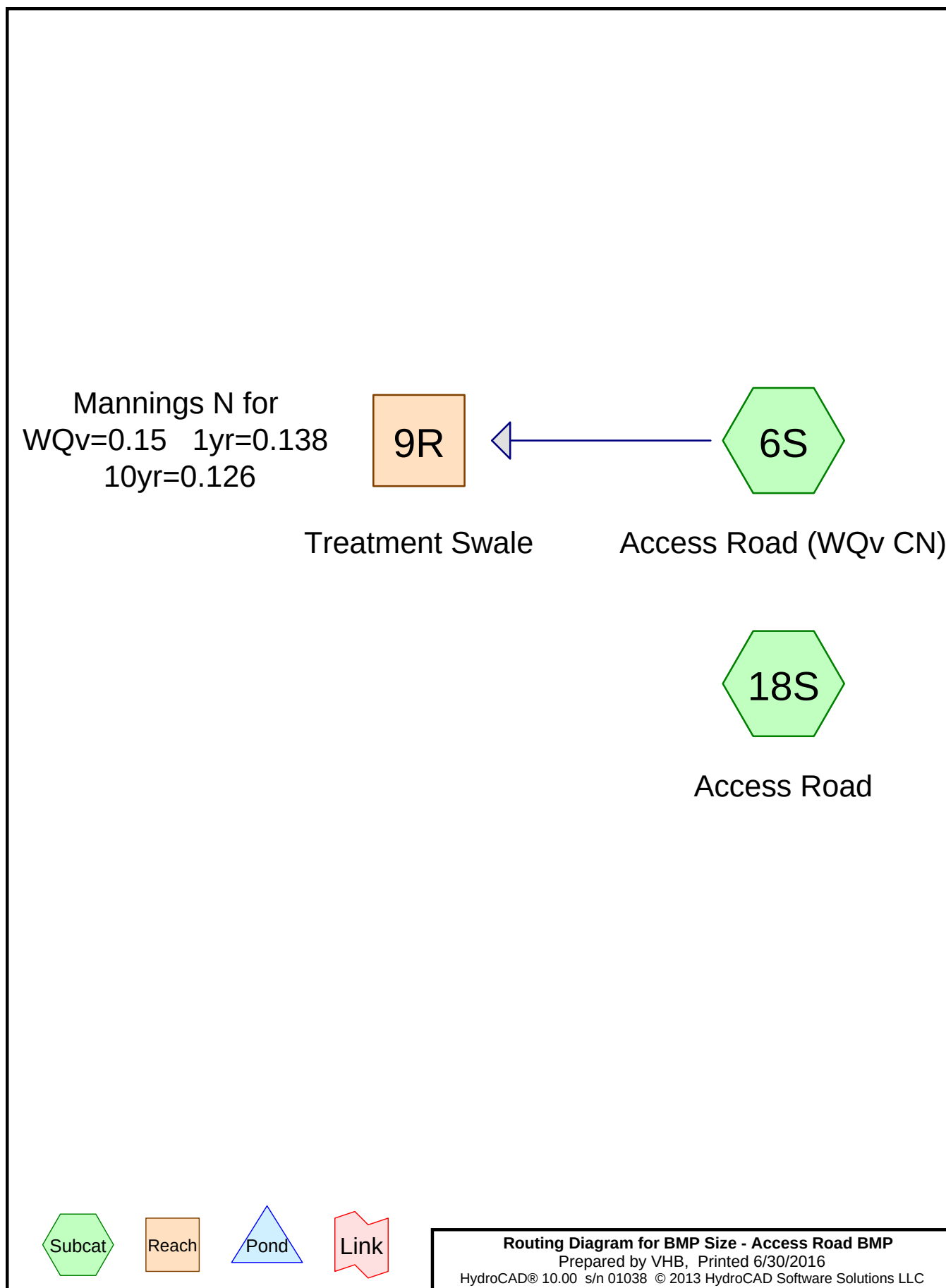
$$CN = 1000 / (10 + (5 \cdot P) + (10 \cdot Q_a) - (10 \cdot (Q_a^2 + (1.25 \cdot Q_a \cdot P))^{0.5}))$$

$CN =$

3. If you are using **hand hydrologic runoff calculations**, use the computed CN above along with your calculated time of concentration and the drainage area (A) to calculate the peak discharge (Q_{wg}) for the water quality storm using the TR-55 Graphical Peak Discharge Method.

OR

3. If you are using a computer aided hydrologic model, simply revise the curve number for your subwatershed(s) draining to the practice using the curve number calculated above; the computed curve number should be applied to the total area (A) used in the WQv calculation. As a check, you should note that now when you run the 0.9" storm, your runoff depth should be roughly equal to Q_a (WQ runoff in inches) and your total runoff volume roughly equal to your WQv (in ac. ft.). If this is not the case, make sure that the time span for your modelling run is long enough to capture the entire storm. Small variations are likely due to having to round your computed CN to a whole number. Remember that for storms larger than 2", you do not need to use the modified curve number and you should calculate your composite curve number based on the accepted values for different types of land-use (see TR-55).



BMP Size - Access Road BMP*Type II 24-hr WQv Rainfall=0.90"*

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Page 2

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: Access Road (WQv CN) Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.61"
 Flow Length=375' Tc=3.8 min CN=97 Runoff=0.57 cfs 0.026 af

Subcatchment18S: Access Road Runoff Area=0.500 ac 72.00% Impervious Runoff Depth=0.50"
 Flow Length=375' Tc=3.8 min CN=81 Runoff=0.45 cfs 0.021 af

Reach 9R: Treatment Swale Avg. Flow Depth=0.22' Max Vel=0.48 fps Inflow=0.57 cfs 0.026 af
 n=0.150 L=121.0' S=0.0207 '/' Capacity=13.64 cfs Outflow=0.50 cfs 0.026 af

Total Runoff Area = 1.000 ac Runoff Volume = 0.046 af Average Runoff Depth = 0.56"
64.00% Pervious = 0.640 ac 36.00% Impervious = 0.360 ac

BMP Size - Access Road BMP

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Type II 24-hr WQv Rainfall=0.90"

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Summary for Subcatchment 6S: Access Road (WQv CN)

Runoff = 0.57 cfs @ 11.95 hrs, Volume= 0.026 af, Depth= 0.61"

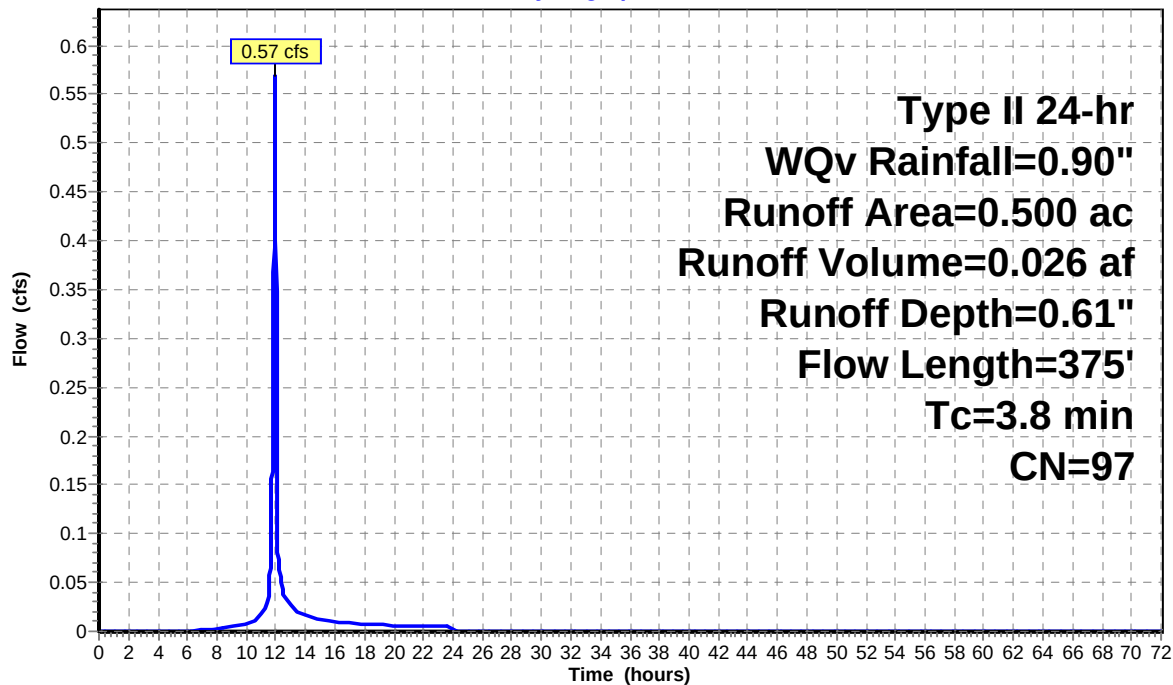
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=0.90"

Area (ac)	CN	Description
* 0.500	97	Modified CN from WQv flow calc sheet
0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 6S: Access Road (WQv CN)

Hydrograph



BMP Size - Access Road BMP

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Type II 24-hr WQv Rainfall=0.90"

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Summary for Subcatchment 18S: Access Road

Runoff = 0.45 cfs @ 11.94 hrs, Volume= 0.021 af, Depth= 0.50"

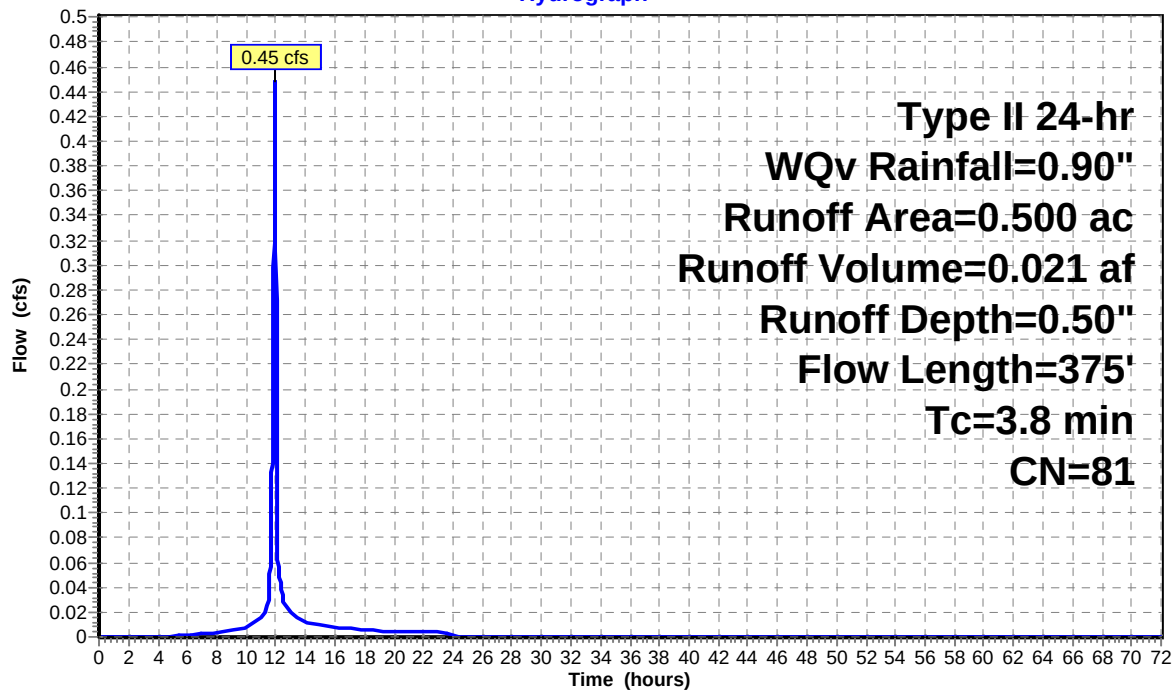
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=0.90"

Area (ac)	CN	Description
0.360	98	Paved parking, HSG A
0.140	39	>75% Grass cover, Good, HSG A
0.500	81	Weighted Average
0.140		28.00% Pervious Area
0.360		72.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 18S: Access Road

Hydrograph



BMP Size - Access Road BMP

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Type II 24-hr WQv Rainfall=0.90"

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Summary for Reach 9R: Treatment Swale

Inflow Area = 0.500 ac, 0.00% Impervious, Inflow Depth = 0.61" for WQv event
 Inflow = 0.57 cfs @ 11.95 hrs, Volume= 0.026 af
 Outflow = 0.50 cfs @ 11.98 hrs, Volume= 0.026 af, Atten= 12%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.48 fps, Min. Travel Time= 4.2 min

Avg. Velocity= 0.11 fps, Avg. Travel Time= 18.5 min

Peak Storage= 127 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.22'

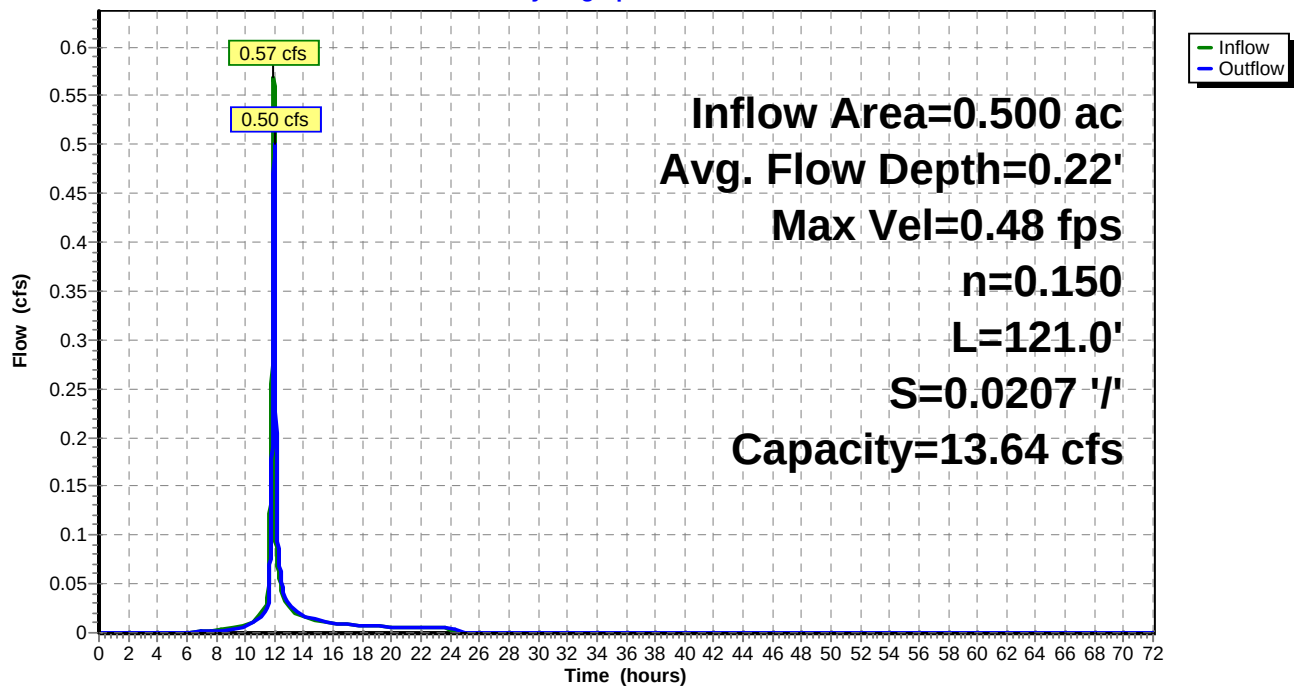
Bank-Full Depth= 1.33' Flow Area= 10.6 sf, Capacity= 13.64 cfs

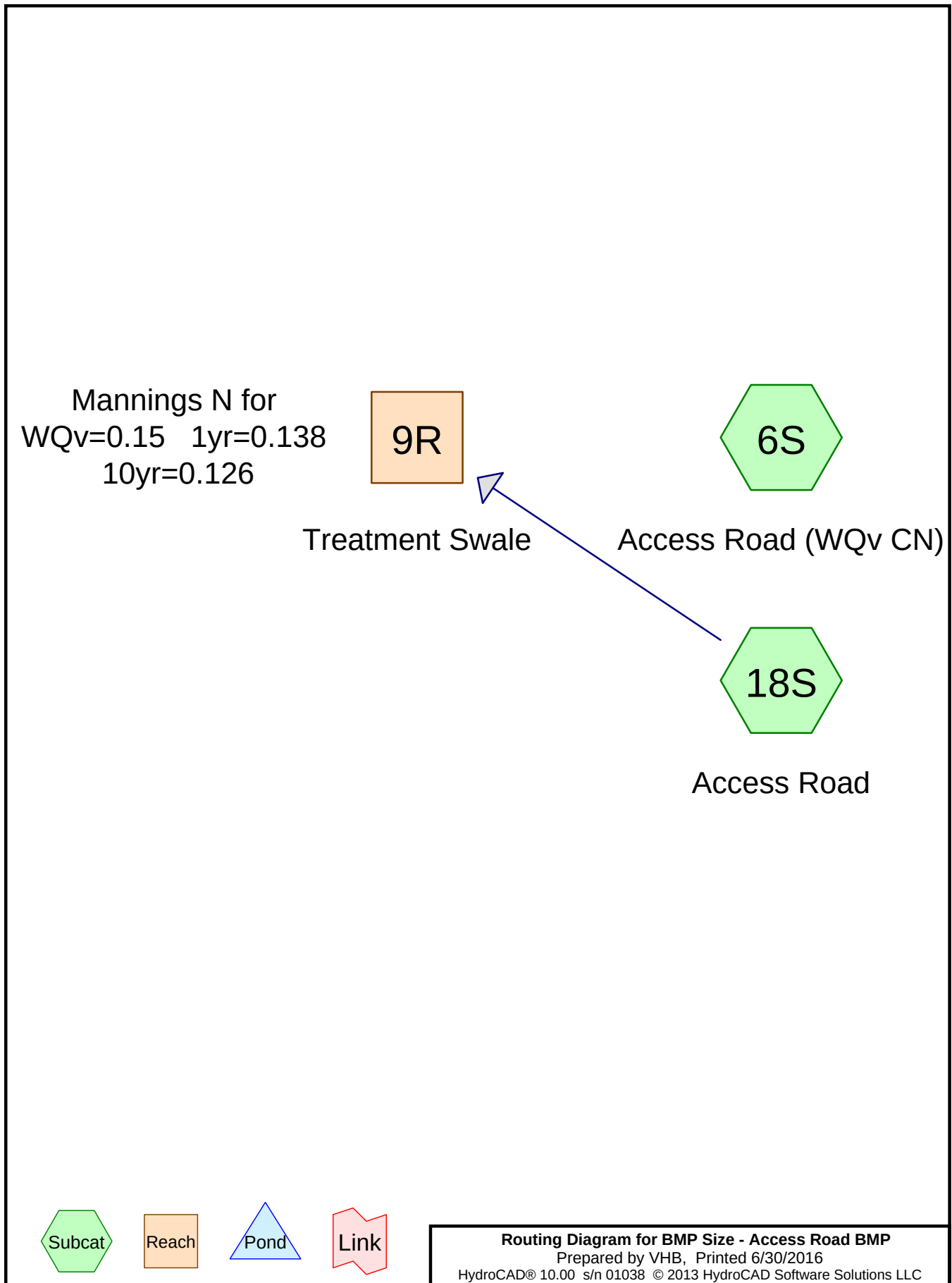
4.00' x 1.33' deep channel, n= 0.150

Side Slope Z-value= 3.0 '/' Top Width= 11.98'

Length= 121.0' Slope= 0.0207 '/'

Inlet Invert= 123.50', Outlet Invert= 121.00'

**Reach 9R: Treatment Swale****Hydrograph**



BMP Size - Access Road BMP*Type II 24-hr 1-yr Rainfall=2.10"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: Access Road (WQv CN) Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=1.77"
 Flow Length=375' Tc=3.8 min CN=97 Runoff=1.53 cfs 0.074 af

Subcatchment18S: Access Road Runoff Area=0.500 ac 72.00% Impervious Runoff Depth=1.35"
 Flow Length=375' Tc=3.8 min CN=81 Runoff=1.13 cfs 0.056 af

Reach 9R: Treatment Swale Avg. Flow Depth=0.33' Max Vel=0.64 fps Inflow=1.13 cfs 0.056 af
 n=0.138 L=121.0' S=0.0207 '/' Capacity=14.83 cfs Outflow=1.04 cfs 0.056 af

Total Runoff Area = 1.000 ac Runoff Volume = 0.130 af Average Runoff Depth = 1.56"
64.00% Pervious = 0.640 ac 36.00% Impervious = 0.360 ac

BMP Size - Access Road BMP

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Type II 24-hr 1-yr Rainfall=2.10"

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Summary for Subcatchment 6S: Access Road (WQv CN)

Runoff = 1.53 cfs @ 11.94 hrs, Volume= 0.074 af, Depth= 1.77"

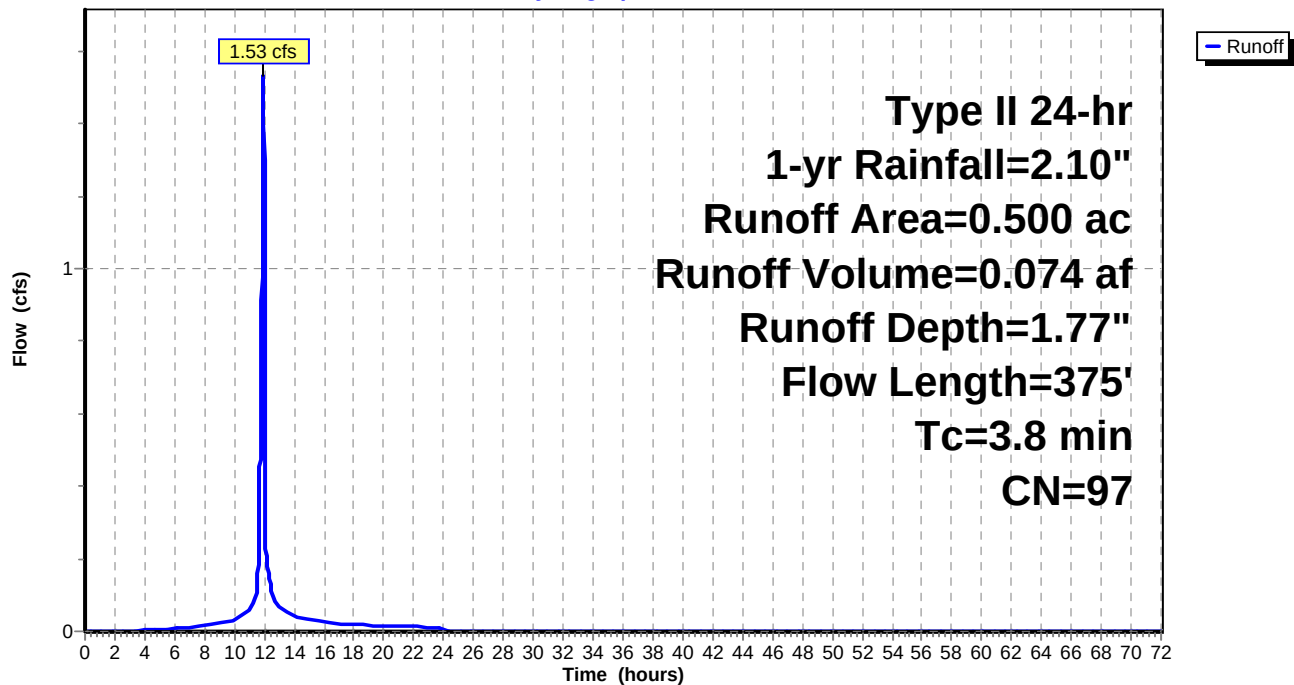
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.10"

Area (ac)	CN	Description
* 0.500	97	Modified CN from WQv flow calc sheet
0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 6S: Access Road (WQv CN)

Hydrograph



BMP Size - Access Road BMP

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Type II 24-hr 1-yr Rainfall=2.10"

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Summary for Subcatchment 18S: Access Road

Runoff = 1.13 cfs @ 11.94 hrs, Volume= 0.056 af, Depth= 1.35"

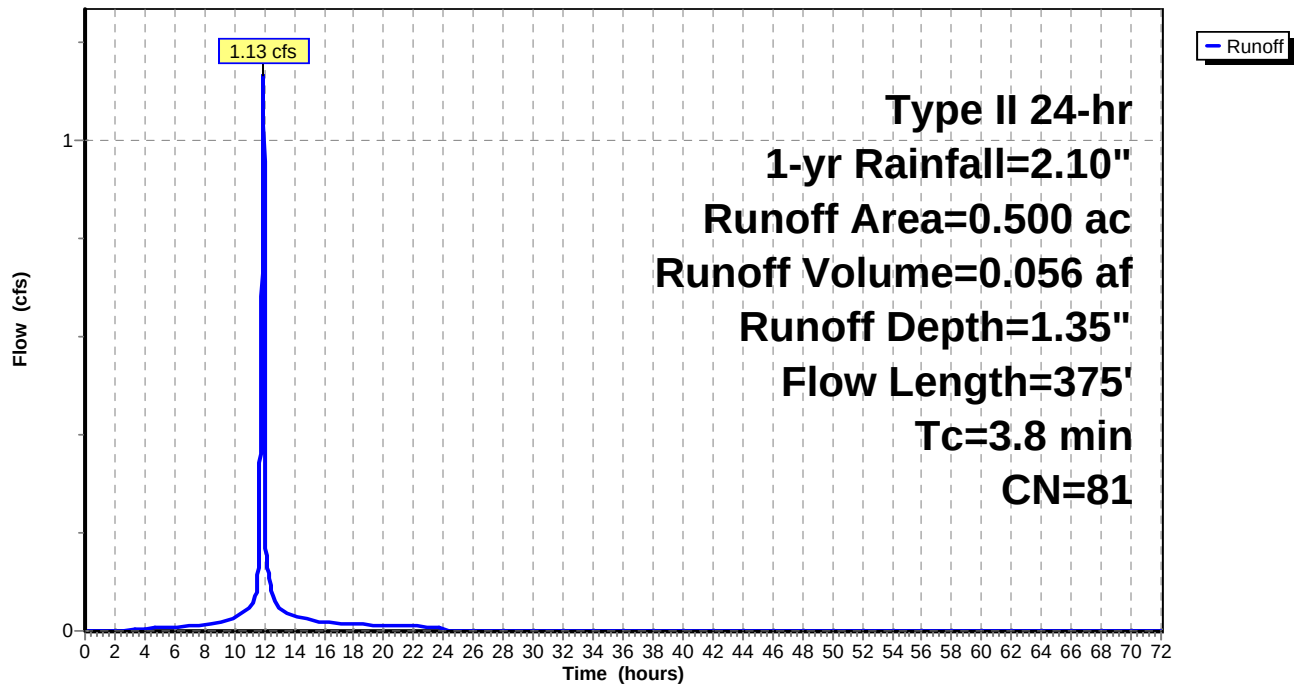
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.10"

Area (ac)	CN	Description
0.360	98	Paved parking, HSG A
0.140	39	>75% Grass cover, Good, HSG A
0.500	81	Weighted Average
0.140		28.00% Pervious Area
0.360		72.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 18S: Access Road

Hydrograph



BMP Size - Access Road BMP

Type II 24-hr 1-yr Rainfall=2.10"

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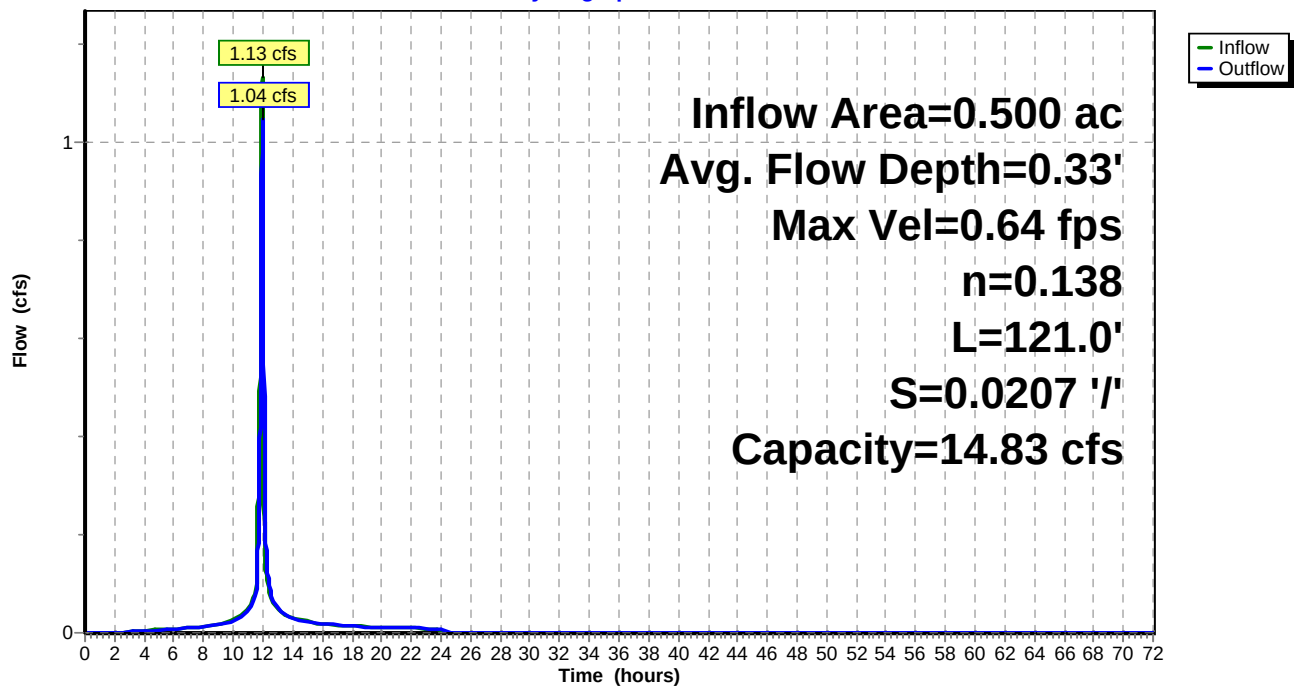
Summary for Reach 9R: Treatment Swale

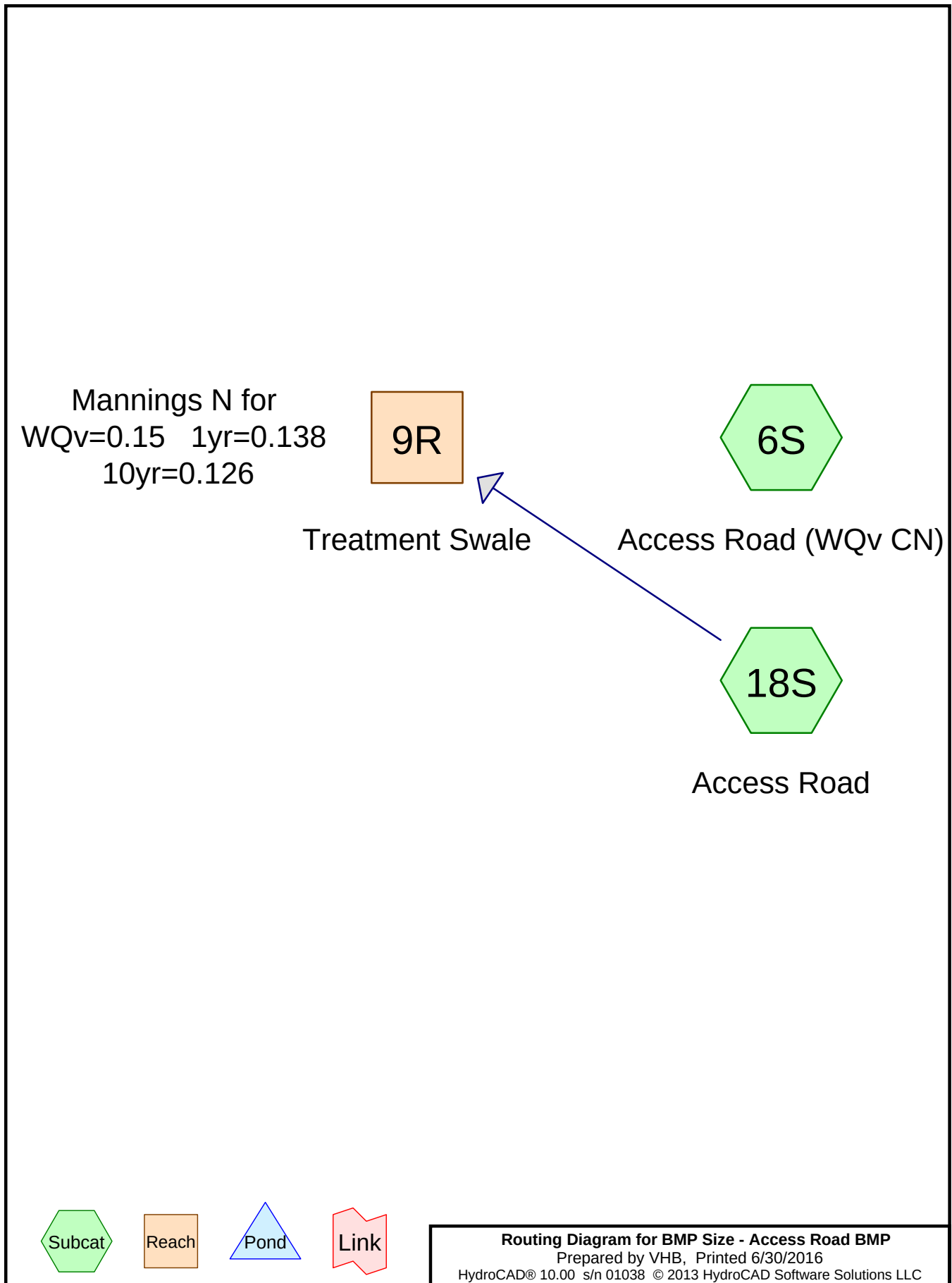
Inflow Area = 0.500 ac, 72.00% Impervious, Inflow Depth = 1.35" for 1-yr event
 Inflow = 1.13 cfs @ 11.94 hrs, Volume= 0.056 af
 Outflow = 1.04 cfs @ 11.97 hrs, Volume= 0.056 af, Atten= 8%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Max. Velocity= 0.64 fps, Min. Travel Time= 3.1 min
 Avg. Velocity= 0.14 fps, Avg. Travel Time= 14.3 min

Peak Storage= 196 cf @ 11.97 hrs
 Average Depth at Peak Storage= 0.33'
 Bank-Full Depth= 1.33' Flow Area= 10.6 sf, Capacity= 14.83 cfs

4.00' x 1.33' deep channel, n= 0.138
 Side Slope Z-value= 3.0 '/' Top Width= 11.98'
 Length= 121.0' Slope= 0.0207 '/'
 Inlet Invert= 123.50', Outlet Invert= 121.00'

**Reach 9R: Treatment Swale****Hydrograph**



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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: Access Road (WQv CN) Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=2.86"
Flow Length=375' Tc=3.8 min CN=97 Runoff=2.39 cfs 0.119 af

Subcatchment18S: Access Road Runoff Area=0.500 ac 72.00% Impervious Runoff Depth=2.14"
Flow Length=375' Tc=3.8 min CN=81 Runoff=1.75 cfs 0.089 af

Reach 9R: Treatment Swale Avg. Flow Depth=0.40' Max Vel=0.79 fps Inflow=1.75 cfs 0.089 af
n=0.126 L=121.0' S=0.0207 ' Capacity=16.24 cfs Outflow=1.64 cfs 0.089 af

Total Runoff Area = 1.000 ac Runoff Volume = 0.208 af Average Runoff Depth = 2.50"
64.00% Pervious = 0.640 ac 36.00% Impervious = 0.360 ac

BMP Size - Access Road BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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Summary for Subcatchment 6S: Access Road (WQv CN)

Runoff = 2.39 cfs @ 11.94 hrs, Volume= 0.119 af, Depth= 2.86"

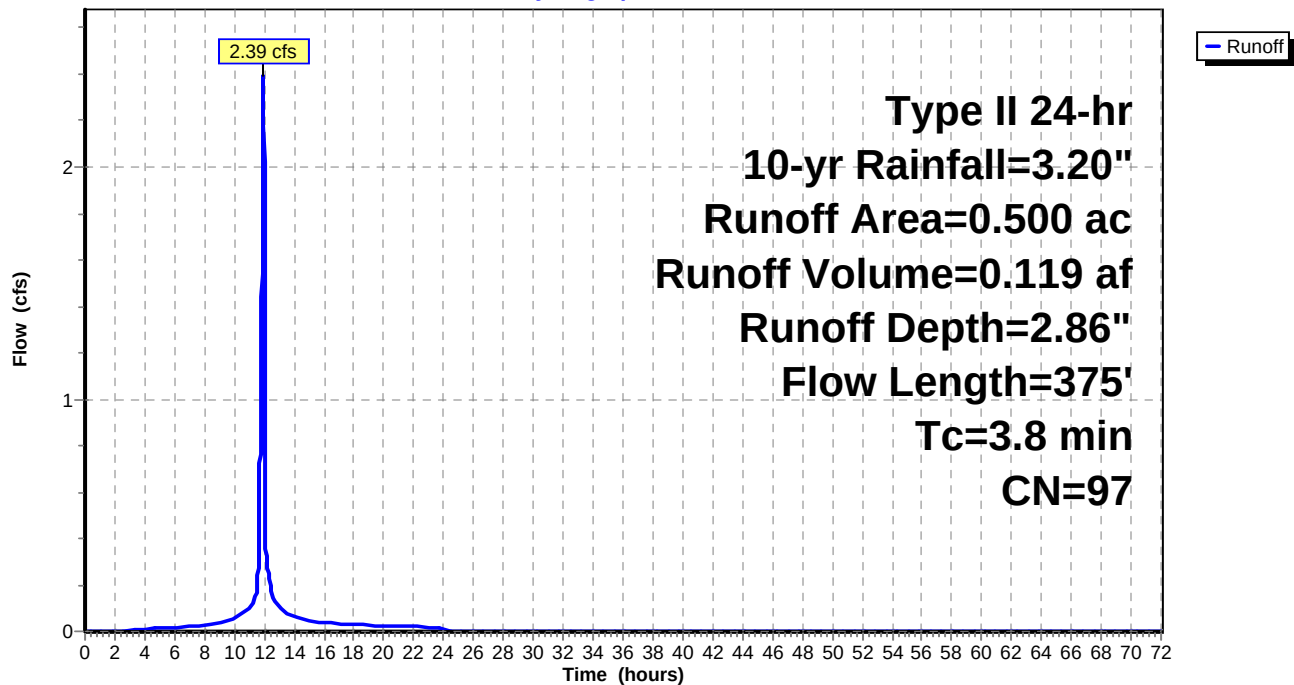
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.20"

Area (ac)	CN	Description
* 0.500	97	Modified CN from WQv flow calc sheet
0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 6S: Access Road (WQv CN)

Hydrograph



BMP Size - Access Road BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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Summary for Subcatchment 18S: Access Road

Runoff = 1.75 cfs @ 11.94 hrs, Volume= 0.089 af, Depth= 2.14"

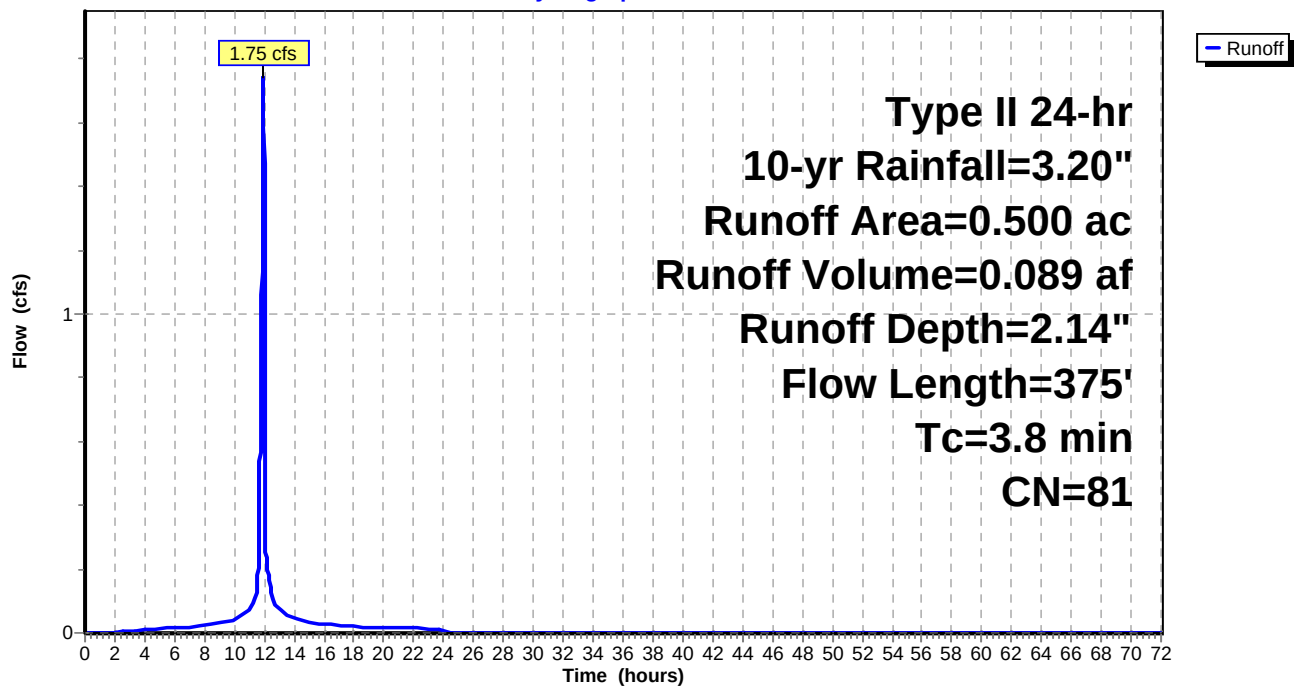
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=3.20"

Area (ac)	CN	Description
0.360	98	Paved parking, HSG A
0.140	39	>75% Grass cover, Good, HSG A
0.500	81	Weighted Average
0.140		28.00% Pervious Area
0.360		72.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0005	0.20		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.30"
1.7	350	0.0280	3.40		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.8	375	Total			

Subcatchment 18S: Access Road

Hydrograph



BMP Size - Access Road BMP

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Type II 24-hr 10-yr Rainfall=3.20"

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Summary for Reach 9R: Treatment Swale

Inflow Area = 0.500 ac, 72.00% Impervious, Inflow Depth = 2.14" for 10-yr event
 Inflow = 1.75 cfs @ 11.94 hrs, Volume= 0.089 af
 Outflow = 1.64 cfs @ 11.96 hrs, Volume= 0.089 af, Atten= 6%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.79 fps, Min. Travel Time= 2.6 min

Avg. Velocity = 0.17 fps, Avg. Travel Time= 11.5 min

Peak Storage= 252 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.40'

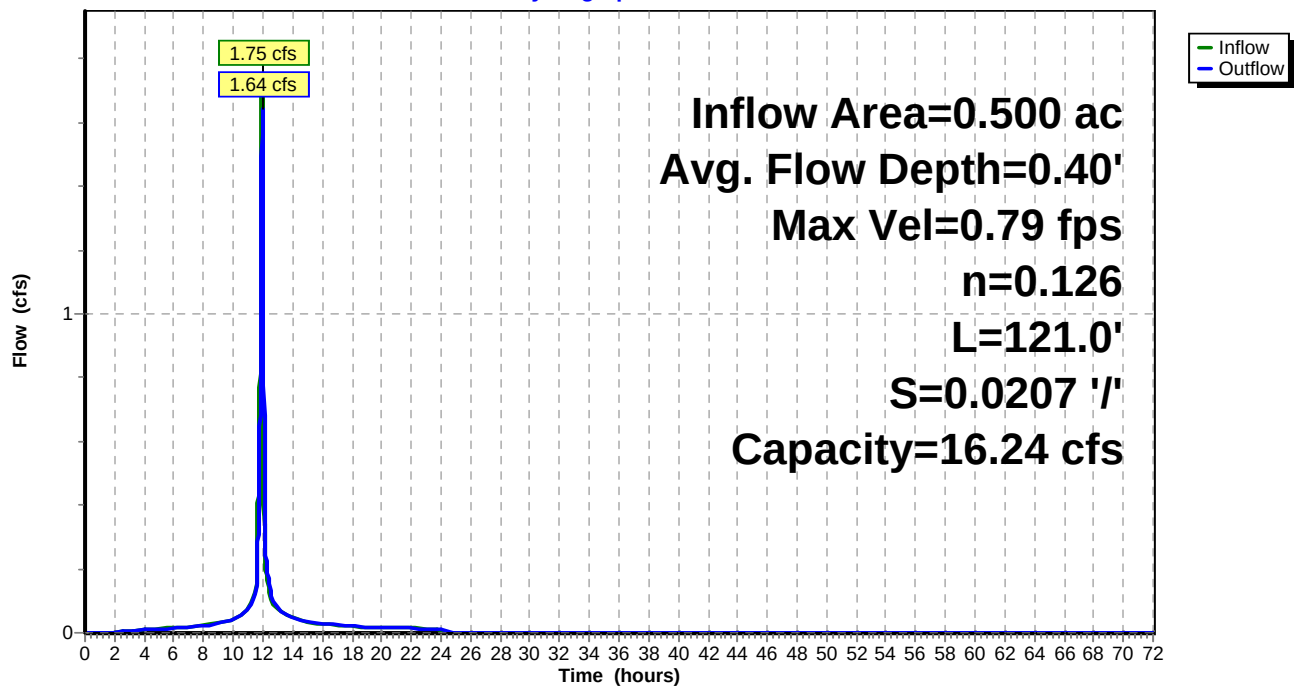
Bank-Full Depth= 1.33' Flow Area= 10.6 sf, Capacity= 16.24 cfs

4.00' x 1.33' deep channel, n= 0.126

Side Slope Z-value= 3.0 '/' Top Width= 11.98'

Length= 121.0' Slope= 0.0207 '/'

Inlet Invert= 123.50', Outlet Invert= 121.00'

**Reach 9R: Treatment Swale****Hydrograph**

Wet Pond (P-2)

Wet Pond # 1

Line **Indicate the treatment standards met for the site area draining to this practice:**

- 1 WQv ☒
 2 Cpv ☐
 3 Qp10 ☐
 4 Qp100 ☐

Water Quality Volume (WQv)

5	What is the WQv (cubic feet) for the site area draining to this practice (from WQv worksheets)?	10213
---	---	-------

Feasibility (2.7.1. A)

	Response	Attachment location
6	Have you performed a site evaluation to establish the Hazard Classification of the pond?	yes
7	Have you determined depth to bedrock and soil properties using geotechnical investigations?	yes

Conveyance (2.7.1.B)

	Response	Attachment location
8	Have forebays been provided at every inlet with 10% or more of the total inflow to the pond?	no
9	Have the outfalls been designed/protected to avoid erosive velocities?	yes

Pretreatment (2.7.1.C)

	Response	Attachment location
10	Has pretreatment been provided for non-rooftop runoff?	yes
11	Is the forebay 4 to 6 feet deep?	N/A
12	Has the forebay been designed with non-erosive outlets?	N/A
13	Has direct access to the forebay been provided for maintenance?	N/A

14	What volume (cubic feet) of water is the forebay (or equivalent upstream pretreatment) sized to contain?	1021
----	--	------

Treatment (2.7.1.D)

	Response	Attachment location
15	Is the length to width ratio for the main cell of the pond equal to or greater than 1.5:1?	yes

16	What volume (cubic feet) of the WQv is contained within the permanent pool?	15006
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Landscaping (2.7.1.E)

	Response	Attachment location
17	Is the main cell of the pond four feet or greater (do not include pretreatment forebay)? If no, skip to Line 23.	no
18	Are the side slopes of the pond 4:1 (h:v) or flatter?	yes / no
20	Is the pond fenced?	
20a	yes → Does the pond have a safety bench of at least 6% grade extending at least 6 feet from the normal water edge?	yes / no / not applicable
20b	no → Does the pond have a safety bench of at least 6% grade extending generally 15 feet from the normal water edge?	yes / no / not applicable
21	Does the pond have an aquatic bench with an irregular configuration at a maximum depth of 18 inches, extending up to 15 feet from the normal water level edge?	yes / no
22	Have all the required elements of the landscaping plan been addressed?	yes / no

Maintenance (2.7.1.F)

	Response	Attachment location
23	Is the principal spillway accessible from land and equipped with a removable trash rack?	yes & no

Cold Climate Design Considerations (2.7.1.G)

	Response	Attachment location
24	Have the potential impacts of Vermont's severe winter climate been addressed in your design?	yes

Pond Stage Storage and Outlet Information

25	At what elevation (feet) does the storage begin during the larger (> 0.9") storm events?	
----	--	--

	Response	Attachment location
26	Does the application include outlet elevation and size information for the pond?	yes / no
27	Has peak storage volume and elevation information for the 1, 10 and 100-year storms been included?	yes / no

Channel Protection Treatment Standard (Cpv)

	Response
28	Check which detention time standard must be used, based on the fisheries designation of the receiving water:
	☐ 12 hours for cold water
	☐ 24 hours for warm water

	Response	Attachment location
29	Did you use the Storage Volume Estimation Method? If yes, skip to Line 37.*	yes / no

*Please review the guidance sheet "Channel Protection Storage Volume Estimation" and attach the specified information. This method is not appropriate if more than one subwatershed drains to the practice. Using the center of mass detention time calculated by a hydrologic model that accounts for pond routing is the preferred method.

30	What storage volume (cubic feet) is necessary to meet the Channel Protection Standard?	
31	What orifice size (inches) is necessary to meet the required detention time?	
32	What is the calculated average release rate (cfs)?	
33	What is the controlled peak release rate (cfs) during the 1-year storm as indicated by the model?	

Overbank Flood Protection Treatment Standard (Qp10)

	Response	Attachment location
34	Have you demonstrated that Qp10 post is less than or equal to Qp10 pre at the discharge point?*	yes / no

*Please include runoff and routing calculations of the 10-year storm event.

Extreme Flood Protection Treatment Standard (Qp100)

	Response	Attachment location
35	Have you demonstrated that Qp100 post is less than or equal to Qp100 pre at the discharge point?*	yes / no

*Please include runoff and routing calculations of the 100-year storm event.

See VSMM-Vol. II, Appendix D7 for guidance about maintaining non-erosive conditions. Forebays should be a minimum of 10% of the WQv. They can be more, but the main cell of the pond should still contain a minimum of 90% of the WQv. Larger storm volumes should begin at the level of the permanent pool. They does not need to be at the elevation of the total WQv, since a portion of the WQv is being addressed through extended detention. While the Channel Protection Treatment Standard only applies to the site, ensure that appropriate overflow outlets are designed to safely release off-site water that may also be entering the pond.

Attachment location: Indicate the specific location (i.e. appendix, page, plan sheet) where the requisite support documentation has been provided within the application

Project Name: Shelburne Transload

Discharge Point: S/N001

3.3 – Disconnection of Non-Rooftop Runoff Credit

Fill out this worksheet for each discharge point drainage area in which you have disconnected all or a portion of your non-rooftop runoff.

Line	Disconnection of Non-Rooftop Runoff Credit Criteria:	Response	
1	Has a typical disconnection detail been included on the site plans?	☐ Yes	☒ No*
2	Is the disconnection on a slope less than or equal to 5%?	☒ Yes	☐ No*
3	Is the maximum contributing length of non-rooftop 75 feet or less?	☒ Yes	☐ No*
4	Is the maximum contributing area less than 1000 square feet? Note: This criterion applies to collected, routed non-rooftop runoff.	☐ Yes	☒ N/A
5	Is the length of the disconnection at least equal to the contributing length?	☒ Yes	☐ No*
6	Does the disconnected runoff drain either as sheet flow or into a subsurface drain that is not directly connected to the drainage network?	☒ Yes	☐ No*
7	Have disconnections located on HSG C or D soils been evaluated to determine if disconnection is appropriate?	☐ Yes	☒ N/A
8	Does the disconnected non-rooftop runoff drain from a "hotspot" land use area?	☐ N/A	☒ No
*If No, please explain why below? 8. the disconnection areas are located along the access road, where low potential for salt spillage exists. Note: To be eligible for the credit all minimum criteria must be met.			

Appendix B: Non-Stormwater Discharges

*Non-stormwater discharges can include discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, or sanitary wastes, and are typically the result of unauthorized connections of sanitary or process wastewater drains to storm sewers. These connections are common, yet often go undetected. Typically these discharges are significant sources of pollutants, and unless regulated by an NPDES permit, they are also illegal.*¹

Record the results of the Non-Stormwater Discharge Assessment and Certification in Worksheet 1.

If evaluation of any discharge points is impossible, then the discharge points of concern and the reasons they could not be evaluated should be recorded on Worksheet 2.

¹ US EPA, 1999. Stormwater Management Fact Sheet: Non-Stormwater Dischargers to Storm Sewers. EPA 832-F-99-022. September 1999.

Worksheet 1: Assessment and Certification of Non-Stormwater Discharges

Date of Test	Outfall	Method Used to Evaluate Discharge	Test Results	Potential Sources	Person or Party Conducting the Test
CERTIFICATION					
I _____ (responsible corporate official) certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.					
Name & Official Title				Area Code and Telephone No.	
Signature				Date Signed	

Worksheet 2: Non-Stormwater Discharge Failure to Certify Notification

Outfall Not Tested/Evaluated	Why Certification is Infeasible	Potential Sources of Non-Stormwater Pollution
CERTIFICATION		
I _____ (responsible corporate official) certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		
Name & Official Title		Area Code and Telephone No.
Signature		Date Signed

Appendix C: **Routine Facility Inspections**

Keep records of all routine facility inspections here.

A sample inspection form has been included.

Routine Facility Inspection Form – Updated October 2017

Date: _____

Completed by: _____

Area Checked	Checked for...	Stormwater Discharge Occurring? (Y/N)	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
			Y	N			
PPS-1: SALT SHEDS AND ADJACENT PAVEMENT							
PPS-1: RAIL SPUR SEGMENT/RAILCAR OFFLOADING & PIT							
PPS-1: SCALE HOUSE AND ADJACENT PAVEMENT							
PPS-1: TRUCK LOADING STRUCTURE							
PPS-2: MAINTENANCE EQUIPMENT							
PPS-3: VEHICLE STORAGE							
PPS-3: CHARGE STATION							
GRASS CHANNEL TO NW POND							
SEDIMENT TRAP NEAR GRASS CHANNEL							

Note: An inspection must be conducted when stormwater discharge is occurring at least once per calendar year

Routine Facility Inspection Form

Date: 9/14/17

Completed by: Brian Barrett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	oil		✓			
SCALE HOUSE	oil, salt		✓			
MAINTANCE EQUIPMENT	Leaking		✓			
GRASS CHANNEL TO N.W. POND	Erosion		✓			
SALT SHED	SALT overage		✓			
CAR UNLOADING	SALT, oil		✓			
SEDIMENT TRAP NEAR GRASS CHANNEL	Erosion		✓			
GRASS CHANNEL	Erosion	✓		Attend of Coluier by Shed Between - Sheds by Rock Ramp Between shed - 1 bend siding	MANH GROW OUT TO WYLMOUT	By Sep. 30
Storage Shed	oil		✓	Equipment Leaking	Clean up oil Fix equipment	

Level Spaced

Stormwater Pollution Prevention Plan

Vermont Railway, Inc. Shelburne Transload Facility, Shelburne, VT

C

Routine Facility Inspection Form

Date: 8/11/17

Completed by: Brian Barrett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	Oil leaks		✓			
SCALE HOUSE	Oil leaks		✓			
MAINTANCE EQUIPMENT	Any leaks		✓			
GRASS CHANNEL TO N.W. POND	Erosion		✓			
SALT SHED 1	SALT over-Flow		✓			
CAR UNLOADING	SALT over Flow Oil Spill		✓			
SEDIMENT TRAP NEAR GRASS CHANNEL	Oil, SALT		✓			
SALT Shed 2	SALT over Flow		✓			

Routine Facility Inspection Form

Date: 7/10/17

Completed by: Brian Barrett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	oil LEAKS		✓			
SCALE HOUSE	oil LEAKS spilled salt		✓			
MAINTANCE EQUIPMENT	LEAKS		✓			
GRASS CHANNEL TO N.W. POND	Erosion		✓			
SALT SHED	spilled salt		✓			
CAR UNLOADING	oil LEAKS Spilled salt		✓			
SEDIMENT TRAP NEAR GRASS CHANNEL	Erosion, Sheen		✓			

Routine Facility Inspection Form

Date: 6/22/17

Completed by: Brian Barnett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	oil Leaks,		✓			
SCALE HOUSE	oil Leaks		✓			
MAINTANCE EQUIPMENT	oil Leaks		✓			
GRASS CHANNEL TO N.W. POND	Erosion Sheen		✓			
SALT SHED	Spilled SALT		✓			
CAR UNLOADING	Spilled salt oil Leaked		✓			
SEDIMENT TRAP NEAR GRASS CHANNEL	Erosion, Sheen		✓			

Routine Facility Inspection Form

Date: 5/17/17 Completed by: Brian Barrett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	Check for Leaks in equipment		✓			
SCALE HOUSE	Oil Leaks, Overage over material		✓			
MAINTANCE EQUIPMENT	Leaks		✓			
GRASS CHANNEL TO N.W. POND	Erosion, Sheen		✓			
SALT SHED	Material overflow	✓		Spillage of salt	Sweep up with Brooms	5/17/17
CAR UNLOADING	Overflow of SALT		✓			
SEDIMENT TRAP NEAR GRASS CHANNEL						

Routine Facility Inspection Form

Date: 4/20/17

Completed by: *[Signature]*

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
Charge Station	checked for leaks		✓			
Scale House	oil leaks, salt spillage		✓			
Maintenance Equipment	leaks		✓			
Grass Channel to N.W. Pond	Erosion, oil sheen		✓			
Salt Shed	Spilled salt		✓			
Car unloading	Material overage		✓			
Sediment Trap Near Glass Channel	Erosion, oil in water		✓			

Routine Facility Inspection Form

Date: 3/18/17 Completed by: _____

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	Leakages & Spills					
SCALE HOUSE	Oil, Salt					
MAINTANCE EQUIPMENT	Leakages					
GRASS CHANNEL TO N.W. POND	Erosion					
SALT SHED	SALT Leaching					
CAR UNLOADING	Spilled salt					
SEDIMENT TRAP NEAR GRASS CHANNEL	Oil Leaks					
	Erosion, Flooding					

Routine Facility Inspection Form

Date: 2/17/17

Completed by: Brian Barnard

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
CHARGE STATION	Checked oil leaks		✓			
SCALE HOUSE	Checked for oil, salt, dirt		✓			
MAINTANCE EQUIPMENT	Checked for leaks		✓			
GRASS CHANNEL TO N.W. POND	Snow Covered		✓			
SALT SHED	locked for salt outside/none		✓			
CAR UNLOADING	Salt under Belt	✓			Cleaned up salt	ASAP
SEDIMENT TRAP NEAR GRASS CHANNEL	Snow Covered		✓			

Routine Facility Inspection Form

Date: 1-12-2017

Completed by: Shayne M. Leggett

Area Checked	Checked for...	Problems?		If yes, describe	Corrective Actions to be Taken	Schedule for Corrective Actions
		Y	N			
Charge Station	leaks, None noted		✓			
Scale House	overage of material on soil, salt, etc.		✓			
Maintenance Equipment	leaks,		✓			
Gross Channel leading into NW	Erosion, Sheen, None noted		✓			
Salt Shed	material overflow		✓			
Coal unloading	None, All material inside overflow of material off Belt,		✓		Material on Pallets to be removed.	ASAP, after trucks are loaded.
Sediment Trap near Gross Chan	6770 MS micro sediment per centimeter		✓			
SN: 002 001	608 MSC Pond		✓			

Appendix D: **Employee Training Records**

Keep a sign in sheet for each employee training session your facility holds and retain them with this SWPPP.

Refresher Course Employee Sign-In Sheet

Date:_____

Initial training completed December 12, 2016

[illegible]

Stormwater Pollution Prevention Plan

Appendix E: **Quarterly Visual Monitoring Inspection Forms**

Keep records of all quarterly visual monitoring inspections here.

A sample inspection form has been included.

Quarterly Visual Inspection Form

Inspections at each outfall should be made within the first 30 minutes of the runoff event.

Observations should note color, odor, turbidity, solids, foam, oil sheen, or any other obvious form of contamination.

Date/ Time	Outfall	Weather Conditions	Observations	Probable Sources of contamination	Action Taken to Prevent in Future
	S/N 001				
	S/N 002				

Date Completed: _____

Complete by: _____

Quarterly Visual Inspection Form

Inspections at each outfall should be made within the first 30 minutes of the runoff event.

Observations should note color, odor, turbidity, solids, foam, oil sheen, or any other obvious form of contamination.

Date/ Time	Outfall	Weather Conditions	Observations	Probable Sources of contamination	Action Taken to Prevent in Future
8/11/17 12:20 PM	S/N 001	Sunny Rain Overnight	Color - Murky Water Below OUTFALL	None	None
8/11/17 12:30	S/N 002	Sunny Rain Overnight	No water	None	None

Date Completed: 8/11/17

Complete by: Britten

Quarterly Visual Inspection Form

Inspections at each outfall should be made within the first 30 minutes of the runoff event.

Observations should note color, odor, turbidity, solids, foam, oil sheen, or any other obvious form of contamination.

Date/ Time	Outfall	Weather Conditions	Observations	Probable Sources of contamination	Action Taken to Prevent in Future
4/20 8:00AM	S/N 001	Light Rain Rainy/ Overcast	Water in Pond NO Signs of oil, salt	None	None
4/20 8:15AM	S/N 002	Light Rain	no water, no Erosion	None	None

Date Completed:

4/20/17

Complete by:

Brian Barnett

Quarterly Visual Inspection Form

Inspections at each outfall should be made within the first 30 minutes of the runoff event.

Observations should note color, odor, turbidity, solids, foam, oil sheen, or any other obvious form of contamination.

Date/ Time	Outfall	Weather Conditions	Observations	Probable Sources of contamination	Action Taken to Prevent in Future
Jan 12 2017 0630	S/N 001	same as Below	water in Pond, Ice over No Signs of Erosion. Tested - 60% MSC.	None	None
Jan, 12 2017 0610	S/N 002	overcast, Raining over night & morning.	No Signs of water in level stream Other than snow melt. No Signs of erosion.	None	None.

Date Completed: 1-12-2017

Complete by: Shayne M. Leggett

Appendix F: **Analytical Monitoring and Quality Assurance Project Plan**

This appendix contains the following information:

- Quality Assurance Project Plan ("QAPP")
- Water Quality Monitoring Data

Records of results from the surface water and groundwater monitoring should be kept in this section of the SWPPP.

A sample storm event form is included.

TRANSLOAD FACILITY PROJECT

Shelburne, Vermont

Prepared for **Vermont Railway, Inc.**
One Railway Lane
Burlington, VT 05401

Prepared by **VHB**
40 IDX Drive, Building 100, Suite 200
South Burlington, VT 05403

Last Revised: October 13, 2017



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1.0 Introduction

At the request of Vermont Railway, Inc. ("VTR"), VHB has prepared this Quality Assurance Project Plan ("QAPP") for water quality monitoring of surface waters and groundwater in the vicinity of the Shelburne Transload Facility ("Project") located at 4744 Shelburne Road in Shelburne, Vermont.

The Project primarily involves the delivery, off-loading, storage and distribution of rail transported salt as well as other rail freight. These activities occur year-round. A rail spur that ties into the existing railroad follows the southern edge of the site and is used to deliver salt. Salt is offloaded from bottom hopper cars into an unloading pit. From the unloading pit the salt is conveyed to trucks which is then transported off site or dumped inside the salt storage shed. Adjacent to the unloading pit is a scale, and the end of the rail spur contains a split track that is used for storing rail cars. A second scale and a temporary office trailer are located east of the southern interior wetland. Stormwater from impervious areas on the site is directed via vegetated swales to a stormwater pond located in the northwest corner of the site or to a water quality swale and level spreader located near the southeast corner of the site. Both treatment practices discharge to the LaPlatte River.

The purpose of the monitoring program presented herein is to evaluate surface water and groundwater quality associated with stormwater discharges from the Project. This QAPP has been prepared in support of the Stormwater Pollution Prevention Plan ("SWPPP"), a requirement of the Multi-Sector General Permit ("MSGP") that has been issued for the Project by the Vermont Department of Environmental Conservation ("DEC").

The Project is not required to obtain an operational phase stormwater permit from the DEC nor to comply with the Vermont Stormwater Rule or Treatment Standards because the Project is subject to federal pre-emption under the Interstate Commerce Commission Termination Act of 1995 ("ICCTA"). However, VTR has voluntarily incorporated applicable elements of the Vermont Stormwater Management Manual ("VSMM") into the stormwater treatment practices used at the site. In support of the MSGP, the SWPPP and its associated documentation, including this QAPP, have been developed for the site in consultation with the DEC Stormwater Program.

1.1 Study Purpose and Objectives

The purpose of the water quality monitoring program ("WQMP") is to provide water quality data that is needed in order to evaluate the status of surface water and groundwater associated with the Project. In particular, the WQMP focuses on criteria incorporated in the Vermont Water Quality Standards ("VWQS"), as adopted from EPA and federal Clean Water Act legislation.

This data is to document compliance with the requirements of the MSGP and to inform the adaptive management process employed as part of the SWPPP. The objectives are to collect baseline (pre-construction) and operational phase (post-construction) data related to the contaminants of concern

and to use that data to evaluate the effectiveness of good housekeeping efforts and other best management practices that are used at the site pursuant to the SWPPP.

This QAPP and the results gathered in accordance with the QAPP is maintained in SWPPP Appendix F - Analytical Monitoring. This Appendix is updated as necessary to reflect changes to site operations or permit conditions. Specific WQMP details including monitoring locations, monitoring frequency, data standards, and reporting requirements are specified below.

1.2 Project Organization

The WQMP consists of the following components:

- Surface Water Monitoring (see section 2.3)
- Groundwater Monitoring (see section 3.3)

VHB (South Burlington, Vermont) conducts water chemistry sampling and provides overall project oversight and reporting. Chemical analysis of water samples is performed by Endyne, Inc. ("Endyne") of Williston, Vermont. The roles and responsibilities of these organizations are summarized below.

1.2.1 VHB

- perform overall project coordination, oversight, and assessment
- water chemistry sample collection
 - field analysis and assessment
 - sample delivery to Endyne
 - maintain sampling quality control
 - perform data processing, data processing quality control, data quality review, and data evaluation
- submit monitoring reports to DEC

The sampling activities will be performed by the following qualified personnel:

<u>Technical Project Manager:</u>	Erik Urch, Senior Project Manager, (802) 497-6191
<u>Quality Assurance Personnel:</u>	Meddie Perry, Senior Scientist, (802) 497-6154
<u>Field Operations Manager:</u>	Elvin Cordero, Environmental Scientist, (802) 497-6197

1.2.2 Endyne, Inc.

- Laboratory analysis
- Laboratory quality control
- Reporting laboratory results to VHB

Quality Assurance Officer: Dr. Harry Locker, Laboratory Director, (802) 879-4333

1.3 Quality Objectives and Criteria

The data quality objectives for the WQMP are to qualitatively determine the applicable chemical and physical water quality of surface waters and groundwater that may be impacted by the operation of the Project. To ensure that the quality objectives are met, all sampling will occur in strict accordance with the specifications presented in this QAPP.

This QAPP has been prepared in accordance with the U.S. Environmental Protection Agency ("EPA") Requirements for Quality Assurance Project Plans (EPA 2001).

1.4 Documents and Records

Record keeping is coordinated by VHB, which maintains digital WQMP Project files of all materials associated with this QAPP.

Laboratory reports of the analytical data are provided to VHB from Endyne after the completion of each sampling event. These reports are provided within a typical turn-around time frame (two to three weeks after sample receipt), and are presented in the standard reporting format used by Endyne. Field data and records of calibration of field equipment provided by VHB are scanned from the field notebook(s) and stored in the Project file; photograph logs are also stored in the Project file.

In addition, any difficulties encountered during the field sampling or laboratory analysis processes are. Any difficulties encountered during the sampling episode are recorded in the field book, and any laboratory analytical difficulties are reported on the laboratory reports.

All Project files are maintained at their respective locations (i.e., VHB and Endyne) for a minimum period of three years.

2.0 Surface Water Monitoring Workplan

2.1 Monitoring Locations

Four monitoring locations were identified that are used to characterize surface waters associated with the Project.

Two of these locations are associated with the stormwater treatment practices within the Project area and include the outlets from the stormwater pond and from the water quality swale. These locations correspond to discharge point serial number ("S/N") 001 and S/N 002 identified in the SWPPP and are shown on the Onsite Water Quality Monitoring Locations map included on page 1 of the Appendix.

S/N 001: Outlet from the stormwater treatment pond near the northwest corner of the site.

S/N 002: Outlet from the water quality swale to the level spreader near the southeast corner of the site

The other two surface water monitoring locations are located at or near monitoring sites that were previously established by the LaPlatte Watershed Partnership in conjunction with the Vermont Department of Environmental Conservation Watershed Management Division. These sites are included in the Vermont Integrated Watershed Information System ("IWIS") database which publishes water quality and water chemistry results throughout the State. These locations are shown on the Offsite Water Quality Monitoring Locations map included on page 2 of the Appendix.

DEC ID 500789: Upstream of the Project site. Located near the intersection of the LaPlatte River and Shelburne Road (U.S. Route 7). In order to include the impacts of stormwater runoff from Route 7 in the LaPlatte, this station is located approximately 400 feet downstream from the site that was previously monitored by DEC.

DEC ID 500785: Downstream of the Project site, upstream of the confluence of the LaPlatte River and McCabes Brook. Located off the trail at the end of Yacht Haven Drive.

Stream flow data for the LaPlatte River is obtained from the U.S. Geological Survey ("USGS") stream gage located upstream from the Project off Falls Road in Shelburne. This gage (Station ID 04282795) is shown on the Offsite Water Quality Monitoring Locations map included on page 2 of the Appendix.

2.2 Monitoring Schedule

The Project conducts two baseflow (dry weather) and two event flow (wet weather) sampling events each year at the LaPlatte River monitoring stations. Wet weather samples are also collected at the outlets from the on-site stormwater treatment practices during the same storm events that are sampled at the

LaPlatte River monitoring stations. No dry weather flow is anticipated to occur at the outlets from the stormwater treatment practices and therefore no samples will be collected. Baseflow and event flow samples are collected between May 1 and November 1 of each year.

In addition, continuously recording conductivity meters are deployed at the LaPlatte River and at the outlets of the stormwater treatment practice monitoring stations when safe to do so during ice-off conditions, generally between April 15 and December 15 each year. The meters are programmed to record specific conductivity at a minimum of once every 15 minutes. The meters may also be deployed periodically throughout the winter months if a warming period is anticipated that may result in significant snowmelt or stormwater runoff.

2.3 Monitoring Methods

Weather conditions at the time of sampling are recorded and reported rainfall depths for the 72 hours prior to sampling are provided using publicly-available sources (e.g., National Weather Service, US Geological Survey or other nearby rain gages). Stream flow data from the USGS gage on the LaPlatte River (Station ID 04282795, LaPlatte at Shelburne Falls) is also provided. Samples are collected by VHB and analyzed by VHB (field measurements only) or by Endyne (laboratory analyses).

2.3.1 Water Chemistry Monitoring

Water chemistry monitoring for both baseflow and event flow samples include the following parameters:

- pH (field measurement only)
- Temperature (field measurement only)
- Conductivity (field measurement only)
- Total Suspended Solids (TSS)
- Chloride
- Total Phosphorous

Baseflow monitoring is scheduled and conducted at the stations identified in section 2.1. Sample collection will follow at least a 48-hour period with no precipitation that generates runoff. Event flow sampling at the stations identified in section 2.1 is conducted during a precipitation event that generates runoff. Wet weather event monitoring takes place within the first 30 minutes of a precipitation or snowmelt event if possible, but no more than 60 minutes after onset. Precipitation events must be greater than 0.1 inches in magnitude and occur at least 72 hours after the last runoff producing event.

Qualified VHB personnel monitor precipitation conditions and conduct baseflow and event flow sampling at appropriate times. The date and time of sampling, sampler name, and weather conditions is recorded in a field notebook. VHB personnel compile field notes that will include the date and time of

each sample. The sequence of storm events is also recorded. The amount of rainfall preceding the sampling event is included in the field notes.

The turbidity, conductivity, pH, and temperature analyses are conducted in the field by VHB personnel. The remaining analyses are conducted by Endyne laboratory. Sample analysis and physical sample parameters are listed in Table 1 below.

Table 1: Surface Water Quality Monitoring Methods					
Parameter	Locations	Sample Container	EPA Method	Sample Preservation	Holding Time
Total Suspended Solids	All	1L plastic or glass	SM-2540 D	Cool, 4°C	7 days
Total Phosphorous	All	60 mL glass	SM 4500 P-F	Cool, 4°C, H ₂ SO ₄	28 days
Chloride	All	50 mL plastic or glass	EPA 300.0	none	28 days
pH	All	Field Measurement			
Temperature	All	Field Measurement			
Conductivity	All	Field Measurement			
Turbidity	All	Field Measurement			
EPA: EPA Methods for the Chemical Analysis of Water and Wastes					

Sample Collection Details

Each surface water sample is a grab sample taken at each of the fixed sampling stations via direct sample collection into laboratory containers. The laboratory-supplied sampling containers are held in the main channel facing upstream and located upstream of the sampling personnel to ensure that undisturbed, representative samples are collected. Sample containers are gently raised and lowered in order to collect water from throughout the entire water column. Care is taken to fill the sample bottles to laboratory-specified limits without the loss of any preservative that may be present in the sampling containers. Upon sample collection, sample containers are immediately placed on ice in a cooler to maintain 4°C temperature conditions.

Field Measurement Details

Field-collected measurements (i.e., temperature, pH, conductivity, turbidity, and dissolved oxygen) are made using the following instrumentation:

- Conductivity and Temperature: YSI 30 or equivalent conductivity and temperature meter (base and event flow monitoring); Onset Hobo U24 Conductivity Logger or equivalent (continuous monitoring)
- pH and Temperature: YSI 60 or equivalent pH/temperature meter
- Dissolved Oxygen: YSI 55 or equivalent dissolved oxygen meter
- Turbidity: LaMotte 2020 Turbidimeter or equivalent (EPA 180.1 compliant), turbidity meter.

All measurements collected using these meters are in accordance with the manufacturers' specifications, as provided in their respective operations manuals. Meter calibration is performed prior to conducting sampling and on an ongoing basis in accordance with manufacturers' specifications. The measurements are collected in-situ at each of the sampling stations.

3.0 Groundwater Monitoring Work Plan

3.1 Monitoring Locations

A total of eight groundwater monitoring wells have been installed to evaluate groundwater quality based on hydraulic gradient and potential pollutant source areas. The wells were positioned generally both upgradient and downgradient of the unloading area and downgradient of the loading area and stormwater pond. No wells have been installed adjacent to the water quality swale (level spreader) since this feature treats runoff from a small portion of the site which does not include any loading or unloading areas of potential pollutant concern. Specific locations are listed below and illustrated on the Onsite Water Quality Monitoring Locations map included on page 1 of the Appendix.

MW 300: Upgradient from the unloading area, adjacent to the northern interior wetland.

MW 301: Upgradient from the unloading area, adjacent to the southern interior wetland.

MW 301A: Approximately 20 feet north of MW 301, adjacent to the southern interior wetland.

MW 302: Downgradient from the unloading area, west of the salt storage shed.

MW 303: Downgradient from the unloading area, northwest of the stormwater pond.

MW 304: Downgradient from the unloading area, north of the stormwater pond.

MW-305: Upgradient from the unloading area, adjacent to northern drainage swale.

MW-306: Downgradient from the unloading area, south of salt offloading pit.

3.2 Monitoring Schedule



Groundwater monitoring wells are sampled at least once per quarter during the first two years of operations. If no significant change to the chloride concentrations in shallow groundwater is observed, the sampling schedule is proposed to be reduced to semi-annually (May and October) pending discussion with DEC.

3.3 Monitoring Methods

Monitoring well samples are collected via approved VHB Low Flow sampling Standard Operation Procedure ("SOP") outlined below in section 3.3.1. The date and time of sampling, sampler name, and weather conditions are recorded in a field notebook. VHB personnel compile field notes that include the date and time of each sample. Sample analysis and physical sample parameters are listed in Table 2 below.

Table 2: Groundwater Quality Monitoring Methods					
Parameter	Locations	Sample Container	EPA Method	Sample Preservation	Holding Time
Chloride	All	50 mL plastic or glass	EPA 300.0	None	28 Days
pH	All	Field Measurement			
Temperature	All	Field Measurement			
Conductivity	All	Field Measurement			
Turbidity	All	Field Measurement			
EPA: EPA Methods for the Chemical Analysis of Water and Wastes					

3.3.1 Low Flow Groundwater Sample Collection Procedure

Low Flow Groundwater Sample Collection

Low Flow groundwater sampling is used to collect water samples that reflect the total mobile organic and inorganic loads transported through the subsurface under ambient flow conditions with minimal physical and chemical alterations from sampling operations. In essence, indicator parameters are monitored while using low pumping rates to determine when groundwater stabilization occurs and subsequently when sample collection may begin.

Low Flow groundwater samples are collected in general accordance to the USEPA Region 1 Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells (EPA, 2017). Additional information can also be found in Standard References for Monitoring Wells, DEP Publication #WSC-310-91 (Massachusetts Department of Environmental Protection, 1991)

Equipment

Pumps:

If the hydraulic head of the well is less than 20 feet, a peristaltic pump and dedicated disposable tubing is utilized.

If the hydraulic head of the well is greater than 20 feet, an appropriately sized stainless steel low-flow submersible pump equipped with disposable or dedicated tubing is utilized. Geo-sub, Grundfos pumps or bladder pumps are appropriate examples of submersible pumps.

The pumps run off of a power source. Usually, peristaltic pumps require a battery pack or car battery while submersible pumps may require a generator.

- It is important to note in the field notebook which pumps are used at each well for applicability to Equipment Blank samples. Each pump will have a specific serial number.

Tubing

Tubing is Teflon or Teflon lined polyethylene tubing (preferably 1/4 inch internal diameter for peristaltic set up or 3/8 inch internal diameter for submersible pump set up). Silastic tubing is used for the section around the rotary head of the peristaltic pump. Metal barb fittings can be used to splice lengths of tubing together. These barbs need to be decontaminated prior to use in each well (see decontamination procedure below).

Water Level Indicator

A water level probe is required to measure water levels and drawdown in the well. The water level probe is capable of a 0.01 foot accuracy.

A steel tape measure with a weighted plumb bob is used to sound the total depth of the wells.

Monitoring Equipment

A YSI multi-phase meter fitted with a transparent 250 mL flow-through-cell is used. The YSI meter is capable of measuring pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), specific conductance and temperature.

Turbidity measurements is completed with the use of a LaMotte turbidity meter. Turbidity samples is collected from the outlet of the flow-through-cell using a T-connection barb which can be opened or closed to allow the passage of water.

The YSI and turbidity meter is calibrated at the beginning of each day of sampling. A calibration check is performed at the end of each day to verify that the instrument is functioning properly. In addition, calibration checks can be performed at any time during the sampling day at the samplers' discretion.

- Daily calibration documentation is recorded in the field notebook
- It is important to record in the field notebook which meters are used at each wells for applicability to calibration notes. Each meter will have a specific serial number.

Water Level Measurements

Prior to monitoring or pumping the sampler should measure water level depth and total well depth and record in the field book. Care should be taken to minimize water column disturbance.

After the initial sampling round, total well depth is measured annually to minimize water column disturbance, unless a 'silting' problem is apparent. Measurements of total depth will indicate whether a well is filling-in due to silt accumulation. It is recommended that subsequent total depth measurement occur after well purging/sampling to minimize water column disturbance.

Installing the Pump

For a submersible pump, attach the tubing to the pump head. Lower the pump head, tubing and electrical line using the safety cable, taking care to minimize water column disturbance. Lower the pump to the appropriate depth (see note below). Secure the cables and tubing to the well casing using a fastener or clip. Connect the discharge end of the tubing to the flow-through-cell/YSI and connect the pump to the power source.

For a peristaltic pump, lower the tubing down the well to the appropriate depth (see note below), taking care to minimize water column disturbance. Connect the tubing to appropriately size silastic tubing which will fit the pump rotary head. Connected the discharge end of the silastic tubing to the flow-through-cell/YSI and connect the pump to the power source.

The pump head/tubing intake should be located at an appropriate depth that will remain underwater at all times. If the well screen interval is known, then the pump head/tubing intake should be placed in the center of the well screen interval. If the well screen interval is not known then the pump head/tubing intake should be placed 2 to 5 feet from the bottom of the well to minimize mobilization of particulates present at the bottom of the well. It is recommended that the intake depth remain the same for each well for each sampling event.

Purging

Start the pump at a relatively low speed and slowly increase the speed until discharge occurs. Try to match pumping rate used during previous sampling events (if known) for consistency. Adjust the pump speed until there is little to no water level drawdown (as measured with a water level meter at 5 minute intervals) and record any pumping rate adjustments.

- The pumping rate should remain constant while monitoring indicator parameters and while collecting samples
- The pump must be able to 'turn over' a flow-through-cell volume between measurements (i.e. 250 mL vessel with a pumping rate of at least 50mL/min)

Purge water is discharged into a graduated bucket and total amount of purge water is noted on the field sheet.

If initial purge water is silty or cloudy then disconnect from the flow-through-cell and discharge the water directly to the graduated bucket. Clean the flow-through-cell of silt or debris with deionized water. Continue to measure water levels at 5 minute intervals until the water clears, then re-connect to the flow-through-cell and continue monitoring.

Monitoring of Indicator Parameters

Wait for the flow-through-cell to completely fill. When discharge occurs from the cell, begin monitoring indicator parameters at 5 minute intervals. Stabilization of the parameters is considered to have occurred once the change between 2 consecutive readings is within the limits in Table 3 below:

Table 3: Groundwater Monitoring Indicator Parameters		
Indicator Parameter	Units	Stabilization
Temperature	°C	3% *
pH	s.u.	±0.1 s.u.
Specific Conductance	mS/cm	3% *
DO	mg/L	10% *
ORP	mV	±10 mV
Turbidity	NTU	10% *
* Denotes percent change between current reading and previous reading.		

If after 2 hours of purging, indicator parameters have not stabilized, samples are collected but data will need to be qualified and noted that stabilization did not occur.

If the flow-through-cell needs to be cleaned during purging, continue pumping and disconnect the cell for cleaning, then reconnect after cleaning and continue monitoring. Record cleaning time interval and purpose.

Collecting Water Samples

Once stabilization has been attained, or the well has been purged for 2 hours, samples may be collected.

Pumps should not be removed between purging and sampling operations and the pumping rate should remain constant. While the pump is still running, disconnect the flow-through-cell and T-connector barb and collect a sample directly from the pump's tubing.

- Samples must NOT be collected from the flow-through-cell outlet.

Water samples shall be preserved according to the protocol established for the specific analytical method and for specific regulatory requirements (see sub-sections below for specific analysis requirements). The laboratory should be contacted to ensure that the proper sample preparation and sample preservation measures are taken prior to receipt of sample containers.

Samples are collected in pre-cleaned glass or plastic containers and stored in a clean cooler with ice packs to preserve the samples (approximately 4°C). Samples are submitted on the same day of collection to a certified laboratory for chemical analysis. The samples will remain refrigerated at the laboratory until analysis is completed.

Decontamination Procedure

Decontamination of submersible pumps should occur prior to sampling the first well and following sampling of each well thereafter. The pump, support cable, electrical wires, fittings and water level probe should be decontaminated by:

- Flushing/Rinsing with potable water
- Flushing/Rinsing with non-phosphate detergent solution
- Flushing/Rinsing with potable water
- Flushing/Rinsing with methanol or isopropyl alcohol
- Flushing/Rinsing with distilled/deionized water (cannot be recycled water)

*Do not use distilled/deionized water stored in plastic (polyethylene) containers for decontamination as the plastic will leach phthalates and may actually introduce contamination. Instead, Nalgene glass, or Teflon vessels/bottles should be used.

Decontamination solution can be pumped from buckets through the pump and can be recycled but must be periodically changed. It is recommended that detergent and alcohols be used sparingly and that water flushing be extended.

Tubing is disposable or dedicated to a specific well and, therefore, should not require decontamination.

If dedicated disposable tubing cannot be utilized then Equipment Blanks are required. The Equipment Blank is collected to determine if the sampling pump imparts analyte carry over from well to well. Decontamination of the pump and cable should be followed in order to minimize or eliminate carry over. Equipment Blank samples are collected by passing clean deionized water through the pump and collecting the discharge. The Equipment Blank will include the pump only as tubing will either be disposable or dedicated.

- If the pump is dedicated to the well, the Equipment Blank is collected prior to its placement in the well.
- If the pump is used to sample multiple wells, the Equipment Blank is normally collected after sampling from contaminated wells and not after background wells. One Equipment Blank per pump set-up, per day is required.

Additional Considerations

It is recommended that low flow sampling be conducted when air temperature is above 32°F (0°C). If used below this temperature special precautions will need to be taken to prevent groundwater from freezing in the equipment. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically.

If sampling occurs in direct sunlight or hot ambient air conditions, air temperature may cause groundwater in the tubing and flow-through-cell to heat up. During these conditions, the sampler will need to shade the equipment and the tubing exiting the monitoring well should be kept as short as possible.

4.0 Quality Control

4.1 Water Chemistry Sample Handling and Custody

Upon sample collection, sample containers are immediately placed on ice in a cooler to maintain 4°C temperature conditions. As shown in Tables 1 and 2 above, the constituent with the shortest holding time is total suspended solids with a holding time of seven days. Following completion of sample collection, the samples are transported by the sampler directly to Endyne Laboratory. An Endyne Chain-of-Custody form is completed for each sampling event, and presented upon sample delivery to

laboratory personnel. Chain-of-Custody forms are used to identify and document all persons having contact with the samples. These forms are kept in a permanent Project file at Endyne and are available for inspection during normal business hours.

When samples are received by the laboratory, they are logged into the master log and given a number. A laboratory analysis sheet is generated and analytical duties are assigned. A bound laboratory notebook is maintained for each analytical parameter. Results of sample analyses, as well as calibration curve data, and results of spikes and duplicates are recorded in these notebooks. The samples are analyzed in conjunction with quality control samples. If all data are within quality control specifications, the data and the quality control information are reported. If an out-of-control situation exists, the laboratory supervisor is notified and the problem is resolved. The Field Operations Manager is notified of all such occurrences in writing. If unusual or unexpected results are obtained on the Project, the Field Operations Manager is notified, and a course of action is chosen. When the laboratory analysis sheet is completed, the data are reviewed and a laboratory report is prepared.

4.2 Laboratory Quality Assurance and Quality Control Procedures

Quality control for the field sampling activities are achieved by strictly following the sampling procedures described in Section 2.2.4. Quality control activities for the laboratory include the following:

1. All samples are prepared and analyzed by the requirements outlined in the analytical methods presented in Table 3, and are analyzed within specified holding times.
2. All laboratory instrumentation are calibrated with the appropriate frequency and verified by the requirements of the analytical methods.
3. Analysis of blank samples are done to determine if the analytical results are affected.
4. Analytical method precision and accuracy are monitored by laboratory control standards which include matrix spike, duplicate, and quality control analysis.

All quality control information and laboratory reports are reviewed by the laboratory director. As well as maintaining an internal quality control program, Endyne participates in the EPA's semi-annual Water Supply and Water Pollution Proficiency Studies.

Table 4 reports method detection limits, as well as accuracy and precision protocols.

Table 4: Laboratory Accuracy and Precision Procedures					
Parameter	Detection Limit	Established Accuracy	Accuracy Protocol	Precision	Precision Protocol
Total Suspended Solids	1.0 mg/L	± 20%	1	20%	3
Chloride	2.5 mg/L	± 15%	1	20%	2
Total Phosphorous	0.005 mg/L	± 30%	1	33%	3
(1) Laboratory Fortified Blank (2) Matrix Spike Duplicates (3) Duplicates					

4.3 Instrument/Equipment Testing, Inspection, Maintenance and Calibration

Professional scientific grade conductivity, turbidity, pH and temperature meters are used for field measurements for the surface water quality monitoring. Maintenance, testing, and calibration of the meters used for field measurements are performed in accordance with manufacturer's specifications as presented in the operations manual for the instrument. See page 3 of the Appendix for accuracy and resolution information for the field meters.

Laboratory equipment is tested, maintained, and calibrated by Endyne personnel. See pages 4 through 6 of the Appendix for the Statement of Qualifications provided by Endyne. A manual is kept at Endyne, enumerating the procedures used by the laboratory. These procedures are available upon request.

4.4 Inspection/Acceptance of Supplies

All sampling containers are provided directly to VHB from Endyne. Upon receipt of the sampling containers, prior to sampling, VHB personnel inspects the sampling containers supplied by the laboratory. The containers are inspected for the presence of tightly fitting lids, the presence of preservative, and the general condition. Only containers found to be intact and complete are used for sampling.

4.5 Data Management

Water quality data is managed by VHB. Field data is collected in Project-specific field book(s). These data are photocopied and placed into the Project file after the completion of each sampling episode. Laboratory analytical data is provided to VHB by Endyne upon the completion of sample analysis after each sampling episode. All water quality data, field-collected and laboratory analytical, are entered into a Microsoft® Excel spreadsheet maintained for the Project. Within the spreadsheet, one page is dedicated to each specific sampling location. The data within the spreadsheet is checked against original

field data and laboratory analytical reports to ensure accuracy by a person uninvolved in the sampling and data entry.

4.6 Assessment and Oversight

It is not anticipated that an intensive assessment and oversight program will be necessary to achieve the required data quality and goals of this Project. However, at the discretion of VHB, sampling procedures, field sampling instrumentation, data quality, and Project management systems may be reviewed at any time during the monitoring program. Any reviews will help ensure that the data collection and analysis methods presented in this QAPP resulted in the collection of water quality data necessary to achieve the goals of the Project.

5.0 Data Validation and Usability

5.1 Data Review, Verification, and Validation

Upon inspection of the field-collected and laboratory analytical data, the data is accepted for the monitoring program, unless there is a noted occurrence of field instrumentation malfunction, or laboratory note indicating that the required analysis was not performed in accordance with one or more of the criteria associated with the particular analysis. These conditions are clearly noted within field data collection notes, and on laboratory analytical reports.

The analysis of grab samples performed using the laboratory and field data collection techniques described above provide direct measurements of water quality parameters at the time the samples are collected. In addition, collection of paired chloride and conductivity measurements are used to validate a regression equation that is used to convert the continuous conductivity data to estimate chloride concentrations in the LaPlatte River and in stormwater discharges from the facility. These estimated chloride concentrations are evaluated over the durations of time specified in the VWQS and compared to the chloride loading analysis that was performed in support of the Shelburne Transload Project's MSGP application. Compliance with the chronic concentration (4 day average) and acute concentration (1 hour average) criteria is most effectively demonstrated using continuous conductivity data that can be time-averaged for the required period. The results obtained from the paired sampling are compared to the state-wide conductivity/chloride regression equation¹ (DEC, 2016) to determine if site-specific adjustments are necessary.



1. Chloride (mg/L) = 0.292 * Conductivity (µS) – 69.72; $r^2 = 0.94$

5.2 Verification and Validation Methods

A Quality Assurance/Quality Control Policy Statement for Endyne is included on page 6 of the Appendix.

5.3 Reconciliation with User Requirements

All data that are validated using the methods described above are considered to be suitable for use in meeting the objectives of this monitoring program.

6.0 Reporting

VHB prepared and submitted a summary report to DEC of the results of the 2017 WQMP as a part of the Annual Compliance Report to DEC in accordance with conditions of the MSGP. VHB is responsible for coordination, data reduction, calculations, evaluation of compliance with VWQS, and preparation of the water quality monitoring report that summarizes results, including maps, data statistics, photographs, and observations. Additional monitoring reports will be submitted as outlined above.

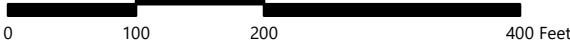
References and Resources

- Massachusetts Department of Environmental Protection, 1991. Standard References for Monitoring Wells, Massachusetts Department of Environmental Protection, DEP Publication #WSC-310-91.
- US Environmental Protection Agency - Region 1, 2017. Low Stress (Low Flow) Purging and Sampling Procedure for the collection of Groundwater Samples from Monitoring Wells. EQASOP-GW 001, Revised September 19, 2017.
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- US Environmental Protection Agency, 2001. EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. March 2001.
- Vermont Department of Environmental Conservation – Water Quality Division, 2012. Field Methods Manual, May 2012.
- Vermont Department of Environmental Conservation – Watershed Management Division, 2017. Vermont Water Quality Standards – Environmental Protection Rule Chapter 29(a). Effective January 15, 2017.
- Vermont Department of Environmental Conservation – Watershed Management Division, 2016. Vermont Surface Water Assessment and Listing Methodology, March 2016.

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APPENDIX 1

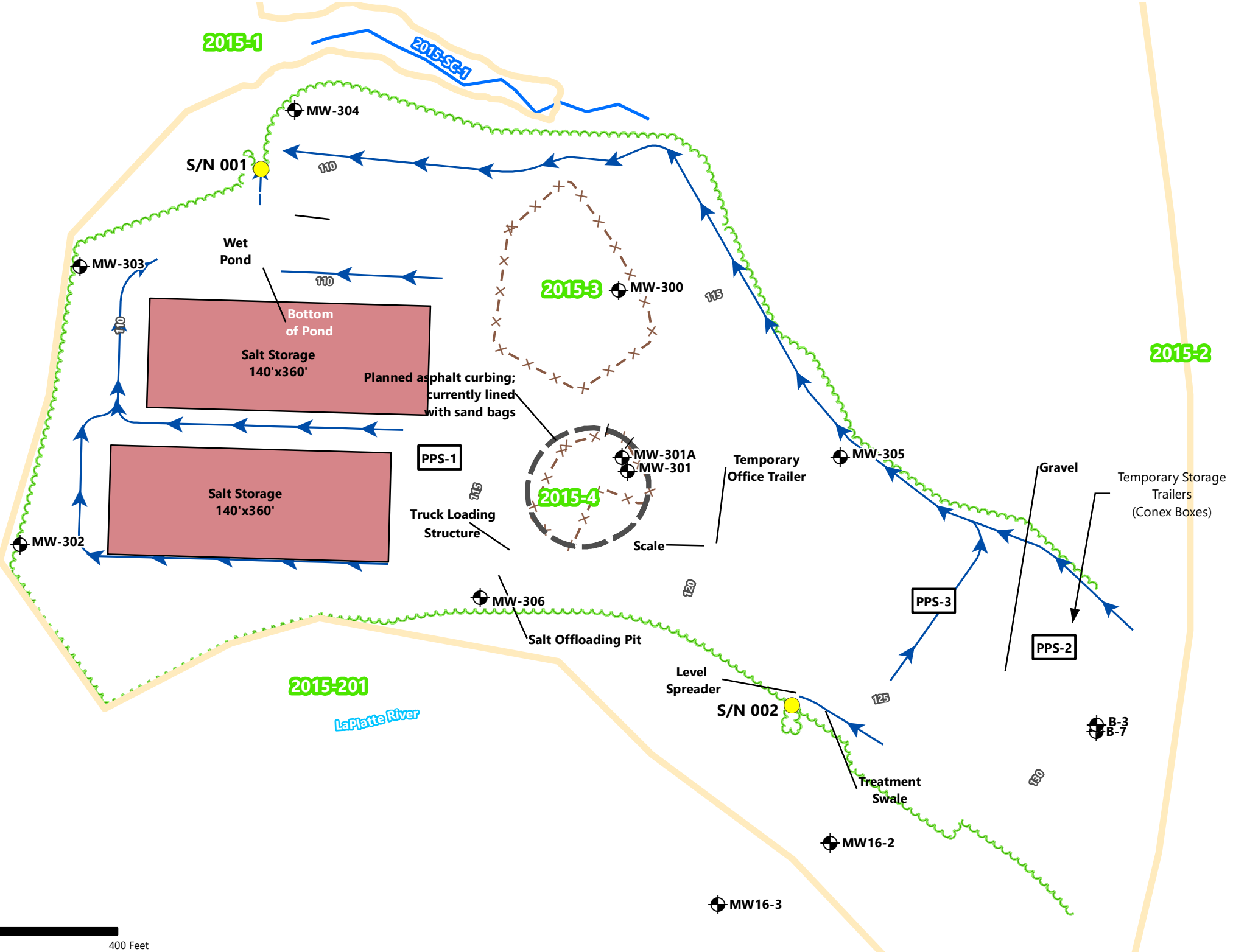
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Project Parcel (VCGI)	Proposed Facility Feature (VHB)	Gravel	Railroad (VTrans)
1 ft. Contour (As-Built) (VHB)	Asphalt Curbing	Pavement	
Monitoring Well (VHB/KAS)	Bottom of Pond; Top of Berm	Stormwater Treatment Pond	
Stormwater Discharge Point (VHB)	Fence	Rail Siding	
Delineated Stream (VHB)	Parking	RipRap	
Delineated Wetland (VHB)	Stormwater Swale	Scale	
Class II	Tree Line	Unloading Pit	
Class III	Building	Pervious Area	

LaPlatte River

LaPlatte River



VCGI

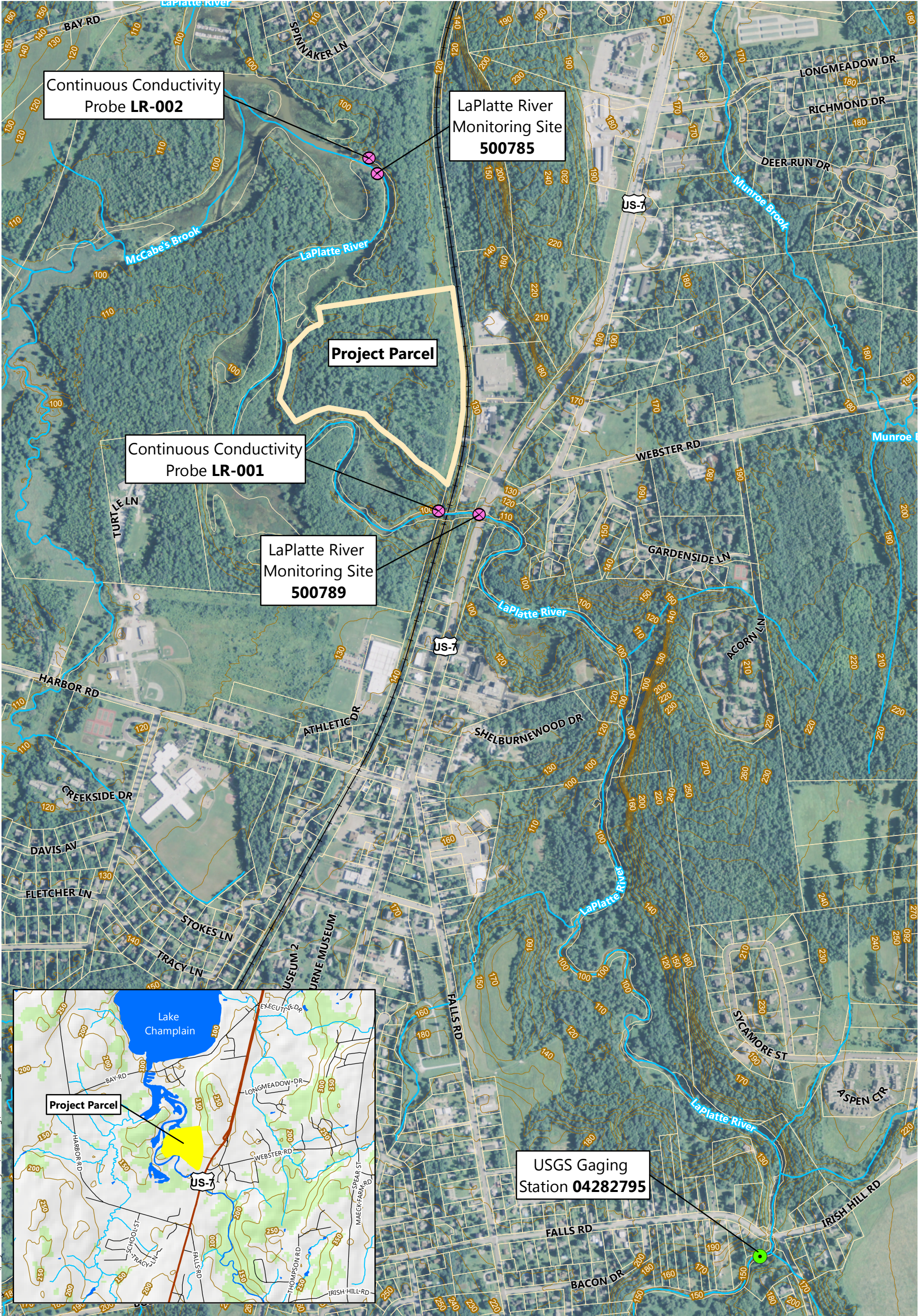
Shelburne Transload Facility

Shelburne, Vermont

Sources:
Background Imagery by VCGI (2016)
VCGI (Vermont Center for Geographic Information - 2011)
VTrans (Vermont Agency of Transportation - 2014)
VHB - 2015-2017

**Potential Pollutant
Source Map
October 2017 Update**

APPENDIX 2



Shelburne Transload Facility

Shelburne, Vermont

- Project Parcel (VCGI)
- DEC Monitoring Site (ANR)
- 10 ft. Contour (VCGI)
- Stream (VHD)
- Parcel Boundary (VCGI)
- Railroad (VTrans)

Offsite Water Quality Monitoring Locations

Sources:
NAIP background imagery by USDA (2014)
ANR (Vermont Agency of Natural Resources - 2016 IWIS Report)
VCGI (Vermont Center for Geographic Information - Various Dates)
VTrans (Vermont Agency of Transportation - 2014)

APPENDIX 3

Vermont Railway - Shelburne Transload Facility Project

Water Quality Monitoring Program, Quality Assurance Project Plan

Equipment Specifications:

November 7, 2016

(1) pH Meter

- Range: 0.00 – 14.0 pH
- Resolution: 0.01 pH
- Accuracy: ± 0.05 pH
- Calibration: per Manufacturer's requirements

(2) Temperature

- Range: 0.00 – 60.0 °C
- Resolution: 0.01 °C
- Accuracy: ± 0.05 °C
- Calibration: per Manufacturer's requirements

(3) Conductivity Meter (YSI 30 or equivalent, discrete measurements)

- Range: 0.00 – 20.0 mS/cm
- Resolution: 0.01 mS/cm
- Accuracy: $\pm 2\%$ F.S.
- Calibration: per Manufacturer's requirements

(4) Conductivity Meter (HOBO U24 or equivalent, continuous measurements)

- Range: 0.00 – 10.0 mS/cm
- Resolution: 0.001 mS/cm
- Accuracy: $\pm 3\%$ of reading or 0.020 mS/cm, whichever is greater
- Calibration: per Manufacturer's requirements

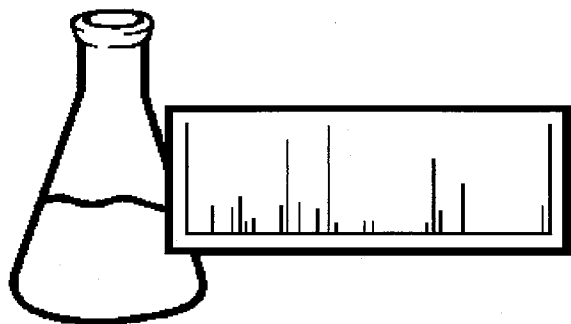
(5) Turbidity Meter

- Range: 0.00 – 9.99 NTU, 10.0 – 99.9 NTU, and 100 – 1000 NTU
- Resolution: 0.01 NTU, 0.10 NTU, and 1.00 NTU
- Accuracy: $\pm 2\%$ of reading plus 0.02 NTU
- Calibration: per Manufacturer's requirements

(6) Dissolved Oxygen Meter

- Range: 0.00 – 20.0 mg/L or 0.00 – 200%
- Resolution: 0.01 mg/L or 0.10%
- Accuracy: ± 0.30 mg/L or $\pm 2\%$ saturation
- Calibration: per Manufacturer's requirements

APPENDIX 4



Endyne, Inc.

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Williston, VT 05495

Phone: (802) 879-4333

Fax: (802) 879-7103

STATEMENT

OF

QUALIFICATIONS



INTRODUCTION

Endyne Inc., incorporated in 1987, is a full-service Environmental Testing Laboratory proficient in organic, inorganic, metal and microbiological analyses. Endyne, Inc. consists of three regional Laboratories with headquarters in Williston VT. The other facilities, located in Plattsburgh NY and Lebanon NH, also provide a broad range of analytical services. Endyne has extensive experience testing a variety of samples including: water, wastewater, soils, hazardous waste and air. Endyne's mission is to provide the environmental community with high quality analytical data in a timely and cost effective manner.

EXPERIENCE

Endyne's management staff each has twenty or more years experience in environmental testing . As well as, licensed wastewater and drinking water operators on staff and available for consultation.

Endyne has a broad and diverse range of project experience ranging from the analysis of drinking water to monitoring large scale subsurface remediation projects. Examples of projects in which Endyne has participated include: Hazardous waste characterization, Industrial and Municipal discharge compliance, Phase II/V Federal drinking water compliance, Landfill monitoring, Industrial hygiene testing, Underground storage tank testing, Sludge Land application studies, Dairy waste testing, TCLP/Priority Pollutant analyses and much more.

CAPABILITIES

Endyne-Williston is truly a full-service Laboratory and maintains a staff of 20 professionals in a modern 6000 square foot facility. Our Lebanon NH facility has 8 employees with 4500 square feet of space. This lab is dedicated to inorganic and microbiological analysis methods. Plattsburgh is our third facility which employs 5 staff members. In addition to the routine inorganic and microbiological analysis this lab also performs many of our specialty analysis such as phenol, cyanide, TOC and others.

The Williston Organics Laboratory is equipped with several Agilent GC, GC/MS and HPLC systems for the analysis of environmentally significant organic compounds. Available detectors include: MS, ECD, FID, PID UV and CD. The Laboratory routinely processes samples for EPA 600 and 8000 series methods, including: 602, 608, 624 625 and 8021B, 8270D, 8260C 8015B methods.

The Williston Metals Analysis Laboratory is equipped with a Graphite Furnace Atomic Absorption Spectrophotometer (GFAA), a Thermo Inductively Coupled Plasma Atomic Emission Spectrophotometer (ICP) for the analysis of metal species and PE-FIMS Mercury Analyzer. The Laboratory processes samples in accordance with EPA methods 6010 and 200.7 for the ICP, and SM3113B, EPA 7000 and 200 Series for the GFAA.



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NELAP 2037
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Plattsburgh

315 New York Ave
Plattsburgh, NY 12903
Ph. 518-563-1720
NELAP 11892



The Inorganic Laboratory, or wet chemistry lab, is equipped with all the instrumentation necessary to perform a broad range of nutrient and physical characteristic assays. These include methods involving gravimetric, titrimetric and spectrophotometric assays. The Laboratory has been performing all the testing required under the NPDES discharge requirements for over 20 years.

The Microbiology Laboratory analyzes water and solid matrix samples for a variety of microbial assays including Coliform and *E.coli* via a variety of analytical methods. In addition to waste water and potable drinking water, the laboratory is equipped to analyze food and environmental samples according to the accepted AOAC methodologies for Salmonella, Listeria, *S. aureus*, Aerobic Plate Count, and Yeast and Mold.

QUALITY CONTROL/QUALITY ASSURANCE

Each individual analysis that is performed by Endyne is of critical importance to the laboratory. It is thus imperative that Endyne be able to assure the validity of each result that is reported.

The Laboratory maintains a variety of certifications in Vermont, New Hampshire and New York. Current certifications are available on our website or upon request. Furthermore, Endyne is accredited by the National Environmental Laboratory Accreditation Program (NELAP)

Endyne adheres to a Comprehensive Quality Assurance Program including;

- Documentation of Extensive Analyst Training program.
- A multi-tiered review process of all incoming work and reported data.
- Documented adherence to method procedures as defined by EPA, ASTM, AOAC, NIOSH, APHA Standard Methods with method specific Quality Control procedures that meet or exceed those defined in the published methods.
- An annual Managerial Review program that assesses all laboratory procedures with the goal of assuring compliance and improving all aspects of the laboratory operations. This includes Internal Audits to monitor analyst adherence to laboratory specific and published method dictates.
- Participation in Routine audits conducted by Certification Officers from NELAC/TNI and ISO 17025 certifying organizations.
- Participation in multiple semi-annual Blind Proficiency Test studies for all available certified parameters and methods.



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Shelburne Transload, Shelburne, Vermont

Water Quality Monitoring

Baseflow Water Chemistry Sampling

Station DEC 500789, LaPlatte River at Route 7



Date Sampled in Field	Time Sampled in Field	Daily Mean Discharge ¹ (ft ³ /sec)	Antecedent Rainfall (Prev. 72 hrs, inches) ²	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)
06/10/16	10:10 AM	18.0	0.30	Dry	8.60	3.52	13.7	364	23	0.040	9
07/06/16	9:15 AM	2.00	0.00	Dry	8.10	29.0	24.3	439	39	0.097	16
08/12/16	8:10 AM	1.40	0.00	Dry	8.00	16.5	25.7	434	34	0.066	10
09/14/16	10:30 AM	1.60	0.46	Dry	8.30	26.0	19.7	462	40	0.065	18
10/19/16	10:20 AM	2.30	0.05	Dry	8.30	9.71	15.9	543	43	0.055	4
11/28/16	2:30 PM	12.0	0.05	Dry	8.10	5.44	4.8	338	39	0.017	2
12/20/2016 ³	12:47 PM	Ice	0.70	Dry	8.60	515	0.1	635	98	0.160	104
01/23/17	2:00 PM	Ice	0.00	Dry	8.01	5.85	0.3	393	37	0.038	5
02/23/17	5:55 PM	20.4	0.00	Dry			0.6	200			
03/03/17	12:38 PM	93.4	0.27	Dry	6.65	42.3	0.1	269	30	0.057	18
04/10/17	3:41 PM	170	0.00	Dry	8.21	26.9	11	173	22	0.039	10
05/10/17	9:41 AM	59.0	0.05	Dry	8.50	10.4	9.1	329	25	0.016	3
07/07/17	11:15 AM	41.5	0.00	Dry	8.26	19.8	21.1	288	20	0.042	14
08/11/17	9:30 AM	10.0	0.07	Dry	8.70	8.69	23.2	365	26	0.035	6
08/29/17	2:52 PM	4.13	0.00	Dry	8.20	11.7	19.5	441	34	0.028	8
09/21/17	6:02 PM	1.89	0.00	Dry	8.05	9.72	21.5	431	32	0.03	5

2016 - 2017 STATISTICS											
Mean	***	31.3	***	***	8.29	46.9	13.2	386	36	0.053	15
Min	***	1.4	***	***	6.62	3.52	0.1	173	20	0.016	2
Max	***	170	***	***	8.70	515	25.7	635	98	0.160	104
n	***	14	***	***	16	16	17	17	15	15	15

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Daily Mean Discharge from USGS National Water Information System's Web Interface for USGS Gage 04282795 LaPlatte River at Shelburne Falls, VT

² Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

³ High turbidity value measured on this day likely reflects the large amount of disturbed sediment generated during the ice-breaking process.

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Event Flow Water Chemistry Sampling
Station DEC 500789, LaPlatte River at Route 7



Date Sampled in Field	Time Sampled in Field	Daily Mean Discharge ¹ (ft ³ /sec)	Antecedent Rainfall (Prev. 72 hrs, inches) ²	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)
06/06/17	2:45 PM	202	1.13	Event	7.05	50.5	13	247	25	0.054	35
07/24/17	10:50 AM	22.1	0.90	Event	8.48	11.5	21.9	349	27	0.028	6
08/18/17	10:05 AM	10.6	0.71	Event	8.60	12.2	20.7	407	32	0.039	16

2017 STATISTICS											
Mean	***	78.3	***	***	8.37	24.7	18.5	364	28	0.040	19.0
Min	***	10.6	***	***	7.05	11.5	13.0	247	25	0.028	6.0
Max	***	202	***	***	8.60	51	22	455	32	0.054	35
n	***	3	***	***	3	3	3	4	3	3	3

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Daily Mean Discharge from USGS National Water Information System's Web Interface for USGS Gage 04282795 LaPlatte River at Shelburne Falls, VT

² Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont

Water Quality Monitoring

Baseflow Water Chemistry Sampling

Station DEC 500785, LaPlatte River near Trail at end of Yacht Haven Drive



Date Sampled in Field	Time Sampled in Field	Daily Mean Discharge ¹ (ft ³ /sec)	Antecedent Rainfall (Prev. 72 hrs, inches) ²	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)
06/10/16	11:04 AM	18.0	0.30	Dry	8.70	6.94	15.2	360	22	0.100	18
07/06/16	9:45 AM	2.00	0.00	Dry	8.00	17.4	24.5	426	38	0.100	12
08/12/16	8:45 AM	1.40	0.00	Dry	8.00	16.0	26.3	435	40	0.078	9
09/14/16	11:05 AM	1.60	0.46	Dry	8.10	12.2	20.2	457	43	0.064	11
10/19/16	10:45 AM	2.30	0.05	Dry	8.20	12.3	15.3	540	46	0.100	10
11/28/16	3:05 PM	12.0	0.05	Dry	8.40	2.36	3.8	299	36	0.019	2
12/20/16	1:15 PM	Ice	0.70	Dry	8.90	18.4	0.1	535	59	0.045	5
01/23/17	1:40 PM	Ice	0.00	Dry	7.92	7.09	0.8	390	34	0.042	6
02/23/17	5:10 PM	20.4	0.00	Dry			0.4	170			
03/03/17	1:05 PM	93.4	0.27	Dry	6.60	15.9	0.3	260	25	0.052	15
04/10/17	4:21 PM	170	0.00	Dry	9.13	19.4	9.7	164	21	0.040	12
05/10/17	10:15 AM	59.0	0.05	Dry	8.40	7.85	11.7	320	24	0.024	5
07/07/17	12:10 PM	41.5	0.00	Dry	8.27	37.8	24.0	296	18	0.054	11
08/11/17	10:15 AM	10.0	0.07	Dry	8.40	14.0	22.5	385	27	0.062	7
08/29/17	3:19 PM	4.13	0.00	Dry	7.98	10.0	19.3	438	34	0.044	3
09/21/17	6:51 PM	1.89	0.00	Dry	7.81	12.1	22.1	426	34	0.057	6

2016 - 2017 STATISTICS											
Mean	***	31.3	***	***	8.33	14.2	13.5	374	33	0.059	8.80
Min	***	1.40	***	***	6.60	2.36	0.1	164	18	0.019	2.00
Max	***	170	***	***	9.13	37.8	26.3	540	59	0.100	18.00
n	***	14	***	***	16	16	17	17	15	15	15

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Average Daily Flow Rate from USGS National Water Information System's Web Interface for USGS Gage 04282795 LaPlatte River at Shelburne Falls, VT

² Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Event Flow Water Chemistry Sampling
Station DEC 500785, LaPlatte River near Trail at end of Yacht Haven Drive



Date Sampled in Field	Time Sampled in Field	Daily Mean Discharge ¹ (ft ³ /sec)	Antecedent Rainfall (Prev. 72 hrs, inches) ²	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)
06/06/17	3:15 PM	202	1.13	Event	7.53	16.9	14.4	239	21	0.038	11
07/24/17	11:25 AM	22.1	0.90	Event	7.99	11.9	22.3	347	25	0.052	7
08/18/17	10:55 AM	10.6	0.71	Event	8.20	6.91	21.6	426	31	0.057	7

2017 STATISTICS											
Mean	***	78.3	***	***	7.99	11.9	19.4	337	26	0.049	8
Min	***	10.56	***	***	7.53	6.91	14.4	239	21	0.038	7
Max	***	202	***	***	8.20	16.9	22.3	426	31	0.057	11
n	***	3	***	***	3	3	3	3	3	3	3

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Average Daily Flow Rate from USGS National Water Information System's Web Interface for USGS Gage 04282795 LaPlatte River at Shelburne Falls, VT

² Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Baseflow Water Chemistry Sampling
Stormwater Pond (SN 001)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)	Comment
1/12/2017	8:00 AM	0.23	Wet				608				No lab samples collected
1/23/2017	2:20 PM	0.00	Dry				116				Only ~2" ice, just above bottom of pond, negligible amount of water, no lab samples collected
2/23/2017	5:35 PM	0.00	Dry			2.5	432				Melt water flowing in and over ice; flow leaving pond, no lab samples collected
04/10/17	3:41 PM	0.00	Dry	8.25	51.4	16.5	2,060	730	0.04	22	No ice, flow coming in
05/10/17	9:15 AM	0.05	Dry	8.70	14.7	13.2	2,100	590	0.01	7	
07/07/17	10:45 AM	0.00	Dry	8.85	103	25.3	817	160	0.05	9	Lots of frogs in and around pond
08/11/17	8:30 AM	0.07	Dry	8.40	9.99	24.1	1,263	310	0.06	6	
08/29/17	2:29 PM	0.00	Dry	8.26	5.25	23.9	800	180	0.02	3	
09/21/17	5:47 PM	0.00	Dry	8.69	7.54	28.3	573	100	0.11	124	

2017 STATISTICS											
Mean	***	***	***	8.52	28.1	19.0	913	345	0.047	29	***
Min	***	***	***	8.25	5.16	2.5	116	100	0.014	3	***
Max	***	***	***	9.55	103	28.3	2100	730	0.110	124	***
n	***	***	***	7	7	8	10	6	6	6	***

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)



Shelburne Transload, Shelburne, Vermont
 Water Quality Monitoring
 Event Flow Water Chemistry Sampling
 Stormwater Pond (SN 001)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)	Comment
06/06/17	1:50 PM	1.13	Event	7.53	24.4	15.8	707	180	0.045	17	Pond elevation below weir
07/24/17	10:20 AM	0.90	Event	8.30	12.5	21	1,168	300	0.034	8	Small amount of flow over weir
08/18/17	9:21 AM	0.71	Event	8.30	7.48	22.3	886	180	0.034	7	Flow over the weir

2017 STATISTICS											
Mean	***	***	***	8.16	14.8	19.7	920	220	0.038	11	***
Min	***	***	***	7.53	7.48	15.8	707	180	0.034	7	***
Max	***	***	***	8.30	24	22.3	1168	300	0.045	17	***
n	***	***	***	3	3	3	3	3	3	3	***

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Water Chemistry Sampling
Level Spreader (SN 002)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	Dry Weather or Event Flow	pH (SU)	Turbidity (NTU)	Water Temp (°C)	Conductivity (µmho/cm)	Chloride (mg/L)	Total Phosphorous (mg/L)	Total Suspended Solids (mg/L)	Comment
1/12/2017	8:00 AM	0.23	Wet								No water
1/23/2017	2:30 PM	0.00	Dry								No water
2/23/2017	5:46 PM	0.00	Dry			1.7	309				No lab samples collected
4/10/2017	3:15 PM	0.00	Dry								No water
5/10/2017	9:15 AM	0.05	Dry								No water
6/6/2017	1:50 PM	1.13	Event								No water
7/7/2017	10:45 AM	0.00	Dry								No water
7/24/2017	10:20 AM	0.90	Event								No water
8/11/2017	8:30 AM	0.07	Dry								No water
8/18/2017	9:21 AM	0.71	Event								No water
8/29/2017	2:29 PM	0.00	Dry								No water
9/21/2017	6:10 PM	0.00	Dry								No water

2017 STATISTICS											
Mean	***	***	***	***	***	1.7	309	***	***	***	***
Min	***	***	***	***	***	1.7	309	***	***	***	***
Max	***	***	***	***	***	1.7	309	***	***	***	***
n	***	***	***	***	***	1	1	***	***	***	***

Notes:

Blank cells indicates no data available

There were no event samples taken for this location

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling
Monitoring Well MW-300 (Near interior wetland 2015-3)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L) ²	Turbidity (NTU)
11/17/16	11:23 AM	0.24	3.24	1.36	172	10.8	5.91	195	< 2.5	15.1
03/03/17	11:42 AM	0.27	1.00	2.43	101	3.4	6.10	114	< 2.5	51.0
06/06/17	10:29 AM	1.13	0.19	1.61	99.4	10.1	6.19	90.8	< 2.5	16.7
08/29/17	12:00 PM	0.00	3.49	1.17	183	15.5	6.51	-32.2	< 5.0	72.3
09/19/17	1:13 PM	0.00			238					
09/21/17	6:13 PM	0.00	3.13		236					
09/26/17	12:01 PM	0.00	3.52	0.96	159	15.3	6.35	-38	1.4	28.9
10/09/17	1:50 PM	1.33	2.69		241	14.4				

2017 STATISTICS										
Mean	***	***	2.34	1.54	179.60	11.74	6.32	33.65	1.5	42.24
2016 - 2017 STATISTICS										
Mean	***	***	2.47	1.51	178.70	11.58	6.26	65.96	2.8	36.81
Min	***	***	0.19	0.960	99.4	3.4	5.9	-38.2	1.4	15.1
Max	***	***	3.52	2.43	241	15.5	6.5	195.2	< 5.0	72.3
n	***	***	7	5	8	6	5	5	5	5

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

² Per MSGP Section 6.2.1.2, a value halfway between zero and the quantitation limit has been used for values to calculate statistical values

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling



Monitoring Well MW-301 (Near interior wetland 2015-4)

Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
11/17/16	9:44 AM	0.24	4.04	6.02	109	11.3	4.81	236	5.2	5.41
03/03/17	12:20 PM	0.27	2.27	8.40	242	2.9	5.30	155	22	10.93
06/06/17	2:23 PM	1.13	1.60	4.81	2,284	11.6	4.97	187	640	11.9
08/29/17	12:38 PM	0.00	3.50	3.45	4,110	17.5	4.50	57.6	1,200	6.75
09/19/17	1:28 PM	0.00			4,050					
09/21/17	4:26 PM	0.00	3.60	3.15	3,633	15.7	4.79	-88.3		
09/26/17	10:36 AM	0.00	3.18	3.07	2,867	17.4	4.68	75	810	8.08
10/09/17	1:10 PM	1.33	3.45		3,571	16.4				

2017 STATISTICS										
Mean	***	***	2.93	4.58	2965	13.6	4.94	77.22	668	9.42
2016 - 2017 STATISTICS										
Mean	***	***	3.09	4.82	2,608	13.3	4.92	103.8	535.4	8.6
Min	***	***	1.60	3.07	109	2.90	4.50	-88.3	5.2	5.4
Max	***	***	4.04	8.40	4110	17.50	5.30	236.4	1200	11.9
n	***	***	7	6	8	7	6	6	5	5

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling
Monitoring Well MW-301A (Near interior wetland 2015-4)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
09/21/17	4:39 PM	0.00	3.56	9.50	1,740	17.8	5.88	-64.2		
09/26/17	10:51 AM	0.00	3.82	4.02	1,137	17.7	5.19	72.6	240	60.5
10/09/17	1:00 PM	1.33	3.51		976	16.3				

2017 STATISTICS										
Mean	***	***	3.63	6.76	1,284	17.3	5.66	4.2	240	60.5
2017 STATISTICS										
Mean	***	***	3.63	6.76	1,284	17.3	5.66	4.2	240	60.5
Min	***	***	3.51	4.02	976	16.3	5.19	-64.2	240	60.5
Max	***	***	3.82	9.50	1,740	17.8	5.88	72.6	240	60.5
n	***	***	3	2	3	3	2	2	1	1

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling
Monitoring Well MW-302 (West of salt shed)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
11/17/16	5:13 PM	0.24	2.45	0.990	158	10.6	5.81	208	5.4	17.6
03/03/17	8:25 AM	0.27	0.26	0.960	211	0.9	6.26	33.1	29	32.7
06/06/17	11:25 AM	1.13	0.39	0.600	215	10.9	6.26	67.0	19	10.3
08/29/17	1:15 PM	0.00	2.41	0.240	379	16.3	5.83	-92.4	51	5.94
09/19/17	1:42 PM	0.00			397					
09/21/17	~5:25 PM	0.00	2.54		413					
09/26/17	11:55 AM	0.00	2.80	0.160	322	17.3	5.43	6.20	50	13.7
10/09/17	12:25 PM	1.33	2.55		312	14.1				

2017 STATISTICS										
Mean	***	***	1.83	0.49	321	11.9	6.06	3.5	37	15.6
2016 - 2017 STATISTICS										
Mean	***	***	1.91	0.590	301	11.7	6.02	44.4	31	16.0
Min	***	***	0.26	0.160	158	0.9	5.43	-92.4	5.4	5.94
Max	***	***	2.80	0.990	413	17.3	6.26	208	51	32.7
n	***	***	7	5	8	6	5	5	5	5

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling
Monitoring Well MW-303 (West of stormwater pond)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
11/17/2016 ²	2:54 PM	0.24	2.48	0.600	240	11.4	6.16	206	4.7	--
03/03/17	9:43 AM	0.27	0.97	0.510	224	4.1	6.49	64.0	4.9	26.9
06/06/17	12:20 PM	1.13	0.26	0.140	259	10.3	6.56	70.3	6.0	3.72
08/29/17	2:09 PM	0.00	0.94	0.250	424	16.2	6.17	-110	51	9.6
09/19/17	1:48 PM	0.00			394					
09/21/17	5:45 PM	0.00	0.72		313					
09/26/17	1:45 PM	0.00	1.17	0.180	425	16.4	5.77	-59.5	72	0.74
10/09/17	1:30 PM	1.33	0.81		543	15.3				

2017 STATISTICS										
Mean	***	***	0.81	0.270	369	12.5	6.44	-8.85	33	10.2
2016 - 2017 STATISTICS										
Mean	***	***	1.05	0.336	353	12.3	6.38	34.0	28	10.2
Min	***	***	0.26	0.140	224	4.1	5.77	-110	4.7	0.74
Max	***	***	2.48	0.600	543	16.4	6.56	206	72	26.9
n	***	***	7	5	8	6	5	5	5	4

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

² Turbidity meter malfunction during low-flow sampling

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling



Monitoring Well MW-304 (North of stormwater outfall)

Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
11/17/16	1:22 PM	0.24	4.73	0.690	155	12.2	5.94	202	5.4	126
03/03/17	10:23 AM	0.27	1.30	8.04	74.1	4.1	5.66	116	6.9	15.1
06/06/17	1:27 PM	1.13	0.45	6.16	215	12.1	5.64	137	49	74.8
08/29/17	11:10 AM	0.00	4.28	1.76	207	17.4	6.07	-27.2	14	31.8
09/19/17	1:22 PM	0.00			213					
09/21/17	6:00 PM	0.00	3.75		215					
09/26/17	1:04 PM	0.00	4.08	0.470	209	17.7	6.05	-53	19	63.1
10/09/17	1:40 PM	1.33	4.36		284	15.3				

2017 STATISTICS										
Mean	***	***	3.04	4.11	202	13.3	5.90	43.4	22	46.2
2016 - 2017 STATISTICS										
Mean	***	***	3.28	3.42	196	13.1	5.91	75	19	62.2
Min	***	***	0.45	0.470	74.1	4.1	5.64	-52.9	5.4	15.1
Max	***	***	4.73	8.04	284	17.7	6.07	202	49	126
n	***	***	7	5	8	6	5	5	5	5

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling
Monitoring Well MW-305 (East of interior wetland 2015-4)



Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L) ²	Turbidity (NTU)
09/21/17	5:40 PM	0.00	3.32		83.8					
09/26/17	12:40 PM	0.00	3.35	2.68	76.4	20.3	4.98	108	< 5.0	> 1100
10/09/17	1:20 PM	1.33	3.32		100.8	16.7				

2017 STATISTICS										
Mean	***	***	3.33	2.68	87.0	18.5	4.98	108	--	1100
2017 STATISTICS										
Mean	***	***	3.33	2.68	87.0	18.5	4.98	108.0	--	1100
Min	***	***	3.32	2.68	76.4	16.7	4.98	108	0	1100
Max	***	***	3.35	2.68	100.8	20.3	4.98	108	0	1100
n	***	***	3	1	3	2	1	1	0	1

Notes:

Blank cells indicates no data available

*** indicates not applicable

pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

² Per MSGP Section 6.2.1.2, a value halfway between zero and the quantitation limit has been used for values to calculate statistical values

Shelburne Transload, Shelburne, Vermont
Water Quality Monitoring
Groundwater Water Chemistry Sampling



Monitoring Well MW-306 (Southeast of salt shed)

Date Sampled in Field	Time Sampled in Field	Antecedent Rainfall (Prev. 72 hrs, inches) ¹	GW depth BGS (ft)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmho/cm)	Water Temp (°C)	pH (SU)	ORP (mV)	Chloride (mg/L)	Turbidity (NTU)
09/21/17	4:00 PM	0.00	4.85	2.86	1,923	17.6	7.11	-175		
09/26/17	10:45 AM	0.00	5.10	1.75	1,535	18.2	6.59	137	430	19.2
10/09/17	12:50 PM	1.33	5.18		1,896	16.8				

2017 STATISTICS										
Mean	***	***	5.04	2.31	1,785	17.5	6.92	-19	430	19.2
2017 STATISTICS										
Mean	***	***	5.04	2.31	1,785	17.5	6.92	-19	430	19.2
Min	***	***	4.85	1.75	1,535	16.8	6.59	-175	430	19.2
Max	***	***	5.18	2.86	1,923	18.2	7.11	137	430	19.2
n	***	***	3	2	3	3	2	2	1	1

Notes:

Blank cells indicates no data available

*** indicates not applicable

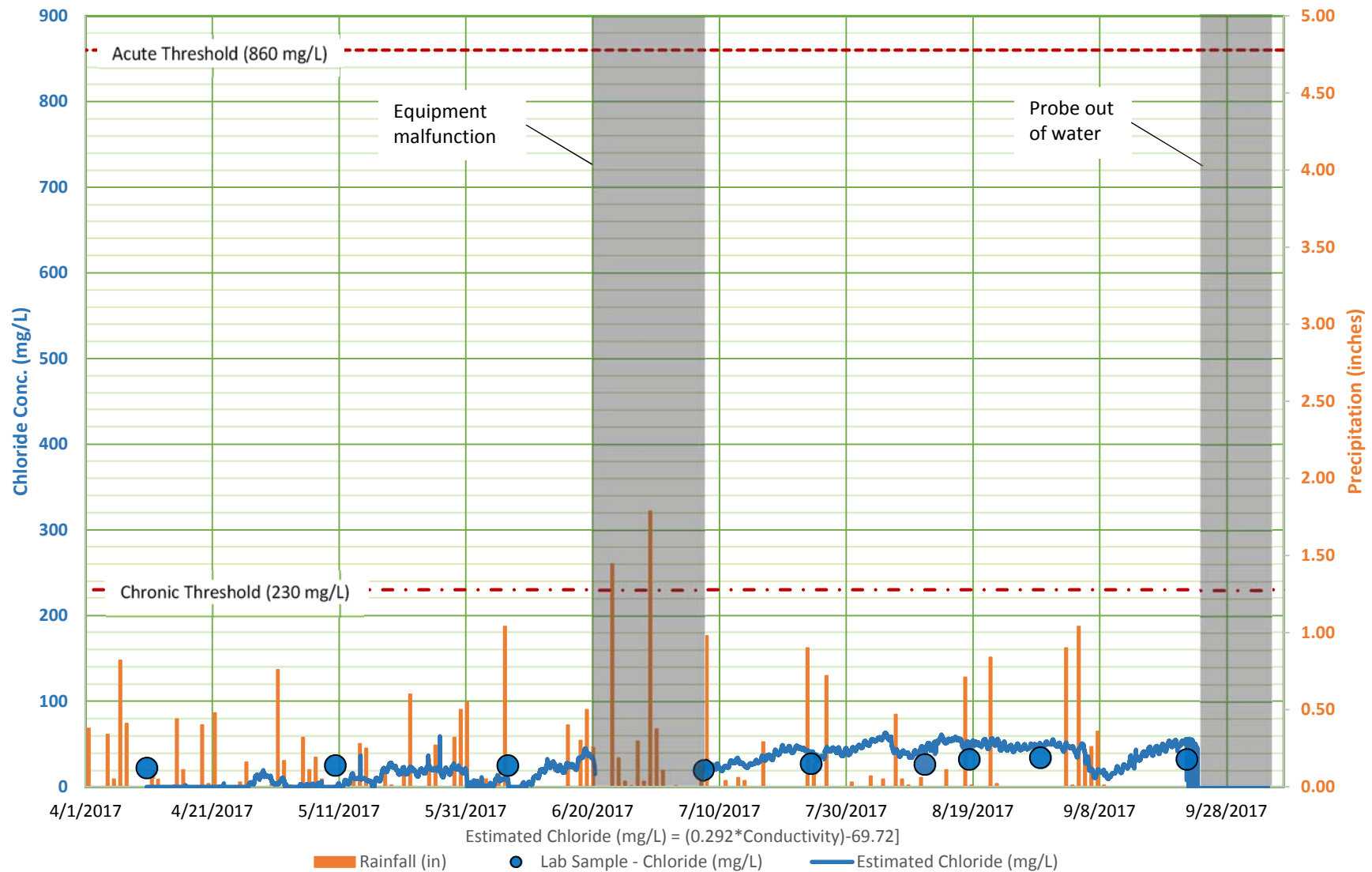
pH statistics based on Hydrogen Ion concentration

¹ Antecedent Rainfall from NOAA's NCEI CDO site for the Burlington, VT Airport (GHCND:USW00014742)

Vermont Rail Systems - Shelburne Transload Facility

LaPlatte River - Upstream Chloride Monitoring Location

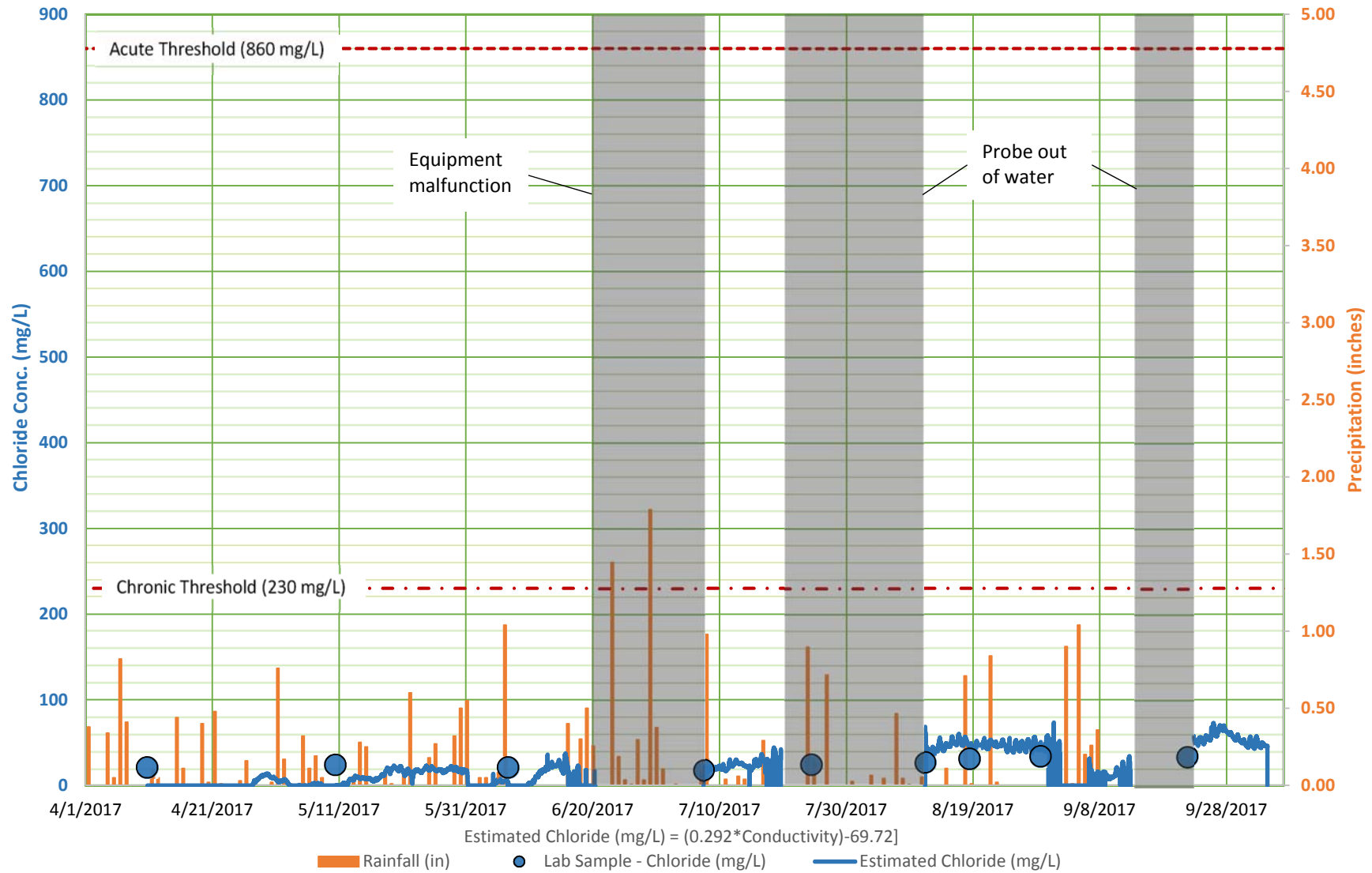
Estimated Chloride Concentrations from 5-Minute Conductivity Data and Statewide Regression Equation



Vermont Rail Systems - Shelburne Transload Facility

LaPlatte River - Downstream Chloride Monitoring Location

Estimated Chloride Concentrations from 5-Minute Conductivity Data and Statewide Regression Equation

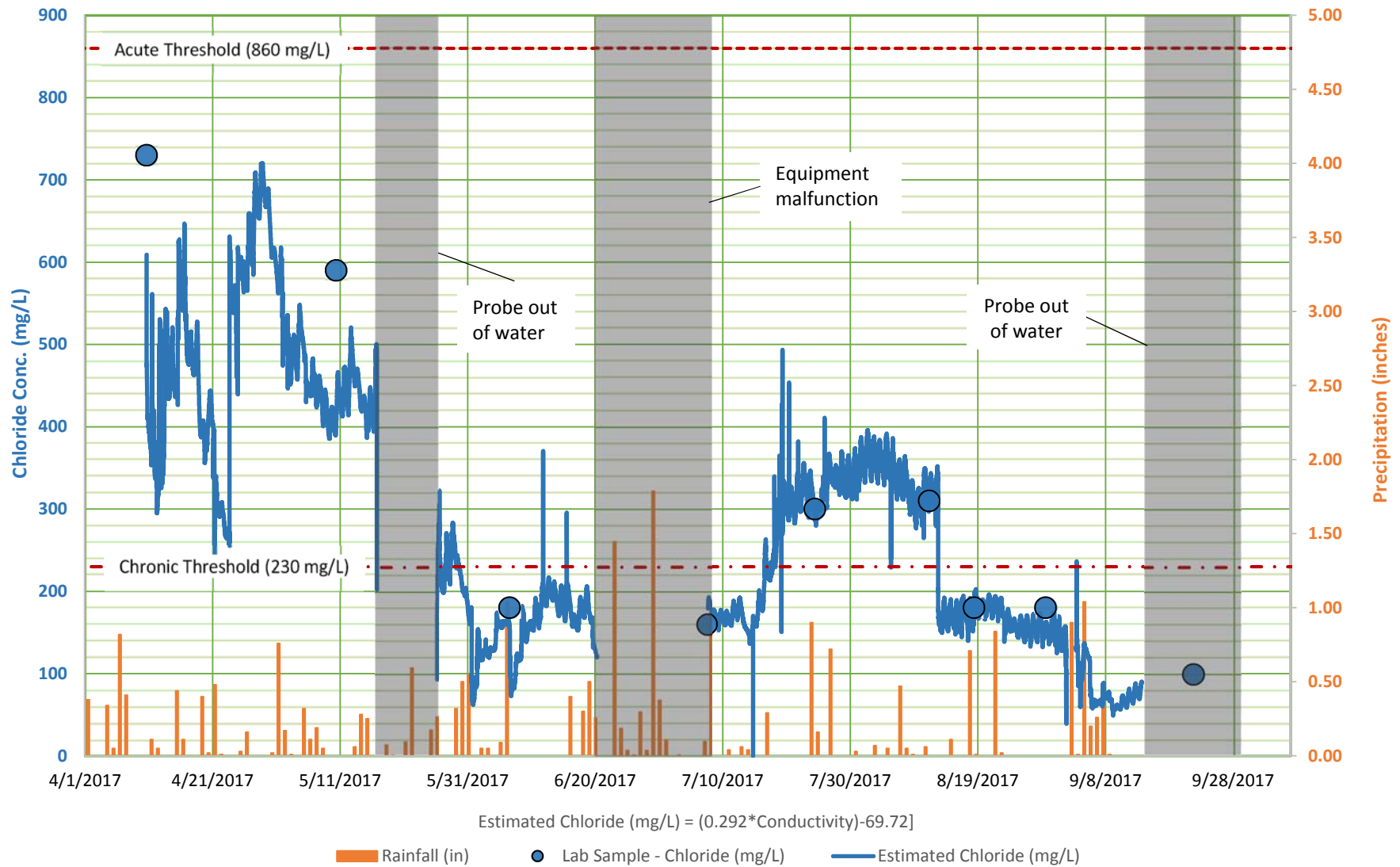


Vermont Rail Systems - Shelburne Transload Facility

Stormwater Pond Monitoring Location (S/N 001)



Estimated Chloride Concentrations from 5-Minute Conductivity Data and Statewide Regression Equation





Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 200, Suite 200

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS-Shelburn Transload

WORK ORDER: **1606-12042**

DATE RECEIVED: June 10, 2016

DATE REPORTED: June 22, 2016

SAMPLER: RAW/ALC

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 06/22/2016

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: **1606-12042**

PROJECT: VRS-Shelburn Transload

DATE RECEIVED 06/10/2016

001	Site: Station 500789 LaPlatte @ Rte 7				Date Sampled: 6/10/16		Time: 10:11	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>		<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	23	mg/L	EPA 300.0	6/10/16		W CM	A	
Phosphorus, Total	0.040	mg/L	SM20 4500 P-F	6/20/16	12:19	R LS	A	
Solids, Total Suspended	9	mg/L	SM 2540 D-97	6/16/16		W JSS	A	

002	Site: Station 500785 LaPlatte @ Yacht Haven Trail				Date Sampled: 6/10/16		Time: 11:04	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>		<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	22	mg/L	EPA 300.0	6/10/16		W CM	A	
Phosphorus, Total	0.10	mg/L	SM20 4500 P-F	6/20/16	12:21	R LS	A	
Solids, Total Suspended	18	mg/L	SM 2540 D-97	6/16/16		W JSS	A	



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: _____

77330

Project Name: <u>VRS-Shelburne Transload</u> <u>57762.00</u>	Client/Contact Name: <u>VHB Alexis Caplin</u>	Sampler Name: <u>RAW/ALC</u>
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Phone #: <u>802-497-6112</u>	Phone #: <u>802-497-6112</u>
Endyne WO # _____	Mailing Address: <u>40 IDX Dr.</u> <u>Building 100, Suite 200</u> <u>South Burlington, VT 05403</u>	Billing Address: _____

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
Station 500789-Laplate @ Rt. 7		✓		6/10/16 10:11				7		
Station 500789-Laplate @ Vacht Haven Trail		✓		10:11				2+12		
Station 500785-Laplate @ Vacht Haven Trail		✓		11:04				7		
Station 500785-Laplate @ Vacht Haven Trail		✓		11:04				2+12		

1606-12042



1606-12042

Vanasse Hangen Brustlin, Inc.
URS-Shelburn Transload

Relinquished by: <u>Alex Caplin</u>	Date/Time: <u>6/10/16 11:58</u>	Received by: _____	Date/Time: _____	Received by: <u>Kevin Fungell</u>	Date/Time: <u>6/10/16 12:00</u>
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1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	LAB USE ONLY Delivery: <u>Client</u> Temp: <u>4.7</u> Comment:
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest	
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB	
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8	
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn											
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other					
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other					
38	Other											



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 200, Suite 200

South Burlington, VT 05403

Atten: Jordan Duffy

PROJECT: VRS Shelburne Transload

WORK ORDER: **1607-14145**

DATE RECEIVED: July 06, 2016

DATE REPORTED: July 14, 2016

SAMPLER: ALC/JMD

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 07/14/2016

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: **1607-14145**

PROJECT: VRS Shelburne Transload

DATE RECEIVED 07/06/2016

001	Site: Station 500789 Laplatte at Rt 7			Date Sampled: 7/6/16		Time: 9:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	39	mg/L	EPA 300.0	7/7/16	W CM	A	
Phosphorus, Total	0.097	mg/L	SM20 4500 P-F	7/11/16 15:24	R SMY	A	
Solids, Total Suspended	16	mg/L	SM 2540 D-97	7/12/16	W JSS	A	

002	Site: Station 500785 Laplatte at Yacht Haven			Date Sampled: 7/6/16		Time: 9:45	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	38	mg/L	EPA 300.0	7/7/16	W CM	A	
Phosphorus, Total	0.10	mg/L	SM20 4500 P-F	7/11/16 15:25	R SMY	A	
Solids, Total Suspended	12	mg/L	SM 2540 D-97	7/12/16	W JSS	A	



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: _____

76126

Project Name: <u>VRS - Shelburne Transload</u> <u>57762-00</u>		Client/Contact Name: <u>VHB Jordan Duffy</u>		Sampler Name: <u>ALC / JMD</u>	
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐		Phone #: <u>802-497-6175</u>		Phone #: <u>802-497-6175</u>	
Endyne WO #		Mailing Address: <u>40 IDX Dr.</u> <u>Building 100, suite 200</u> <u>South Burlington, VT 05403</u>		Billing Address:	

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
Station 500789 - L. Platte @ rt 7		✓		7/16/16 9:16	1	160ml	H ₂ SO ₄	7		
Station 500789 - L. Platte @ rt 7		✓		9:16	1	160E	—	2 & 12		
Station 500785 - L. Platte @ rt 7		✓		9:45	1	160ml	H ₂ SO ₄	7		
Station 500785 - L. Platte @ rt 7		✓		9:45	1	160E	—	2 & 12		

1607-14145



1607-14145

Vanasse Hangen Brustlin, Inc.
URS Shelburne Transload

Relinquished by: <u>[Signature]</u>	Date/Time: <u>7/16/16 2:15</u>	Received by: _____	Date/Time: _____	Received by: <u>Eileen Lomay</u>	Date/Time: <u>7/16 @ 1410</u>
-------------------------------------	--------------------------------	--------------------	------------------	----------------------------------	-------------------------------

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Ti, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)						33	Other			
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY

Delivery: Client

Temp: -0.2

Comment:

LAB USE ONLY	
Delivery: <u>Client</u>	
Temp: <u>-0.2</u>	
Comment:	



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 100, Suite 200

South Burlington, VT 05403

PROJECT: Shelburne Transload

WORK ORDER: **1608-17922**

DATE RECEIVED: August 12, 2016

DATE REPORTED: August 23, 2016

SAMPLER: Alexis

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 08/23/2016

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: **1608-17922**

PROJECT: Shelburne Transload

DATE RECEIVED 08/12/2016

001	Site: 500789-LaPlatte @ Rt 7				Date Sampled: 8/12/16		Time: 8:10	
Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Chloride	34	mg/L	EPA 300.0	8/15/16		W CM	A	
Phosphorus, Total	0.066	mg/L	SM20 4500 P-F	8/22/16	9:21	R SMY	A	
Solids, Total Suspended	10	mg/L	SM 2540 D-97	8/19/16		W JSS	A	

002	Site: 500785-LaPlatte @ Yacht Haven Dr				Date Sampled: 8/12/16		Time: 8:45	
Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Chloride	40	mg/L	EPA 300.0	8/15/16		W CM	A	
Phosphorus, Total	0.078	mg/L	SM20 4500 P-F	8/22/16	9:23	R SMY	A	
Solids, Total Suspended	9	mg/L	SM 2540 D-97	8/19/16		W JSS	A	



160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: _____

77009

Project Name: <u>Shelburne Transload 57762</u>	Client/Contact Name: <u>VHB</u>	Sampler Name: <u>Alexis Caplin</u>
State of Origin: VT <u>NY</u> <u>NH</u> <u>Other</u> _____	Phone #: <u>802-497-6112</u>	Phone #: <u>802-497-6112</u>
Endyne WO # _____	Mailing Address: <u>40 IDX Dr., Building 100, Suite 200, South Burlington, VT 05403</u>	Billing Address: <u>Same as mailing</u>

Sample Location	Matrix	GRA	COM	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Resu
					No.	Type/Size			
500789 - LaPlatte @ Rt 7	Baseflow	✓		8/12/16 8:10	1	60mL	H ₂ SO ₄	7	
					1	16 oz P	no	2, 12	
					↓	↓	↓	↓	
500785 - LaPlatte @ Yacht Haven Dr	Baseflow	✓		8/12/16 8:45					

1608-17922



1608-17922

Vanasse Hangen Brustlin, Inc.
Shelburne Transload

Relinquished by: <u>Alex Caplin</u>	Date/Time: <u>8/12/16 9:32</u>	Received by: _____	Date/Time: _____	Received by: <u>Clean Loma</u>	Date/Time: <u>8/12/16 @ 9:32</u>
-------------------------------------	--------------------------------	--------------------	------------------	--------------------------------	----------------------------------

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 1.5
Comment: _____



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 100, Suite 200

South Burlington, VT 05403

Atten: Alexis Caplin

PROJECT: Shelburne Tansload 57762.00

WORK ORDER: **1609-21015**

DATE RECEIVED: September 15, 2016

DATE REPORTED: September 29, 2016

SAMPLER: Alexis

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 09/29/2016

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: Shelburne Tansload 57762.00

WORK ORDER: **1609-21015**
 DATE RECEIVED 09/15/2016

001	Site: 500789-LaPlatte @ Rt 7				Date Sampled: 9/14/16		Time: 10:35	
Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Chloride	40	mg/L	EPA 300.0	9/16/16		W CM	A	
Phosphorus, Total	0.065	mg/L	SM20 4500 P-F	9/26/16	10:00	R SMY	A	
Solids, Total Suspended	18	mg/L	SM 2540 D-97	9/20/16		W JSS	A	

002	Site: 500785-LaPlatte Yacht Haven Dr				Date Sampled: 9/14/16		Time: 11:05	
Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Chloride	43	mg/L	EPA 300.0	9/16/16		W CM	A	
Phosphorus, Total	0.064	mg/L	SM20 4500 P-F	9/26/16	10:02	R SMY	A	
Solids, Total Suspended	11	mg/L	SM 2540 D-97	9/20/16		W JSS	A	



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#:

78095

Project Name: <u>Shelburne Transload 57762.00</u>	Client/Contact Name: <u>VHB</u>	Sampler Name: <u>Alexis Caplan</u>
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Phone #: <u>802-497-6112</u>	Phone #: <u>802-497-6112</u>
Endyne WO #	Mailing Address: <u>40 IDX Dr, Building 100</u> <u>Suite 200, South Burlington, VT 05403</u>	Billing Address: <u>Same as mailing</u>

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due
					No.	Type/Size				
500789 - LaPlatte @ Rt. 7	Baseflow	☒	☐	9/14/16 10:35	1	60 mL	H ₂ SO ₄	7		
		☐	☐		1	16 oz P	no	2, 12		
500785 - LaPlatte @ Yacht Haven Dr.	Baseflow	☒	☐	9/14/16 11:05	1	60 mL	H ₂ SO ₄	7		
		☐	☐		1	32 oz P	no	2, 12		
		☐	☐							
		☐	☐							
		☐	☐							
		☐	☐							
		☐	☐							
		☐	☐							

1609-21015



Vanasse Hangen Brustlin, Inc.
Shelburne Transload 57762.00

Relinquished by: <u>Alex Caplan</u>	Date/Time <u>9/15/16 11:41</u>	Received by:	Date/Time	Received by: <u>B. Bugbee</u>	Date/Time <u>9/15/16 11:40</u>
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1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	LAB USE ONLY Delivery: <u>Client</u> Temp: <u>0.0</u> Comment:
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest	
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB	
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8	
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn											
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)						33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other					
38	Other											



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 100, Suite 200

South Burlington, VT 05403

Atten: Robert Wildey

PROJECT: Shelburne Transload

WORK ORDER: 1611-26648

DATE RECEIVED: November 22, 2016

DATE REPORTED: November 23, 2016

SAMPLER: Robert

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 11/23/2016

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: Shelburne Transload

WORK ORDER: 1611-26648
 DATE RECEIVED 11/22/2016

001	Site: MW-301				Date Sampled: 11/17/16		Time: 9:44	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	5.2	mg/L	EPA 300.0	11/22/16	W CM	A		
002	Site: MW-300				Date Sampled: 11/17/16		Time: 11:23	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	< 2.5	mg/L	EPA 300.0	11/22/16	W CM	A		
003	Site: MW-304				Date Sampled: 11/17/16		Time: 13:22	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	5.0	mg/L	EPA 300.0	11/22/16	W CM	A		
004	Site: MW-303				Date Sampled: 11/17/16		Time: 14:54	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	4.7	mg/L	EPA 300.0	11/22/16	W CM	A		
005	Site: MW-302				Date Sampled: 11/17/16		Time: 17:13	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	5.4	mg/L	EPA 300.0	11/22/16	W CM	A		



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 57762.00

78380

Project Name: <u>Shelburne Transload</u>	Client/Contact Name: <u>Robert Wilder</u>	Sampler Name: <u>Robert Athan</u>
State of Origin: VT <u>X</u> NY <u> </u> NH <u> </u> Other <u> </u>	Phone #: <u>802-497-6164</u>	Phone #: <u>802-497-6141</u>
Endyne WO #	Mailing Address: <u>VHB</u>	Billing Address: <u>VHB</u>

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
MW-301	Water	X		11/17/16 0944	1	8 oz	None	2		2 WK
MW-300	↓	↓		1123	↓	↓	↓	↓		↓
MW-304				1322						
MW-303				1454						
MW-302	↓	↓		1713	↓	↓	↓	↓		↓

Relinquished by: <u>MA Athan</u>	Date/Time: <u>11/22/16 8:20</u>	Received by: <u>BB Bugbee</u>	Date/Time: <u>11/22/16 8:20</u>
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1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	LAB USE ONLY Delivery: <u>Client</u> Temp: <u>16.6</u>
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest	
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB	
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B			
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid			
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zr											
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)						33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other					
38	Other											

1611-26648



1611-26648

Vanasse Hangen Brustlin, Inc.
Shelburne Transload



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: 1611-26891

DATE RECEIVED: November 28, 2016

DATE REPORTED: December 07, 2016

SAMPLER: Alexis Coplin

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 12/07/2016

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: **1611-26891**

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 11/28/2016

001 Site: 500789 LaPlatte @ Rt. 7

Date Sampled: 11/28/16 Time: 14:30

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	39	mg/L	EPA 300.0	11/28/16	W CM	A	
Phosphorus, Total	0.017	mg/L	SM20 4500 P-F	12/5/16 12:10	R LS	A	
Solids, Total Suspended	2	mg/L	SM 2540 D-97	11/29/16	W JSS	A	

Sample was frozen during transportation.

002 Site: 500785 LaPlatte @ Yacht Haven Dr

Date Sampled: 11/28/16 Time: 15:05

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	36	mg/L	EPA 300.0	11/28/16	W CM	A	
Phosphorus, Total	0.019	mg/L	SM20 4500 P-F	12/5/16 12:11	R LS	A	
Solids, Total Suspended	2	mg/L	SM 2540 D-97	11/29/16	W JSS	A	



160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#:

78432

Project Name: <u>VRS - Shelburne Transload</u> <u>57762.00</u>	Client/Contact Name: <u>VAB - Alexis Caplin</u> Phone #: <u>acoplin@vrb.com</u>	Sampler Name: <u>ALC/MDI</u> Phone #:
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Mailing Address:	Billing Address:
Endyne WO #		

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Due Date
					No.	Type/Size			
500789 - LaPlatte @ Rt. 7		✓		11/28/16 14:30	2	60mL	H ₂ SO ₄	7,2,12	
500789		✓							
500785 - LaPlatte @ Kicht Haven Dr.		✓		11/28/16 15:05	2	60mL + 1L	H ₂ SO ₄	7,2,12	
500785		✓							

Vanasse Hangen Brustlin, Inc.
VRS - Shelburne Transload



1611-26891

Relinquished by: <u>Alex Caplin</u>	Date/Time: <u>11/28/16 17:05</u>	Received by:	Date/Time:	Received by: <u>Eileen Lomay</u>	Date/Time: <u>11/28/16 @ 17:05</u>
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												LAB USE ONLY		
1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	Delivery: <i>Client</i>		
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest		Temp: <i>2.2</i>	
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB			Comment:
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals			
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8			
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn													
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other							
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other							
38	Other													



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1612-28757**

DATE RECEIVED: December 20, 2016

DATE REPORTED: December 28, 2016

SAMPLER: JMD, CS

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 12/28/2016

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: **1612-28757**

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 12/20/2016

001	Site: 500789 LaPlatte @ Rt. 7			Date Sampled: 12/20/16		Time: 12:47	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	98	mg/L	EPA 300.0	12/20/16	W CM	A	
Phosphorus, Total	0.16	mg/L	SM20 4500 P-F	12/27/16 13:39	R AJR	A	
Solids, Total Suspended	104	mg/L	SM 2540 D-97	12/23/16	W JSS	A	

002	Site: 500785 LaPlatte @ Yacht Haven Dr			Date Sampled: 12/20/16		Time: 13:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	59	mg/L	EPA 300.0	12/20/16	W CM	A	
Phosphorus, Total	0.045	mg/L	SM20 4500 P-F	12/27/16 13:41	R AJR	A	
Solids, Total Suspended	5	mg/L	SM 2540 D-97	12/23/16	W JSS	A	

VRS- Shelburne Transload

Endyne Inc. COC

1612-28757

Prepared: 11/28/16



1612-28757

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 091

VRSSHELBU

W-90395

Vanasse Hangen Brustlin, Inc.
VRS- Shelburne Transload

Page 1 of 1

500789 LaPlatte @ Rt. 7

Sampled Date/Time: 12/20/16 @ 12:47 Sampler: JMD/CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha

Sampled Date/Time: 12/20/16 @ 1:15 Sampler: JMD/CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

One or more sample bottles in this project must be
kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the
temperature preservation requirement is not satisfied. SMD

INITIAL HERE

Relinquished by: [Signature] 12/20/16 2:10 Date Time

Accepted by: _____ Date Time

Relinquished by: _____ Date Time

Received by: B. Bugbee 12/20/16 14:10 Date Time

Sites/Parameters correct as listed. Client Initials _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Delv: Client Tmpl Ck _____ Lab use Only
Temp C: -0.2 Log by _____
Comment: _____



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1701-01644**

DATE RECEIVED: January 23, 2017

DATE REPORTED: January 31, 2017

SAMPLER: RAW/CJS

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 01/31/2017

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: 1701-01644

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 01/23/2017

001	Site: 500789 LaPlatte @ Rt. 7			Date Sampled: 1/23/17		Time: 14:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	37	mg/L	EPA 300.0	1/23/17	W CM	A	
pH	8.01	SU at 22.7C	SM18 4500-H B	1/24/17 13:15	W SJM	U	
Phosphorus, Total	0.038	mg/L	SM20 4500 P-F	1/30/17 12:50	R RLS	A	
Solids, Total Suspended	5	mg/L	SM 2540 D-97	1/25/17	W JSS	A	
Turbidity	5.85	NTU	EPA 180.1	1/24/17 12:44	W SJM	N	

002	Site: 500785 LaPlatte @ Yacht Haven Dr			Date Sampled: 1/23/17		Time: 13:40	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	34	mg/L	EPA 300.0	1/23/17	W CM	A	
pH	7.92	SU at 22.4C	SM18 4500-H B	1/24/17 13:21	W SJM	U	
Phosphorus, Total	0.042	mg/L	SM20 4500 P-F	1/30/17 12:52	R RLS	A	
Solids, Total Suspended	6	mg/L	SM 2540 D-97	1/25/17	W JSS	A	
Turbidity	7.09	NTU	EPA 180.1	1/24/17 12:47	W SJM	N	

Report Summary of Qualifiers and Notes

Samples received in this project required pH. The EPA hold time for this analysis is 15 minutes and should be performed at the time of collection. Analysis was performed as soon as possible upon arrival at the laboratory.

VRS- Shelburne Transload

Endyne Inc. COC

1701-01644

Prepared: 11/28/16

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 0903



1701-01644

VRSSHELBUR Vanasse Hangen Brustlin, Inc.
URS- Shelburne Transload

W-90395Vh

Page 1 of 1

500789 LaPlatte @ Rt. 7 Sampled Date/Time: 1/23/17 @ 2:00 Sampler: RAW/CJS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha Sampled Date/Time: 1/23/17 @ 1:40 Sampler: RAW/CJS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Add turbidity + pH as per phone call

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied.

INITIAL HERE

Relinquished by: Chris Sheldon 1/23/17 2:10 Date Time

Accepted by: Date Time

Relinquished by: Date Time

Received by: BBugbee 1/23/17 15:10 Date Time

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☒ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Delv: Client
Temp C: -0.7
Comment:
Tmpl Ck
Log by
Lab use Only



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1703-04493**

DATE RECEIVED: March 03, 2017

DATE REPORTED: March 14, 2017

SAMPLER: RA, MI

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 03/14/2017

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: 1703-04493

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 03/03/2017

001	Site: LR-100			Date Sampled: 3/3/17		Time: 12:38	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	30	mg/L	EPA 300.0	3/6/17	W CM	A	
Phosphorus, Total	0.057	mg/L	SM20 4500 P-F	3/13/17 13:05	R AJR	A	
Solids, Total Suspended	18	mg/L	SM 2540 D-97	3/7/17	W JSS	A	

002	Site: LR-200			Date Sampled: 3/3/17		Time: 13:05	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	25	mg/L	EPA 300.0	3/6/17	W CM	A	
Phosphorus, Total	0.052	mg/L	SM20 4500 P-F	3/13/17 13:07	R AJR	A	
Solids, Total Suspended	15	mg/L	SM 2540 D-97	3/7/17	W JSS	A	

VRS- Shelburne Transload

Endyne Inc. COC

Prepared: 11/28/16

1703-04493

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vnb.com;jwilson@vnb.

Cust # C

VRSSHELE

W-903



1703-04493

Vanasse Hangen Brustlin, Inc.
URS- Shelburne Transload

500789 LaPlatte @ Rt. 7
LR-100

Sampled Date/Time: 3 / 3 / 17 @ 1238 Sampler: RA/MI

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha
LR-200

Sampled Date/Time: 3 / 3 / 17 @ 1305 Sampler: RA/MI

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied. RA

INITIAL HERE

Relinquished by: [Signature] 3/3/17 1450
Date Time

Accepted by: [Signature] 3/3/17 1450
Date Time

Relinquished by: [Signature] 3/3/17 1450
Date Time

Received by: [Signature] 3/3/17 1450
Date Time

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☒ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) 57762.00

Requested Turnaround Time: Routine: Rush Due Date 2 wk

Delv: [Signature] Tmpl Ck Lab use Only
Temp C: 0.9°C Log by
Comment:



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
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315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1703-04494**

DATE RECEIVED: March 03, 2017

DATE REPORTED: March 07, 2017

SAMPLER: Robert

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 03/07/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload

WORK ORDER: 1703-04494
 DATE RECEIVED 03/03/2017

001	Site: MW-302				Date Sampled: 3/3/17	Time: 8:25	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	29	mg/L	EPA 300.0	3/4/17	W CM	A	

002	Site: MW-303				Date Sampled: 3/3/17	Time: 9:43	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	4.9	mg/L	EPA 300.0	3/4/17	W CM	A	

003	Site: MW-304				Date Sampled: 3/3/17	Time: 10:23	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	6.9	mg/L	EPA 300.0	3/4/17	W CM	A	

004	Site: MW-300				Date Sampled: 3/3/17	Time: 11:42	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	< 2.5	mg/L	EPA 300.0	3/4/17	W CM	A	

005	Site: MW-301				Date Sampled: 3/3/17	Time: 12:20	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	22	mg/L	EPA 300.0	3/4/17	W CM	A	



160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 5776200

78383

Project Name: <u>Shelburne Transload</u>	Client/Contact Name: <u>Robert Wilkey</u>	Sampler Name: <u>Robert Athan</u>
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Phone #: <u>802-497-6164</u>	Phone #: <u>802-497-6141</u>
Endyne WO #	Mailing Address: <u>VHB</u>	Billing Address: <u>VHB</u>

Sample Location	Matrix	G R A B	C O M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Due Date
					No.	Type/Size			
MW-302	Water	X		3/3/17 0825	1	50 mL	—	2	2 wk
MW-303	↓	↓		0943	↓	↓	↓	↓	↓
MW-304	↓	↓		1023	↓	↓	↓	↓	↓
MW-300	↓	↓		1142	↓	↓	↓	↓	↓
MW-301	↓	↓		1220	↓	↓	↓	↓	↓

Vanasse Hangen Brustlin, Inc.
URS - Shelburne Transload



1703-04494

Relinquished by: <u>[Signature]</u>	Date/Time: <u>3/3/17 1450</u>	Received by: <u>[Signature]</u>	Date/Time: <u>3/3/17 1450</u>
-------------------------------------	-------------------------------	---------------------------------	-------------------------------

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY

Delivery: *Christ*

Temp: *0.92*

Comment:

LAB USE ONLY	
Delivery: <u>[Signature]</u>	
Temp: <u>0.92</u>	
Comment:	



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS-Shelburne Transload

WORK ORDER: **1704-07303**

DATE RECEIVED: April 11, 2017

DATE REPORTED: April 19, 2017

SAMPLER: Chris

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 04/19/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS-Shelburne Transload

WORK ORDER: 1704-07303
 DATE RECEIVED 04/11/2017

001	Site: 500789 LaPlatte @ Rt. 7 Upstream				Date Sampled: 4/10/17	Time: 16:21		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	22	mg/L	EPA 300.0	4/11/17	W CM	A		
Phosphorus, Total	0.039	mg/L	SM20 4500 P-F	4/17/17 17:42	R LS	A	BL	
Solids, Total Suspended	10	mg/L	SM 2540 D-97	4/13/17	W JSS	A		

002	Site: 500785 LaPlatte @ Yacht Haven Dr Downstream				Date Sampled: 4/10/17	Time: 16:41		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	21	mg/L	EPA 300.0	4/11/17	W CM	A		
Phosphorus, Total	0.040	mg/L	SM20 4500 P-F	4/17/17 17:44	R LS	A	BL	
Solids, Total Suspended	12	mg/L	SM 2540 D-97	4/13/17	W JSS	A		

003	Site: Stormwater Storage Pond				Date Sampled: 4/10/17	Time: 15:50		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	730	mg/L	EPA 300.0	4/12/17	W CM	A		
Phosphorus, Total	0.042	mg/L	SM20 4500 P-F	4/17/17 18:36	R LS	A	BL	
Solids, Total Suspended	22	mg/L	SM 2540 D-97	4/13/17	W JSS	A		

Report Summary of Qualifiers and Notes

BL: The blank associated with this sample was greater than acceptance value. Sample result could be biased high.

VRS- Shelburne Transload

Endyne Inc. COC

Prepared: 11/28/16

1704-07303



Bill to:
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:
Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.

Cust # 09039

VRSSHELburn

W-90395VR

Vanasse Hangen Brustlin, Inc.
VRS-Shelburne Transload

500789 LaPlatte @ Rt. 7 (upstream) Sampled Date/Time: 4/10/17 @ 4:21 Sampler: sheldo

Chloride	1 - 32 oz Plastic	<6C
Solids, Total Suspended		
Phosphorus, Total	1 - 60 mL Glass	<6C, H2SO4

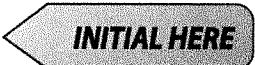
500785 LaPlatte @ Yacht Ha (Downstream) Sampled Date/Time: 4/10/17 @ 4:41 Sampler: sheldo

Chloride	1 - 32 oz Plastic	<6C
Solids, Total Suspended		
Phosphorus, Total	1 - 60 mL Glass	<6C, H2SO4

Stormwater Storage Pond 4/10/17 @ 3:50 Sheldon
Chloride 1-32oz Plastic <6C
Solids, Total suspended 1-60 mL Glass <6C, H2SO4
Phosphorus, Total

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied. CS



Relinquished by: Chris Sheldon 4/11/17 8:15 Accepted by: B. Bugbee 4/11/17 8:10

Relinquished by: Date Time Received by: Date Time

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Delv: Client

Temp C: 0.2

Comment:

Tmpl Ck Log by

Lab use Only



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1705-09771**

DATE RECEIVED: May 10, 2017

DATE REPORTED: May 17, 2017

SAMPLER: CS

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

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Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

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160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 05/17/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload

WORK ORDER: 1705-09771
 DATE RECEIVED 05/10/2017

001	Site: 500789 LaPlatte @ Rt. 7				Date Sampled: 5/10/17	Time: 9:41		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	25	mg/L	EPA 300.0	5/11/17	W CM	A		
Phosphorus, Total	0.016	mg/L	SM20 4500 P-F	5/15/17 15:32	R LS	A		
Solids, Total Suspended	3	mg/L	SM 2540 D-97	5/10/17	W JSS	A		

002	Site: 500785 LaPlatte @ Yacht Haven Dr				Date Sampled: 5/10/17	Time: 10:15		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	24	mg/L	EPA 300.0	5/11/17	W CM	A		
Phosphorus, Total	0.024	mg/L	SM20 4500 P-F	5/15/17 15:34	R LS	A		
Solids, Total Suspended	5	mg/L	SM 2540 D-97	5/15/17	W JSS	A		

003	Site: Storm Water Pond				Date Sampled: 5/10/17	Time: 9:15		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	590	mg/L	EPA 300.0	5/11/17	W CM	A		
Phosphorus, Total	0.014	mg/L	SM20 4500 P-F	5/15/17 15:43	R LS	A		
Solids, Total Suspended	7	mg/L	SM 2540 D-97	5/15/17	W JSS	A		

VRS- Shelburne Transload

Endyne Inc. COC

1705-09771

Prepared: 11/28/16

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 0903



1705-09771

VRSSHELBUR

Vanasse Hangen Brustlin, Inc.
VRS- Shelburne Transload

W-90395V

Page 1 of 1

500789 LaPlatte @ Rt. 7

Sampled Date/Time:

5/10/17 @ 9:41

Sampler:

CS

Chloride

1 - 32 oz Plastic

<6C

Solids, Total Suspended

Phosphorus, Total

1 - 60 mL Glass

<6C, H2SO4

500785 LaPlatte @ Yacht Ha

Sampled Date/Time:

5/10/17 @ 10:15

Sampler:

CS

Chloride

1 - 32 oz Plastic

<6C

Solids, Total Suspended

Phosphorus, Total

1 - 60 mL Glass

<6C, H2SO4

Storn White Pond

Chloride

Solids, Total Suspended

Phosphorus, Total

1 - 32 oz Plastic

1 - 60 mL Glass

<6C

<6C, H2SO4

5/10/17
9:15

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied.

INITIAL HERE

Relinquished by:

Chris Giddan

5/10/17 10:55

Date Time

Accepted by:

Relinquished by:

Date Time

Received by:

EBryce

5/10/17 10:55

Date Time

Date Time

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin:

VT

NH

NY

Other

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Del: Client
Temp C: 4.1
Comment:

Temp Ck

Log by

Lab use Only



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload QTR

WORK ORDER: **1706-11995**

DATE RECEIVED: June 06, 2017

DATE REPORTED: June 09, 2017

SAMPLER: Chris Sheldon

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



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Laboratory Report

DATE REPORTED: 06/09/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload QTR

WORK ORDER: 1706-11995
 DATE RECEIVED 06/06/2017

001	Site: MW-300				Date Sampled: 6/6/17	Time: 10:35	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	< 2.5	mg/L	EPA 300.0	6/6/17	W CM	A	

002	Site: MW-301				Date Sampled: 6/6/17	Time: 9:45	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	640	mg/L	EPA 300.0	6/7/17	W CM	A	

003	Site: MW-302				Date Sampled: 6/6/17	Time: 11:29	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	19	mg/L	EPA 300.0	6/7/17	W CM	A	

004	Site: MW-303				Date Sampled: 6/6/17	Time: 12:25	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	6.0	mg/L	EPA 300.0	6/7/17	W CM	A	

005	Site: MW-304				Date Sampled: 6/6/17	Time: 13:35	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	49	mg/L	EPA 300.0	6/7/17	W CM	A	

VRS- Shelburne Transload QTR

Endyne Inc. COC

1706-11995

Prepared: 6/5/17

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 0903



1706-11995

Vanasse Hangen Brustlin, Inc.
VRS- Shelburne Transload QTR

W-90395VI

Page 1 of 1

MW-300	Sampled Date/Time: 6/6/17 @ 10:35	Sampler: CS
Chloride	1 - 2 oz Plastic	<6C
MW-301	Sampled Date/Time: 6/6/17 @ 9:45	Sampler: CS
Chloride	1 - 2 oz Plastic	<6C
MW-302	Sampled Date/Time: 6/6/17 @ 11:29	Sampler: CS
Chloride	1 - 2 oz Plastic	<6C
MW-303	Sampled Date/Time: 6/6/17 @ 12:25	Sampler: CS
Chloride	1 - 2 oz Plastic	<6C
MW-304	Sampled Date/Time: 6/6/17 @ 13:35	Sampler: CS
Chloride	1 - 2 oz Plastic	<6C

Relinquished by:

Date Time

Accepted by:

Date Time

Relinquished by:

Date Time

Received by:

M. Farnell 6/6/17 1410
Date Time

Sites/Parameters correct as listed. Client Initials _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Aqueous samples requiring metals testing require acid preservation for a 24 hr period prior to analysis.

Delv:

Temp C: 0.4°C

Comment:

Tmpl Ck

Log by

Lab use Only



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Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1706-11996**

DATE RECEIVED: June 06, 2017

DATE REPORTED: June 13, 2017

SAMPLER: Chris Sheldon

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

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Laboratory Report

DATE REPORTED: 06/13/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload

WORK ORDER: 1706-11996
 DATE RECEIVED 06/06/2017

001	Site: 500789 LaPlatte @ Rt. 7				Date Sampled: 6/6/17	Time: 14:45	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	25	mg/L	EPA 300.0	6/7/17	W CM	A	
Phosphorus, Total	0.054	mg/L	SM20 4500 P-F	6/12/17 14:24	R LS	A	
Solids, Total Suspended	35	mg/L	SM 2540 D-97	6/7/17	W JSS	A	
002	Site: 500785 LaPlatte @ Yacht Haven Dr				Date Sampled: 6/6/17	Time: 15:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	21	mg/L	EPA 300.0	6/7/17	W CM	A	
Phosphorus, Total	0.038	mg/L	SM20 4500 P-F	6/12/17 14:33	R LS	A	
Solids, Total Suspended	11	mg/L	SM 2540 D-97	6/7/17	W JSS	A	
003	Site: Storm Water Pond				Date Sampled: 6/6/17	Time: 13:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	180	mg/L	EPA 300.0	6/7/17	W CM	A	
Phosphorus, Total	0.045	mg/L	SM20 4500 P-F	6/12/17 14:35	R LS	A	
Solids, Total Suspended	17	mg/L	SM 2540 D-97	6/7/17	W JSS	A	

VRS- Shelburne Transload

Endyne Inc. COC

Prepared: 6/5/17

1706-11996



1706-11996

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 09035

VRSSHELNBURN

W-90395VR.

Vanasse Hangen Brustlin, Inc.
VRS- Shelburne Transload

Page 1 of 1

500789 LaPlatte @ Rt. 7

Sampled Date/Time: 6/6/17 @ 14:45 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha

Sampled Date/Time: 6/6/17 @ 15:15 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Storm Water Pond

Sampled Date/Time: 6/6/17 @ 13:15 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Level Spreader

Sampled Date/Time: / / @ Sampler:

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Relinquished by:

Chris Sheldon

Date Time

Accepted by:

Relinquished by:

Date Time

Received by:

M. J. Farnell 6/6/17 16:10

Date Time

Date Time

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Delv:

Temp C:

Comment:

Chloride
0.4°C

Tmpl Ck

Log by

Lab use Only



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Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1707-14993**

DATE RECEIVED: July 07, 2017

DATE REPORTED: July 19, 2017

SAMPLER: CS

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 07/19/2017

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: 1707-14993

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 07/07/2017

001	Site: 500789 LaPlatte @ Rt. 7				Date Sampled: 7/7/17		Time: 11:45	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	20	mg/L	EPA 300.0	7/7/17	W CM	A		
Phosphorus, Total	0.042	mg/L	SM20 4500 P-F	7/17/17 10:44	R AJR	A		
Solids, Total Suspended	14	mg/L	SM 2540 D-97	7/13/17	W JSS	A		
002	Site: 500785 LaPlatte @ Yacht Haven Dr				Date Sampled: 7/7/17		Time: 12:05	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	18	mg/L	EPA 300.0	7/7/17	W CM	A		
Phosphorus, Total	0.054	mg/L	SM20 4500 P-F	7/17/17 10:46	R AJR	A		
Solids, Total Suspended	11	mg/L	SM 2540 D-97	7/13/17	W JSS	A		
003	Site: Storm Water Pond				Date Sampled: 7/7/17		Time: 10:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	160	mg/L	EPA 300.0	7/7/17	W CM	A		
Phosphorus, Total	0.045	mg/L	SM20 4500 P-F	7/17/17 10:55	R AJR	A		
Solids, Total Suspended	9	mg/L	SM 2540 D-97	7/13/17	W JSS	A		

VRS- Shelburne Transload

Endyne Inc. COC

1707-14993

Prepared: 11/28/16

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 0903



1707-14993

Vanasse Hangen Brustlin, Inc.
VRSSHELBU VRS- Shelburne Transload

W-90395VF

Page 1 of 1

500789 LaPlatte @ Rt. 7

Sampled Date/Time: 7/17/17 @ 11:45 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha

Sampled Date/Time: 7/17/17 @ 12:05 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

storm water Pond

Date/Time 7/17/17 @ 10:15

Sampler CS

Chloride
Solids, Total Suspended

1-32oz Plastic

LGC

Phosphorus, Total

1-60 mL Glass

LGC, H2SO4

One or more sample bottles in this project must be
kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the
temperature preservation requirement is not satisfied.

INITIAL HERE

Relinquished by: Chris Sheldon 7/17/17 12:50

Date Time

Accepted by:

Relinquished by:

Received by:

B. Bugbee 7/17/17 13:00

Date Time

Date Time

Sites/Parameters correct as listed. Client Initials _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Delv: Client
Temp C: 2.2
Comment:

Tmpl Ck
Log by

Lab use Only



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1707-16562**

DATE RECEIVED: July 24, 2017

DATE REPORTED: August 02, 2017

SAMPLER: Chris

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 08/02/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload

WORK ORDER: 1707-16562
 DATE RECEIVED 07/24/2017

001	Site: 500789 LaPlatte @ Rt. 7				Date Sampled: 7/24/17		Time: 10:50	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	27	mg/L	EPA 300.0	7/24/17	W CM	A		
Phosphorus, Total	0.028	mg/L	SM20 4500 P-F	7/31/17 11:33	R SMY	A		
Solids, Total Suspended	6	mg/L	SM 2540 D-97	7/26/17	W JSS	A		

002	Site: 500785 LaPlatte @ Yacht Haven Dr				Date Sampled: 7/24/17		Time: 11:25	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	25	mg/L	EPA 300.0	7/24/17	W CM	A		
Phosphorus, Total	0.052	mg/L	SM20 4500 P-F	7/31/17 11:34	R SMY	A		
Solids, Total Suspended	7	mg/L	SM 2540 D-97	7/26/17	W JSS	A		

003	Site: Storm Water Pond				Date Sampled: 7/24/17		Time: 10:20	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	300	mg/L	EPA 300.0	7/24/17	W CM	A		
Phosphorus, Total	0.034	mg/L	SM20 4500 P-F	7/31/17 11:36	R SMY	A		
Solids, Total Suspended	8	mg/L	SM 2540 D-97	7/26/17	W JSS	A		

VRS- Shelburne Transload

Endyne Inc. COC

Prepared: 6/5/17

1707-16562

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
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South Burlington VT 05403
acoplin@vhb.com;jwilson@vhb.com

Cust # 090



1707-16562

VRSSHELBU Vanasse Hangen Brustlin, Inc.
URS- Shelburne Transload

W-90395\

500789 LaPlatte @ Rt. 7

Sampled Date/Time: 7/24/17@10:50 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

500785 LaPlatte @ Yacht Ha

Sampled Date/Time: 7/24/17@11:25 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Storm Water Pond

Sampled Date/Time: 7/24/17@10:20 Sampler: CS

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Level Spreader

Sampled Date/Time: / / @ Sampler:

Chloride 1 - 32 oz Plastic <6C
Solids, Total Suspended

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Relinquished by:

7/24/17 12:15

Date Time

Accepted by:

Date Time

Relinquished by:

Received by:

Sites/Parameters correct as listed. Client Initials

Date Time

Date Time

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Delv: Client
Temp C: 4.0
Comment:

Tmpl Ck
Log by

Lab use Only



160 James Brown Dr.
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Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 100, Suite 200

South Burlington, VT 05403

Atten: Robert Wildey

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1708-18694**

DATE RECEIVED: August 11, 2017

DATE REPORTED: August 23, 2017

SAMPLER: EC, RAW

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 08/23/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload

WORK ORDER: 1708-18694
 DATE RECEIVED 08/11/2017

001	Site: SW Pond			Date Sampled: 8/11/17		Time: 8:30	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	310	mg/L	EPA 300.0	8/11/17	W CM	A	
Phosphorus, Total	0.055	mg/L	SM20 4500 P-F	8/21/17 11:23	R AJR	A	
Solids, Total Suspended	6	mg/L	SM 2540 D-97	8/16/17	W JSS	A	

002	Site: LPR Upstream			Date Sampled: 8/11/17		Time: 9:30	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	26	mg/L	EPA 300.0	8/11/17	W CM	A	
Phosphorus, Total	0.035	mg/L	SM20 4500 P-F	8/21/17 11:24	R AJR	A	
Solids, Total Suspended	6	mg/L	SM 2540 D-97	8/16/17	W JSS	A	

003	Site: LPR Downstream			Date Sampled: 8/11/17		Time: 10:15	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	27	mg/L	EPA 300.0	8/11/17	W CM	A	
Phosphorus, Total	0.062	mg/L	SM20 4500 P-F	8/21/17 11:26	R AJR	A	
Solids, Total Suspended	7	mg/L	SM 2540 D-97	8/16/17	W JSS	A	

Shelburne Transload
~~LS-A18 Stormwater~~ **572.00**

Endyne Inc. COC

1708-18694

Prepared: 6/27/17

Bill to:

Report to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
jwilson@vhb.com;mperry@vhb.com

Cust # 09

GENE

W-9036



1708-18694

Vanasse Hangen Brustlin, Inc.
URS- Shelburne Transload

Page 1 of 1

~~LS-A18 Inlet~~ **SW POND** Sampled Date/Time: **08/11/17@8:30** Sampler: **EC/RAW**

Solids, Total Suspended, **CI** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

GRAB

~~LS-A18 Upstream~~ **LPR-UPSTREAM** Sampled Date/Time: **08/11/17@9:30** Sampler: **EC/RAW**

Solids, Total Suspended, **CI** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

GRAB

~~LS-A18 Downstream~~ **LPR-DSTR** Sampled Date/Time: **08/11/17@10:15** Sampler: **EC/RAW**

Solids, Total Suspended, **CL** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

GRAB

~~LS-A18 ROSS~~ Sampled Date/Time: ____/____/____@____ Sampler: ____

Solids, Total Suspended 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied.

INITIAL HERE

Relinquished by: [Signature] 8/11/17 Accepted by: [Signature] 8/11/17@11:30
Date Time Date Time

Relinquished by: _____ Received by: _____
Date Time Date Time

Sites/Parameters correct as listed. Client Initials _____ Date Time _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Delv: Client
Temp C: 4.7
Comment:

Tmpl Ck
Log by

Lab use Only



160 James Brown Dr.
Williston, VT 05495
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Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

Building 100, Suite 200

South Burlington, VT 05403

Atten: Elvin Cordero

PROJECT: Shelburne Transload 57762.00

WORK ORDER: **1708-19407**

DATE RECEIVED: August 18, 2017

DATE REPORTED: August 31, 2017

SAMPLER: EC

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 08/31/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: Shelburne Transload 57762.00

WORK ORDER: 1708-19407
 DATE RECEIVED 08/18/2017

001	Site: SW Pond			Date Sampled: 8/18/17		Time: 9:21	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	180	mg/L	EPA 300.0	8/21/17	W CM	A	
Phosphorus, Total	0.034	mg/L	SM20 4500 P-F	8/28/17 10:11	R LS	A	
Solids, Total Suspended	7	mg/L	SM 2540 D-97	8/22/17	W JSS	A	

002	Site: LPR-Upstream			Date Sampled: 8/18/17		Time: 10:05	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	32	mg/L	EPA 300.0	8/21/17	W CM	A	
Phosphorus, Total	0.039	mg/L	SM20 4500 P-F	8/28/17 11:09	R LS	A	
Solids, Total Suspended	16	mg/L	SM 2540 D-97	8/22/17	W JSS	A	

003	Site: LPR-Downstream			Date Sampled: 8/18/17		Time: 10:55	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	31	mg/L	EPA 300.0	8/21/17	W CM	A	
Phosphorus, Total	0.057	mg/L	SM20 4500 P-F	8/28/17 11:15	R LS	A	
Solids, Total Suspended	7	mg/L	SM 2540 D-97	8/22/17	W JSS	A	

SHELburnE TRANSLAND 57762.10

LS-A18 Stormwater 57346.11

Endyne Inc. COC 1708-19407

Prepared: 6/27/17

Bill to:

Report to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
jwilson@vhb.com;mperry@vhb.com

Cust #

C

GEI

W-9C



1708-19407

Vanasse Hangen Brustlin, Inc.
LS-A18 Stormwater 57346.11

~~LS-A18 Inlet~~ **JW POND**

Sampled Date/Time: **8/18/17 @ 9:21**

Sampler: **EC**

Solids, Total Suspended, **CI** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Grab

~~LS-A18 Upstream~~
LPR-UPSTREAM

Sampled Date/Time: **8/18/17 @ 10:05**

Sampler: **EC**

Solids, Total Suspended, **CI** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Grab

~~LS-A18 Downstream~~
LPR-DSTR

Sampled Date/Time: **8/18/17 @ 10:55**

Sampler: **EC**

Solids, Total Suspended, **CL** 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Grab

~~LS-A18 Ross~~

Sampled Date/Time: **8/18/17 @ 13:00**

Sampler: **EC**

Solids, Total Suspended 1 - 16 oz Plastic <6C

Phosphorus, Total 1 - 60 mL Glass <6C, H2SO4

Grab

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied.

INITIAL HERE

Relinquished by:

8/18/17 13:00

Accepted by:

Relinquished by:

Received by:

B. Bugbee 8/18/17 13:00

Sites/Parameters correct as listed. Client Initials

Client Authorization to use Subcontract lab Client Initials

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#)

Requested Turnaround Time: Routine: Rush Due Date

Delv: **Client**
Temp C: **3.9**
Comment:

Tmpl Ck
Log by

Lab use Only



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
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Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: Shelburne Transload # 57762.00

WORK ORDER: **1708-20331**

DATE RECEIVED: August 29, 2017

DATE REPORTED: September 08, 2017

SAMPLER: EC

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

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Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

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Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 09/08/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: Shelburne Transload # 57762.00

WORK ORDER: 1708-20331
 DATE RECEIVED 08/29/2017

001	Site: Duplicate				Date Sampled: 8/29/17		0:00
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	51	mg/L	EPA 300.0	8/30/17	W CM	A	
002	Site: MW-304				Date Sampled: 8/29/17		Time: 11:10
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	14	mg/L	EPA 300.0	8/30/17	W CM	A	
003	Site: MW-300				Date Sampled: 8/29/17		Time: 12:05
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	< 5.0	mg/L	EPA 300.0	8/30/17	W CM	A	
004	Site: MW-301				Date Sampled: 8/29/17		Time: 12:38
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	1,200	mg/L	EPA 300.0	8/31/17	W CM	A	
005	Site: MW-302				Date Sampled: 8/29/17		Time: 13:19
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	51	mg/L	EPA 300.0	8/30/17	W CM	A	
006	Site: MW-303				Date Sampled: 8/29/17		Time: 14:09
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	51	mg/L	EPA 300.0	8/30/17	W CM	A	
007	Site: SW Pond				Date Sampled: 8/29/17		Time: 14:29
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	180	mg/L	EPA 300.0	8/30/17	W CM	A	
Phosphorus, Total	0.018	mg/L	SM20 4500 P-F	9/5/17 12:47	R LS	A	
Solids, Total Suspended	3	mg/L	SM 2540 D-97	8/31/17	W JSS	A	
008	Site: Upstream				Date Sampled: 8/29/17		Time: 14:52
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	34	mg/L	EPA 300.0	8/30/17	W CM	A	
Phosphorus, Total	0.028	mg/L	SM20 4500 P-F	9/5/17 12:49	R LS	A	
Solids, Total Suspended	8	mg/L	SM 2540 D-97	8/31/17	W JSS	A	
009	Site: Downstream				Date Sampled: 8/29/17		Time: 15:19
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Chloride	34	mg/L	EPA 300.0	8/30/17	W CM	A	
Phosphorus, Total	0.044	mg/L	SM20 4500 P-F	9/5/17 12:50	R LS	A	
Solids, Total Suspended	3	mg/L	SM 2540 D-97	8/31/17	W JSS	A	



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: _____

76332

Project Name: SHEL. TRANS. #57762.00	Client/Contact Name: VHB	Sampler Name: ZGC Elvin Cordero
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Phone #: 802-497-6137	Phone #: Zack Clark
Endyne WO #	Mailing Address: 40 IDX DR. S. BURLINGTON VT 05403	Billing Address: 05403

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
3P DUPLICATE "DUP"	GW	X		8/29/17	1	PLASTIC 80Z		CHLORIDE		
MW-304				1110	1					
MW-300				1205	1					
MW-301				1238	1					
MW-302				1319	1					
MW-303	↓			1409	1	↓	↓			
SW POND	SW			1429	2	PLAST 160Z 50 mL	H2SO4	2,12,7		
UPSTREAM	↓			1452	2	↓	↓	↓		
DOWSTREAM	↓	↓		1519	2	↓	↓	↓		

Relinquished by: EL	Date/Time: 8/29/17	Received by: Eileen Lomay	Date/Time: 8/29/17 @ 1650
----------------------------	---------------------------	----------------------------------	----------------------------------

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	LAB USE ONLY Delivery: Client Temp: 36 Comment:
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest	
3	Ammonia N	8	Total Diss. P	13	TDS	18	COND				2 PCB	
4	Nitrite N	9	BOD	14	Turbidity	19					3 Metals	
5	Nitrate N	10	Alkalinity	15	Conductivity	20					1 RCRA8	
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K,					33	C					
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	C					
34	Corrosivity	35	Ignitability	36	Reactivity	37	C					
38	Other											

1708-20331



Vanasse Hangen Brustlin, Inc.
Shelburne Transload # 57762.00



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload

WORK ORDER: **1709-22808**

DATE RECEIVED: September 22, 2017

DATE REPORTED: October 05, 2017

SAMPLER: Elvin

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

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56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 10/05/2017

CLIENT: Vanasse Hangen Brustlin, Inc.

WORK ORDER: 1709-22808

PROJECT: VRS- Shelburne Transload

DATE RECEIVED 09/22/2017

001	Site: 500789 LaPlatte @ Rt. 7 USTR				Date Sampled: 9/21/17		Time: 18:02	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	32	mg/L	EPA 300.0	9/23/17	W CM	A		
Phosphorus, Total	0.034	mg/L	SM20 4500 P-F	10/2/17 13:09	R RLS	A		
Solids, Total Suspended	5	mg/L	SM 2540 D-97	9/28/17	W JSS	A		
002	Site: 500785 LaPlatte @ Yacht Haven Dr DSTR				Date Sampled: 9/21/17		Time: 18:51	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	34	mg/L	EPA 300.0	9/23/17	W CM	A		
Phosphorus, Total	0.057	mg/L	SM20 4500 P-F	10/2/17 13:11	R RLS	A		
Solids, Total Suspended	6	mg/L	SM 2540 D-97	9/28/17	W JSS	A		
003	Site: Storm Water Pond				Date Sampled: 9/21/17		Time: 17:47	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>	
Chloride	100	mg/L	EPA 300.0	9/23/17	W CM	A		
Phosphorus, Total	0.11	mg/L	SM20 4500 P-F	10/2/17 13:13	R RLS	A		
Solids, Total Suspended	124	mg/L	SM 2540 D-97	9/28/17	W JSS	A		

500789 LaPlatte @ Rt. 7
USTR

Sampled Date/Time: 09/21/17 @ 18:02

Sampler: EC

Chloride	1 - 32 oz Plastic	<6C	
Solids, Total Suspended			
Phosphorus, Total	1 - 60 mL Glass	<6C, H2SO4	GRAB

500785 LaPlatte @ Yacht Ha
DSTR

Sampled Date/Time: 09/21/17 @ 18:51

Sampler: EC

Chloride	1 - 32 oz Plastic	<6C	
Solids, Total Suspended			GRAB
Phosphorus, Total	1 - 60 mL Glass	<6C, H2SO4	

SW POND

09/21/17 @ 17:47

C1, TSS

1-32 oz Plastic

<6C

Total Phosphorus

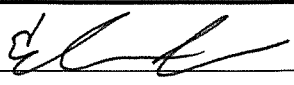
1-60mL Glass

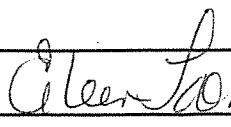
<6C, H2SO4

GRAB

One or more sample bottles in this project must be kept refrigerated or on ice until delivery at the laboratory.

Your initials will allow Endyne to proceed with analysis if the temperature preservation requirement is not satisfied. INITIAL HERE

Relinquished by:  9/22/17 16:43
Date Time

Accepted by:  9/22/17 @ 16:43
Date Time

Relinquished by: _____
Date Time

Received by: _____
Date Time

Sites/Parameters correct as listed. Client Initials _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Delv: Client
Temp C: -1.8
Comment:

Temp Ck
Log by

Lab use Only



Vanasse Hangen Brustlin, Inc.

40 IDX Drive

090395

South Burlington, VT 05403

Atten: Alexis Coplin

PROJECT: VRS- Shelburne Transload QTR

WORK ORDER: **1709-23062**

DATE RECEIVED: September 27, 2017

DATE REPORTED: October 04, 2017

SAMPLER: JWG, RFA

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 10/04/2017

CLIENT: Vanasse Hangen Brustlin, Inc.
 PROJECT: VRS- Shelburne Transload QTR

WORK ORDER: **1709-23062**
 DATE RECEIVED 09/27/2017

001	Site: MW-300				Date Sampled: 9/26/17	Time: 12:01	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	1.4	mg/L	EPA 300.0	10/3/17	W CM	A	
002	Site: MW-301				Date Sampled: 9/26/17	Time: 10:36	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	810	mg/L	EPA 300.0	9/28/17	W CM	A	
003	Site: MW-301a				Date Sampled: 9/26/17	Time: 10:51	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	240	mg/L	EPA 300.0	9/28/17	W CM	A	
004	Site: MW-302				Date Sampled: 9/26/17	Time: 12:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	50	mg/L	EPA 300.0	9/28/17	W CM	A	
005	Site: MW-303				Date Sampled: 9/26/17	Time: 13:50	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	72	mg/L	EPA 300.0	9/28/17	W CM	A	
006	Site: MW-304				Date Sampled: 9/26/17	Time: 13:04	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	19	mg/L	EPA 300.0	9/28/17	W CM	A	
007	Site: MW-305				Date Sampled: 9/26/17	Time: 12:52	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	< 5.0	mg/L	EPA 300.0	9/28/17	W CM	A	
008	Site: MW-306				Date Sampled: 9/26/17	Time: 10:50	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Chloride	430	mg/L	EPA 300.0	9/28/17	W CM	A	

VRS- Shelburne Transload QTR

Endyne Inc. COC

Prepared: 9/26/17

1709-23062



1709-23062

Bill to:

Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
Ph: 802-497-6137

Report to:

Alexis Coplin
Vanasse Hangen Brustlin, Inc.
40 IDX Drive
South Burlington VT 05403
acoplin@vhb.com; jwilson@vhb.com
Eurch@VHB.com

Cust # 090395

VRS-SHELBURNE

W-90395VRQ

Vanasse Hangen Brustlin, Inc.
VRS- Shelburne Transload QTR

Page 1 of 1

MW-300

Sampled Date/Time: 9/26/17 @ 1201 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-301

Sampled Date/Time: 9/26/17 @ 1036 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-301a

Sampled Date/Time: 9/26/17 @ 1051 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-302

Sampled Date/Time: 9/26/17 @ 1200 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-303

Sampled Date/Time: 9/26/17 @ 1350 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-304

Sampled Date/Time: 9/26/17 @ 1304 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-305

Sampled Date/Time: 9/26/17 @ 1252 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

MW-306

Sampled Date/Time: 9/26/17 @ 1050 Sampler: JW6/RFA

Chloride

1 - 2 oz Plastic

<6C

Relinquished by:

9/27/17 8:07

Date Time

Accepted by:

Received by:

9/27/17 8:10

Date Time

Date Time

Relinquished by:

Sites/Parameters correct as listed. Client Initials JG

Client Authorization to use Subcontract lab Client Initials JW6

Sample origin: VT ☒ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) 57762.06

Requested Turnaround Time Routine Rush Due Date

Delv: Client
Temp C: -3.0
Comment:

Tmpl Ck

Log by

Lab use Only

Aqueous samples requiring metals testing require acid preservation for a 24 hr period prior to analysis.



160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052

Storm Event Data

Information on the storm events sampled should be recorded here. This information does not need to be submitted to the Agency, but should be available upon request.

Monitoring Period:	<u>04/01/2017</u> MO/DAY/YEAR	to	<u>06/30/2017</u> MO/DAY/YEAR
Date of Storm Event:	<u>06/06/2017</u> MO/DAY/YEAR	Type of Monitoring:	SWPPP Compliance Effluent limitation/ Benchmark
Storm Duration :	<u>21 hrs</u> Hours	Total Precipitation:	<u>1.04 in</u> Inches
Time Since Last Measurable Storm Event:	<u>6 days</u> Hours or Days		

Monitoring Period:	<u>07/01/2017</u> MO/DAY/YEAR	to	<u>09/30/2017</u> MO/DAY/YEAR
Date of Storm Event:	<u>07/24/2017</u> MO/DAY/YEAR	Type of Monitoring:	SWPPP Compliance Effluent limitation/ Benchmark
Storm Duration :	<u>14 hrs</u> Hours	Total Precipitation:	<u>0.90 in</u> Inches
Time Since Last Measurable Storm Event:	<u>7 days</u> Hours or Days		

Monitoring Period:	<u>07/01/2017</u> MO/DAY/YEAR	to	<u>09/30/2017</u> MO/DAY/YEAR
Date of Storm Event:	<u>08/18/2017</u> MO/DAY/YEAR	Type of Monitoring:	SWPPP Compliance Effluent limitation/ Benchmark
Storm Duration :	<u>20 hrs</u> Hours	Total Precipitation:	<u>0.71 in</u> Inches
Time Since Last Measurable Storm Event:	<u>11 days</u> Hours or Days		

Appendix G: **Comprehensive Site Compliance Evaluation**

Keep records of the annual comprehensive site compliance evaluation and certification of compliance here.

A sample inspection form has been included.



October 16, 2017

Ref: 57762.00

Ms. Christy Witters
MSGP Program Coordinator
Vermont Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, Vermont 05620-3522

Re: Shelburne Transload Facility
Shelburne, Vermont
MSGP No. 7514-9003
2017 Annual Report and Supporting Documentation

Dear Christy:

Enclosed please find the Annual Report Form associated with Multi-Sector General Permit ("MSGP") Authorization No. 7514-9003 for the Shelburne Transload Facility in Shelburne, Vermont. As required by the MSGP authorization dated November 21, 2016, inspections and water quality monitoring have been conducted in accordance with the approved Stormwater Pollution Prevention Plan ("SWPPP"). The results from these inspections and monitoring during the 2016-2017 reporting period are available upon request.

During the reporting period, the routine facility inspections and annual comprehensive inspection were conducted to identify potential sources of pollution associated with operations at the facility. As intended, these inspections identified a possible concern associated with incidental salt spillage, minor equipment leaks (less than 2 gallons), and soil erosion that were promptly addressed in accordance the Best Management Practices ("BMPs") identified in the SWPPP. As required, quarterly visual inspections of runoff were also conducted at the facility's discharge locations (S/N 001 and 002) and observed no evidence of contamination leaving the site. In accordance with the approved SWPPP, water quality monitoring at the facility consists of three types of monitoring: wet- and dry-weather grab samples of surface waters, continuous conductivity monitoring of surface waters, and quarterly groundwater sampling. The results from these monitoring activities are described below.

Surface water sampling was conducted within the LaPlatte River at the approved locations upstream and downstream from the facility, as well as within the stormwater treatment practices within the facility. The LaPlatte River samples have shown no measurable change between upstream and downstream locations

and all results were within the ranges of values previously reported through the Vermont Department of Environmental Conservation ("DEC") Integrated Watershed Information System ("IWIS"). Samples collected within the stormwater treatment pond at the facility indicate that chloride concentrations in this structure were consistently below the modeled chloride concentration of 1,323 mg/L that was previously established by VHB as the upper threshold to maintain compliance with the VWQS acute chloride criterion in the LaPlatte River during a 7Q10 low flow event.

Continuous conductivity monitoring was conducted at four locations, which included the upstream and downstream LaPlatte River sampling locations and at the two stormwater treatment practices within the facility. These data are collected at five minute intervals. One of the stormwater treatment practices (S/N 002) has generally been observed to be dry and thus not able to be sampled for continuous conductivity measurements. The other locations experienced periodic events where the water level dropped below the sensor of the conductivity probe, resulting in unusable data during these periods. The probes were also removed during periods of extreme cold when they could have been damaged due to ice encasement or dislodgement. The Vermont state-wide conductivity to chloride regression equation presented in the Vermont Surface Water Assessment and Listing Methodology, (DEC 2016) (accessed on line at http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/WSMD_assessmethod_2016.pdf) was used to convert these conductivity measurements to estimated chloride concentrations. Based on the results from this monitoring, the estimated chloride concentrations in the LaPlatte did not exceed the chronic (230 mg/L) or the acute (860 mg/L) criteria at any time during the reporting period. The estimated chloride concentration in the pond also remained well below the 1,323 mg/L chloride threshold.

In accordance with the SWPPP, groundwater monitoring was conducted at a series of shallow groundwater wells installed at the facility. Quarterly samples were collected from these wells and delivered to a laboratory for analysis. Chloride concentrations in some of these wells demonstrated an increasing trend during the reporting period. In accordance with Section 3 of the MSGP, and to investigate potential causes for this increase and to better characterize groundwater flow at the facility, additional monitoring wells were installed and samples collected. Additionally, two corrective actions have been identified and are being implemented at the site while our investigation continues. The first involves installation of curbing around the vegetated area where wetland 2015-4 is located to direct surface runoff from the adjacent paved area to the stormwater treatment pond and away from this wetland. The second involves enhancing the good housing keeping BMP to more frequently clean incidental salt spillage from the pavement and rail spur ballast when salt loading and transport operations are underway. These two corrective actions are documented on the Annual Report Form included with this letter. The original and newly-added wells, all now equipped with tamper-evident locking mechanisms, will continue to be monitored over the next year to evaluate the efficacy of these BMPs.

The results from these monitoring activities indicate that the facility is operating in compliance with the MSGP. In accordance with the SWPPP, and in accordance with the MSGP, appropriate corrective actions will be undertaken in response to future monitoring results. The facility's SWPPP has been updated to reflect the additional groundwater monitoring wells and the as-built condition of the facility. A copy of the updated SWPPP narrative is included in the Attachment. As required by the permit, a complete copy of the SWPPP and its appendices, as well as all data collected, is being maintained on-site and is available for

Ms. Christy Witters
Ref: 57762.00
Page 3 of 3
October 16, 2017



review upon request. If you have any questions or comments regarding this information, please do not hesitate to contact me at (802) 497-6164 or Erik Urch, Senior Project Manager, at (802) 497-6102.

Sincerely,

A handwritten signature in blue ink that reads "Robert Wildey".

Robert Wildey
Water Resources Consultant

RAW/jkw
Attachment

cc: Kevin Burke, DEC Stormwater
Peter Young, VTR
Brion Muzzy, Shelburne Transload Stormwater Pollution Prevention Team

ATTACHMENT

Multi-Sector General Permit 3-9003 Annual Report Form



A. General Information

Facility Name: Shelburne Transload Facility

Permit Number: 7514 -9003 or 9003.R

Inspection Date: 9/14/2017

Facility Physical Address:

Street: 4744 Shelburne Road

City/Town: Shelburne

State: VT

Zip: 05482

Lead Inspector Name: Brion Muzzy

Title: Operations Manager

Additional Inspector Name: Brian Barrett

Title: Vice President

Contact Person: Brion Muzzy

Title: Operations Manager

Phone: (802) 862-2503

Email: bmuzzy@vrs.us.com

B. General Inspection Findings

1. As part of this comprehensive site inspection, did you inspect all potential pollutant sources, including areas where industrial activity may be exposed to stormwater?

☒ Yes
☐ No

If no, describe why not:

2. Did this inspection identify any stormwater or non-stormwater outfalls not previously identified in your SWPPP?

☐ Yes
☒ No

If yes, for each location, describe the sources of those stormwater and non-stormwater discharges and any associated control measures in place:

3. Did this inspection identify any sources of stormwater or non-stormwater discharges not previously identified in your SWPPP?

☐ Yes
☒ No

If yes, describe these sources of stormwater or non-stormwater pollutants expected to be present in these discharges, and any control measures in place:

4. Please review the results of your stormwater benchmark monitoring testing from the past year and summarize the findings below.

☒ Benchmark monitoring is not required at this site.

Sector P facilities do not have specific benchmark monitoring requirements. Stormwater monitoring for several parameters, including chloride, has been completed in accordance with the approved SWPPP. Results from this monitoring show no evidence of increased chloride concentrations in the LaPlatte River. Elevated chloride concentrations have been observed at certain groundwater monitoring wells, see Corrective Actions 1 and 2.

5. Describe any evidence of pollutants entering the drainage system or discharging to surface waters, and the condition of and around outfalls, including flow dissipation measures to prevent scouring:

No visual evidence of pollutants entering the drainage system was observed. Elevated chloride concentrations were observed in certain groundwater monitoring wells, which may indicate discharge of chloride via surface waters to isolated wetland 2015-4. See Corrective Actions 1 and 2. The level spreader was observed to be in good condition. Minor erosion was observed at the outlet from the stormwater pond, see Corrective Action 3.

6. Have you taken or do you plan to take any corrective actions, as specified in Part 3 of the permit, since your last annual report submission (or since you received authorization to discharge under this permit if this is your first annual report), including any corrective actions identified as a result of this annual comprehensive site inspection? ☒ Yes ☐ No

If yes, how many conditions requiring review for corrective action as specified in Parts 3.1 and 3.2 were addressed by these corrective actions? 2

NOTE: Complete the Corrective Action section on this form for each condition identified, including any conditions identified as a result of this comprehensive stormwater inspection.

C. Industrial Activity Area Specific Findings

Complete one block for each industrial activity area where pollutants may be exposed to stormwater. Copy this page for additional industrial activity areas.

In reviewing each area, you should consider:

- Industrial materials, residue, or trash that may have or could come into contact with stormwater;
- Leaks or spills from industrial equipment, drums, tanks, and other containers;
- Offsite tracking of industrial or waste materials from areas of no exposure to exposed areas; and
- Tracking or blowing of raw, final, or waste materials from areas of no exposure to exposed areas.

Industrial Activity Area: PPS-1 (Salt loading and handling area)

1. Brief Description: Paved area around truck scale and scale-house: rock salt observed on pavement after passage of loaded trucks.

2. Are any control measures in need of maintenance or repair? ☐ Yes ☒ No
3. Have any control measures failed and require replacement? ☐ Yes ☒ No
4. Are any additional/revised BMPs necessary in this area? ☒ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Enhance good housekeeping practices around scalehouse and install berm/curbing around perimeter of wetland 2015-4 to direct runoff away from this feature and towards the stormwater pond.

Industrial Activity Area: PPS-1 (Salt loading and handling area)

1. Brief Description: Offloading pit and conveyor: stormwater entering offloading pit results in concentrated brine, salt observed on ballast in area of offloading pit.

2. Are any control measures in need of maintenance or repair? ☐ Yes ☒ No
3. Have any control measures failed and require replacement? ☐ Yes ☒ No
4. Are any additional/revised BMPs necessary in this area? ☒ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Enhance good housekeeping practices at offloading area and pump out water from offloading pit as needed via septic hauler.

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

D. Corrective Actions

Complete this page for each specific condition requiring a corrective action or a review determining that no corrective action is needed. Copy this page for additional corrective actions or reviews.

Include both corrective actions that have been initiated or completed since the last annual report, and future corrective actions needed to address problems identified in this comprehensive stormwater inspection. Include an update on any outstanding corrective actions that had not been completed at the time of your previous annual report.

1. Corrective Action # 1 of 2

2. Is this corrective action:

- ☐ An update on a corrective action from a previous annual report; or
☒ A new corrective action

3. Identify the condition(s) triggering the need for this review:

- ☐ Unauthorized release or discharge
☐ Average benchmark value exceedance
☐ Numeric effluent limitation exceedance
☐ Control measures inadequate to meet applicable water quality standards
☐ Control measures inadequate to meet non-numeric effluent limitations
☐ Control measures not properly operated or maintained
☐ Change in facility operations necessitated change in control measures
☒ Other (describe): Elevated chloride concentration observed in groundwater monitoring wells.

4. Briefly describe the nature of the problem identified:

Stormwater runoff from pavement entering vegetated area instead of flowing overland to stormwater treatment practice.

5. Date problem identified: 9/15/2017

6. How problem was identified:

- ☐ Comprehensive site inspection
☐ Quarterly visual inspection
☐ Routine facility inspection
☐ Benchmark monitoring
☐ Notification by EPA or State or local authorities
☒ Other (describe): Quarterly groundwater monitoring

7. Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analyses to be conducted, etc.) or if no modifications are needed, basis for the determination:

Sand bag berm installed to keep runoff from leaving pavement; berm to be replaced by permanent curb.

8. Did/will this corrective action require modification of your SWPPP?

☒ Yes ☐ No

9. Date corrective action initiated: 10/1/2017

10. Date corrective action completed: _____ or expected to be completed: 11/15/2017

11. If corrective action is not yet completed, provide the status of corrective action at the time of the comprehensive site inspection and describe any remaining steps (including timeframes associated with each step) necessary to complete the corrective action:

Sand bags have been placed, will be replaced with asphalt curb / berm before end of paving season in mid-November.

D. Corrective Actions

Complete this page for each specific condition requiring a corrective action or a review determining that no corrective action is needed. Copy this page for additional corrective actions or reviews.

Include both corrective actions that have been initiated or completed since the last annual report, and future corrective actions needed to address problems identified in this comprehensive stormwater inspection. Include an update on any outstanding corrective actions that had not been completed at the time of your previous annual report.

1. Corrective Action # 2 of 2

2. Is this corrective action:

- ☐ An update on a corrective action from a previous annual report; or
☒ A new corrective action

3. Identify the condition(s) triggering the need for this review:

- ☐ Unauthorized release or discharge
☐ Average benchmark value exceedance
☐ Numeric effluent limitation exceedance
☐ Control measures inadequate to meet applicable water quality standards
☐ Control measures inadequate to meet non-numeric effluent limitations
☐ Control measures not properly operated or maintained
☐ Change in facility operations necessitated change in control measures
☒ Other (describe): Elevated chloride concentration observed in groundwater monitoring wells.

4. Briefly describe the nature of the problem identified:

Spilled rock salt observed on pavement near wetland 2015-4 and within rail spur ballast near unloading area.

5. Date problem identified: 9/26/2017

6. How problem was identified:

- ☐ Comprehensive site inspection
☐ Quarterly visual inspection
☐ Routine facility inspection
☐ Benchmark monitoring
☐ Notification by EPA or State or local authorities
☒ Other (describe): Supplemental inspection to review sources of chloride in groundwater.

7. Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analyses to be conducted, etc.) or if no modifications are needed, basis for the determination:

Enhance good housekeeping efforts (sweeping and clean-up) of spilled salt on paved areas and in the vicinity of the unloading area.

8. Did/will this corrective action require modification of your SWPPP?

☐ Yes ☒ No

9. Date corrective action initiated: 10/1/2017

10. Date corrective action completed: 10/1/2017 or expected to be completed: _____

11. If corrective action is not yet completed, provide the status of corrective action at the time of the comprehensive site inspection and describe any remaining steps (including timeframes associated with each step) necessary to complete the corrective action:

Corrective action is a continuation of good housekeeping practices and will be on-going.

E. Annual Report Certification

Compliance Certification

Do you certify that your annual inspection has met the requirements of Part 4.3 of the permit, and that, based upon the results of this inspection, to the best of your knowledge, you are in compliance with the permit?

☒ Yes ☐ No

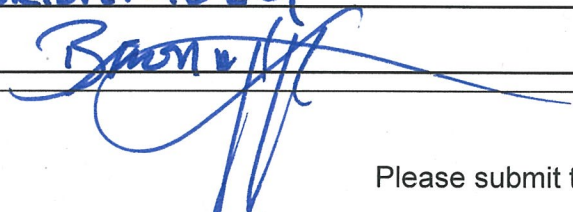
If no, summarize why you are not in compliance with the permit:

Annual Report Certification

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

Authorized Representative:

Name: Brunmuzzey Title: sp manager

Signature:  Date: 10-16-17

Please submit this form to:

Vermont Department of Environmental Conservation
Stormwater Program - MSGP Coordinator
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Or by email to:

anr.wsmdstormwatergeneral@vermont.gov

Multi-Sector General Permit 3-9003

Annual Report Form



A. General Information

Facility Name: _____

Permit Number: _____ -9003 or 9003.R Inspection Date: _____

Facility Physical Address:

Street: _____

City/Town: _____ State: VT Zip: _____

Lead Inspector Name: _____ Title: _____

Additional Inspector Name: _____ Title: _____

Contact Person: _____ Title: _____

Phone: _____ Email: _____

B. General Inspection Findings

1. As part of this comprehensive site inspection, did you inspect all potential pollutant sources, including areas where industrial activity may be exposed to stormwater? ☐ Yes ☐ No

If no, describe why not:

2. Did this inspection identify any stormwater or non-stormwater outfalls not previously identified in your SWPPP? ☐ Yes ☐ No

If yes, for each location, describe the sources of those stormwater and non-stormwater discharges and any associated control measures in place:

3. Did this inspection identify any sources of stormwater or non-stormwater discharges not previously identified in your SWPPP? ☐ Yes ☐ No

If yes, describe these sources of stormwater or non-stormwater pollutants expected to be present in these discharges, and any control measures in place:

4. Please review the results of your stormwater benchmark monitoring testing from the past year and summarize the findings below. ☐ Benchmark monitoring is not required at this site.

5. Describe any evidence of pollutants entering the drainage system or discharging to surface waters, and the condition of and around outfalls, including flow dissipation measures to prevent scouring:

6. Have you taken or do you plan to take any corrective actions, as specified in Part 3 of the permit, since your last annual report submission (or since you received authorization to discharge under this permit if this is your first annual report), including any corrective actions identified as a result of this annual comprehensive site inspection? ☐ Yes ☐ No

If yes, how many conditions requiring review for corrective action as specified in Parts 3.1 and 3.2 were addressed by these corrective actions? _____

NOTE: Complete the Corrective Action section on this form for each condition identified, including any conditions identified as a result of this comprehensive stormwater inspection.

C. Industrial Activity Area Specific Findings

Complete one block for each industrial activity area where pollutants may be exposed to stormwater. Copy this page for additional industrial activity areas.

In reviewing each area, you should consider:

- Industrial materials, residue, or trash that may have or could come into contact with stormwater;
- Leaks or spills from industrial equipment, drums, tanks, and other containers;
- Offsite tracking of industrial or waste materials from areas of no exposure to exposed areas; and
- Tracking or blowing of raw, final, or waste materials from areas of no exposure to exposed areas.

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____

2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No

3. Have any control measures failed and require replacement? ☐ Yes ☐ No

4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____
2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No
3. Have any control measures failed and require replacement? ☐ Yes ☐ No
4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____
2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No
3. Have any control measures failed and require replacement? ☐ Yes ☐ No
4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____
2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No
3. Have any control measures failed and require replacement? ☐ Yes ☐ No
4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

Industrial Activity Area: _____

1. Brief Description: _____
2. Are any control measures in need of maintenance or repair? ☐ Yes ☐ No
3. Have any control measures failed and require replacement? ☐ Yes ☐ No
4. Are any additional/revised BMPs necessary in this area? ☐ Yes ☐ No

If yes to any of these three questions, provide a description of the problem. (Any necessary corrective actions should be described in the corrective action section of this form)

D. Corrective Actions

Complete this page for each specific condition requiring a corrective action or a review determining that no corrective action is needed. Copy this page for additional corrective actions or reviews.

Include both corrective actions that have been initiated or completed since the last annual report, and future corrective actions needed to address problems identified in this comprehensive stormwater inspection. Include an update on any outstanding corrective actions that had not been completed at the time of your previous annual report.

1. Corrective Action # _____ of _____

2. Is this corrective action:

- ☐ An update on a corrective action from a previous annual report; or
☐ A new corrective action

3. Identify the condition(s) triggering the need for this review:

- ☐ Unauthorized release or discharge
☐ Average benchmark value exceedance
☐ Numeric effluent limitation exceedance
☐ Control measures inadequate to meet applicable water quality standards
☐ Control measures inadequate to meet non-numeric effluent limitations
☐ Control measures not properly operated or maintained
☐ Change in facility operations necessitated change in control measures
☐ Other (describe): _____

4. Briefly describe the nature of the problem identified:

5. Date problem identified: _____

6. How problem was identified:

- ☐ Comprehensive site inspection ☐ Benchmark monitoring
☐ Quarterly visual inspection ☐ Notification by EPA or State or local authorities
☐ Routine facility inspection ☐ Other (describe): _____

7. Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analyses to be conducted, etc.) or if no modifications are needed, basis for the determination:

8. Did/will this corrective action require modification of your SWPPP? ☐ Yes ☐ No

9. Date corrective action initiated: _____

10. Date corrective action completed: _____ or expected to be completed: _____

11. If corrective action is not yet completed, provide the status of corrective action at the time of the comprehensive site inspection and describe any remaining steps (including timeframes associated with each step) necessary to complete the corrective action:

E. Annual Report Certification

Compliance Certification

Do you certify that your annual inspection has met the requirements of Part 4.3 of the permit, and that, based upon the results of this inspection, to the best of your knowledge, you are in compliance with the permit?

☐ Yes

☐ No

If no, summarize why you are not in compliance with the permit:

Annual Report Certification

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

Authorized Representative:

Name: _____ Title: _____

Signature: _____ Date: _____

Please submit this form to:

Vermont Department of Environmental Conservation
Stormwater Program - MSGP Coordinator
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Or by email to:

anr.wsmdstormwatergeneral@vermont.gov

Appendix H: Rare, Threatened and Endangered Species Coordination

This appendix contains the following information:

- Stormwater Permit 7514-9020 - Rare, Threatened, and Endangered Species Assessment Memorandum dated January 18, 2016 (VHB)
- Email from Helen Carr to VHB dated February 2, 2016 (DEC)
- Response to Additional Comments Regarding Appendix E – Letter to Helen Carr dated February 4, 2016 (VHB)
- Application for Endangered & Threatened Species Taking Permit (State-designated Mussel Survey Permit) dated June 30, 2016 (VHB)
- Supplement to the Stormwater Permit 7514-9020 - Rare, Threatened, and Endangered Species Assessment Memorandum dated July 8, 2016 (VHB)
- Endangered & Threatened Species Takings Permit ER-2016-23 (State-designated Mussel Survey Permit) dated July 14, 2016 (DEC)
- Email from Mark Ferguson to Kevin Burke dated September 2, 2016 (FWD/DEC)
- Freshwater Mussel Survey in the LaPlatte River Report dated August 2016 (Biodrawiversity)
- Endangered & Threatened Species Takings Permit ER-2016-28 (Stonecat Survey Permit) dated October 15, 2016 (DEC)
- Stonecat (*Noturus flavus*) Survey in the LaPlatte River Report dated October 2016 (Biodrawiversity)
- An Evaluation of Chloride Water Quality Criteria for the LaPlatte River dated October 26, 2016. (Philip C. Downey, Ph.D., Aquatec Biological Sciences, Inc.)



To: Shelburne Transload Facility
Project File

Date: January 18, 2016

Memorandum

Project #: 57762.00

From: Carla A. Fenner,
Environmental Scientist

Re: Stormwater Permit 7514-9020 - Rare, Threatened, and
Endangered Species Assessment

INTRODUCTION

In support of Vermont Railway ("VTR", or "Applicant") proposal to develop the Shelburne Transload Facility ("Project"), VHB performed natural resource inventory and assessment work on the Project site and environs, located to the north of the Village of Shelburne and west of US Route 7 ("US-7") and a VTR track and approximately 0.5 southeast from the mouth of the LaPlatte River. The closest E911 address to the Project site is 4740 Shelburne Road, which is the commercial address of Harbor Industries and is depicted on the Natural Resources Map (Attachment 1). The Study Area for the natural resource inventory and assessment is approximately 43 acres and includes the parcel wherein the Project is proposed (32.8 acres) and abutting areas. VHB conducted desktop and field surveys to assess the presence and extent of natural resources within the Study Area.

As described in the Erosion Prevention and Sediment Control ("EPSC") Plan narrative submitted in support of application #7514-9020, the proposed development would include the construction of:

- access road and rail spur;
- two (2) new 35-foot by 350-foot storage buildings;
- 75-foot long truck, 35-foot long truck and employee parking areas;
- shop, office and two additional storage buildings;
- truck weighing scales; and
- above-ground storage tank fuel pad and Fleet Fuel island facility.

Components of the Project construction include clearing of the existing vegetation, removal of trees, earthwork and site grading to support the proposed infrastructure, and a surface stormwater collection and management system.

This memorandum does not represent a full evaluation of the suite of natural resources that were assessed during VHB's studies, but rather presents a discussion of applicable survey methodologies and findings pursuant to Appendix E of the Vermont Department of Environmental Conservation ("VT DEC") General Permit 3-9020 ("GP 3-9020") for Stormwater Runoff from Construction Sites (2008). The contents of this memorandum support the Project application file #7514-9020 ("Project Application") and addresses VT DEC comments provided on January 14, 2016 by documenting the measures taken by the Applicant, which satisfy the applicable criteria and designated process as defined in Appendix E. Specifically, Section I Criterion A and Criterion E are applicable to the Application; the sections below summarize relevant studies and findings as documentation of compliance with the process outlined in Appendix E Section II.



SURVEY METHODS AND FINDINGS

In order to identify occurrences of known rare, threatened, and endangered ("RTE") plant and animal species, particularly those that are federally- or Vermont-listed threatened or endangered,¹ VHB researched the Vermont Natural Heritage Inventory ("NHI") database for the presence of known Element Occurrences ("EOs") of RTE species within and adjacent to the Study Area. Although not directly applicable to Appendix E, in order to assess the potential for RTE species typically associated with any onsite natural communities, VHB also conducted a database review of Significant Natural Community EOs in or in the vicinity of the Study Area. Additionally, VHB reviewed the U.S. Fish and Wildlife Service ("USFWS") Information, Planning, and Conservation System ("IPaC") database for a list of federally-listed Endangered and Threatened species within Chittenden County, Vermont.

A one-mile radius was initially used when querying the NHI database and information specific to each EO identified within the radius was reviewed. After the list of known EOs from within the one-mile vicinity was acquired, it was then referenced against the known habitat criteria for each species and compared to available habitats within the Project site or Study Area. The list of known EOs, in combination with rare plants and animals often associated with any onsite natural communities that may occur within the Study Area, were considered for targeted onsite vegetation surveys.

The desktop survey was combined with field investigations, during which VHB also reviewed onsite natural community and vegetative assemblage types using descriptions found in *Wetland, Woodland, Wildland- A Guide to the Natural Communities of Vermont* by Thompson and Sorenson² (2005) and the updated Agency of Natural Resources ("ANR") Vermont Natural Community Ranking Specifications³ (2014) so that the potential for RTE species typically associated onsite natural communities were fully assessed.

RTE Plants

Results of IPaC Database Review

From the IPaC database review, no federally-listed plant species or critical habitats of protected plants were identified within the Project vicinity (see *USFWS Species of Concern- Trust Resources Report*, Attachment 3).

Results of NHI Database Review

From the EO database search, there are three RTE plant EOs mapped within the Study Area: the S2 (rare) but otherwise not protected species false hop sedge (*Carex lupuliformis*) is mapped near the confluence of McCabe's Brook with the LaPlatte River; the S2S3 (rare/uncommon) but otherwise not protected broad beech fern (*Phegopteris hexagonoptera*) is mapped in a transmission line right-of-way ("ROW") near the bank of the LaPlatte River; and the S2S3 (rare/uncommon) but otherwise not protected narrow blue-eyed grass (*Sisyrinchium angustifolium*). There are 12 documented RTE plant species occurrences within a one-mile radius of the Study Area as detailed in the summary table entitled *Potential Rare, Threatened, and Endangered Species and Significant Natural Communities Summary in the*

¹ Federally-listed species are protected under the U.S. Endangered Species Act and Vermont-listed species are protected under 10 V.S.A. §123.

² Thompson, E.H, E.S. Sorenson. 2005. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*. Vermont Department of Fish and Wildlife and the Nature Conservancy. Hanover, NH.

³ Vermont Fish and Wildlife Department (VT FWD). 2014. "Vermont Natural Community Ranking Specifications". Received from VT FWD.



Memorandum

Project Region and Onsite Habitats (see "Summary Table" in Attachment 3). Of all EOs within one mile of the Study Area, only the obedient plant (*Physostegia virginiana*) is protected; it is listed as Threatened in Vermont.

The list of all known RTE plant and animal species mapped within or in the immediate vicinity of the Study Area from the NHI database is included in the Summary Table in Attachment 3.

Results of Field Survey

VHB conducted a targeted field survey within the Study Area on July 16 and 17, 2015 for four plants known to occur within a one-mile radius according to the criteria for targeted survey described above and included on the Summary Table (Attachment 3). Field surveys were conducted by a qualified botanist and staff environmental scientist during the portion of the growing season appropriate for the target RTE species and many of the other known occurrences in the vicinity. Field methods included conducting irregular transects across all portions of the Study Area and collecting a general floristic inventory of all vegetative species observed. Within mapped EO polygons, a thorough survey of the area for the target known species was also conducted, and all RTE occurrences identified in the field were located using a Trimble® GPS unit capable of sub-meter accuracy and post-processed using Trimble® Pathfinder software, and both qualitative and quantitative data at each occurrence was collected. The results of VHB's floristic inventory are included in the table entitled *Species Checklist – Partial Floristic Inventory* in Attachment 4.

VHB identified two occurrences of rare, but otherwise non-protected RTE plants within the Study Area that were previously unknown at this site but which are known to occur in similar habitats within the Champlain Valley. Both the green arrow arum (*Peltandra virginica*) and the hairy hedge nettle (*Stachys pilosa*), as shown on the Natural Resources Map (Attachment 1) were observed during the field survey. Green arrow arum is ranked in Vermont to be S2S3 (rare/uncommon) and is not listed in Vermont or federally. Hairy hedge nettle is ranked in Vermont to be S2? (rare, uncertain) and is not listed in Vermont or federally. Observed RTE occurrences are depicted on the Natural Resources Map (Attachment 1) as point features; both populations were observed as small, concentrated distributions within a localized area. Both of these species occur within a wetland complex extending inland from the LaPlatte River up a small intermittent drainage that is itself fringed by wetlands. No existing or cumulative impacts to the plants or their habitat observed during the July 2015 surveys and their habitat is anticipated to persist following Project construction, as this wetland area is not within the Project's limit of disturbance ("LOD").

No listed threatened or endangered plants are known to occur or were identified during detailed field surveys within VHB's Study Area, which includes the Project site.

RTE Animals

Results of IPaC Database Review

From the USFWS Trust Resources List, (see Attachment 2), no federally-listed animal species were identified specific to the Project Study Area. However the Project lies within the range of the northern long-eared bat (*Myotis septentrionalis*), which is federally-listed as threatened and Vermont-listed as endangered. No critical habitat for this or any species is listed by USFWS within the Study Area.



Memorandum

Results of NHI Database Review

Additionally, in order to further assess the potential occurrence of RTE animal species in the Study Area, particularly those that are either federally- or Vermont-listed threatened or endangered, VHB researched the NHI public database for the presence of known EOs of RTE animals within or adjacent to the Study Area. A radius of one mile was used when querying the NHI database for RTE animal EOs, and the information specific to each EO was reviewed (see Summary Table in Attachment 3). The list of known animal EOs from within the vicinity was then referenced against the known habitat criteria for each species and compared to the available habitats within the Study Area. There are 5 EO reports for RTE animals within one mile of the Study Area. Of these, three are aquatic species known from the LaPlatte River and Lake Champlain, one is a bird species, one is a moth species, and two are salamander species. None of the RTE animals known to occur within one mile of the Study Area are protected in Vermont or federally. Details of EOs within one mile of the Study Area are included in the Summary Table in Attachment 3.

Results of Field Surveys

A general habitat survey for potential summer roosting areas for the northern long-eared bat was conducted in the Study Area on July 16 and 17, 2015. Per USFWS guidance⁴ (2014), potential summer habitat for this species can include trees as small as three-inches diameter at breast height ("DBH") that contain cracks, crevices or cavities. Because the Study Area included areas dominated by mature and successional forest cover, it is assumed that potentially suitable habitat for summer maternity roosting is present within the Study Area.

Although there are no known occurrences of either winter hibernacula or summer roosting habitat within the Study Area or a one mile radius recorded in the NHI database, VHB conducted additional due diligence to investigate the potential for *Myotis* bat habitat by direct consultation with the Vermont Fish and Wildlife Department ("VTFWD") in order to request any additional, unpublished data and solicit questions or concerns regarding potential impacts to bats on this site. Through this consultation, VHB understands that VTFWD has no concerns about a project at this site provided that building demolition is not proposed. VTFWD confirmed the information available on the NHI database that there are no known occupied hibernacula or known northern long-eared bat summer colonies in the vicinity of the Project⁵. Additionally, VTFWD confirmed that the Project site is outside of the known range of the Indiana bat (*Myotis sodalis*), another bat species that is protected in Vermont and federally. As such, the Project does not propose any direct impacts to protected bats or indirect impacts by way of impacts to critical habitat.

No listed threatened or endangered plants are known to occur or were identified during detailed field surveys within VHB's Study Area, which includes the Project site.

CONCLUSIONS

Pursuant to Appendix E of the VT DEC GP 3-9020, VHB concludes that the Applicant is eligible for coverage under the Permit, as the Project activities and discharges would not result in an impact or place in jeopardy the continued

⁴ Department of the Interior. U. S. Fish and Wildlife Service. 2014. Northern Long-Eared Bat Interim Conference and Planning Guidance: Regions 2, 3, 4, 5, & 6. January 6, 2014.

⁵ VTFWD (Alyssa Bennett). Personal communication, electronic mail, August 14, 2015.



Memorandum

existence of a known Vermont- or federally-listed threatened or endangered species, nor would it result in the destruction or adverse modification of known critical habitat. This memorandum summarizes the numerous measures undertaken by VHB on behalf of the Applicant to assess the presence of threatened or endangered species or their habitats. As described in the sections above, the results of both desktop and field surveys, as well as consultation with the VTFWD conclude that there are no known occurrences of protected species that would be impacted by the Project at its proposed location. Based on the findings of these surveys and consultation, the Project would be eligible for coverage as stated in Step 1 of the process contained in Section II of Appendix E as no listed species or critical habitats are present in the Project area.

ATTACHMENTS

Attachment 1 – Natural Resources Map

Attachment 2 - IpaC Trust Resources List

Attachment 3 – Summary Table: Potential Rare, Threatened, and Endangered Species and Significant Natural Communities Summary in the Project Region and Onsite Habitats

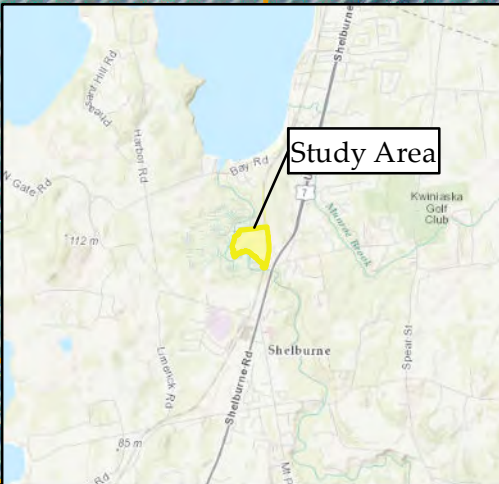
Attachment 4 – Species Checklist – Partial Floristic Inventory

Attachment 5 – Vermont Fish and Wildlife Department (Alyssa Bennett) electronic mail, August 14, 2015.

Wetland and Waters Delineations Conducted by VHB (C. Martin, C. Fenner and M. Jackman) on May 19th, May 27th, June 16th and June 19th, 2015.
Partial Floristic Inventory/Rare, Threatened, and Endangered Plant Survey conducted by VHB (C. Fenner) on July 16-17, 2015.

VHB Study Area
Approximately 43 Acres
73°13'40.971"W 44°23'30.558"N

Proposed Limit of
Disturbance: 18.7 Acres



Soil Symbol	Soil Name	K Value	Erodibility	Agricultural Value	Acreage
AdA	Adams and Windsor loamy sands, 0 to 5 percent slopes	0.15	Not Highly Erodible	Statewide	18.61
Cv	Covington silty clay	0.49	Highly Erodible	Statewide (b)	0.01
ScA	Scantic silt loam, 0 to 2 percent slopes	0.32	Not Highly Erodible	Statewide (b)	0.03

- Study Area (VHB)

Proposed Limit of Disturbance (VHB)

Utility Pole (VHB)

Culvert (VHB)

USACE Data Point (VHB)

RTE Plant (VHB)

Delineated Streams (VHB)

Delineated Wetlands (VHB)

Wetland Continues (VHB)
- Wetland (VSWI)

Stream (VHD)

100-Year Flood Zone (FEMA)

NRCS Soil Boundary (VCGI)

2' Contours



Vermont Railways, Inc.
Shelburne Transload Facility
Shelburne, VT
Wetland and Stream Delineation Map
December 23, 2015
Revised: January 18, 2016

2001000200

Feet

Sources: NAIP Background Imagery by USDA (2014);
Contours generated from LiDAR DEM (2007); The following
statewide datasets are provided by VCGI: NRCS Soils
(2011), VHD Streams (2008), VSWI Wetlands (ANR, 2010);
Study Area, Utility Poles, Culverts, Delineated Wetlands &
Streams, and Proposed Limit of Disturbance by VHB (2015);
Flood zone by FEMA (2014).



Shelburne Transload Facility

IPaC Trust Resource Report

Generated January 18, 2016 12:03 PM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



US Fish & Wildlife Service

IPaC Trust Resource Report



NAME

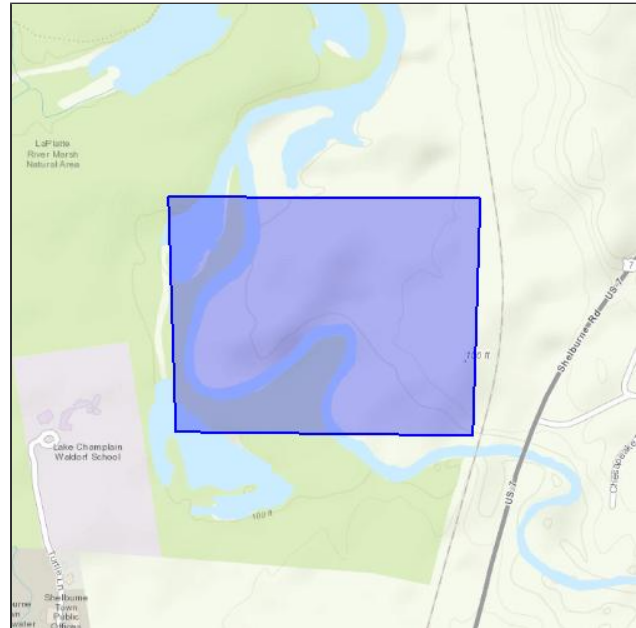
Shelburne Transload Facility

LOCATION

Chittenden County, Vermont

IPAC LINK

<http://ecos.fws.gov/ipac/project/GDDFG-GBLDV-BSNM7-IPJ2F-N5KJTA>



U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

New England Ecological Services Field Office

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Mammals

Northern Long-eared Bat *Myotis septentrionalis*

Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service ([1](#)). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php>

The following species of migratory birds could potentially be affected by activities in this location:

American Bittern *Botaurus lentiginosus*

Bird of conservation concern

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle *Haliaeetus leucocephalus*

Bird of conservation concern

Year-round

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Tern *Chlidonias niger*

Bird of conservation concern

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09F

Black-billed Cuckoo *Coccyzus erythrophthalmus*

Bird of conservation concern

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Black-crowned Night-heron *Nycticorax nycticorax*

Bird of conservation concern

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EU

Canada Warbler *Wilsonia canadensis*

Bird of conservation concern

Season: Breeding

Common Tern *Sterna hirundo*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B09G

Bird of conservation concern

Olive-sided Flycatcher *Contopus cooperi*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0AN

Bird of conservation concern

Peregrine Falcon *Falco peregrinus*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FU

Bird of conservation concern

Pied-billed Grebe *Podilymbus podiceps*

Season: Breeding

Bird of conservation concern

Short-eared Owl *Asio flammeus*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HD

Bird of conservation concern

Willow Flycatcher *Empidonax traillii*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0F6

Bird of conservation concern

Wood Thrush *Hylocichla mustelina*

Season: Breeding

Bird of conservation concern

Refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

Refuge data is unavailable at this time.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

[PEM1/UBF](#)

10.0 acres

Freshwater Forested/shrub Wetland

[PFO4/1A](#)

69.7 acres

[PFO1E](#)

40.5 acres

Freshwater Pond

[PUBH](#)

3.78 acres

Riverine

R2UBH

18.3 acres

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

Vermont Potential Rare, Threatened, and Endangered Species and Natural Communities in the Project Region and Onsite Habitats Summary

Client: Vermont Railway
Project: Shelburne Transload Facility
Date: January 16, 2016
Survey Date(s): July 16 and July 17, 2015
Surveyor(s): VHB (C. Fenner, O. McEnroe)
Prepared by: VHB (C. Fenner, M. Jackman)

	Species	Common Name	Type	State Rank	Global Rank	VT Status	Federal Status	Habitat Description ¹	Occurrence Description ²	Potential for Habitat to Occur Onsite?	2015 Target Survey Recommended? (Y/N)	Comments
Natural Heritage Element Occurrence (1-mile Radius)	<i>Ambystoma laterale</i>	Blue-spotted Salamander	Animal	S3	G5			Moist woodlands with sandy soils	From Shelburne Road (Route 7) in Shelburne take Bay Road to fishing access. TNC Preserve is across the road. Specimen found along the bank of the LaPlatte River	Yes	No	Not mapped within Study area; Not listed species
	<i>Asclepias exaltata</i>	Poke Milkweed	Plant	S3	G5			Dry forest edges, forests	On west side of Route 7 and in back of (to west of) Rice Lumber	No	No	No suitable habitat
	<i>Carex lupuliformis</i>	False Hop Sedge	Plant	S2	G4			Marshes, shores of rivers or lakes, swamps	Plants located in floodplain forest about 10 feet into the upland from marsh/upland interface. near junction of McCabe's Brook and LaPlatte River	Yes	Yes	EO Polygon mapped within the Study Area; potential onsite habitat
	<i>Euphyes dion</i>	Dion Skipper	Animal	S2	G4			Sedge meadows	Near river and utility line at SW end of preserve	No	No	EO Polygon mapped within the Study Area; no suitable habitat
	<i>Hemidactylium scutatum</i>	Four-toed Salamander	Animal	S2	G5			Mature, mesic forests with dense canopy cover to preserve body moisture, an abundance of downed woody debris for cover and foraging opportunities, and vernal pools, ponds, bogs, shallow marshes, or other fishless bodies of water for nesting and larval success; wooded wetlands such as seepage swamps or cedar swamps with moss mats	LaPlatte River wetlands; on west side approx. 0.75 mile from mouth of river	Yes	No	Not mapped within Study area; Not listed species
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	Animal	S3S4	G5			Quiet weedy inshore waters of lakes, and pools and backwaters of low gradient creeks and small to large rivers	LaPlatte River just upstream of Route 7 (Shelburne Road) crossing.	No	No	Not mapped within Study area; Not listed species; No suitable habitat
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	Animal	S2	G5			Lakes, reservoirs, large rivers	LaPlatte River about 300 meters upstream of Route 7.	Yes	No	Not mapped within Study area; Not listed species; No suitable habitat
	<i>Lycopus virginicus</i>	Virginia Bugleweed	Plant	S2	G5			Floodplain woodlands, marshes, borders of lakes and streams, gravelly seeps, soggy meadows, and ditches	East side of Rte. 7 south of the LaPlatte River, in wet woods by the pull-off.	Yes	No	Not mapped within Study area; Not listed species
	<i>Notropis rubellus</i>	Rosyface Shiner	Animal	S3	G5			Large creeks and small rivers with clean gravel or rubble; usually in or around riffle or flowing pools	LaPlatte River just upstream of Route 7 (Shelburne Road) crossing	No	No	No suitable habitat
	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	Animal	S1B	G5			Large marsh wetland systems	Shelburne, near mouth of the LaPlatte River at Lake Champlain, south of Bay Road. Exact location at site not reported.	No	No	EO Polygon mapped within the Study Area; no suitable habitat
	<i>Paellaea glabella</i> ssp. <i>Glabella</i>	Smooth Cliff-brake	Plant	S3	GNR			Dry rocky oak-hickory woods with west facing outcrop overlooking LaPlatte River. Disturbance from survey lines and roads and past grazing.	On west side of Route 7 and in back of (to west of) Rice Lumber.	No	No	No suitable habitat
	<i>Percina copelandi</i>	Channel Darter	Animal	S1	G4			Rivers and large creeks in areas of moderate current over sand and gravel substrates; wave swept nearshore areas of lakes Huron and Erie in coarse-sand, fine-gravel beach and sandbar habitats	Approximately 400-500 meters downstream of Shelburne Falls on the LaPlatte River.	No	No	No suitable habitat
	<i>Phegopteris hexagonoptera</i>	Broad Beech-fern	Plant	S2S3	G5			Forests, swamps, wetland margins	LaPlatte River floodplain west of the transmission line centerline under a single Carpinus caroliniana tree	Yes	Yes	EO Polygon mapped within the Study Area; potential onsite habitat
	<i>Physostegia virginiana</i>	Obedient Plant	Plant	S2	G5	T		Meadows and fields, shores of rivers and lakes	LaPlatte River Marsh. Plants on wetland bank that was probably an old river channel. A TNC trail goes within a few feet of the population.	Yes	Yes	Not mapped within Study area; State-listed species
	<i>Polygala sanguinea</i>	Field Milkwort	Plant	S3	G5			Dry or wet situations in prairies, old fields, meadows, and glades, often on poor or acid soils	Fields near Shelburne Town Garage	Yes	No	Not mapped within Study area; Not listed species
	<i>Quercus muehlenbergii</i>	Yellow Oak	Plant	S3	G5			Forest, ridges or edges, talus or rocky slopes	On west side of Route 7 and in back of (to west of) Rice Lumber	No	No	No suitable habitat
	<i>Ranunculus aquatilis</i> var. <i>diffusus</i>	White Water-crowfoot	Plant	S3	G5T5			Rivers and ponds, lakes or streams	Mouth of the LaPlatte River.	No	No	No suitable habitat
	<i>Ranunculus flabellaris</i>	Yellow Water-crowfoot	Plant	S3	G5			Lacustrine habitats and edges, riverine habitats and edges, swamps, wetland margins	LaPlatte River Marsh, approx. 0.5 mile south of Shelburne Bay along the river; on both east and west side of the river.	No	No	No suitable habitat
	<i>Sisyrinchium angustifolium</i>	Narrow Blue-eyed-grass	Plant	S2S3	G5			Meadows and fields, shores of rivers and lakes, wetland margins	LaPlatte River Marsh, approx. 0.5 mile south of Shelburne Bay along the river	Yes	Yes	EO polygon mapped in Study Area; potential onsite habitat
	<i>Thalictrum venulosum</i>	Border Meadow-rue	Animal	S2S3	G5			Shores of river or lakes	LaPlatte River Marsh, approx. 0.5 mile south of Shelburne Bay along the river	Yes	No	Not mapped within Study area; Not listed species
	<i>Utricularia geminiscapa</i>	Hidden-fruited Bladderwort	Plant	S3	G4G5			Sunny/exposed, slow moving or still water, lakes, bog pools, fens	LaPlatte River Marsh, approx. 0.5 mile south of Shelburne Bay along the river	Yes	No	Not mapped within Study area; Not listed species

¹ Potential sources for habitat information

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Thompson, Elizabeth H. and Sorenson, Eric R. 2005. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* . Vermont Department of Fish and Wildlife and The Nature Conservancy.
Vermont Natural Resources Atlas, Accessed July 2015. Element Occurrence Reports

² Sources for occurrence description listed below:

Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department - Element Occurrence Reports.

Vermont Potential Rare, Threatened, and Endangered Species and Natural Communities in the Project Region and Onsite Habitats Summary

Client: Vermont Railway
Project: Shelburne Transload Facility
Date: January 16, 2016
Survey Date(s): July 16 and July 17, 2015
Surveyor(s): VHB (C. Fenner, O. McEnroe)
Prepared by: VHB (C. Fenner, M. Jackman)

	Species	Common Name	Type	State Rank	Global Rank	VT Status	Federal Status	Habitat Description ¹	Occurrence Description ²	Potential for Habitat to Occur Onsite?	2015 Survey Recommended? (Y/N)	Comments/ Potential RTE Species Associates
Natural Community Element Occurrence (1- mile Radius)	Button Swamp	NA	Natural Community	S2	GNR	NA	NA	Buttonbush strongly dominant, with approx. 90% cover. Few other plants are present, but can be locally abundant.	Backwater marsh along LaPlatte River, around .35 miles west of Route 7 bridge.	Yes	Yes	Potential onsite habitat; Auricled twayblade (<i>Listera auriculata</i>) Wild garlic (<i>Allium canadense</i>)
	Deep Bulrush Marsh	NA	Natural Community	S4	GNR	NA	NA	Occurs in deep water, and is dominated by bulrushes (<i>Scirpus/Schoenoplecus</i> spp.). Cattails (<i>Typha</i> spp.) are also present with duckweed (<i>Lemna</i> sp.) forming a floating mat on the water surface.	LaPlatte River Marsh, near mouth of river and south end of Shelburne Bay	No	No	No potential onsite habitat
	Dry Oak-Hickory-Hophornbeam Forest	NA	Natural Community	S3	GNR	NA	NA	Dry to dry-mesic uplands on generally poor/acidic soils and sometimes calcium rich soils hallow to bedrock.	On west side of Route 7 and in ledgy area in the back of (to west of) Rice Lumber.	No	No	No potential onsite habitat
	Lakeside Floodplain Forest	NA	Natural Community	S3	GNR	NA	NA	Lakesides, shorelines, floodplains, flat topography and hydrologic regime dominated by annual/seasonal flooding in well drained to poorly drained soils.	LaPlatte River Mouth at the south end of Shelburne Bay, extending through LaPlatte River Marsh in low, frequently flooded areas	Yes	Yes	Potential onsite habitat; Cattail sedge (<i>Carex typhina</i>) Gray's sedge (<i>Carex grayi</i>) Yellow water-crowfoot (<i>Ranunculus flabellaris</i>) Green dragon (<i>Arisaema dracontium</i>) Black gum (<i>Nyssa sylvatica</i>) Lance-leaved loosestrife (<i>Lysimachia hybrida</i>) False hop sedge (<i>Carex lupuliformis</i>) Mild water-pepper (<i>Polygonum hydropiperoides</i>)
	Mesic Clayplain Forest	NA	Natural Community	S2	GNR	NA	NA	Lakesides, shorelines, floodplains with flat topography and hydrologic regime dominated by annual/seasonal flooding in poorly drained soils with a high clay content.	In LaPlatte River Marsh area, mostly north of McCabe Brook with another patch between McCabe Brooke and LaPlatte River.	Yes	Yes	Potential onsite habitat; Short-styled snakeroot (<i>Sanicula canadensis</i>) Harsh sunflower (<i>Helianthus strumosus</i>) Buxbaum's sedge (<i>Carex buxbaumii</i>) Leafy bulrush (<i>Scirpus polyphyllus</i>) Grove sandwort (<i>Arenaria lateriflora</i>) Loose sedge (<i>Carex laxiculmis</i>) Yellow bartonia (<i>Bartonia virginica</i>) American hazelnut (<i>Corylus americana</i>) Drooping bluegrass (<i>Poa saltuensis</i>) Umbellate sedge (<i>Carex umbellata</i>) Rough avens (<i>Geum laciniatum</i>) Broad beech fern (<i>Thelypteris hexagonoptera</i>) Minnesota sedge (<i>Carex albursina</i>) Gray's sedge (<i>Carex grayi</i>) Folliculate sedge (<i>Carex folliculata</i>) Handsome sedge (<i>Carex formosa</i>) Stout woodreed (<i>Cinna arundinacea</i>) Fragrant sumac (<i>Rhus aromatica</i>) Spicebush (<i>Lindera benzoin</i>)
	River Mud Shore	NA	Natural Community	S3	GNR	NA	NA	Exposed, unvegetated mud along the banks of large, low order, slow moving river and stream waters.	Immediate banks of LaPlatte River near its outlet into Lake Champlain	No	No	No potential onsite habitat
	Sand-Over-Clay Forest	NA	Natural Community	S2	GNR	NA	NA	Generally small patch sizes where sandy soils have been deposited atop clay dominated soils, associated with fluvial processes and results in a highly variable vegetative community, sometime in complexes with Wet-Sand-Over-Clay and other floodplain forests	LaPlatte River mouth at the south end of Shelburne Bay. Mainly on the low terrace between McCabe Brook and the LaPlatte River	Yes	Yes	Potential onsite habitat; potential species similar to Mesic Clayplain Forest
	Silver Maple-Sensitive Fern Riverine Floodplain Forest	NA	Natural Community	S3	GNR	NA	NA	Floodplains and low, flat topography largely in the Champlain Valley; dominated by silver maple in the overstory, closely related to silver maple-ostrich fern and other floodplain forest types with well or moderately well drained soils	Stretches along LaPlatte River from just downstream of Shelburne Falls to just upstream of the junction of McCabe Brook with the LaPlatte River	Yes	Yes	Potential onsite habitat; Green dragon (<i>Arisaema dracontium</i>) Gray's sedge (<i>Carex grayi</i>) Stout woodreed (<i>Cinna arundinacea</i>)
	Temperate Calcareous Outcrop	NA	Natural Community	S3	GNR	NA	NA	Calcareous cliff and bedrock outcrops with dry, dry-xeric and sometimes exposed conditions	On west side of Route 7 and in back of (to west of) Rice Lumber.	No	No	No potential onsite habitat
	Wet Clayplain Forest	NA	Natural Community	S2	GNR	NA	NA	Floodplains and low, flat topography largely in the Champlain Valley; dominated by hardwoods in the overstory, and commonly a fern or mixed fern/herbaceous understory	Larger portion of EO is in southwestern portion of LaPlatte River Marsh near McCabe Brook. A smaller section occurs between McCabe Brook and the LaPlatte River near and south of their confluence.	Yes	Yes	Potential onsite habitat; potential species similar to Mesic Clayplain Forest
	Wet Sand-Over-Clay-Forest	NA	Natural Community	S2	GNR	NA	NA	Generally small patch sizes where thin deposits of sandy soils have been deposited atop clay dominated soils, associated with fluvial processes and results in a highly variable vegetative community, sometimes in complexes with Sand-Over-Clay and other floodplain forests	LaPlatte River mouth at the south end of Shelburne Bay. In scattered small patches, mainly on the low terrace between McCabe Brook and the LaPlatte River	Yes	Yes	Potential onsite habitat; potential species similar to Mesic Clayplain Forest

¹ Potential sources for habitat information
Conant, Roger and Collins, Joseph T. 1998. *Peterson Field Guides: Reptiles and Amphibians* . Houghton Mifflin Company, Boston.
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Vermont Natural Resources Atlas, Accessed July 2015. Element Occurrence Reports
² Sources for occurrence description listed below:
Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department - Element Occurrence Reports.

Species Checklist1 - Partial Floristic Inventory
Client: Vermont Railway
Project: Shelburne Transload
Date: January 18, 2016
Survey Date(s) July 16 and 17, 2015
Surveyor(s): VHB (C. Fenner, O. McEnroe)
Prepared by: VHB (C. Fenner)


Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Non-Native Invasive Species ³
Acer negundo L.	boxelder	Aceraceae		
Acer rubrum L.	red maple	Aceraceae		
Agrostis gigantea Roth	redtop	Poaceae		
Alnus incana (L.) Moench	gray alder	Betulaceae		
Amphicarpaea bracteata (L.) Fernald	American hogpeanut	Fabaceae		
Anemone quinquefolia L.	wood anemone	Ranunculaceae		
Apios americana Medik.	groundnut	Fabaceae		
Apocynum cannabinum L.	Indianhemp	Apocynaceae		
Aralia nudicaulis L.	wild sarsaparilla	Araliaceae		
Arisaema triphyllum (L.) Schott	Jack in the pulpit	Araceae		
Asclepias incarnata L.	swamp milkweed	Asclepiadaceae		
Asclepias syriaca L.	common milkweed	Asclepiadaceae		
Athyrium filix-femina (L.) Roth ssp. angustum (Willd.) R.T.	subarctic ladyfern	Scrophulariaceae		
Berberis vulgaris L.	common barberry	Berberidaceae		
Betula alleghaniensis Britton	yellow birch	Betulaceae		
Betula papyrifera Marshall	paper birch	Betulaceae		
Betula populifolia Marshall	gray birch	Betulaceae		
Bidens cernua L.	nodding beggartick	Asteraceae		
Boehmeria cylindrica (L.) Sw.	smallspike false nettle	Urticaceae		
Carex annectens (E.P. Bicknell) E.P. Bicknell	yellowfruit sedge	Cyperaceae		
Carex baileyi Britton	Bailey's sedge	Cyperaceae		
Carex blanda Dewey	eastern woodland sedge	Cyperaceae		
Carex conoidea Schkuhr ex Willd.	openfield sedge	Cyperaceae		
Carex crinita Lam.	fringed sedge	Cyperaceae		
Carex gracillima Schwein.	graceful sedge	Cyperaceae		
Carex gynandra Schwein.	nodding sedge	Cyperaceae		
Carex intumescens Rudge	greater bladder sedge	Cyperaceae		
Carex lupulina Muhl. ex Willd.	hop sedge	Cyperaceae		
Carex lurida Wahlenb.	shallow sedge	Cyperaceae		
Carex scoparia Schkuhr ex Willd. var. scoparia	broom sedge	Cyperaceae		
Carex vulpinoidea Michx.	fox sedge	Cyperaceae		
Carpinus caroliniana Walter	American hornbeam	Betulaceae		
Carya ovata (Mill.) K. Koch	shagbark hickory	Juglandaceae		
Cephalanthus occidentalis L.	common buttonbush	Rubiaceae		
Cerastium arvense L.	field chickweed	Caryophyllaceae		
Cinna arundinacea L.	sweet woodreed	Poaceae		
Circaea lutetiana L. ssp. canadensis (L.) Asch. & Magnus	broadleaf enchanter's	Onagraceae		
Cirsium vulgare (Savi) Ten.	bull thistle	Asteraceae		
Clematis virginiana L.	devil's darning needles	Ranunculaceae		
Cornus amomum Mill.	silky dogwood	Cornaceae		
Cornus racemosa Lam.	gray dogwood	Cornaceae		
Dennstaedtia punctilobula (Michx.) T. Moore	eastern hayscented fern	Dennstaedtiaceae		
Equisetum fluviale L.	water horsetail	Equisetaceae		
Equisetum variegatum Schleich. ex F. Weber & D. Mohr	variegated scouringrush	Equisetaceae		
Eupatorium perfoliatum L.	common boneset	Asteraceae		
Festuca rubra L.	red fescue	Poaceae		
Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae		
Fraxinus pennsylvanica Marshall	green ash	Oleaceae		
Galium asprellum Michx.	rough bedstraw	Rubiaceae		
Galium palustre L.	common marsh bedstraw	Rubiaceae		

Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Invasive Species ³
Geum canadense Jacq.	white avens	Rosaceae		
Glyceria canadensis (Michx.) Trin.	rattlesnake mannagrass	Poaceae		
Glyceria grandis S. Watson	American mannagrass	Poaceae		
Hackelia virginiana (L.) I.M. Johnst.	beggarslice	Boraginaceae		
Hamamelis virginiana L.	American witchhazel	Hamamelidaceae		
Hieracium pratense Tausch	yellow hawkweed	Asteraceae		
Hypericum perforatum L.	common St. Johnswort	Clusiaceae		
Hypericum punctatum Lam.	spotted St. Johnswort	Clusiaceae		
Impatiens capensis Meerb.	jewelweed	Balsaminaceae		
Juncus canadensis J. Gay ex Laharpe	Canadian rush	Juncaceae		
Juncus effusus L.	common rush	Juncaceae		
Juniperus virginiana L.	eastern redcedar	Cupressaceae		
Laportea canadensis (L.) Weddell	Canadian woodnettle	Urticaceae		
Leersia oryzoides (L.) Sw.	rice cutgrass	Poaceae		
Lobelia spicata Lam.	palespike lobelia	Campanulaceae		
Lonicera canadensis W. Bartram ex Marshall	American fly honeysuckle	Caprifoliaceae		
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae		B
Lycopus americanus Muhl. ex W.P.C. Barton	American water horehound	Lamiaceae		
Lysimachia nummularia L.	creeping jenny	Primulaceae		
Lysimachia quadrifolia L.	whorled yellow loosestrife	Primulaceae		
Lysimachia terrestris (L.) Britton, Sterns & Poggenb.	earth loosestrife	Primulaceae		
Lythrum salicaria L.	purple loosestrife	Lythraceae		B
Maianthemum canadense Desf.	Canada mayflower	Liliaceae		
Matteuccia struthiopteris (L.) Todaro	ostrich fern	Dryopteridaceae		
Medeola virginiana L.	Indian cucumber	Liliaceae		
Melilotus officinalis (L.) Lam.	sweetclover	Fabaceae		
Mentha arvensis L.	wild mint	Lamiaceae		
Mitchella repens L.	partridgeberry	Rubiaceae		
Moneses uniflora (L.) A. Gray	single delight	Pyrolaceae		
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae		
Osmunda cinnamomea L.	cinnamon fern	Osmundaceae		
Osmunda claytoniana L.	interrupted fern	Osmundaceae		
Osmunda regalis L.	royal fern	Osmundaceae		
Oxalis corniculata L.	creeping woodsorrel	Oxalidaceae		
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Vitaceae		
Peltandra virginica (L.) Schott	green arrow arum	Araceae	S2S3	
Phalaris arundinacea L.	reed canarygrass	Poaceae		WL
Phragmites australis (Cav.) Trin. ex Steud.	common reed	Poaceae		B
Phryma leptostachya L.	American lopseed	Verbenaceae		
Pilea pumila (L.) A. Gray	Canadian clearweed	Urticaceae		
Pinus strobus L.	eastern white pine	Pinaceae		
Polygonum sagittatum L.	arrowleaf tearthumb	Polygonaceae		
Polystichum acrostichoides (Michx.) Schott	Christmas fern	Dryopteridaceae		
Populus tremuloides Michx.	quaking aspen	Salicaceae		
Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae		
Prenanthes altissima L.	tall rattlesnakeroot	Asteraceae		
Prunus pensylvanica L. f.	pin cherry	Rosaceae		
Prunus serotina Ehrh.	black cherry	Rosaceae		
Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae		
Pyrola rotundifolia auct. non L. p.p.	American shinleaf	Pyrolaceae		
Quercus alba L.	white oak	Fagaceae		
Quercus bicolor Willd.	swamp white oak	Fagaceae		
Quercus rubra L.	northern red oak	Fagaceae		
Rhus typhina L.	staghorn sumac	Anacardiaceae		
Rubus allegheniensis Porter	Allegheny blackberry	Rosaceae		
Rubus canadensis L.	smooth blackberry	Rosaceae		
Rubus occidentalis L.	black raspberry	Rosaceae		
Salix bebbiana Sarg.	Bebb willow	Salicaceae		
Salix petiolaris Sm.	meadow willow	Salicaceae		
Salix sericea Marshall	silky willow	Salicaceae		
Sambucus racemosa L.	red elderberry	Caprifoliaceae		

Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Invasive Species ³
<i>Sanguinaria canadensis</i> L.	bloodroot	Papaveraceae		
<i>Scirpus atrovirens</i> Fernald	blackgirdle bulrush	Cyperaceae		
<i>Scirpus atrovirens</i> Willd.	green bulrush	Cyperaceae		
<i>Scirpus cyperinus</i> (L.) Kunth	woolgrass	Cyperaceae		
<i>Solanum dulcamara</i> L.	climbing nightshade	Solanaceae		
<i>Solidago canadensis</i> L.	Canada goldenrod	Asteraceae		
<i>Solidago rugosa</i> Mill.	wrinkleleaf goldenrod	Asteraceae		
<i>Sparganium americanum</i> Nutt.	American bur-reed	Sparganiaceae		
<i>Spiraea alba</i> Du Roi var. <i>latifolia</i> (Aiton) Dippel	white meadowsweet	Rosaceae		
<i>Stachys pilosa</i>	hairy hedge-nettle	Lamiaceae	S2?	
<i>Symphotrichum cordifolium</i> (L.) G.L. Nesom	common blue wood aster	Asteraceae		
<i>Symphotrichum lateriflorum</i> (L.) Á. Löve & D. Löve	calico aster	Asteraceae		
<i>Symplocarpus foetidus</i> (L.) Salisb. ex W.P.C. Barton	skunk cabbage	Araceae		
<i>Taraxacum officinale</i> F.H. Wigg.	common dandelion	Asteraceae		
<i>Thalictrum pubescens</i> Pursh	king of the meadow	Ranunculaceae		
<i>Thelypteris noveboracensis</i> (L.) Nieuwl.	New York fern	Thelypteridaceae		
<i>Thelypteris palustris</i> Schott	eastern marsh fern	Thelypteridaceae		
<i>Trifolium pratense</i> L.	red clover	Fabaceae		
<i>Trillium</i> L.	trillium	Liliaceae		
<i>Tsuga canadensis</i> (L.) Carrière	eastern hemlock	Pinaceae		
<i>Typha latifolia</i> L.	broadleaf cattail	Typhaceae		
<i>Ulmus americana</i> L.	American elm	Ulmaceae		
<i>Urtica dioica</i> L.	stinging nettle	Urticaceae		
<i>Vaccinium angustifolium</i> Aiton	lowbush blueberry	Ericaceae		
<i>Valeriana uliginosa</i> (Torr. & A. Gray) Rydb.	mountain valerian	Valerianaceae		
<i>Verbena urticifolia</i> L.	white vervain	Verbenaceae		
<i>Veronica americana</i> Schwein. ex Benth.	American speedwell	Scrophulariaceae		
<i>Viburnum acerifolium</i> L.	mapleleaf viburnum	Caprifoliaceae		
<i>Vicia cracca</i> L.	bird vetch	Fabaceae		
<i>Viola blanda</i> Willd.	sweet white violet	Violaceae		
<i>Viola renifolia</i> A. Gray	white violet	Violaceae		
<i>Viola sororia</i> Willd.	common blue violet	Violaceae		
<i>Vitis aestivalis</i> Michx.	summer grape	Vitaceae		
<i>Zanthoxylum americanum</i> Mill.	common pricklyash	Rutaceae		

¹ Nomenclature follows USDA-NRCS PLANTS database (plants.usda.gov/) and/or Haines (2011).

² The Vermont State Rank from the "Rare and Uncommon Native Vascular Plants of Vermont - Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department", version dated June 15, 2015.

³ Quarantine #3- Noxious Weeds (2012);

Vermont Wildlife Action Plan- Appendix K Exotic Invasive and Pest Species (2005). Vermont Fish & Wildlife Department

Fenner, Carla

From: Bennett, Alyssa <Alyssa.Bennett@vermont.gov>
Sent: Friday, August 14, 2015 12:27 PM
To: Fenner, Carla
Cc: Ketterling, Brad
Subject: RE: Shelburne - bat occurrence information request

Hi Carla,

You are out of Indiana bat summer range and not near any known occupied hibernacula or northern long-eared bat known occupied summer colony sites. There is a long-established and still in existence colony of state endangered little brown bats out at Shelburne Farms. Unless this project includes building demolition I do not see any further bat concerns.

Alyssa

Alyssa B. Bennett
Small Mammals Biologist
Vermont Fish & Wildlife Dept.
271 North Main Street, Suite 215
Rutland, VT 05701
Tel: 802-786-0098
e-mail: alyssa.bennett@vermont.gov
Help Vermont's Bats at
http://www.vtfishandwildlife.com/wildlife_bats.cfm

From: Fenner, Carla [mailto:CFenner@VHB.com]
Sent: Tuesday, August 11, 2015 11:30 AM
To: Bennett, Alyssa <Alyssa.Bennett@vermont.gov>
Cc: Ketterling, Brad <BKetterling@VHB.com>
Subject: Shelburne - bat occurrence information request

Hi Alyssa,

To follow on my phone calls, here's hoping an email will reach you during your busy time of year!

I'm trying to get information on any hibernacula or known summer habitat use in the area of a potential project I'm working on. The approximate coordinates for the project are 44°23'16.07"N, 73°13'42.74"W, which is near the mouth of the LaPlatte River in Shelburne, to the west of Harbor Industries on Rte 7. Based on the geology in that area, I'm guessing there aren't any hibernacula, but I see that summer mist net surveys have been done nearby on the Shelburne Farms property. I queried the NHI database for a 2 mile radius and came up with a single report (EO ID 7409, EO# 16) for 2 small footed bats caught in a 2005 survey. Can you tell me if there is any more recent survey data or other reports for state or federally protected bats in this area?

Thanks,
Carla

Carla A. Fenner
Environmental Scientist



40 IDX Drive
Building 100, Suite 200
South Burlington, VT 05403
P 802.497.6144 | **C** 802.497.7699
cfenner@vhb.com

Engineers | Scientists | Planners | Designers
www.vhb.com

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Vanasse Hangen Brustlin, Inc. | info@vhb.com

Wildey, Robert

From: Carr, Helen <Helen.Carr@vermont.gov>
Sent: Tuesday, February 02, 2016 10:45 AM
To: Burbank, Scott
Cc: Monks, Padraic; Cronin, Briana; Hakey, Christopher; dwulfson@vrs.us.com
Subject: RE: Stormwater Permit 7514-9020 Shelburne Transload Facility TECHNICAL REVIEW

Scott and all,

Thank you for sending the updated plan sheets. We have had Fish and Wildlife review the memo you sent regarding threatened and endangered species as well as reviewing other species in the area. We have determined that there are two species that weren't addressed in your initial review of threatened and endangered species. The following two species are listed as noted under the Vermont Endangered Species Law, and are known to occur in the LaPlatte River upstream of the project site:

Stonecat (*Noturus flavus*) – Endangered
Pocketbook (*Lampsilis ovata*) – Endangered

These species have been documented to be found in the LaPlatte River upstream of the site, thus there is potential for them to be found near the proposed rail facility site or downstream. In order to ensure these species are not impacted by construction you may survey the project area for these species or you can assume that these species are present within the project area. If you choose not to conduct a survey, you must determine if the construction related discharges are likely to adversely affect these listed species as laid out in Appendix E, part II. The MSGP also requires a review of the potential impact to these threatened and endangered species. As such you are advised to evaluate whether the operational phase discharge, as well as the construction phase discharge, are likely to adversely affect the listed species. Please respond with the assessment of the hydrological (including temperature, salinity and pH), habitat and toxicity impacts and any determinations from Fish and Wildlife.

Thank you,
Helen

Helen Carr, District Manager
Southern Chittenden & Addison Counties
Vermont DEC- Stormwater Program
P: 802-490-6170 / **New email:** Helen.Carr@vermont.gov
W: www.watershedmanagement.vermont.gov



February 4, 2016

Ref: 57762.00

Ms. Helen Carr
Environmental Analyst
Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Section
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Re: Vermont Railway
Shelburne Transload Facility
Shelburne, Vermont
General Permit 3-9020 Application and Authorization (#7514-9020)
Response to Additional Comments Regarding Appendix E

Dear Helen:

On behalf of Vermont Railway ("Applicant"), VHB has prepared this response to comments received from you via email on February 2, 2016 regarding the pending application to the Vermont Department of Environmental Conservation ("VT DEC") for authorization under General Permit ("GP") 3-9020, for discharge of regulated stormwater runoff from construction activities associated with the Shelburne Transload Facility Project ("Project"). Your comments are provided in **bold** text below, followed by our response.

ANR Comment: We have determined that there are two species that weren't addressed in your initial review of threatened and endangered species. The following two species are listed as noted under the Vermont Endangered Species Law, and are known to occur in the LaPlatte River upstream of the project site:

Stone cat (*Noturus flavus*) – Endangered
Pocketbook (*Lampsilis ovata*) – Endangered

These species have been documented to be found in the LaPlatte River upstream of the site, thus there is potential for them to be found near the proposed rail facility site or downstream.

VHB Response: The process specified in Appendix E, Part II, Step One (page A-24 of GP 3-9020) directs applicants to use a web site maintained by the Vermont Agency of Natural Resources ("ANR") to determine if state or federally-listed species or critical habitat are present in the Project area. As described previously in VHB's memorandum entitled *Rare, Threatened, and Endangered Species Assessment* ("RTE Memo"), which was submitted to VT DEC on January 18, 2016, VHB performed a detailed review of publically accessible information through the ANR Natural Resources Atlas and the associated Natural Heritage Inventory



("NHI") database for all Element Occurrences ("EOs") of RTE species within 1 mile of the Project. This was done to assess potential impacts to RTE species or habitat, as well as identify target species or habitats for field surveys. This search radius is typically used by VHB in performing natural resources assessments so that known occurrences in the vicinity can be considered during on site assessments of ecological conditions and potential habitat features and to determine if potentially suitable habitat for those species are present within a Project site.

A list of EO records available at the time of VHB's initial database review (June 15, 2015) was included as an attachment to the RTE Memo. Neither a stonecat nor pocketbook EO record were identified in the NHI database within 1 mile of the Project site during the initial database query of June 15, 2015. Similarly, no EO record for either species was found within 1 mile of the Project during a follow up database query conducted on February 2, 2016.

Based on your comments dated February 2, 2016, VHB performed further evaluation of publically accessible databases with respect to information on occurrences of the pocketbook and stonecat within the LaPlatte River.

Pocketbook

According to available NHI records as of February 2, 2016, there is no EO record for pocketbook on the LaPlatte River.

Based on the process identified in Appendix E, Part II, Step One, which include that ANR "maintains a web site showing the location of all State and Federally listed species in Vermont," and that the web site is to be used to "obtain the necessary information, [emphasis added]" we conclude that because the database review determined that there are no mapped occurrences of pocketbook within the Project area, no further action is required with respect to this listed species.

Stonecat

According to available NHI records as of February 2, 2016, the closest occurrence of stonecat is EO#2 (EO ID 4713), located approximately 1.8 mile (9,940 feet) upstream from the nearest edge of the Project as measured along the centerline of the LaPlatte River (see enclosed map entitled Location of Stonecat Element Occurrence Relative to Project Location). Upon review of the EO ID 4713 record, VHB understands that stonecat have been observed or caught during sampling efforts in 1999, 2000, and 2010 at two discrete locations, both of which are located within approximately 2,000 feet downstream from the Irish Hill Road Bridge crossing of the LaPlatte River. General Comments made by the Vermont Fish and Wildlife Department ("VT FWD") in 1999 for the EO ID 4713 record include the following:

"This is likely the lowest extent of usable stonecat habitat on the LaPlatte River."

Based on this statement and the fact that the Project is located approximately 1.8 miles farther downstream from this location, VHB does not believe that there is potential for the stonecat to be found in the LaPlatte River near the proposed Project or downstream, as suggested by your comment included in bold above. Based on both the initial and follow up review of the NHI database, VHB concludes that the Project is not likely to have an adverse impact on stonecat or stonecat habitat within the LaPlatte River.

Ms. Helen Carr
Ref: 57762.00
Page 3 of 3
February 4, 2016



Conclusion

Based on the review of available information, following the process specified by Appendix E, Part II, Step One of GP 3-9020, VHB concludes that the pocketbook and stonecat are not present in the Project area and therefore the Project is eligible for general permit coverage.

Thank you for your timely review of this permit application. Please do not hesitate to contact me if you have any further questions.

Sincerely,

A handwritten signature in blue ink that reads "Scott E. Burbank".

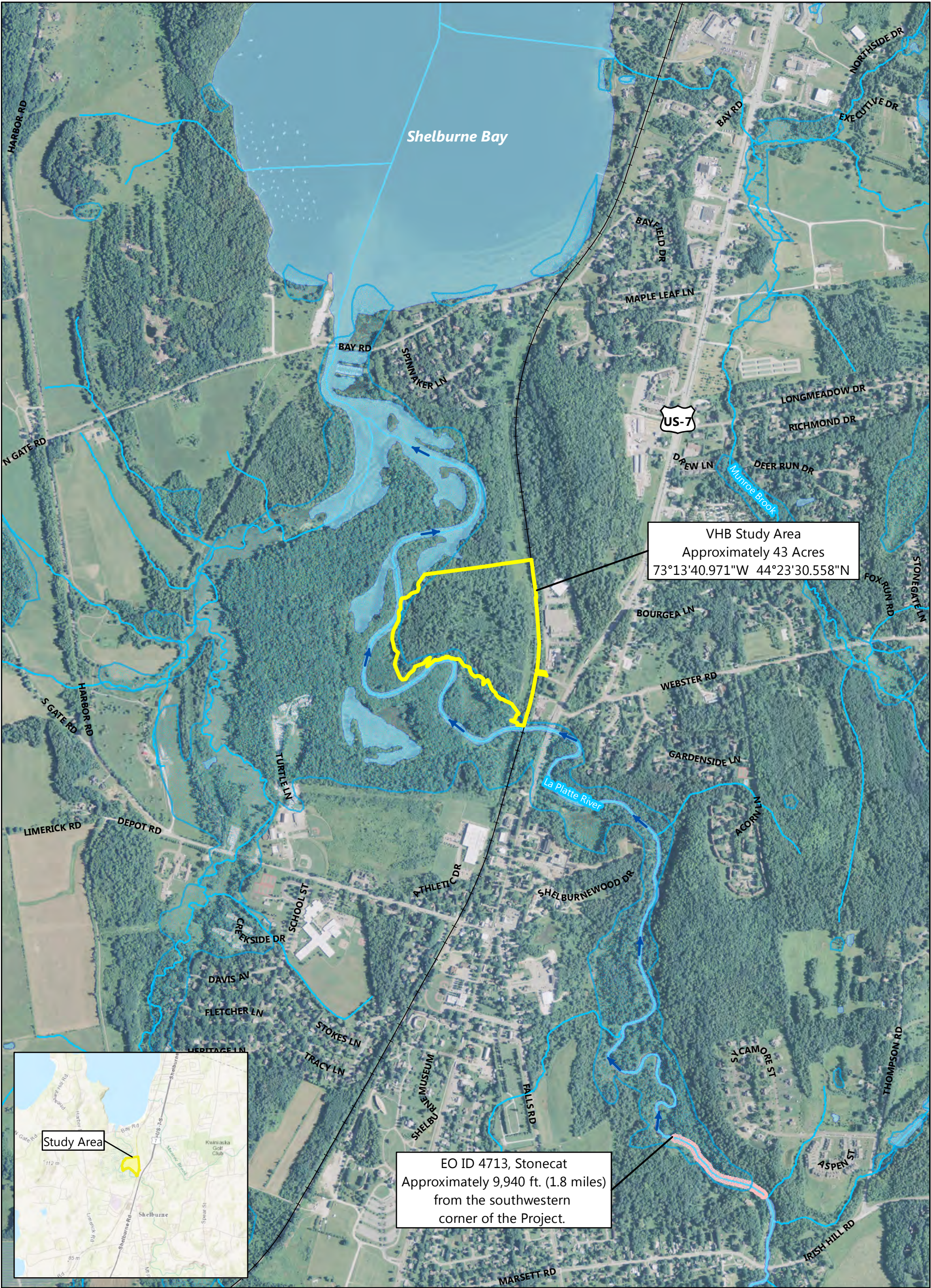
Scott E. Burbank, P.E.
Project Manager

A handwritten signature in blue ink that reads "Carla A. Fenner".

Carla A. Fenner
Environmental Scientist

SEB/CAF/jkw
Enclosure

cc: David Wulfson, President, Vermont Railway



Study Area (VHB)

EO ID 4713 (Stonecat)

Wetland (VSWI)

Stream (VHD)

Flow Direction Arrows (VHB)

Waterbody (VHD)

N

1,000

500

0

1,000

Feet

Vermont Railway

Shelburne Transload Facility

Shelburne, VT

Location of Stonecat Elemental Occurrence

Relative to Project Location

February 3, 2016

Sources: NAIP Background Imagery by USDA (2014);
The following datasets are from VCGI - VHD Streams
(2008), VSWI Wetlands (ANR, 2013); NHI EO (2015);
Study Area by VHB (2015).

vhb

\\vt\ntdata\projects\57762.00\GIS\Project\Shelburne Transload_EO_Review.mxd exported by: jtherrien On 2/3/2016

June 30, 2016

Ref: 57762.00

Mr. Jon Kart
Vermont Fish and Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620

Re: Vermont Railway, Inc.
Shelburne Transload Facility
Application for Endangered & Threatened Species Taking Permit

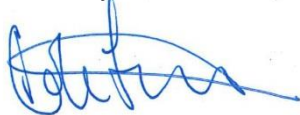


Dear Jon:

On behalf of Vermont Railway, Inc. ("VTR" or "Applicant"), VHB is submitting an application to the Vermont Fish and Wildlife Department ("FWD") requesting an Endangered & Threatened Species Takings Permit ("Permit") per the Vermont Endangered Species Act, pursuant to 10 VSA §5408, for the purpose of conducting a survey for protected mussel species in the Lower LaPlatte River. The survey is being proposed in order to determine the presence/absence, and distribution for state designated mussels in the Laplatte River downstream from a planned railroad transload facility and salt storage shed, referred to as the Shelburne Transload Facility ("STL").

Thank you for your review, and do not hesitate to contact us if you or the permit reviewers have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Carla A. Fenner', is written over a light blue grid background.

Carla A. Fenner
Environmental Scientist

CAF/jkw

cc: Selden Houghton, VTR (electronic copy only)
David Wulfson, VTR (electronic copy only)
Ethan Nedreau, Biodrawiversity (electronic copy only)

\\vhb\proj\Vermont\57762.00\docs\Permits\VT Takings\T&E Takings_Cover_Letter.docx



Agency of Natural Resources

1 National Life Drive, Davis 2
Montpelier, VT 05620-3702
802-828-1294

Application for Endangered & Threatened Species Taking Permit

Statutory Authority: 10 VSA §5408

Application Fee

\$50 for permits issued for scientific and education purposes, for enhancing the propagation of a species and for special purposes consistent with the federal Endangered Species Act.

\$250 for each listed animal/plant taken up to \$25,000. If the ANR Secretary determines that it is in the best interest of the species, ANR and the applicant may agree to mitigation in lieu of a monetary fee.

1. **Permittee/Applicant Name:** Selden Houghton
Institution (if applicable): Vermont Railway, Inc.
Principal Officer (CEO) of Institution: David Wulfson
Physical Address/Town/St/Zip: One Railway Lane, Burlington, VT 05401
Mailing Address (if different): _____
Telephone: (802) 658-2550
E-Mail: shoughton@vrs.us.com

2. **Name(s) & affiliation of subpermittee(s)**

Ethan Nedeau, Biodrawversity LLC
Carla Fenner, VHB

3. **Which species, and how many of each, will be collected or impacted?**

Common Name	Scientific Name	# of individuals to be collected/impacted	% of population to be collected/impacted
Giant floater	<i>Pyganodon grandis</i>	TBD	TBD
Pocketbook	<i>Lampsilis ovata</i>	TBD	TBD
Pink heelsplitter	<i>Potamilus alatus</i>	TBD	TBD
Fragile papershell	<i>Leptodea fragilis</i>	TBD	TBD
Black sandshell	<i>Ligumia recta</i>	TBD	TBD
Fluted shell	<i>Lasmigona costat</i>	TBD	TBD

4. **Purposes for which you are applying for a takings permit** (must meet one of the following):

- ☒ Scientific Purposes
☐ Educational Purposes
☐ Enhance the Propagation of a Species
☐ Special purposes consistent with the federal Endangered Species Act
☐ Economic Hardship
☐ Zoological Exhibition

Conduct survey to determine presence/abundance, and distribution of state-listed mussel species in the Lower LaPlatte River approximately between the river mouth and River Mile ("RM") 1 as shown the attached map (Attachment 1).

5. Detailed Explanation of Proposed Activities

A transload facility and salt storage shed are planned within an upland area in Shelburne, Vermont referred to as the Shelburne Transload Facility ("Project"), which would require the design and implementation of a stormwater management system. The stormwater system would ultimately discharge to the LaPlatte River at approximately RM 1. Therefore the mussel survey would determine if there are state-listed species at or downstream of the Project.

6. Is survey data available to indicate the size and/or extent of the impacted population for each species listed in section 3? No X, Yes ____.

Prior to the commencement of your proposed activities a survey may be required to determine the extent and number of individuals of T&E species populations at your proposed location. Said survey requires authorization from the Agency of Natural Resources (ANR) and shall be completed by an expert with experience/ qualifications acceptable to ANR.

The survey will determine this.

7. Provide a detailed explanation for the basis of the taking/impact.

For instance, if the basis is Economic Hardship explain the nature of hardship and the benefit that will result if the permit is issued. If the basis is Scientific Purposes, demonstrate how the benefits of the proposed activities outweigh the impact(s) to the individuals and the populations. Provide supporting documentation if applicable.

This initial survey is being conducted to assist with environmental review and stormwater permitting. The take/impact included in this permit application includes only the survey itself. Any further take/impact would be discussed pending the outcome of the survey.

8. What is the time frame of proposed activities: July, 2016 to August, 2016**9. What are the qualifications & experience of person(s) conducting the proposed activities?**

Ethan Nedeau (Biodrawversity) has conducted these types of surveys throughout Lake Champlain and statewide in Vermont for all of Vermont's state-listed mussel species.

Carla Fenner (VHB) is coordinating the permit submittal, review, and Agency/Applicant communications.

10. Which methods and equipment will you use?

If you seek authorization to translocate/transplant specimens of Threatened & Endangered Species, attach a translocation/transplanting plan identifying how specimens will be found and moved, where to and how you propose to monitor the effectiveness of the translocation/transplanting.

Snorkeling in shallow water and SCUBA in deeper water. As this is a Phase I survey, no mussels will be moved. See attached Biodiversity Study Plan (Attachment 2).

11. Where do you plan to collect, work and/or implement proposed activities?

Be as specific as possible and identify the town(s) and county. If field-based activities are proposed, attach a detailed map of project site(s).

LaPlatte River (Shelburne, VT). Work will be conducted from the mouth of the river at Shelburne Bay upstream to approximately RM 1, as shown in the attached map (Attachment 1).

12. What are the possible impacts of the proposed activities on species?

Include details about the numbers of plants and/or animals that will be taken/impacted.

Potential impacts that may result from activities contained in this permit application include only the survey activities.

Any concern regarding future potential impacts from the Project to state-listed mussel species would be addressed through a subsequent Takings permit application, if necessary.

13. What is your plan for conservation or mitigation of species impacted?

No specific plan for conservation or mitigation measures specific to the activities contained in this permit application.

If necessary and pending further evaluation following the survey, conservation and mitigation measures would be developed if the Project would result in impacts to state-listed mussel species.

14. Final disposition of the specimens you collect (if any)?

No mussels will be collected.

15. Impacts to Migratory Birds: Federal authorization is required for activities which might take birds (alive or dead, feathers, eggs and even nests). Federal migratory bird permits are issued by the US Fish & Wildlife Service Migratory Bird Office: 413-253-8643, <http://www.fws.gov/migratorybirds/mbpermits.htm>

My proposed project will impact migratory birds, feathers, eggs or nests: ☒ No, ☐ Yes?

If yes: My migratory bird permit # is _____, it is valid until _____
(please include a copy with your application)

I don't have a migratory bird permit but will apply for one ☐ Yes.

16. Required attachments

☒ **Permit fee:** Make checks payable to: "VFWD T&E Permit Fund 20345"

\$50 for permits for scientific and education purposes, for enhancing the propagation of a species and for special purposes consistent with the federal Endangered Species Act.

\$250 for each listed animal/plant taken up to \$25,000. If the ANR Secretary determines that it is in the best interest of the species, ANR and the applicant may agree to mitigation in lieu of a monetary fee.

☒ **Map/Site Plan:** For field-based activities attach a map, of appropriate scale, identifying the location where field based activities will occur.

☒ **Scientific Research:** Include a research proposal/description with any T&E permit application for the purpose of scientific research.

☐ **Translocation/Transplanting Plan:** If you seek authorization to translocate/transplant listed species, attach a plan identifying how specimens will be found and moved, where to and how you propose to monitor the effectiveness of the translocation/transplantation.

☐ **Importation:** For permits authorizing the importation of live specimens of threatened or endangered species a Veterinary Health Inspection report is required certifying the disease free-status of the specimens to be imported.

3. Certification by signature: I hereby affirm, under penalty of perjury, that the information, as well as any exhibits, documentations, and maps, are truthful to the best of my knowledge, that I am not delinquent in any obligation to pay child support or that I am in good standing with respect to any unpaid judgment issued by the judicial bureau or district court for fines and penalties for a civil violation or criminal offense. I also understand that false statements made on this application are punishable pursuant to 10 V.S.A. 4267 of Vermont state law.

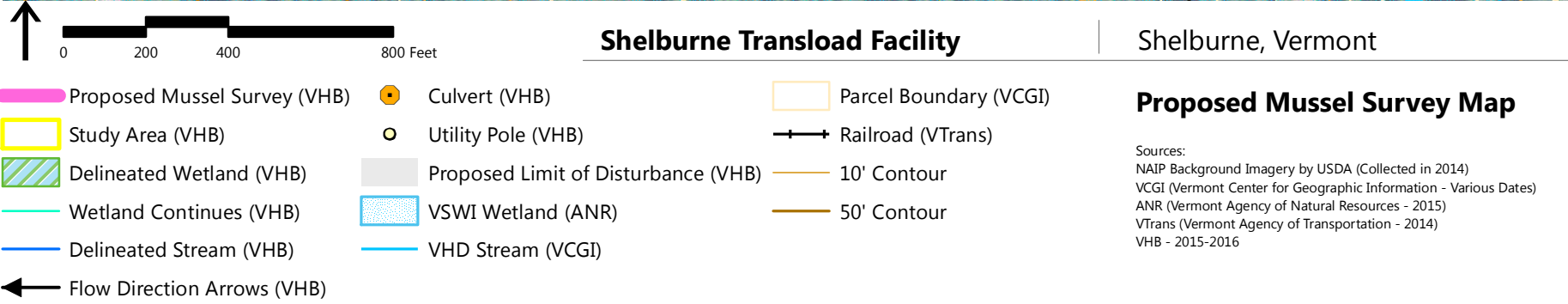
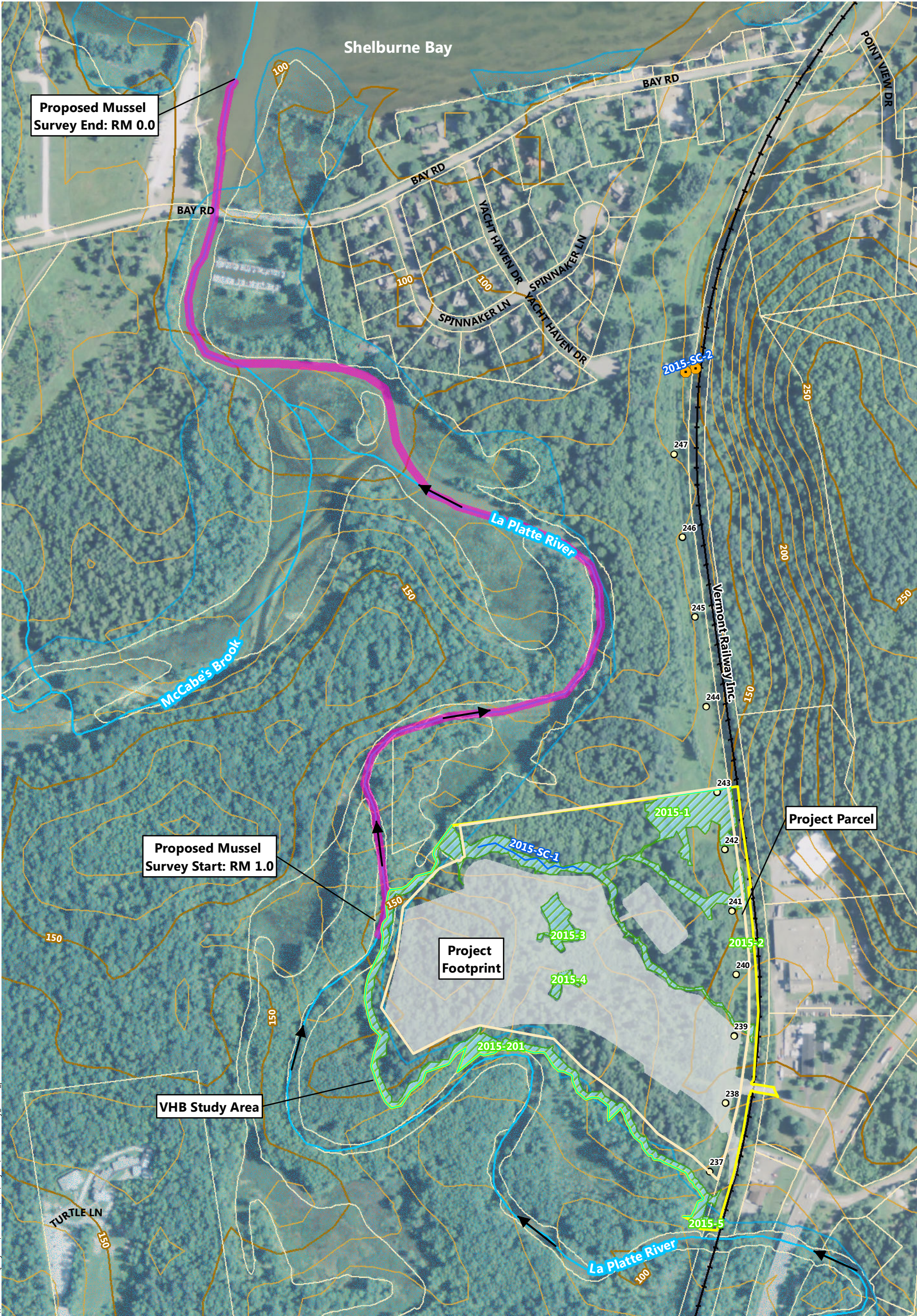
Signature: _____

Date: _____

Mail signed application to: "Permit Specialist" Vermont Fish & Wildlife Department, 1 National Life Drive, Davis 2, Montpelier, VT 05620-3702, or email the signed document to jon.kart@state.vt.us. While a signed application is needed for final approval of a permit, please send an electronic version of the completed application as well.

Endangered and threatened species taking permits are issued under the authority of 10 VSA §5408. Permits are issued for the purposes of taking (including collecting, disturbing or possessing) individuals (or parts of) of species listed as Endangered or Threatened by the state of Vermont. Collection on lands posted according to 10 VSA §5201 or 13 VSA §3705 is unlawful without landowner permission.

ATTACHMENT 1



ATTACHMENT 2

June 21, 2016

PROPOSAL

Freshwater Mussel Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)

Project Location: LaPlatte River in Shelburne, Vermont. Approximately 400 meters of the river will be assessed/surveyed, from near the Route 7 crossing downstream to Lake Champlain, but focusing on areas near a proposed stormwater discharge point.

Target Species: Potential state-listed mussel species in this reach include Giant Floater (*Pyganodon grandis*), Pocketbook (*Lampsilis ovata*), Pink Heelsplitter (*Potamilus alatus*), Fragile Papershell (*Leptodea fragilis*), Black Sandshell (*Ligumia recta*), Cylindrical Papershell (*Anodontoidea ferussacianus*), and Fluted Shell (*Lasmigona costata*).

Objectives: The primary objectives of the proposed study are:

- Determine if state-listed mussels occur in the area of the LaPlatte River along the parcel that is being developed for the Shelburne Transload Facility, especially near the proposed stormwater discharge;
- If state-listed mussels are found, collect information on population size and habitat quality/availability;
- As part of the final report, review and summarize existing information on the potential effects of chloride or other constituents of the proposed stormwater on freshwater mussels.

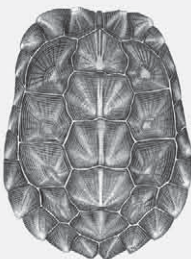
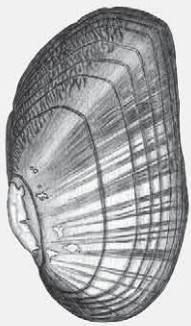
Scope of Work

1. Fieldwork

- A collection permit will be obtained from Vermont Fish and Wildlife.
- The survey will be conducted in July of 2016.
- Qualitative and semi-quantitative mussel surveys will be conducted, using a combination of snorkeling, SCUBA diving, visual and tactile searches, and walking/wading along the shoreline to look for shell middens. Due to the highly turbid nature of the LaPlatte River, we will attempt several methods to adequately characterize the mussel community, detect rare species, and describe habitat. It is likely that the survey will rely on tactile searches, rather than visual searches.
- At each survey location, biologists will record species present, numbers of state-listed mussels, shell lengths and shell conditions for state-listed mussels, habitat descriptions, photographs of mussels and habitat, and survey method/duration.
- Mussel survey results will be reported as raw counts and catch-per-unit-effort (CPUE). The presence and approximate density of co-occurring native mussel species and non-native molluscs (i.e., zebra mussels and Asian clams) will also be recorded.

2. Reporting

- Results of the survey will be summarized in a written report. This will include (1) map(s) showing survey sites and locations of state-listed species and high-quality mussel habitat; (2) raw data and summary statistics for the survey effort, mussel counts, CPUE, shell lengths, shell conditions, and habitat parameters; and (3) photographs of state-listed mussels and their habitat.
- The report will include a summary of available peer-reviewed literature and case studies on the effects of chloride or other constituents of concern in the proposed stormwater discharge.





To: Shelburne Transload Facility
Project File

Date: July 8, 2016

Memorandum

Project #: 57762.00

From: Carla A. Fenner,
Environmental Scientist

Re: **Supplement** - Stormwater Permit 7514-9020 - Rare,
Threatened, and Endangered Species Assessment

This memorandum supplements VHB's January 18, 2016 memorandum titled *Stormwater Permit 7514-9020 – Rare Threatened, and Endangered Species Assessment* ("Memo") for the purpose of documenting a revision to Attachment 4 Species Checklist – Partial Floristic Inventory. In Attachment 4 to the Memo, also dated January 18, 2016, VHB incorrectly included the species *Valeriana uliginosa*. However the species that a VHB Environmental Scientist observed during the July, 2015 field surveys was *Valeriana officinalis*. This correction has been coordinated with the Vermont Department of Fish and Wildlife ("FWD")¹, and is included in an updated Species Checklist included as an attachment to this supplemental memo.

ATTACHMENT

Attachment 1 – Updated Species Checklist – Partial Floristic Inventory

\\vhb\proj\Vermont\57762.00\docs\memos\RTE\Supplemental Memo 070716\RTE Memo_Supplemental Correction_070816.docx

¹ Electronic mail between VHB (C. Fenner) and FWD (A. Marcus) on February 9, 2016.

Species Checklist¹ - Partial Floristic Inventory

Client: Vermont Railway

Project: Shelburne Transload Facility

Date: July 7, 2016

Survey Date(s) July 16 and 17, 2015

Surveyor(s): VHB (C. Fenner, O. McEnroe)

Prepared by: VHB (C. Fenner)



Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Non-Native Invasive Species ³
Acer negundo L.	boxelder	Aceraceae		
Acer rubrum L.	red maple	Aceraceae		
Agrostis gigantea Roth	redtop	Poaceae		
Alnus incana (L.) Moench	gray alder	Betulaceae		
Amphicarpaea bracteata (L.) Fernald	American hogpeanut	Fabaceae		
Anemone quinquefolia L.	wood anemone	Ranunculaceae		
Apios americana Medik.	groundnut	Fabaceae		
Apocynum cannabinum L.	Indianhemp	Apocynaceae		
Aralia nudicaulis L.	wild sarsaparilla	Araliaceae		
Arisaema triphyllum (L.) Schott	Jack in the pulpit	Araceae		
Asclepias incarnata L.	swamp milkweed	Asclepiadaceae		
Asclepias syriaca L.	common milkweed	Asclepiadaceae		
Athyrium filix-femina (L.) Roth ssp. angustum (Willd.) R.T.	subarctic ladyfern	Scrophulariaceae		
Berberis vulgaris L.	common barberry	Berberidaceae		
Betula alleghaniensis Britton	yellow birch	Betulaceae		
Betula papyrifera Marshall	paper birch	Betulaceae		
Betula populifolia Marshall	gray birch	Betulaceae		
Bidens cernua L.	nodding beggartick	Asteraceae		
Boehmeria cylindrica (L.) Sw.	smallspike false nettle	Urticaceae		
Carex annectens (E.P. Bicknell) E.P. Bicknell	yellowfruit sedge	Cyperaceae		
Carex baileyi Britton	Bailey's sedge	Cyperaceae		
Carex blanda Dewey	eastern woodland sedge	Cyperaceae		
Carex conoidea Schkuhr ex Willd.	openfield sedge	Cyperaceae		
Carex crinita Lam.	fringed sedge	Cyperaceae		
Carex gracillima Schwein.	graceful sedge	Cyperaceae		
Carex gynandra Schwein.	nodding sedge	Cyperaceae		
Carex intumescens Rudge	greater bladder sedge	Cyperaceae		
Carex lupulina Muhl. ex Willd.	hop sedge	Cyperaceae		
Carex lurida Wahlenb.	shallow sedge	Cyperaceae		
Carex scoparia Schkuhr ex Willd. var. scoparia	broom sedge	Cyperaceae		
Carex vulpinoidea Michx.	fox sedge	Cyperaceae		
Carpinus caroliniana Walter	American hornbeam	Betulaceae		
Carya ovata (Mill.) K. Koch	shagbark hickory	Juglandaceae		
Cephalanthus occidentalis L.	common buttonbush	Rubiaceae		
Cerastium arvense L.	field chickweed	Caryophyllaceae		
Cinna arundinacea L.	sweet woodreed	Poaceae		
Circaea lutetiana L. ssp. canadensis (L.) Asch. & Magnus	broadleaf enchanter's	Onagraceae		
Cirsium vulgare (Savi) Ten.	bull thistle	Asteraceae		
Clematis virginiana L.	devil's darning needles	Ranunculaceae		
Cornus amomum Mill.	silky dogwood	Cornaceae		
Cornus racemosa Lam.	gray dogwood	Cornaceae		
Dennstaedtia punctilobula (Michx.) T. Moore	eastern hayscented fern	Dennstaedtiaceae		
Equisetum fluviatile L.	water horsetail	Equisetaceae		
Equisetum variegatum Schleich. ex F. Weber & D. Mohr	variegated scouringrush	Equisetaceae		
Eupatorium perfoliatum L.	common boneset	Asteraceae		
Festuca rubra L.	red fescue	Poaceae		
Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae		
Fraxinus pennsylvanica Marshall	green ash	Oleaceae		

Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Invasive Species ³
Galium asprellum Michx.	rough bedstraw	Rubiaceae		
Galium palustre L.	common marsh bedstraw	Rubiaceae		
Geum canadense Jacq.	white avens	Rosaceae		
Glyceria canadensis (Michx.) Trin.	rattlesnake mannagrass	Poaceae		
Glyceria grandis S. Watson	American mannagrass	Poaceae		
Hackelia virginiana (L.) I.M. Johnst.	beggarslice	Boraginaceae		
Hamamelis virginiana L.	American witchhazel	Hamamelidaceae		
Hieracium pratense Tausch	yellow hawkweed	Asteraceae		
Hypericum perforatum L.	common St. Johnswort	Clusiaceae		
Hypericum punctatum Lam.	spotted St. Johnswort	Clusiaceae		
Impatiens capensis Meerb.	jewelweed	Balsaminaceae		
Juncus canadensis J. Gay ex Laharpe	Canadian rush	Juncaceae		
Juncus effusus L.	common rush	Juncaceae		
Juniperus virginiana L.	eastern redcedar	Cupressaceae		
Laportea canadensis (L.) Weddell	Canadian woodnettle	Urticaceae		
Leersia oryzoides (L.) Sw.	rice cutgrass	Poaceae		
Lobelia spicata Lam.	palespike lobelia	Campanulaceae		
Lonicera canadensis W. Bartram ex Marshall	American fly honeysuckle	Caprifoliaceae		
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae		B
Lycopus americanus Muhl. ex W.P.C. Barton	American water horehound	Lamiaceae		
Lysimachia nummularia L.	creeping jenny	Primulaceae		
Lysimachia quadrifolia L.	whorled yellow loosestrife	Primulaceae		
Lysimachia terrestris (L.) Britton, Sterns & Poggenb.	earth loosestrife	Primulaceae		
Lythrum salicaria L.	purple loosestrife	Lythraceae		B
Maianthemum canadense Desf.	Canada mayflower	Liliaceae		
Matteuccia struthiopteris (L.) Todaro	ostrich fern	Dryopteridaceae		
Medeola virginiana L.	Indian cucumber	Liliaceae		
Melilotus officinalis (L.) Lam.	sweetclover	Fabaceae		
Mentha arvensis L.	wild mint	Lamiaceae		
Mitchella repens L.	partridgeberry	Rubiaceae		
Moneses uniflora (L.) A. Gray	single delight	Pyrolaceae		
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae		
Osmunda cinnamomea L.	cinnamon fern	Osmundaceae		
Osmunda claytoniana L.	interrupted fern	Osmundaceae		
Osmunda regalis L.	royal fern	Osmundaceae		
Oxalis corniculata L.	creeping woodsorrel	Oxalidaceae		
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Vitaceae		
Peltandra virginica (L.) Schott	green arrow arum	Araceae	S2S3	
Phalaris arundinacea L.	reed canarygrass	Poaceae		WL
Phragmites australis (Cav.) Trin. ex Steud.	common reed	Poaceae		B
Phryma leptostachya L.	American lopseed	Verbenaceae		
Pilea pumila (L.) A. Gray	Canadian clearweed	Urticaceae		
Pinus strobus L.	eastern white pine	Pinaceae		
Polygonum sagittatum L.	arrowleaf tearthumb	Polygonaceae		
Polystichum acrostichoides (Michx.) Schott	Christmas fern	Dryopteridaceae		
Populus tremuloides Michx.	quaking aspen	Salicaceae		
Potentilla norvegica L.	Norwegian cinquefoil	Rosaceae		
Prenanthes altissima L.	tall rattlesnakeroot	Asteraceae		
Prunus pensylvanica L. f.	pin cherry	Rosaceae		
Prunus serotina Ehrh.	black cherry	Rosaceae		
Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae		
Pyrola rotundifolia auct. non L. p.p.	American shinleaf	Pyrolaceae		
Quercus alba L.	white oak	Fagaceae		
Quercus bicolor Willd.	swamp white oak	Fagaceae		
Quercus rubra L.	northern red oak	Fagaceae		
Rhus typhina L.	staghorn sumac	Anacardiaceae		
Rubus allegheniensis Porter	Allegheny blackberry	Rosaceae		
Rubus canadensis L.	smooth blackberry	Rosaceae		

Scientific Name ¹	Common Name	Family	VT Rarity Rank ²	Invasive Species ³
Rubus occidentalis L.	black raspberry	Rosaceae		
Salix bebbiana Sarg.	Bebb willow	Salicaceae		
Salix petiolaris Sm.	meadow willow	Salicaceae		
Salix sericea Marshall	silky willow	Salicaceae		
Sambucus racemosa L.	red elderberry	Caprifoliaceae		
Sanguinaria canadensis L.	bloodroot	Papaveraceae		
Scirpus atrocinctus Fernald	blackgirdle bulrush	Cyperaceae		
Scirpus atrovirens Willd.	green bulrush	Cyperaceae		
Scirpus cyperinus (L.) Kunth	woolgrass	Cyperaceae		
Solanum dulcamara L.	climbing nightshade	Solanaceae		
Solidago canadensis L.	Canada goldenrod	Asteraceae		
Solidago rugosa Mill.	wrinkleleaf goldenrod	Asteraceae		
Sparganium americanum Nutt.	American bur-reed	Sparganiaceae		
Spiraea alba Du Roi var. latifolia (Aiton) Dippel	white meadowsweet	Rosaceae		
Stachys pilosa	hairy hedge-nettle	Lamiaceae	S2?	
Symphotrichum cordifolium (L.) G.L. Nesom	common blue wood aster	Asteraceae		
Symphotrichum lateriflorum (L.) Á. Löve & D. Löve	calico aster	Asteraceae		
Symplocarpus foetidus (L.) Salisb. ex W.P.C. Barton	skunk cabbage	Araceae		
Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae		
Thalictrum pubescens Pursh	king of the meadow	Ranunculaceae		
Thelypteris noveboracensis (L.) Nieuwl.	New York fern	Thelypteridaceae		
Thelypteris palustris Schott	eastern marsh fern	Thelypteridaceae		
Trifolium pratense L.	red clover	Fabaceae		
Trillium L.	trillium	Liliaceae		
Tsuga canadensis (L.) Carrière	eastern hemlock	Pinaceae		
Typha latifolia L.	broadleaf cattail	Typhaceae		
Ulmus americana L.	American elm	Ulmaceae		
Urtica dioica L.	stinging nettle	Urticaceae		
Vaccinium angustifolium Aiton	lowbush blueberry	Ericaceae		
Valeriana officinalis L.	garden valerian	Valerianaceae		
Verbena urticifolia L.	white vervain	Verbenaceae		
Veronica americana Schwein. ex Benth.	American speedwell	Scrophulariaceae		
Viburnum acerifolium L.	mapleleaf viburnum	Caprifoliaceae		
Vicia cracca L.	bird vetch	Fabaceae		
Viola blanda Willd.	sweet white violet	Violaceae		
Viola renifolia A. Gray	white violet	Violaceae		
Viola sororia Willd.	common blue violet	Violaceae		
Vitis aestivalis Michx.	summer grape	Vitaceae		
Zanthoxylum americanum Mill.	common pricklyash	Rutaceae		

¹ Nomenclature follows USDA-NRCS PLANTS database (plants.usda.gov/) and/or Haines (2011).

² The Vermont State Rank from the "Rare and Uncommon Native Vascular Plants of Vermont - Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department", version dated June 15, 2015.

³ Quarantine #3- Noxious Weeds (2012);

Vermont Wildlife Action Plan- Appendix K Exotic Invasive and Pest Species (2005). Vermont Fish & Wildlife Department



Agency of Natural Resources

1 National Life Dr., Davis 2, Montpelier, VT 05620-3901 • 802-828-1294

Endangered & Threatened Species Takings Permit

Statutory Authority: 10 VSA § 5408

1. Permittee

Selden Houghton

Vermont Railway, Inc

One Railway Lane, Burlington, VT 05401

802-658-2550, shoughton@vrs.us.com, ethan@biodrawiversity.com, cfenner@vnhb.com

2. Permit Period

Effective Date: 7/14/2016

Expiration Date: 9/30/2016

Authorization #: ER-2016-23

Amendment # 0

3. Principal Officer: David Wulfson.

4. Subpermittee(s): Ethan Nedeau and the staff of Biodrawiversity LLC, Carla Fenner VHB.

5. Authorized Species: Giant floater (*Pyganodon grandis*), Pink heelsplitter (*Potamilus alatus*), Fragile papershell (*Leptodea fragilis*), Fluted-shell (*Lasmigona costata*), Pocketbook (*Lampsilis ovata*), Cylindrical papershell (*Anodontoidea ferussacianus*), Black sandshell (*Ligumia rectaa*).

6. Authorized Activity: A pre-construction survey to determine mussel presence and distribution at and downstream of the proposed Shelburne Transload Facility in Shelburne.

7. Location of Authorized Activity: Shelburne, VT.

8. Findings

- A. The Permittee applied for an Endangered and Threatened Species Takings Permit under 10 V.S.A. § 5408 to authorize scientific research.
- B. Said research has been determined to be non-de minimis in nature and will have the following benefits: improved knowledge of the distribution of the species listed in section 5.
- C. The Permittee has retained the services of Ethan Nedeau and the staff of Biodrawiversity, LLC to conduct the proposed survey.
- D. The Vermont Agency of Natural Resources has reviewed Mr. Nedeau's qualifications and has determined that he is qualified to conduct the survey.
- E. The Permittee has submitted a survey proposal titled "Freshwater Mussel Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)" dated June 21, 2016 (hereafter the "Survey Plan") which has been reviewed and approved by the VFWD Mussel Specialist.
- F. The Endangered Species Committee has approved, as a class, pre-construction surveys such as that proposed here, and reviews a summary of such permits annually.

9. Statutory Determination

- A. 10 V.S.A. § 5408(a) provides: "[A]fter obtaining the advice of the Endangered Species Committee, the Secretary may permit, under such terms and conditions as the Secretary may prescribe by rule any act otherwise prohibited by this chapter if done for any of the following purposes: scientific purposes; to enhance the propagation or survival of a species; economic hardship; zoological exhibition, educational purposes; or special purposes consistent with the purposes of the federal Endangered Species Act."
- B. The Permittee requests an Endangered & Threatened Species Takings Permit for Scientific purposes.
- C. The state of Vermont recognizes the value which plants, fish and wildlife in their natural environment have for public enjoyment, ecological balance, and scientific study. See 1981, No. 188 (Adj. Sess.), § 1(a).
- D. The state of Vermont recognizes the need for protection and preservation of these plants, fish and wildlife in their natural environment. *Id.*
- E. The General Assembly of Vermont intends that the species of wildlife and wild plants normally occurring within this state which may be found to be threatened or endangered within the state should be accorded protection as necessary to maintain and enhance their numbers. *Id.* at § 1(b).
- F. The General Assembly of Vermont intends that the state should assist in the protection of species of wildlife and wild plants which are determined to be threatened or endangered elsewhere pursuant to the federal Endangered Species Act. *Id.*

- G. Pursuant to 10 V.S.A. § 5408(a), the ANR Secretary hereby determines, based upon the findings detailed above and after receiving advice from the Endangered Species Committee, that the proposed activity is consistent the purposes of the 10 V.S.A. ch. 123. An Endangered and Threatened Species Takings Permit is authorized, as conditioned below.

10. General Conditions & Authorizations

- A. This permit is issued in accordance with 10 V.S.A. ch. 123. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.
- B. This permit is expressly conditioned upon compliance with all applicable federal and state laws, regulations and permits.
- C. This permit does not confer upon the Permittee the authority to conduct research without the acquiring necessary landowner permission including, but not limited to, state lands.
- D. By acceptance of this permit, the Permittee and its heirs, successors and assigns agree to provide the Agency of Natural Resources with unrestricted access, at reasonable times to the animal or plant specimens and/or animal or plant parts collected and possessed under this permit, collection and monitoring records, and access to the premises as necessary to ensure compliance with this permit.
- E. The Agency maintains continuing jurisdiction over this activity, and may, at any time, order the Permittee to undertake remedial measures if necessary to ensure the protection and conservation of listed species.
- F. This permit is not valid for endangered and threatened species that are not listed in section 5.
- G. The permit is valid for use by the named Permittee and subpermittees(s) only and may be revoked by the Secretary at any time for cause, or violations of any terms or conditions of this permit or state law.
- H. The Permittee and subpermittee(s) shall carry copies of this permit whenever performing authorized activities and shall make the permit available upon request.
- I. Pursuant 10 V.S.A. § 5410, the locations of listed species shall be kept confidential and the sharing of such information is a violation of this permit and the law.

11. Specific Conditions & Authorizations

Standard Requirements

- A. **Qualified personnel:** A qualified and experienced mussel biologist shall conduct all surveys, translocations, and follow-up monitoring. Authorization is conditioned upon the mussel biologist demonstrating to the Vermont Agency of Natural Resources (VANR) that he/she is fully capable of locating and identifying state-listed and federally-listed mussel species and their habitats. The VANR reserves the right to reject surveys, translocations and monitoring data that are not conducted by qualified individuals.
- B. **Plan submission:** At least 30-days prior to the initiation of a survey, translocation, or monitoring event, the Permittee, in consultation with the mussel biologist, shall submit a final plan to the Vermont Fish & Wildlife Department (VFWD) Mussel Specialist for review. This plan shall address all state and/or federally listed mussel species identified by the VANR as potentially impacted by the proposed activities and shall be approved by the VANR before in-water activities may be initiated.
- C. **Consultation:** At least 30-days prior to the initiation of a survey, translocation, or monitoring event the Permittee and mussel biologist shall consult with the VFWD Mussel Specialist, and throughout the project as needed, on protocols, survey conditions, and selection of translocation site(s).
- D. **Field Conditions:** While it is acknowledged that water clarity at this particular survey area is generally limited, at best, the survey shall occur under favorable conditions (e.g. high water clarity—for the location, low flow, suitable water temperatures), generally between May 20th and September 30th of the permit period and no more than one-year prior to the commencement of construction activities. Early summer surveys, when river discharge is near or below average and when there has not been significant rainfall 5-7 days prior to the survey, are preferred. The VFWD Mussel Specialist may authorize permitted activity on site if one or more of these conditions is deemed borderline unfavorable.

- E. Mussel Handling:** Care shall be taken to prevent damage to mussels during handling and during removal from and return to the substrate. Mussels shall be removed slowly from consolidated fine substrate, such as clay or sand, to prevent damage to the foot, which can be extended deep into the substrate. Each mussel shall be oriented in an upright position (foot/anterior end down) when being returned to the substrate as placing a mussel upside down would likely result in its death. If the substrate is firm or rocky, it may be necessary to create an opening to place the mussel in using a hand trowel or other implement to prevent damage to the shell that can occur from attempting to push a mussel directly into hard substrate.

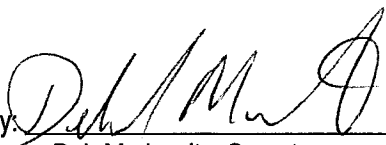
Survey

- F. The survey area** shall include the full extent of the area identified as the "Proposed Mussel Survey" in the map included with the permit application titled "Proposed Mussel Survey Map."
- G. A qualitative survey**, as described in the permit application and approved Survey Plan, shall be employed to evaluate species presence and relative density. Detection methods shall include visual searches at the substrate surface, and tactile searches to find mussels located in the substrate. The location and habitat (water depth, substrate, flow) shall be recorded.
- H. A qualitative estimate of mussel species abundance** shall be calculated using a Timed-Search protocol and the Catch per Unit Effort (CPUE) method. CPUE, the number of mussels found per person hour of searching is calculated as: # of individuals per species found ÷ # minutes searching × 60 ÷ # surveyors.

I. 12. Reporting Requirements

- A. Survey Report:** A report shall be submitted within 30-days of the completion of the survey and at a minimum shall include:
- i. Survey methods (including those used for substrate excavation/subsurface search) and a rationale for any additional efforts and modifications to proposed methods.
 - ii. Survey time, date, and level of effort (number of surveyors, time spent surveying at surface and subsurface).
 - iii. Environmental conditions including weather, flow, water clarity, water temperature, and average discharge at nearest USGS gauge.
 - iv. Counts of each listed species found; a qualitative estimate of abundance for each mussel species observed; and lateral photographs of representative specimens of each mussel species observed.
 - v. Habitat description (e.g., substrate types, depth and flow velocities), photograph(s); and a map that shows the location and spatial extent (size, area) of habitats, and locations where mussels were found.
- B. The Permittee** shall accommodate requests by VANR staff for additional information from collection activities (e.g., copies of original field sheets, computerized data in usable format). Reports of results of any subsequent analyses and copies of subsequent publications resulting from the collections made under this permit shall be forwarded to the VFWD Permits Specialist within 30-days.

Issued by:


Deb Markowitz, Secretary
Agency of Natural Resources

Date: 7-12-16

Right to Appeal to Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. # 802-828-1660).



September 15, 2016

Via Electronic Copy Only

Ref: 57762.00

Mr. Jon Kart
Vermont Fish and Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620

Ms. Helen Carr
Vermont Department of Environmental Conservation
Watershed Management Division
Main Building - 2nd Floor
1 National Life Drive
Montpelier, VT 05620

Re: Vermont Railway, Inc.
Shelburne Transload Facility
Endangered & Threatened Species Taking Permit ER-2016-23
Report Submittal / Freshwater Mussel Survey in the LaPlatte River

Dear Jon and Helen:

On behalf of Vermont Railway, Inc. ("VTR"), and as required by Condition 12(A) of Endangered & Threatened Species Taking Permit ER-2016-23 ("Permit") dated July 12, 2016, VHB is submitting a copy of the report *Freshwater Mussel Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)*, prepared by Biodrawiversity LLC and dated August 2016. The survey work included in the report was performed by and under the direction of Ethan Nedeau of Biodrawiversity, as a subconsultant to VHB, pursuant to and in accordance with the terms and conditions of the Permit.

This report is also intended to supplement and validate the information previously provided to the Vermont Department of Environmental Conservation in Appendix H of the Stormwater Pollution Prevention Plan ("SWPPP") prepared in accordance with the requirements for coverage under the Multi-Sector General Permit for the Shelburne Transload Facility (NOI #7514-9003). A copy of this report that has been redacted to remove the map and other information regarding the specific locations where the state-listed mussels

Mr. Jon Kart / Ms. Helen Carr
Ref: 57762.00
Page 2 of 2
September 15, 2016



were found will be included in the SWPPP binder to be maintained at the facility.

Thank you, and do not hesitate to contact me if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Robert Wildey".

Robert Wildey
Water Resources Consultant

RAW/jkw

cc: Selden Houghton, VTR (electronic copy only)
David Wulfson, VTR (electronic copy only)
Ethan Nedeau, Biodrawiversity (electronic copy only)

REPORT

Freshwater Mussel Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)

prepared for

VHB, Inc.

40 IDX Drive

Building 100, Suite 200

South Burlington, VT 05403-7771

prepared by



Biodrawiversity LLC

206 Pratt Corner Road

Leverett, MA 01054

August 2016



LaPlatte River, about 300 meters downstream from the proposed stormwater discharge of the Shelburne Transload Facility (Shelburne, Vermont).

INTRODUCTION

Biodrawversity LLC conducted a freshwater mussel survey in the LaPlatte River in Shelburne, Vermont. The survey was conducted as part of the review and permitting for a proposed salt storage facility in nearby uplands and its stormwater discharge to the river. There were limited data on the freshwater mussels of the LaPlatte River, but there was potential for state-listed species including Giant Floater (*Pyganodon grandis*; Threatened), Pocketbook (*Lampsilis ovata*; Endangered), Pink Heelsplitter (*Potamilus alatus*; Endangered), Fragile Papershell (*Leptodea fragilis*; Endangered), Black Sandshell (*Ligumia recta*; Endangered), Cylindrical Papershell (*Anodontoidea ferussacianus*; Endangered), and Fluted Shell (*Lasmigona costata*; Endangered). Vermont Railway, Inc. applied for, and received, an *Endangered and Threatened Species Taking Permit* from Vermont Fish and Wildlife; Ethan Nedeau of Biodrawversity LLC was the qualified mussel consultant named as subpermittee. The primary objectives of the proposed study were:

1. Determine if state-listed mussels occur in the area of the LaPlatte River along the parcel that is being

developed for the Shelburne Transload Facility, especially near the stormwater discharge.

2. Collect information on population size and habitat quality/availability of state-listed species.

STUDY AREA AND METHODS

Study Area: Approximately 900 meters of the river was assessed/surveyed, from 400 meters downstream to 500 meters upstream of the proposed stormwater discharge (Figure 1). This is a very low-gradient, meandering reach at lake level, and has extensive riparian wetlands that flood or dry with the lake's water level fluctuations. The study reach began approximately ½ mile downstream from the Route 7 bridge, and 600 meters upstream from the Bay Road bridge. The reach was accessed with kayaks, launched from the public access site in Shelburne Bay.

Biologists conducted the survey on July 20 and July 26, 2016. Weather was sunny and warm on both days, with slight wind. The survey was not conducted on two consecutive days because the Town of Shelburne posted a warning about *E. coli* contamination on the morning of the second day, and biologists returned only after this advisory had expired.



The proposed stormwater discharge is through the small channel shown here.

Methods: Qualitative mussel surveys were conducted using a combination of snorkeling, SCUBA diving, visual and tactile searches, and walking/wading along the shoreline. The LaPlatte River was highly turbid, and shallow areas were often densely vegetated and covered with a skim of duckweed, making it difficult to conduct visual surveys. Thus, these multiple survey techniques were necessary to detect mussels. Biologists recorded species present; numbers, shell lengths and shell conditions for state-listed mussels; habitat descriptions; photographs of mussels and habitat, and survey method/duration. The presence of co-occurring native mussel species and non-native molluscs (i.e., zebra mussels) were recorded.

RESULTS

Species Found: Seven native mussel species were found, including three state-endangered species: *Lampsilis ovata*, *Potamilus alatus*, and *Leptodea fragilis* (Figure 1). The four other species included *Elliptio complanata*, *Lampsilis radiata*, *Pyganodon cataracta*, and *Strophitus undulatus*. *E. complanata*, *L. radiata*, and *P. cataracta* were the three most common species; they were found throughout the entire study area. Only

one *S. undulatus* was found at the upstream end of the survey area. Zebra mussels were present at low to moderate densities on hard substrates in the lower half of the survey area. Native mussels were fouled with zebra mussels, but at non-lethal, low levels.

Four *L. ovata* were found, including two downstream and two upstream from the proposed discharge. These ranged in length from 65 to 92 mm, exhibited light shell erosion, and were found in depths from 0.13 to 0.45 meters in silt/mud substrate (Table 1).

Ten *P. alatus* were found, including six downstream and four upstream from the proposed discharge. These ranged in length from 103 to 147 mm, exhibited light to moderate shell erosion, and were found in depths from 0.1 to 0.8 meters in silt/mud substrate (Table 1).

Three live and one shell of *L. fragilis* were found, including three downstream and one just upstream from the proposed discharge. These ranged in length from 40 to 105 mm, exhibited light shell erosion, and were found in depths from 0.3 to 1.1 meters in clay and silt substrate (Table 1).

Habitat Assessment: Overall, habitat is characterized as lentic depositional, with clay-mud substrates,

Map Redacted

Figure 1. Survey area in the LaPlatte River upstream and downstream from the proposed stormwater discharge of the Shelburne Transload Facility (Shelburne, Vermont), showing locations of the three state-listed mussel species that were found.

dense vegetation and woody debris, and almost no perceptible flow. Very light flow was more evident at the upstream end of the survey area. Water depth exceeded 2.5 meters (~8 ft) in some areas, although some of the deeper areas were poorly surveyed due to zero visibility and accumulations of large woody debris. Few mussels were found in the deeper areas

mid-channel, rather, all species were more concentrated near the shoreline in depths less than one meter. Highest mussel densities (all species) were found within or near beds of emergent and submerged vegetation in water depths less than 0.5 meters on gently sloping banks, usually in mud/silt substrates. Steep clay banks were present, but mussels were compara-

Table 1. Summary of locations, shell length and condition, and habitat of each of the 18 live and 1 dead individuals of three state-endangered mussel species found during the survey. See Figure 1 for locations.

Table Redacted

tively less common in clay than they were in mud/silt. Downstream from the discharge point, along the outside bend, there was a very large amount of broken glass and scrap metal in the river and along the bank – evidence of a former upland dump. This bank was not surveyed as well as other areas, due to the combined effects of zero visibility that prevented visual surveys, and large amounts of sharp debris that made tactile searches unsafe.

mussel species, nearly all of the lower LaPlatte River within the area we assessed is suitable habitat. Although we found relatively few individuals of these three species, we did document evidence of recruitment by finding juvenile *L. fragilis*, and we found endangered mussels throughout the entire area despite near-zero water clarity, dense vegetation, extensive woody debris, and large amount of broken glass.

DISCUSSION

Mussels: The survey documented three state-endangered mussel species both upstream and downstream of the proposed stormwater discharge, and four other mussel species that are not protected in Vermont. Prior to this survey, only *L. ovata* was known to occur in the lower LaPlatte River. All three of the state-endangered species found in the LaPlatte River once occurred more broadly in the Lake Champlain basin but were nearly decimated by zebra mussels, and are primarily now confined to larger tributaries that lack large zebra mussel populations. These species prefer fine-grained sediment (clay, silt, sand) and slow water velocities. They have been found in a broad range of water depths, including very shallow areas (<0.5 meters) within or near submerged aquatic vegetation such as *Elodea* sp. and *Vallisneria* sp. Based on our understanding of the habitat for these three



Three state-endangered mussel species found in the LaPlatte River: *Lampsilis ovata* (top left), *Potamilus alatus* (top left), adult *Leptodea fragilis* (bottom left), and juvenile *Leptodea fragilis* (bottom right).

Wildey, Robert

From: Burke, Kevin <Kevin.Burke@vermont.gov>
Sent: Tuesday, September 06, 2016 3:39 PM
To: Nelson, Jeffrey; Wildey, Robert; dwulfson@vrs.us.com; Peter Young
Cc: Carr, Helen; Chapman, Matt; Monks, Padraic
Subject: FW: VTR Shelburne Transload

Hi Jeff,

See below correspondence from Mark Ferguson, Department of Fish and Wildlife.

In addition, we have tentatively secured the Shelburne Town Hall for a public informational meeting on Thursday, Oct, 13, 2016 from 6-8 PM. We expect to move forward with notice of the MSGP application later this week concurrent with notice of the meeting in the Burlington Free Press.

You will be copied on the notice when issued.

Kevin



Kevin Burke, *Environmental Analyst*
Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522
802-490-6168 / kevin.burke@vermont.gov
www.watershedmanagement.vermont.gov

From: Ferguson, Mark
Sent: Friday, September 02, 2016 4:21 PM
To: Burke, Kevin <Kevin.Burke@vermont.gov>
Cc: Carr, Helen <Helen.Carr@vermont.gov>; Gjessing, Catherine <Catherine.Gjessing@vermont.gov>
Subject: RE: VTR Shelburne Transload

Helen and Kevin,

Helen and I met August 19 to discuss the proposed VTR Shelburne Transload Facility and information provided by VHB (chloride sensitivity analysis memo, chloride loading analysis, and stormwater pollution prevention plan (SWPPP)). I've since then received the revised chloride analysis.

The chloride loading analysis report cites a study that examined runoff from 292 salt storage facilities in Virginia, which concluded that the observed average chloride concentrations in associated stormwater ponds was 1,600 mg/L. It also notes that these were not covered loading facilities. Results of the current VHB chloride analysis indicate that the Vermont acute chloride criterion would only be exceeded if stormwater discharge were higher than 1,323 mg/L during 7Q10 drought streamflow conditions. Although the VT Railways facility is planned to be covered, this maximum calculated concentration which still meet the acute criterion is lower than the average concentration found in the Virginia stormwater ponds. The VHB analysis reports that, "assuming that the stormwater discharged from the facility would contain chloride concentrations between 100 and 1,000 mg/L, it appears likely that the chloride concentrations in

the LaPlatte River as a result of runoff from the Project might range between 82 and 655 mg/L when calculated over the peak one hour of the 0.9-inch WQV storm event and between 52 and 82 mg/L during the 4-day average as the result of the 0.9-inch WQV storm event, in a worst-case scenario in which LaPlatte River streamflows are at 7Q10 drought rates.”

I expect that having the Vermont facility storage and handling area covered, and employing Best Management Practices (BMPs) should reduce the level of chloride runoff from what was observed in the Virginia study. Based on the information provided in the VHB chloride loading analysis and SWPPP, and the analysis’ expected chloride concentrations in runoff and receiving waters (LaPlatte River), I expect that the operation is not likely to impact stonecats or the three state-endangered mussels (pink heelsplitter, pocketbook, fragile papershell) in the river. This is dependent, however, on concentrations staying within or below the anticipated levels noted above. With limited sensitivity or toxicity information available, however, it should be noted that stonecat, pink heelsplitter, pocketbook, and fragile papershell could be more sensitive to chloride than the chronic and acute concentration criteria allowed by the Vermont Water Quality Standards.

Given the unknown level of salt that may be exposed to runoff, BMPs and their implementation and chloride monitoring of effluent and receiving waters will be necessary to ensure that chloride concentrations stay within or below those provided in the chloride loading analysis. Although chloride monitoring is mentioned in “7.5 Supplemental Monitoring” in the SWPPP, I haven’t seen details of this monitoring program. Post-construction water quality monitoring is also mentioned in the Conclusion of the chloride loading analysis report.

To determine whether stonecat could be exposed to potential concentrations of chloride or other pollutants originating from the salt storage/loading facility, it is still necessary for the applicant to conduct a survey for this species in the lower LaPlatte River.

Mark Ferguson
Natural Heritage Zoologist
Vermont Department of Fish & Wildlife
802-279-3422
New email address: mark.ferguson@vermont.gov

From: Burke, Kevin
Sent: Thursday, September 01, 2016 8:11 AM
To: Ferguson, Mark <Mark.Ferguson@vermont.gov>
Cc: Carr, Helen <Helen.Carr@vermont.gov>
Subject: FW: VTR Shelburne Transload

Hi Mark,

See the attached revision to chloride loading analysis.

Thanks,

Kevin



Kevin Burke, *Environmental Analyst*
Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522
802-490-6168 / kevin.burke@vermont.gov
www.watershedmanagement.vermont.gov



VERMONT

Agency of Natural Resources

1 National Life Dr., Davis 2, Montpelier, VT 05620-3901 • 802-828-1294

Endangered & Threatened Species Takings Permit

Statutory Authority: 10 VSA § 5408

1. Permittee

Selden Houghton

Vermont Railway, Inc

One Railway Lane, Burlington, VT 05401

802-658-2550, shoughton@vrs.us.com, ethan@biodrawversity.com; rwilley@VHB.com

2. Permit Period

Effective Date: 9/13/2016

Expiration Date: 10/15/2016

Authorization #: ER-2016-28

Amendment # 0

3. Principal Officer: David Wulfson.

4. Subpermittee(s): Ethan Nedeau, Corbin Brody, Matthew Smith of Biodrawversity LLC; VHB staff biologists supervised by the Permittee or named subpermittees.

5. Authorized Species: Stonecat (*Noturus flavus*).

6. Authorized Activity: A pre-construction survey to determine stonecat presence and distribution near the proposed Shelburne Transload Facility in Shelburne.

7. Location of Authorized Activity: Shelburne, VT.

8. Findings

- A. The Permittee applied for an Endangered and Threatened Species Takings Permit under 10 V.S.A. § 5408 to authorize scientific research.
- B. Said research has been determined to be non-de minimis in nature and will have the following benefits: improved knowledge of the distribution of the species listed in section 5.
- C. The Permittee has retained the services of Ethan Nedeau and the staff of Biodrawversity, LLC to conduct the proposed survey.
- D. The Vermont Agency of Natural Resources has reviewed Mr. Nedeau's qualifications and has determined that he is qualified to conduct the survey.
- E. The Endangered Species Committee has reviewed the application. The committee supports the effort to improve the knowledge of stonecat distribution and its recommendations for permit conditions have been incorporated in this permit.

9. Statutory Determination

- A. 10 V.S.A. § 5408(a) provides: "[A]fter obtaining the advice of the Endangered Species Committee, the Secretary may permit, under such terms and conditions as the Secretary may prescribe by rule any act otherwise prohibited by this chapter if done for any of the following purposes: scientific purposes; to enhance the propagation or survival of a species; economic hardship; zoological exhibition, educational purposes; or special purposes consistent with the purposes of the federal Endangered Species Act."
- B. The Permittee requests an Endangered & Threatened Species Takings Permit for Scientific purposes.
- C. The state of Vermont recognizes the value which plants, fish and wildlife in their natural environment have for public enjoyment, ecological balance, and scientific study. See 1981, No. 188 (Adj. Sess.), § 1(a).
- D. The state of Vermont recognizes the need for protection and preservation of these plants, fish and wildlife in their natural environment. *Id.*
- E. The General Assembly of Vermont intends that the species of wildlife and wild plants normally occurring within this state which may be found to be threatened or endangered within the state should be accorded protection as necessary to maintain and enhance their numbers. *Id.* at § 1(b).
- F. The General Assembly of Vermont intends that the state should assist in the protection of species of wildlife and wild plants which are determined to be threatened or endangered elsewhere pursuant to the federal Endangered Species Act. *Id.*
- G. Pursuant to 10 V.S.A. § 5408(a), the ANR Secretary hereby determines, based upon the findings detailed above and after receiving advice from the Endangered Species Committee, that the proposed activity is consistent the purposes of the 10 V.S.A. ch. 123. An Endangered and Threatened Species Takings Permit is

authorized, as conditioned below.

10. General Conditions & Authorizations

- A. This permit is issued in accordance with 10 V.S.A. ch. 123. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.
- B. This permit is expressly conditioned upon compliance with all applicable federal and state laws, regulations and permits.
- C. This permit does not confer upon the Permittee the authority to conduct research without the acquiring necessary landowner permission including, but not limited to, state lands.
- D. By acceptance of this permit, the Permittee and its heirs, successors and assigns agree to provide the Agency of Natural Resources with unrestricted access, at reasonable times to the animal or plant specimens and/or animal or plant parts collected and possessed under this permit, collection and monitoring records, and access to the premises as necessary to ensure compliance with this permit.
- E. The Agency maintains continuing jurisdiction over this activity, and may, at any time, order the Permittee to undertake remedial measures if necessary to ensure the protection and conservation of listed species.
- F. This permit is not valid for endangered and threatened species that are not listed in section 5.
- G. The permit is valid for use by the named Permittee and subpermittees(s) only and may be revoked by the Secretary at any time for cause, or violations of any terms or conditions of this permit or state law.
- H. The Permittee and subpermittee(s) shall carry copies of this permit whenever performing authorized activities and shall make the permit available upon request.
- I. Pursuant 10 V.S.A. § 5410, the locations of listed species shall be kept confidential and the sharing of such information is a violation of this permit and the law.

11. Specific Conditions & Authorizations

Standard Requirements

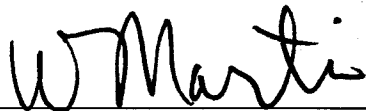
- A. **Qualified personnel:** A qualified and experienced biologist shall conduct all surveys. The VANR reserves the right to reject surveys that are not conducted by qualified individuals.
- B. **Consultation:** The Permittee shall consult with the VFWD Stonecat Specialist throughout the project as needed, on protocols, survey conditions and requirements.
- C. **The survey area** shall include the full extent of the area identified as the "Proposed Stonecat Survey" included with the permit application titled "Proposed Stonecat Survey Map."
- D. **Collection:** The Permittee is authorized to capture stonecat in the survey area for research purposes. Capture is authorized using fyke nets and minnow traps and other tools with the approval of the VFWD Stonecat Specialist. Traps and nets shall be set each evening and checked every morning.
- E. **Collection effort:** A minimum of four nights of collection using two fyke nets and 10 minnow traps or equivalent (e.g., eight nights with one fyke net and five minnow traps) shall be performed as part of the survey. The VFWD Stonecat Specialist may reduce the total number of net and trap nights based on early trap night results.
- F. **Species Handling:**
 - i. **Stonecat** shall be measured, photographed, enumerated and capture location recorded and released at the capture location as soon as possible.
 - ii. **Non-target Rare, Threatened and Endangered species** shall be identified to species (or the lowest taxonomic level possible), photographed, enumerated, capture location recorded and released as soon as possible at the capture location.
 - iii. **All Other Non-Target species** shall be released immediately at the site of capture.
- G. Dead or moribund individuals of stonecat, and other endangered and threatened species, shall be frozen or preserved in alcohol, labeled by the Permittee and retained until such time that the permitting authority directs their final disposition.

- H. Prior to and immediately after aquatic-based sampling Permittee must ensure that all equipment is thoroughly cleaned, disinfected, and dried per VFWD standard protocols.

12. Reporting Requirements

- A. Any mortality/morbidity related to the activities authorized under this permit that was/were not specifically requested, anticipated and/or authorized shall be reported in writing to VFWD Permits Specialist within 72 hours of each occurrence. Reports shall include the preserved specimens and a plan for reducing the likelihood of future occurrences.
- B. A report, due by January 30, 2017 shall be submitted to the Permit Specialist (electronic format preferred). At a minimum, the report shall summarize project activities and species handled, tagged or with transmitters installed, any mortality/morbidity, animal status, other species encounters, tags/transmitters removed, species' behavior, dates of all activities, location of activities (description and coordinates) and locations of important sites for management and conservation.
- C. The Permittee shall accommodate requests by VANR staff for additional information from collection activities (e.g., copies of original field sheets, computerized data in usable format). Reports of results of any subsequent analyses and copies of subsequent publications resulting from the collections made under this permit shall be forwarded to the VFWD Permits Specialist within 30-days.

Issued by:



Deb Markowitz, Secretary
Agency of Natural Resources

Date:

9/13/16

Right to Appeal to Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. # 802-828-1660).



October 11, 2016

Via Electronic Copy Only

Ref: 57762.00

Mr. Jon Kart
Vermont Fish and Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620

Ms. Helen Carr
Vermont Department of Environmental Conservation
Watershed Management Division
Main Building - 2nd Floor
1 National Life Drive
Montpelier, VT 05620

Re: Vermont Railway, Inc.
Shelburne Transload Facility
Endangered & Threatened Species Taking Permit ER-2016-28
Report Submittal / Stonecat Survey in the LaPlatte River

Dear Jon and Helen:

On behalf of Vermont Railway, Inc. ("VTR"), and as required by Condition 12(B) of Endangered & Threatened Species Taking Permit ER-2016-28 ("Permit") dated September 13, 2016, VHB is submitting a copy of the report *Stonecat (Noturus flavus) Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)*, prepared by Biodrawversity LLC and dated October 2016. The survey work included in the report was performed by and under the direction of Ethan Nedeau of Biodrawversity, as a subconsultant to VHB, pursuant to and in accordance with the terms and conditions of the Permit.

This report is also intended to supplement and validate the information previously provided to the Vermont Department of Environmental Conservation in Appendix H of the Stormwater Pollution Prevention Plan ("SWPPP") prepared in accordance with the requirements for coverage under the Multi-Sector General Permit for the Shelburne Transload Facility (NOI #7514-9003). A copy of this report will be included in the SWPPP binder to be maintained at the facility.

Mr. Jon Kart / Ms. Helen Carr
Ref: 57762.00
Page 2 of 2
October 11, 2016



Thank you, and do not hesitate to contact me if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Robert Wildey".

Robert Wildey
Water Resources Consultant

RAW/jkw

cc: Selden Houghton, VTR (electronic copy only)
David Wulfson, VTR (electronic copy only)
Ethan Nedeau, Biodrawversity (electronic copy only)

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REPORT

Stonecat (*Noturus flavus*) Survey in the LaPlatte River for the Shelburne Transload Facility (Shelburne, Vermont)

prepared for

VHB, Inc.

40 IDX Drive

Building 100, Suite 200

South Burlington, VT 05403-7771

prepared by



Biodrawiversity LLC

206 Pratt Corner Road

Leverett, MA 01054

October 2016



LaPlatte River, just upstream from the proposed stormwater discharge of the Shelburne Transload Facility (Shelburne, Vermont).

INTRODUCTION

Biodrawversity LLC conducted a Stonecat (*Noturus flavus*) survey in the LaPlatte River in Shelburne, Vermont. The survey was conducted as part of the review and permitting for a proposed salt storage facility in nearby uplands and its stormwater discharge to the river. Vermont Railway, Inc. applied for, and received, an *Endangered and Threatened Species Taking Permit* from Vermont Fish and Wildlife. Ethan Nedeau of Biodrawversity LLC was the lead biologist named as sub-permittee. The primary objectives of the proposed study were:

- Determine if Stonecat occur in the area of the LaPlatte River along the parcel that is being developed for the Shelburne Transload Facility, especially near the stormwater discharge.
- Collect information on relative abundance and habitat quality/availability of Stonecat.

The LaPlatte River is one of two rivers in Vermont where Stonecat are known to occur. The species prefers stony riffle-run habitats, which are prevalent in the middle and upper reaches of the LaPlatte River. The low-gradient, lowermost reach of the LaPlatte

River downstream from Route 7 in Shelburne, where this survey was focused, is not considered suitable Stonecat habitat. Stonecat in the LaPlatte River tend to be quite small (3-8 inches), and can be distinguished from similar species (Brown Bullhead and Yellow Bullhead) by their low and keel-like adipose fin whose posterior end is attached to the body and the caudal fin (Langdon *et al.* 2006).

STUDY AREA AND METHODS

Study Area: Eight sites were surveyed; these spanned a distance of approximately 2,000 meters of the river from 80 meters upstream from Route 7 to 180 meters downstream from the proposed stormwater discharge (Figure 1). Areas of the LaPlatte River farther downstream to Lake Champlain were assessed, but not sampled, due to a combination of poor habitat, deep water, and limitations of the sampling gear. The entire reach from Route 7 to Lake Champlain is a very low-gradient, meandering reach at lake level, and has extensive riparian wetlands that flood or dry with lake level fluctuations.

Biologists conducted the survey on eight consecutive nights from September 15 to September



Figure 1. Fish survey sites in the LaPlatte River upstream and downstream from the proposed stormwater discharge of the Shelburne Transload Facility (Shelburne, Vermont).

23, 2016 (Table 1). Weather was generally sunny and unseasonably warm on most days, and river levels were near historic lows for the month of September. The lake level at the USGS Gage in Burlington (USGS 04294500) was approximately 93.9-94.0 ft during the survey period.

Methods: One site was surveyed each night. At each site, one fyke net was placed parallel to the current at a depth of 0.5-1.0 meters. The fyke net had a 3x4' frame size and 0.25" mesh size; it was ordered from Christiansen Nets (see photos in this report). It was installed in the evening, around 5:00-6:00, and biologists returned in the morning (8:00-9:00) to check



Survey method photos: fyke net (top and bottom left), minnow trap (middle right), and Vermont DEC fish expert Rich Langdon assisting with species identification.

contents. In addition to the fyke net, five baited minnow traps were deployed at each site, usually near the shoreline or instream cover such as beds of vegetation, large woody debris, or other cover. In the morning, fish were identified, counted, photographed (in some cases), and then released. Amphibians and reptiles were also counted and released.

Rich Langdon of the Vermont Department of Environmental Conservation came out on two occasions to oversee the trapping and assist with species identification. He also brought a seine net during the second visit, and three biologists worked together on seine netting near Site 4.

RESULTS

Species Found: Stonecat were not detected during the survey. A total of 23 fish species were collected (Tables 2, 3), along with two reptiles, some tadpoles (not

Table 1. Sampling dates and habitat at each of the survey sites. See Figure 1 for locations.

Site	Dates (2016)	Fyke Net Depth	Substrate	Flow Velocity
1	9/21-22	26"	Silt/gravel	<0.05 m/s
2	9/22-23	26"	Silt/mud	<0.05 m/s
3	9/20-21	18"	Silt/sand/gravel	<0.05 m/s
4	9/15-16	32"	Silt/mud/clay	<0.05 m/s
5	9/16-17	34"	Silt/clay/gravel	<0.05 m/s
6	9/17-18	36"	Silt/sand/gravel	<0.05 m/s
7	9/18-19	36"	Silt/mud/detritus	<0.05 m/s
8	9/19-20	31"	Clay/silt	<0.05 m/s

counted or identified), and numerous crayfish. A total of 637 fish were captured using the fyke net (Table 2); numerically dominant species included Pumpkinseed (42.5%), Rock Bass (20.9%), and Bluegill (14.0%). Only

Table 2. Species counts in the fyke net at each of the survey sites.

Species	Latin Name	Survey Site								Total
		1	2	3	4	5	6	7	8	
Brown Bullhead	<i>Ameiurus nebulosus</i>	1	2	0	2	0	2	1	1	9
Yellow Bullhead	<i>Ameiurus natalis</i>	1	1	0	0	0	0	1	0	3
Pumpkinseed	<i>Lepomis gibbosus</i>	35	15	29	55	33	43	45	16	271
Black Crappie	<i>Pomoxis nigromaculatus</i>	0	0	0	0	1	0	0	0	1
Bluegill	<i>Lepomis macrochirus</i>	13	23	1	0	1	3	11	37	89
Rock Bass	<i>Ambloplites rupestris</i>	29	27	1	36	12	14	14	0	133
Largemouth Bass	<i>Micropterus salmoides</i>	2	0	0	0	0	0	0	0	2
Smallmouth Bass	<i>Micropterus dolomieu</i>	2	0	0	0	0	0	0	0	2
Yellow Perch	<i>Perca flavescens</i>	2	2	0	4	2	4	2	1	17
White Perch	<i>Morone americana</i>	10	7	0	0	0	4	0	0	21
Northern Pike	<i>Esox lucius</i>	1	0	0	1	0	0	0	0	2
Mudminnow	<i>Umbra limi</i>	0	0	0	2*	0	0	0	0	2*
Brook Silverside	<i>Labidesthes sicculus</i>	0	0	0	6*	0	0	0	0	6*
Common Shiner	<i>Luxilus cornutus</i>	0	0	0	1	0	0	0	0	1
Bluntnose Minnow	<i>Pimephales notatus</i>	0	0	3	0	2	1	0	2	8
Golden Shiner	<i>Notemigonus crysoleucas</i>	0	9	0	0	0	1	1	0	11
Spotfin Shiner	<i>Cyprinella spiloptera</i>	0	0	0	0	0	3	0	1	4
Rosyface Shiner	<i>Notropis rubellus</i>	0	0	1	0	0	0	0	0	1
Eastern Silvery Minnow	<i>Hybognathus regius</i>	0	0	0	0	1	0	0	0	1
Tench	<i>Tinca tinca</i>	5	2	0	0	0	0	0	1	8
Carp	<i>Cyprinus carpio</i>	0	0	1	0	0	0	0	0	1
White Sucker	<i>Catostomus commersonii</i>	3	7	0	0	2	1	2	0	15
American Eel	<i>Anguilla rostrata</i>	2	0	0	0	0	0	0	0	2
Painted Turtle	<i>Chrysemys picta</i>	2	6	0	0	0	7	12	0	27
Snapping Turtle	<i>Chelydra serpentina</i>	0	0	0	0	0	0	1	0	1
Crayfish	Unidentified	0	1	1	0	2	2	1	0	7
Total		108	102	37	99	56	85	91	59	637

*Caught in a seine net at Site 4 only; added to this table to complete the species list for the study.

61 fish were caught in the minnow traps, mostly Pumpkinseed (88.5%) (Table 3). Two species—Central Mudminnow and Brook Silverside—were caught only in the seine net.

DISCUSSION

Stonecat were not detected during the survey, nor was their preferred habitat observed anywhere in the LaPlatte River from Site 1 downstream to Lake Champlain. No other state-listed fish species were documented during the survey. Overall, the fish species that were found are characteristic of small to medium-sized, low-gradient, warmwater tributaries in the floodplain of Lake Champlain.

Table 3. Species counts in the minnow traps (composite of five traps per site) at each of the survey sites. Common names listed in Table 2.

Site	<i>L. gibbosus</i>	<i>A. rupestris</i>	<i>M. salmoides</i>	<i>P. flavescens</i>	Total
1	4	1	0	0	5
2	0	0	0	0	0
3	2	0	0	0	2
4	5	0	1	0	6
5	11	0	0	0	11
6	12	2	0	1	15
7	10	0	0	0	10
8	10	1	0	1	12
Total	54	4	1	2	61



Some of the diversity caught in the fyke net: Pumpkinseed Sunfish and Rock Bass (top left), White Sucker (top right), Snapping Turtle (bottom left), and American Eel (bottom right).



Some of the diversity caught in the LaPlatte River: Tench (top), Central Mudminnow (middle left), White Perch (middle right), Golden Shiner (bottom left), and Yellow Bullhead (bottom right).



October 31, 2016

Via Electronic Copy Only

Ref: 57762.00

Mr. Kevin Burke
Vermont Department of Environmental Conservation
Watershed Management Division
Main Building - 2nd Floor
1 National Life Drive
Montpelier, VT 05620

Ms. Helen Carr
Vermont Department of Environmental Conservation
Watershed Management Division
Main Building - 2nd Floor
1 National Life Drive
Montpelier, VT 05620

Re: Vermont Railway, Inc.
Shelburne Transload Facility
Evaluation of Chloride Water Quality Criteria for the LaPlatte River

Dear Kevin and Helen:

On behalf of Vermont Railway, Inc. ("VTR"), VHB is submitting a copy of the report *An Evaluation of Chloride Water Quality Criteria for the LaPlatte River*, prepared by Philip C. Downey, Ph.D. of Aquatec Biological Sciences, Inc. and dated October 26, 2016.

As summarized in the report, Dr. Downey concludes that the acute and chronic chloride criteria of the Vermont Water Quality Standards are sufficiently protective of listed threatened and endangered species present or potentially present in the LaPlatte River, such that no adverse impacts to these species would occur as a result of the operation of the Project in accordance with the Stormwater Pollution Prevention Plan prepared by VHB.

Mr. Kevin Burke / Ms. Helen Carr
Ref: 57762.00
Page 2 of 2
October 31, 2016



Thank you, and do not hesitate to contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey A. Nelson".

Jeffrey A. Nelson, CPESC, CPSWQ
Director, Energy & Environmental Services

JAN/jkw

Enclosure

cc: Selden Houghton, VTR
David Wulfson, VTR
Jon Kart, FWD
Mark Ferguson, FWD

AQUATEC BIOLOGICAL SCIENCES, INC.

An Evaluation of Chloride Water Quality Criteria

for the LaPlatte River

October 26, 2016

Submitted By:

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1.0 OVERVIEW AND OBJECTIVE

The State of Vermont has established chloride (Cl^-) criteria for the overall protection of aquatic species in Vermont waters. The threshold values listed in the Vermont Water Quality Standards (VWQS) are 230mg/L Cl^- under chronic conditions (four-day average, no more than once every 3 years) or the 860mg/L Cl^- under acute conditions (one-hour average, not more than once every 3 years).

Currently, there is a proposal for the development of a facility which may provide runoff containing concentrations of sodium chloride (NaCl) into the LaPlatte River. There are three mussels and one fish state-listed endangered species inhabiting the LaPlatte River. The three species of unionid (family *Unionidae*) mussels, the pocketbook mussel (*Lampsilis ovata*), fragile papershell (*Leptodea fragilis*), and the pink heelsplitter (*Potamilus alatus*) have documented in the LaPlatte River (Biodrawiversity LLC 2016a). Although the listed fish species, the stonecat (*Noturus flavus*), has been reported from the LaPlatte River, a field survey conducted in September found no stonecat or suitable habitat adjacent to or downstream from the site (Biodrawiversity LLC, 2016b).

An evaluation of the VWQS chloride criteria and their adequacy for the protection of the LaPlatte River organisms based on site-specific conditions was conducted. This study was undertaken to evaluate whether Vermont's chloride criteria provide reasonable in-stream protection of these listed species and the overall LaPlatte River aquatic community.

2.0 LAPLATTE RIVER CHLORIDE CRITERIA ASSESSMENT APPROACH

The most straightforward approach for establishing appropriate criteria would be to have published data on chloride toxicity for the four listed species. However, a review of the published literature has not found any direct toxicity studies and/or data on chloride toxicity for these listed species.

An alternate approach was employed and used surrogate species data from the same genus to determine reasonable LaPlatte River chloride criteria. To evaluate reasonable chloride criteria, four factors were examined:

- 1) appropriateness of the surrogate species based on phylogenetic similarities and chloride sensitivity;
- 2) to examine seasonality of the mussel life history and relative sensitivity of these life history stages;
- 3) to examine water quality parameters that alter chloride toxicity to aquatic species;
- 4) to compare and contrast published studies used to establish chloride criteria in other states and Canada.

2.1 Species Sensitivity

The four listed species consist of three mussels and one fish species. Since chloride criteria established for the more sensitive species is the most protective, the remaining

(less sensitive) species should also be protected. One study (CCME 2011) examined 31 aquatic species and developed a continuous curve of species chloride sensitivities. Invertebrates, particularly mussels, were among the most sensitive species to chloride while fish displayed a more moderate or low chloride sensitivity. Other studies have also reported similar trends with invertebrates typically more sensitive than vertebrates to chloride (see Table 5 in CCME 2011). Even taking the variability among species into account, mussel glochidia were the more sensitive species to chloride than most previously tested aquatic organisms (Gillis 2011). The conclusion of this study was that chloride criteria based upon the more sensitive mussels, other species (such as *Elliptio complanata* mussels; see **Table 1**, particularly fish species, with higher chloride tolerances would also have adequate protection afforded.

Many of the published mussel chloride toxicity studies were conducted on two mussel species: the wavy-rayed lampmussel (*Lampsilis fasciola*) (Canadian special concern) and the freshwater mussel (*Lampsilis siliquoidea*), which are in the same genus as one of the Vermont listed species, the pocketbook (*Lampsilis ovata*). Since mussels are typically the more chloride sensitive species and the two most studied mussels are related to the pocketbook mussel, other criteria which directly and/or indirectly included chloride tolerances of these two species (genus *Lampsilis*) would be applicable for evaluating LaPlatte River chloride criteria.

2.2 Mussel Life History

The unionid mussels have a complex life cycle. Adult spawning occurs in the summer producing under-developed glochidia (offspring). The glochidia, a fish parasitic stage of mussels, develops during the fall/winter in the marsupium of the adult female. Once the glochidia mature (and with appropriate temperature cues) in the following spring-early summer, glochidia are released from the marsupium to infect the fish host. The glochidia develop in fish for several months in the summer and at the end of the summer drop off from the fish to the sediments. These juveniles develop over several years into spawning adults and repeat the process.

This complex life cycle is applicable to the three listed mussel species. The pocketbook (*L. ovata*) is a long-term breeder with full maturation of the glochidia attained in late-July – early-August and released by early-July of the following year (Fichtel and Smith 1995). The fragile papershell (*Leptodea fragilis*) spawns in late summer and glochidia released in June or July of the following year. The pink heelsplitter (*Potamilus alatus*) also spawns in late summer with release of glochidia in late May-early July of the following year.

Mussel chloride sensitivity differs during the mussel development. Many of the published studies focused on the glochidia stage of the mussels and the 50% chloride Effective Concentration (EC₅₀; defined as the chloride concentration that results in death and/or abnormal development of 50% of the tested population) (**Table 1**). As noted in the life history description, the parasitic glochidia stage is present for only several months of the summer each year. The release of runoff high ladened chloride (salts) due to the

seasonal influx of chloride associated with snowmelt runoff does not typically occur during the glochidia stages of the mussels (CCME 2011).

Juvenile mussels were 2-8 times less sensitive to chloride toxicity than glochidia (Bringinghoff et al., 2007; see also **Table 1**). The relatively higher tolerance of juveniles and adults are likely the result of several factors. For example, the juvenile *Epioblasma torulosa rangiana* mussel (an endangered species) may be able to avoid exposure to contaminants (chloride) by limiting feeding and respiration. This behavioral adaptation has ramifications for both acute and chronic pollutant criteria determination for juvenile unionid mussels which would not be observed in glochidia or newly transformed unionid mussels that are unable to close their valves (IDNR2009). Adult mussels may limit short term chloride exposure by closing their valves.

The fate of brooding glochidia in the marsupium has not been widely reported in the literature. However, Jacobson et al., 1997 (as cited by Gillis 2011) found that brooding glochidia are less sensitive to waterborne copper than those released to the water column. Some mussel species can respond to certain stressors, such as toxic metals by closing their shell (Blakeslee et al., 2013). It would be expected that some of the same mechanisms (reduced metabolism, closing valves by brooding adults) would afford the brooding glochidia some increased protection from water-borne chloride concentrations.

Based on this life history analysis, the parasitic glochidia stage, which typically occurs in the spring-summer for the three listed mussel species, represents the most sensitive stage to chloride. Many of the published chloride criteria relied heavily upon glochidia toxicity studies. Considering both seasonality of the glochidia stage and the higher chloride juvenile and adult mussel relative chloride sensitivities, published chloride criteria incorporating glochidia toxicity data may be even more conservative (protective) during most of the year when glochidia are not present.

2.3 Factors Affecting the Toxicity of Chloride

The salts providing the chloride ion to the water column, instream water hardness, sulfate and other water quality parameters have been shown to affect mussel chloride sensitivity. In a study on the various salts used for dosing the laboratory tests, one study (Mount et al. 1997 cited by Gillis 2011) found that potassium chloride (KCl) was significantly more toxic to freshwater organisms than sodium chloride at similar chloride levels. This led to the conclusion that potassium may provide the overriding toxicity component in potassium chloride solutions while the chloride ion was the more toxic component in sodium chloride solutions. The sodium chloride (NaCl) salt (of four salts tested) was reported as the least toxic source of chloride in this study. The proposed facility plans to use a salt compound which is 95.8 – 99.9% sodium chloride (Cargill SMS).

Water hardness has also been demonstrated to affect the toxicity of chloride. Gillis (2011) exposed glochidia of the freshwater mussel *L. siliquoidea* to 0 – 10,000mg/L NaCl and with varying hardness (47, 99, 172, 322mg/L as CaCO₃). The exposures resulted in a linear (r^2 of 0.97) decrease in toxicity (measured by the 24h chloride EC₅₀'s) as water

hardness was increased from 47 and 172mg/L CaCO₃. Higher water hardness ultimately decreased chloride toxicity by approximately 2½ fold.

Other studies have shown that the different types of water used in laboratory toxicity tests can affect mussel chloride toxicity. Typically, many published studies have used reconstituted waters (laboratory prepared water) in the toxicity testing. Reconstituted water used in the laboratory provide consistency and permits comparison among studies and species. However, the disadvantage is that EC₅₀'s produced using reconstituted water may not necessarily predict how an organism will respond to that contaminant in its natural environment. Gillis (2011) using both reconstituted waters and four natural waters found that *L. fasciola* glochidia were significantly less sensitive (higher tolerance) to salt (chloride) in natural water than in reconstituted water. These studies indicate that laboratory toxicity tests conducted with lower hardness and reconstituted could result in a more conservative (protective) of instream mussels/fauna.

2.4 Published Chloride Criteria

Various states, the federal government (USEPA) and the Canadian government have established chloride water quality criteria using several different methodologies. The most recent comprehensive approach (and often cited) for establishing chloride criteria was conducted by the Canadian Council of Ministers of the Environment (CCME 2011). The CCME developed criteria based on Species Sensitivity Determination (SSD) utilizing 31 aquatic species chloride sensitivities for inclusion in the establishment of Canadian water quality goals (CCME 2011). Intra-species variability was accounted for by taking the geometric mean of the toxicity studies of the 31 species, and chloride criteria considered to protect 95% of the species (5%SSD) established. The substantial difference of this Canadian endeavor from the USEPA approach (EPA 1988) was the inclusion of toxicity data for larval mussels (glochidia) which are obligate parasites on fish for several weeks before transforming free-living mussels (Patnode et al. 2013).

The resulting non-hardness adjusted acute and chronic criteria proposed was 640mg/L and 120mg/L, respectively. However, the CCME (2011) cited one study (Bringinghoff et al., 2010) that reported a *L. fascoila* glochidia 24h Cl⁻ EC₁₀ (presumably a no-effect level) of 24mg/L Cl⁻ (95% confidence interval of -79 – 127mg/L) and suggested that their guidelines may not be as protective for *L. fascoila* (glochidia). As noted by the CCME authors, the negative lower fiducial limit (of -79mg/L) of the calculated 24h Cl⁻ EC₁₀ (not hardness adjusted) was an artifact of the statistical calculations. The footnote in the CCME report noted that the effect is not significantly different from the control (no added chloride) and could be due to natural variability (CCME 2011) and/or laboratory test variability. Statistically, the upper confidence EC₁₀ of 127mg/L is also a realistic estimate, of the *L. fascoila* 24h Cl⁻ EC₁₀. This numerically higher EC₁₀ (but not statistically higher value of 127mg/L Cl⁻) would place *L. fascoila* within the protective range defined by the Canadian SSD chloride criteria.

The CCME guidance did not incorporate hardness in their chloride criteria due to insufficient data on hardness and chloride toxicity. However, the guidance specifically allowed for jurisdictions to choose to derive site-specific hardness adjusted water quality criteria (CCME 2011). As stated by this document, short-term benchmark concentrations (as well as long-term water quality guidelines) relied heavily on laboratory-based studies conducted with reconstituted water. By design, water quality guidelines are likely to be conservative (more protective) (CCME 2011). As these chloride criteria were based on multiple species of unionid mussels, they may be more relevant to waters supporting an endangered unionid mussels such as the Allegheny River (Patnode et al. 2013).

Several US states have developed water quality criteria using the review of 'safe toxicity values' and adjusting for hardness and in many cases sulfate. The State of Iowa (IDNR 2009) examined four calculated acute criteria and twelve chronic criteria alternatives using combinations of hardness and sulfate concentrations. The option C chloride criteria was selected and is normalized for hardness and sulfate by:

$$\text{IA Acute criterion} = 161.5 [(\text{hardness})^{(0.20597)} * \text{sulfate}^{(-0.07452)}] \quad (\text{equation 1})$$

$$\text{IA Chronic criterion} = 254.3 [(\text{hardness})^{(0.20597)} * \text{sulfate}^{(-0.07452)}] \quad (\text{equation 2})$$

Missouri (Whipps ND) has drafted similar chloride criteria as:

$$\text{MO Acute criterion} = 177.8 [(\text{hardness})^{(0.20597)} * \text{sulfate}^{(-0.07452)}] \quad (\text{equation 3})$$

$$\text{MO Chronic criterion} = 287.8 [(\text{hardness})^{(0.20597)} * \text{sulfate}^{(-0.07452)}] \quad (\text{equation 4})$$

A recent study of the Allegheny River federally endangered mussel examined the distribution of mussels in the river relative to a source of chloride (salts) (Patnode et al. 2013). Conductivity measures (converted to chloride concentrations) were taken in conjunction with the mussel river distribution and caged mussel studies to determine the no effect level. Based on values at the reference site and previously published hardness values for the Allegheny River, chloride levels (converted from conductivity measures) were then converted to instream measures (of protection for target mussels) of 541mg/L and 316mg/L chloride for the protection of target mussel species.

3.0 LAPLATTE RIVER CHLORIDE CRITERIA EVALUATION

As discussed above, species-specific chloride toxicity data were not available for the four LaPlatte River listed species to provide species-specific criteria. The LaPlatte River chloride criteria in this assessment was based on several toxicity studies (largely using mussels) and published chloride criteria approaches. Two related mussels (*Lampsilis spp.*) were used in many of the chloride toxicity studies and have been shown to be among the most chloride sensitive species in aquatic ecosystems.

The results of recent literature, cited above, indicate that hardness (and possibly other naturally occurring site-specific factors) should be used to establish water quality criteria for aquatic organisms. The LaPlatte River has a relatively high hardness (measured as 240mg/L; personal observation). To assess the applicability of Vermont chloride criteria, the LaPlatte River hardness was used to calculate adjusted acute and chronic chloride

criteria (Table 2). The hardness-adjusted acute chloride criteria of other state and federal agencies ranged from 541.9 – 1976mg/L. While the one value listed for a species based on site-specific Allegheny River data was below the Vermont criterion, the remaining four calculated guidelines were comparable to the Vermont chloride criteria.

Chronic chloride criteria as included in the VWQS were lower (more protective) than all other calculated criteria by approximately 50 – 250% (Table 2). These comparisons indicate that the current Vermont chloride criteria are more conservative than calculated chloride criteria using other state guidelines and adjusted for the LaPlatte River hardness.

As previously noted, many of the published chloride criteria are likely very conservative (overprotective) due to a number of factors, namely: source of chloride (NaCl being the least toxic of four examined); reported guidelines based on laboratory studies (reconstituted waters typically overestimates chloride toxicity in natural waters); juveniles and adult mussels are typically more tolerant of chloride; and free swimming glochidia are only present during the spring-summer months (when snowmelt run-off is typically low).

Based on this analysis and these additional conservative factors inherent in the development of water quality criteria, the current VWQS acute and chronic criteria should be protective of the four listed species and other fauna in the LaPlatte River.

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Table 1. Published Effective Concentration (EC) values for several mussel species.

<i>Lampsilis siliquoidea glochidia</i>			
24hEC ₅₀	168-1430mg/L	Gillis 2011	Inter Annual Variability Observed Reconstituted water
24hEC ₅₀	1212-1638mg/L	Gillis 2011	Citing Cope 2008
48hEC ₅₀	560mg/L	Bringhoff 2007	
<i>Lampsilis siliquoidea juveniles</i>			
96hEC ₅₀	4560mg/L	Bringhoff et al. 2007	
<i>Lampsilis fascoila glochidia</i>			
24hEC ₅₀	1265-1559mg/L	Gillis 2011	Natural waters (4 rivers)
24hEC ₂₀	153-432mg/L	Gillis 2011	Same as previous study Natural waters
24hEC ₅₀	113-285mg/L	Gillis 2011	Two years' variability reconstituted water
24hEC ₅₀	1840mg/L	Bringhoff et al. 2007	
24hEC ₅₀	746mg/L	CCME (2011)	Citing Valenti 2008
48hEC ₅₀	1740mg/L	Bringhoff et al. 2007	
<i>Lampsilis fasciola juveniles</i>			
96hEC ₅₀	3980mg/L	Bringhoff et al. 2007	
<i>Lampsilis cardium glochidia</i>			
24hEC ₅₀	817mg/L	Bringhoff et al. 2007	
<i>Elliptio complanata glochidia</i>			
24hEC ₅₀	2670mg/L		
48hEC ₅₀	2230mg/L		

Table 2. Published chloride criteria and hardness-adjusted criteria based on LaPlatte River hardness (See text for discussion of published literature).

<i>Agency/Source</i>	<i>Recommended Criterion Published</i>	<i>LaPlatte River Hardness- Adjusted Criterion</i>	<i>Comments</i>
Acute Chloride Criteria			
Vermont	860mg/L	860mg/L	
USEPA	860mg/L	860mg/L	
Iowa	254.3mg/L (base)	785.5mg/L	Base value adjusted by hardness
Missouri	287.8mg/L (base)	889.0mg/L	Base value adjusted by hardness
PA Allegheny River	541.86mg/L	541.86mg/L	Recommended included site-specific hardness
Canada (CCME)	640mg/L	1976mg/L	Base value adjusted by hardness
Chronic Chloride Criteria			
Vermont	230mg/L	230mg/L	
USEPA	230mg/L	230mg/L	
IADNR (2009)	161.5mg/L	498.9mg/L	Base value adjusted by hardness
Missouri	177.87mg/L	549.4mg/L	Base value adjusted by hardness
PA Allegheny River	316.71mg/L	316.71mg/L	Recommended included site-specific hardness
Canada (CCME)	120mg/L	370.7mg/L	Base value adjusted by hardness

Appendix I: **LaPlatte River Chloride**

Loading Analysis

This appendix contains the following information:

- Chloride Loading Analysis dated August 31, 2016 (VHB)



To: Vermont Railway, Inc.
Project File

Date: August 31, 2016

Memorandum

Project #: 57762.00

From: Robert Wildey, CPESC

Re: Shelburne Transload Facility
LaPlatte River Chloride Loading Analysis

INTRODUCTION

In support of the Vermont Railway, Inc. ("VTR", or "Applicant") proposal to develop the Shelburne Transload Facility ("Project" or "Facility"), located to the north of the Village of Shelburne and west of U.S. Route 7 and a VTR track and approximately 0.5 southeast from the mouth of the LaPlatte River, VHB has prepared the chloride loading analysis which is summarized in this memorandum. The memorandum outlines the data and assumptions used to evaluate whether chloride concentrations in the LaPlatte River are likely to exceed the Vermont Water Quality Standards for chloride under certain worst case conditions due to wash-off of residual material that may temporarily accumulate on paved surfaces during transfer activities at the Facility. Representatives of the Vermont Department of Environmental Conservation ("DEC") Stormwater Program were consulted during the development of the procedures and assumptions used in this analysis.

The proposed operations and facilities are designed to minimize any potential exposure of road salt to stormwater runoff as outlined in detail in the Stormwater Pollution Prevention Plan ("SWPPP") that was developed in support of the Facility's application for coverage under the Multi-Sector General Permit ("MSGP"). Various Best Management Practices ("BMPs") will be utilized at the site including covered storage of bulk salt and other potential stormwater contaminants, regular pavement sweeping and other material containment practices that are identified in the SWPPP. Post-construction water quality monitoring will also be conducted as described in the sampling plan memorandum included in Appendix F of the SWPPP.

In conducting this analysis, VHB reviewed existing chloride concentrations in the LaPlatte River and evaluated potential increases that could result from chloride wash-off following the construction of the Project.

The chloride loading analysis consisted of the following steps:

- Review and analyze historic streamflow and conductivity data from the United States Geological Survey ("USGS") LaPlatte River stream gage to determine the streamflow under a range of existing conditions, and the baseline chloride concentration found in the LaPlatte River. This gage is located near the Project site, approximately one mile upstream.
- Review historic chloride data from the DEC at water quality monitoring stations located near the Project site to evaluate the baseline chloride concentration that is found in the LaPlatte River during low flow periods.
- Evaluate the stormwater runoff that would be generated by the impervious areas of the Project to determine the peak flow rate during the 0.9-inch Water Quality Volume rainfall event.
- Conduct a literature review to identify the potential range of chloride concentrations that have been observed in runoff at other similar types of salt transfer/storage facilities. However, it was not possible to determine if

the facilities represented in the literature were subject to the requirements of the MSGP or the extent to which BMPs were implemented as part of their facility management.

- Conduct a sensitivity analysis to compare the resultant chloride concentration in the LaPlatte River with the Vermont Water Quality Standard ("VWQS") chronic concentration criterion (four day average concentration no greater than 230 mg/L once every 3 years) and the VWQS acute chloride concentration criterion (one hour average concentration no greater than 860 mg/L once every 3 years).

REVIEW OF EXISTING CHLORIDE CONCENTRATION DATA

To evaluate the existing chloride concentrations in the LaPlatte River, VHB reviewed water quality data from two DEC water quality monitoring stations located near the site (DEC Location ID 500789 and DEC 500785), along with streamflow data from the USGS stream gaging station located on the LaPlatte River upstream from the site at Shelburne Falls (USGS Gage 04272895). The location of this gaging station is shown on the Site Location Map, page 1 of the Attachment. A summary table of the median monthly flows reported by the gage is included on page 2 of the Attachment, along with the daily median flows during the months of July, August, September, October, and November.

The DEC reported total chloride in mg/L from a total of 50 samples that were collected between 2004 and 2007. These samples were collected between May and November of each year. The median concentration of all samples reported for these two stations was 46 mg/L. No samples exhibited concentrations above the VWQS chronic criterion of 230 mg/L. The sample with the maximum concentration of 117 mg/L was reported in November 2004. A summary table of the DEC chloride data and the corresponding flow data at the USGS stream gage for those sampling events is presented on page 3 of the Attachment.

Additional chloride background information is available from USGS conductivity measurements, which VHB converted to approximate chloride concentrations using the state-wide regression equation, which indicated an approximate background concentration of 50 mg/L.

Given the historic water quality and streamflow information available from these two sources, the background chloride concentration in the LaPlatte is relatively well-documented. The critical period when the highest chloride concentrations typically were measured is the late-summer and fall (September, October and November) when stream flows are at their lowest. Based on this information, the background chloride concentration in the River rarely has been measured above the chronic criterion and does not appear ever to have been measured in excess of the acute criterion. The two data sources are generally in agreement that the median chloride concentration is approximately 50 mg/L. This value was therefore selected for use as an estimate of the background concentration in the River for subsequent calculations that are presented in this analysis.

REVIEW OF EXISTING FLOW DATA

Existing flow data from the USGS stream gage at Shelburne Falls (Gage # 04282795) are available from 1991 to the present and were downloaded from the USGS website (http://waterdata.usgs.gov/nwis/uv?site_no=04282795). VHB computed flow statistics (low-flow recurrence intervals) based on this data, which comprised a period of record of 25 complete water years. VHB calculated the 7Q10 drought flow, representing a seven-day duration drought with a probability of occurring once every ten years (e.g., with a ten-year recurrence interval), to be used as the design streamflow for modeling in-stream chloride concentrations, in accordance with the VWQS.

Based on the 25 complete water years of USGS data, VHB determined a 7Q10 flow of 0.83 cubic feet per second ("cfs") at the USGS gage. Although the watershed at the Project site is approximately 2 square miles larger than at the USGS gage, VHB did not adjust the 7Q10 rate upwards to account for this additional drainage area. For the instream chloride analysis, VHB rounded the USGS gage site 7Q10 rate to 0.8 cfs for use in the chloride concentration analysis. Calculations of the 7Q10 flow rate are provided on pages 4 to 5 of the Attachment.

To be conservative, VHB modeled chloride concentrations in the LaPlatte River in a worst-case scenario in which streamflows are at 7Q10 drought flow conditions while at the same time a storm event is washing runoff from the Project site. This worst-case scenario envisions that the flows leaving the Project site as a result of stormwater runoff during the water quality volume design storm would enter the LaPlatte River before streamflow would increase as a result of the same storm event.

LITERATURE REVIEW OF CHLORIDE RUNOFF FROM SALT STORAGE AND HANDLING FACILITIES

The values reported in the literature for chloride concentrations in runoff associated with salt storage and handling facilities are widely variable and at times over several orders of magnitude, with values reported from 140 mg/L to 13,500 mg/L. This variability is attributable to many site related factors including the land cover conditions, drainage area size, rainfall/runoff volumes, sample timing during runoff event, to name a few. For this analysis, VHB focused on using observed data at salt storage facilities, which in themselves are highly variable with some covered and others not. It was difficult to find data that directly relates to the proposed facility being completely covered and with several BMPs being employed to reduce exposure of the material to stormwater runoff. A study evaluating runoff from a variety of transportation facilities entitled, "Characterization and Environmental Management of Runoff from Road-Salt Storage Facilities – Final Report (Fitch et al., (2004)," and published by the Virginia Transportation Research Council was determined to provide the most relevant observed data. This study examined runoff from 292 facilities throughout Virginia that are managed by the Virginia Department of Transportation ("VDOT"). In this study, chloride concentrations were measured in the stormwater ponds that were used at the various facilities to collect runoff from salt handling and storage areas. The loading areas at the sites in the study were not covered and no discussion is given of the BMPs that are employed to reduce exposure to stormwater runoff. The observed chloride concentrations reported in this study ranged from 140 mg/L to 3,100 mg/L, with an average concentration of 1,600 mg/L. Based on a standard deviation analysis of the 292 sites that were evaluated, the study's authors determined that 95 percent of

VDOTs ponds would have chloride concentrations less than 3,200 mg/L. The results of this study were used to help characterize the potential chloride concentrations that may occur in runoff from the Project.

WATER QUALITY VOLUME RUNOFF EVENT

For this analysis, the water quality event as defined in the Vermont Stormwater Management Manual (Vermont Agency of Natural Resources, April 2001, "VSMM") was selected as the representative rainfall event for analysis, as it represents the storm event for which 90 percent of annual storm events are smaller. The precipitation depth for the water quality storm as defined in the VSMM is 0.9 inches. The flow rate from the portion of the Site involved in salt handling operations was calculated using the TR-55 modified curve number method as defined in the VSMM. The modified curve number method was selected as conventional methods have been found to underestimate the volume and rate of runoff for rainfall events less than two inches.

The portion of the Site involved in salt handling operations is 5.6 acres, 2.0 acres of which consist of paved impervious surfaces that would be used for salt handling and 1.2 acres of the salt shed roof. This 5.6-acre area drains via stormwater conveyance channels and a pretreatment grass channel to a wet pond, which will provide settling of suspended solids prior to discharge via an overflow weir. Flow overtopping the weir discharges from the Project towards the LaPlatte River to the north. The flow rate during the water quality storm that will outlet from the overflow weir was used as the site runoff rate in this chloride loading analysis. Complete site plans are included as an attachment to the SWPPP. Flow rate computations, calculated using TR-55 modified curve number methodology as applied by HydroCAD, are included on pages 6 through 11 of the Attachment.

The peak flow rate from the Site during the water quality storm event was estimated to be 2.4 cfs. This flow rate assumes that the wet pond is full at the start of the storm event, which is a conservative assumption considering the dry conditions that would be in effect during the design 7Q10 streamflow event. In order to compare the potential chloride flux with the chronic and acute criteria of the VWQS, VHB estimated the average stormwater discharge rate during the peak hour of the WQV event to be 1.4 cfs, and the average flow rate during a four-day period that includes the WQV event to be 0.03 cfs.

VHB then performed mass balance equations to estimate the instream chloride concentrations, based on the peak 1-hour and average 4-day stormwater discharge rates mixing with the calculated 7Q10 flow rate for the LaPlatte River together with the background instream chloride concentrations that were previously discussed. These calculations assume that the available chloride concentrations in both the stormwater runoff and the River are static throughout the storm event. This assumption is conservative given that dilution would occur as the storm continues and that the chloride wash-off load is not unlimited.

Table 1 presents the results of the sensitivity analysis performed to estimate the resulting chloride concentration in the LaPlatte River under different chloride concentrations in the stormwater discharged from the site. Supporting calculations are included on pages 12 through 17 of the Attachment.

Table 1. LaPlatte River Chloride Concentration Sensitivity Analysis

Chloride Concentration in Runoff	Peak 1-hour Instream Chloride Concentration (Acute Criteria)	4-day Average Instream Chloride (Chronic Criteria)
VWQS Criteria	860	230
100 mg/L	82 mg/L	52 mg/L
500 mg/L	336 mg/L	65 mg/L
1,000 mg/L	655 mg/L	82 mg/L
5,450 mg/L (chronic)	3,486mg/L	230 mg/L
1,323 mg/L (acute)	860 mg/L	92 mg/L

The results of this analysis indicate that an exceedance of the acute chloride criterion would only likely occur if the chloride concentration in the stormwater discharge from the pond was higher than 1,323 mg/L during 7Q10 drought streamflow conditions. The analysis also indicates that an exceedance of the chronic chloride criterion would only likely occur if the chloride concentration in the stormwater discharge from the pond was higher than 5,450 mg/L during 7Q10 drought streamflows. In the case of the chronic criterion, such a runoff concentration would be higher than the 95 percent probability concentration of 3,200 mg/L reported in the VDOT study (Fitch, 2004).

Assuming that the sodium chloride was completely dissolved in solution, the amount of bulk salt required to generate an acute instream chloride concentration above the VWQS criterion would be equivalent to 0.2 cubic yards (or roughly 640 pounds of salt being washed-off in the peak 1 hour of a storm). For the chronic criterion, the equivalent of 1.6 cubic yards, or 5,000 pounds, of salt would need to be washed-off during a 4-day period. Because BMPs, such as having a covered storage and handling area and regularly sweeping paved areas as part of good house-keeping practices, are required to be employed at the Project pursuant to the MSGP, VHB anticipates that this volume of salt would not be exposed and available for wash-off prior to storm events, and therefore the chloride concentration in stormwater discharges from the Project would be considerably below the threshold values identified in this analysis.

Assuming that the stormwater discharged from the facility would contain chloride concentrations between 100 and 1,000 mg/L, it appears likely that the chloride concentrations in the LaPlatte River as a result of runoff from the Project might range between 82 and 655 mg/L when calculated over the peak one hour of the 0.9-inch WQV storm event and

between 52 and 82 mg/L during the 4-day average as the result of the 0.9-inch WQV storm event, in a worst-case scenario in which LaPlatte River streamflows are at 7Q10 drought rates.

CONCLUSION

Based on the assumptions and data used in this analysis, the results indicate that the Project would not likely cause exceedances of the VWQS acute or chronic chloride criteria within the LaPlatte River. The analysis is very conservative, because it estimates instream chloride concentrations in a worst-case scenario wherein runoff is being generated at the site from a storm that exceeds the runoff of 90 percent of all annual storms, at the same time that streamflows in the LaPlatte River are at 7Q10 drought conditions.

The use of BMPs at the Project site will minimize the amount of chloride potentially discharged from the site by limiting the exposure to stormwater runoff. Sampling of the stormwater discharges from the facility is proposed as part of the SWPPP that has been prepared as part of compliance with the MSGP. Post-construction water quality monitoring is also proposed as a means to further protect against potential water quality criteria exceedances. Such samples can also be used to validate the assumptions and results that were derived from this analysis.

REFERENCES

- Fitch, G. Michael et al., 2008. *Recycling of Salt-Contaminated Stormwater Runoff for Brine Production at Virginia Department of Transportation Road-Salt Storage Facilities*. Charlottesville, VA: Virginia Transportation Research Council, 2008.
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- Vermont Agency of Natural Resources. 2014. Vermont Water Quality Standards (Vt. Code R 12 004 052), Effective October 30, 2014.
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ATTACHMENT

Site Location Map

USGS Topo Background (1996)
DEC Monitoring Sites from IWIS Report (2016)



Computations

Project: Shelburne Transload
Location: Shelburne, Vermont
Calculated by: Robert Wildey
Checked by:
Title: LaPlatte River Median Daily Flows

Project #: 57762.00
Sheet: 1 of 1
Date: July 6, 2016
Date:

Average Median Flow, By Month (cfs) ²	
Month	Flow
January	24
February	19
March	52
April	83
May	34
June	16
July	8
August	6
September	5
October	14
November	30
December	36

LaPlatte River Median Daily Flow (cfs) ¹					
Day	July	August	September	October	November
1	8.9	6.4	5.4	8.6	21.0
2	9.3	6.7	5.7	7.2	23.0
3	7.2	7.0	4.5	6.7	23.0
4	6.6	7.1	4.5	6.0	22.0
5	10.0	8.7	4.7	9.2	20.0
6	10.0	7.4	4.7	8.9	22.0
7	7.8	6.7	4.7	8.8	20.0
8	8.7	5.1	4.5	8.2	20.0
9	15.0	4.9	5.0	7.0	22.0
10	12.0	5.9	4.4	7.7	18.0
11	9.3	9.1	4.4	7.0	21.0
12	6.9	9.5	4.2	7.4	27.0
13	6.1	6.7	4.3	6.8	32.0
14	5.9	7.9	4.2	7.2	26.0
15	8.2	6.9	5.0	8.2	36.0
16	8.3	5.9	4.8	9.5	42.0
17	6.7	4.9	5.4	12.0	35.0
18	7.3	4.5	4.9	12.0	33.0
19	7.8	4.2	4.9	14.0	30.0
20	6.4	4.4	4.4	13.0	30.0
21	5.8	5.1	4.7	16.0	30.0
22	6.1	7.1	5.2	22.0	34.0
23	6.8	5.3	5.5	23.0	30.0
24	9.4	5.8	7.1	24.0	29.0
25	7.6	4.9	7.2	22.0	35.0
26	6.8	4.3	5.2	25.0	34.0
27	6.4	4.2	5.4	24.0	46.0
28	7.6	4.0	5.8	28.0	43.0
29	8.0	3.5	7.2	25.0	42.0
30	8.1	3.4	9.1	23.0	41.0
31	7.3	3.7	-	21.0	-

Maximum	15	10	9	28	46
Minimum	6	3	4	6	18
Average	8	6	5	14	30

1. Median daily flow as measured at USGS Gage 04282795 (LaPlatte River at Shelburne Falls)

2. Average median daily flows for entire year, as measured at USGS Gage 04282795 (LaPlatte River at Shelburne Falls)



Computations

Project: Shelburne Transload **Project #:** 57762.00
Location: Shelburne, Vermont **Sheet:** 1 of 1
Calculated by: Robert Wildey **Date:** August 31, 2016
Checked by: **Date:** _____
Title: LaPlatte River Background Chloride Concentration
DEC Chloride Sampling Data

LaPlatte River @ Route 7 (DEC 500789)		
Sample Date	Chloride Conc. (mg/L) ¹	Flow (cfs) ²
6/22/2004	53	9
7/20/2004	45	35
8/31/2004	14	406
9/21/2004	47	11
9/21/2004	47	11
10/12/2004	31	4
10/12/2004	31	4
11/16/2004	117	5
11/16/2004	116	5
5/3/2005	26	70
6/7/2005	53	8
7/5/2005	56	17
8/2/2005	47	23
9/6/2005	49	7
10/4/2005	30	9
11/8/2005	44	44
7/5/2006	16	86
8/1/2006	35	13
9/5/2006	55	6
10/3/2006	55	16
11/7/2006	27	27
6/12/2007	49	7
7/10/2007	23	98
8/14/2007	109	2
9/11/2007	71	4
11/13/2007	48	9

LaPlatte @ Yacht Haven Dr. (DEC 500785)		
Sample Date	Chloride Conc. (mg/L) ¹	Flow (cfs) ²
6/22/2004	78	9
7/20/2004	32	35
8/31/2004	15	406
9/21/2004	48	11
10/12/2004	30	4
11/16/2004	117	5
5/3/2005	23	70
6/7/2005	46	8
7/5/2005	52	17
8/2/2005	43	23
9/6/2005	48	7
10/4/2005	30	9
11/8/2005	38	44
6/6/2006	17	81
7/5/2006	17	86
8/1/2006	32	13
9/5/2006	54	6
10/3/2006	46	16
11/7/2006	25	27
6/12/2007	38	7
7/10/2007	28	98
8/14/2007	78	2
9/11/2007	71	4
11/13/2007	46	9

Monthly Median Chloride and Flow Analysis (All DEC Data)		
Month	Flow (cfs) ¹	Chloride (mg/L) ³
May	70	24
Jun	8	49
July	61	30
Aug	18	39
Sep	7	49
Oct	9	31
Nov	9	46

Maximum	406	117
Minimum	2	14
Median	11	46

1. Chloride measured at DEC Location ID 500789 - LaPlatte River at Route 7
2. Average daily flow on date of DEC sample, as measured at USGS Gage 04282795 (LaPlatte River at Shelburne Falls)
3. Median chloride concentration of DEC samples, by month
4. Median stream flow on dates when DEC samples were collected, by month
5. Median average daily flow, as measured at USGS Gage 04282795 (LaPlatte River at Shelburne Falls)

Shelburne Transload Facility

LaPlatte River 7Q10 Analysis

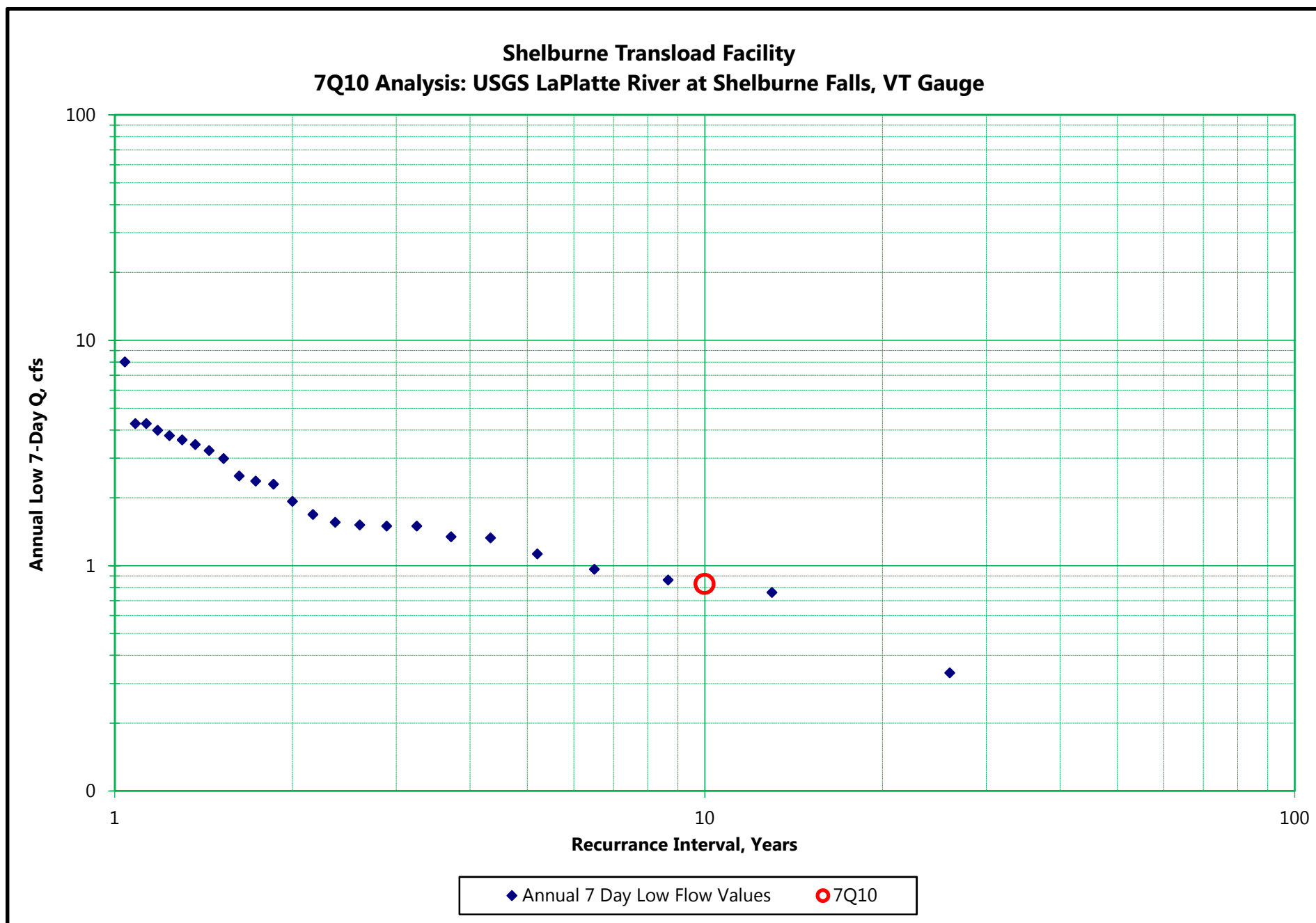
Based on USGS Station #04282795 (LaPlatte River at Shelburne Falls, VT)

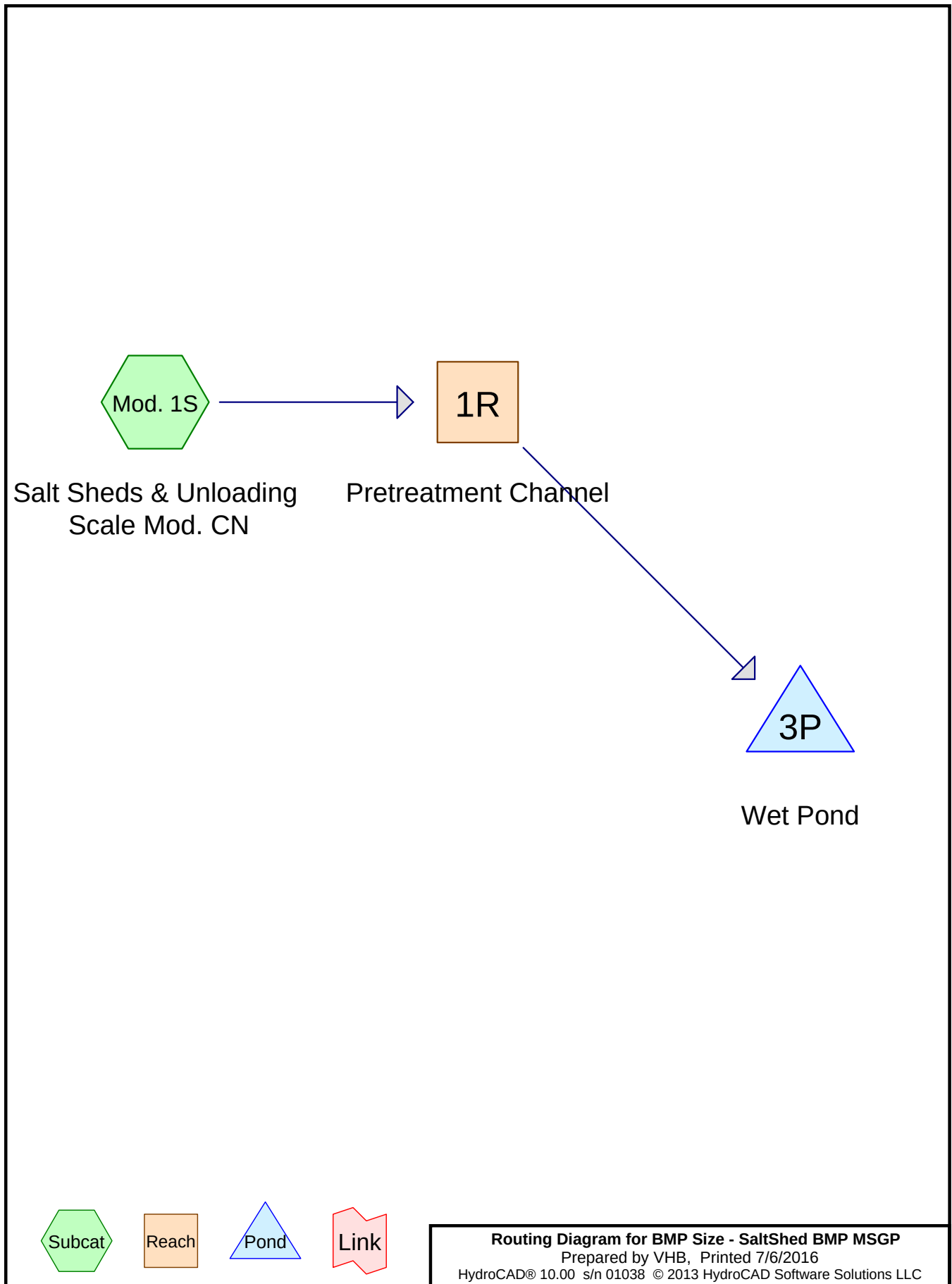
USGS Flow Data from LaPlatte River at Shelburne Falls, VT Gauge			
Water Year (ending in Sept)	Annual Low 7-Day Q (cfs)	Rank	Recurrence Interval (years)
1995	0.33	1	26
2001	0.76	2	13
1999	0.86	3	8.7
2007	1.0	4	6.5
2002	1.1	5	5.2
2010	1.3	6	4.3
1992	1.3	7	3.7
1991	1.5	8	3.3
2009	1.5	9	2.9
2015	1.5	10	2.6
2003	1.6	11	2.4
2012	1.7	12	2.2
2008	1.9	13	2.0
2011	2.3	14	1.9
1996	2.4	15	1.7
1993	2.5	16	1.6
2014	3.0	17	1.5
1997	3.2	18	1.4
2005	3.4	19	1.4
2004	3.6	20	1.3
2006	3.8	21	1.2
1994	4.0	22	1.2
1998	4.3	23	1.1
2000	4.3	24	1.1
1905	8.0	25	1.0
7Q10	0.83		

cfs, at USGS LaPlatte River at Shelburne Falls, VT (watershed area = 44.6 square miles)

NOTE: "7Q10" is the drought flow equal to the **lowest average flow for 7 consecutive days with a 10% chance of occurring in any year** (that is, with a ten-year return period).

Pro-Rate the 7Q10 at the USGS gauge, to the watershed area at the project site:			
Watershed area at USGS gauge:	44.6	square miles (source: USGS)	
Unitized 7Q10 :	0.02	csm (cfs per square mile of watershed)	
Watershed area at project site:	46.4	square miles (source: USGS Streamstats)	
Ratio of watershed areas:	1.04		
Pro-rated 7Q10 at project site:	0.86	cfs (= 7Q10 at USGS gauge x Ratio)	





BMP Size - SaltShed BMP MSGP*Type II 24-hr WQv Rainfall=0.90"*

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Page 2

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment Mod. 1S: Salt Sheds &Runoff Area=5.640 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=914' Tc=9.2 min CN=95 Runoff=4.28 cfs 0.224 af**Reach 1R: Pretreatment Channel**Avg. Flow Depth=0.57' Max Vel=0.69 fps Inflow=4.28 cfs 0.224 af
n=0.099 L=433.0' S=0.0060 '/' Capacity=18.53 cfs Outflow=3.05 cfs 0.221 af**Pond 3P: Wet Pond**Peak Elev=109.38' Storage=16,393 cf Inflow=3.05 cfs 0.221 af
Outflow=2.38 cfs 0.219 af**Total Runoff Area = 5.640 ac Runoff Volume = 0.224 af Average Runoff Depth = 0.48"**
100.00% Pervious = 5.640 ac 0.00% Impervious = 0.000 ac

BMP Size - SaltShed BMP MSGP

Type II 24-hr WQv Rainfall=0.90"

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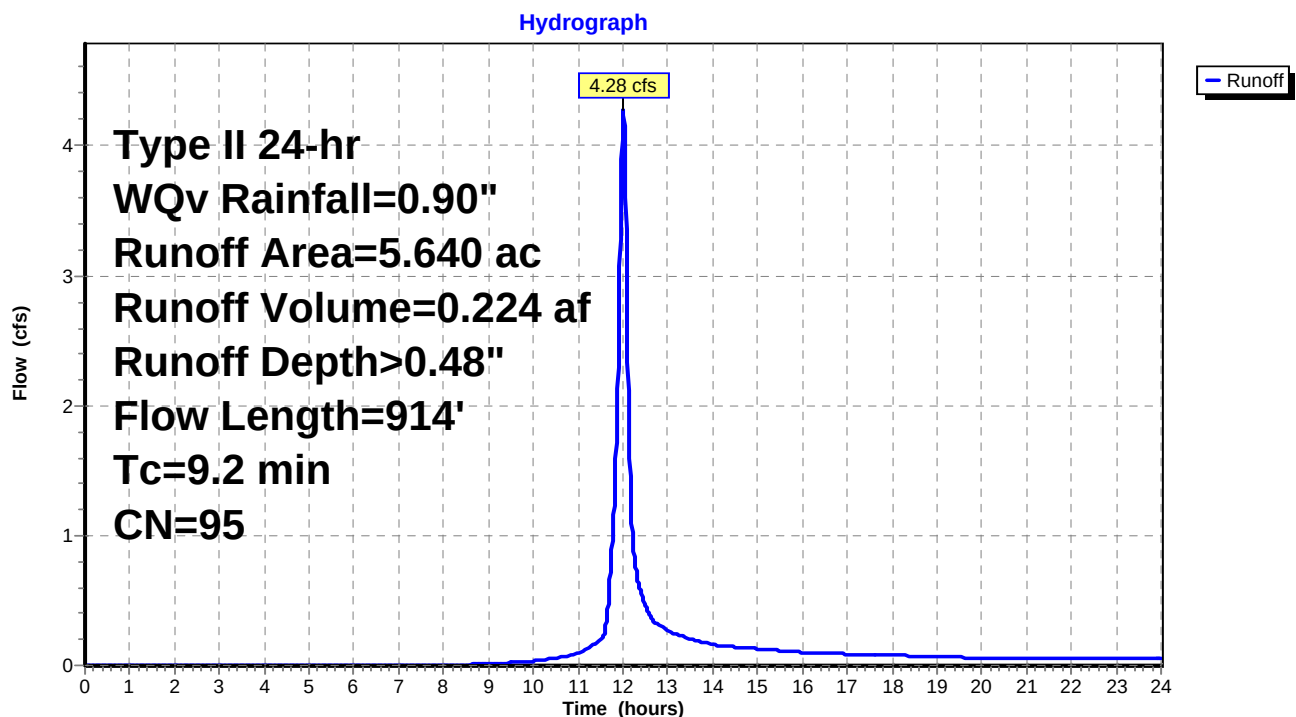
Summary for Subcatchment Mod. 1S: Salt Sheds & Unloading Scale Mod. CN

Runoff = 4.28 cfs @ 12.01 hrs, Volume= 0.224 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=0.90"

Area (ac)	CN	Description
* 5.640	95	Mod. Curve Number
5.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.17		Sheet Flow, paved Smooth surfaces n= 0.011 P2= 2.30"
2.9	500	0.0200	2.87		Shallow Concentrated Flow, paved Paved Kv= 20.3 fps
4.9	314	0.0050	1.06		Shallow Concentrated Flow, conveyance channel Grassed Waterway Kv= 15.0 fps
9.2	914	Total			

Subcatchment Mod. 1S: Salt Sheds & Unloading Scale Mod. CN

BMP Size - SaltShed BMP MSGP

Type II 24-hr WQv Rainfall=0.90"

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Summary for Reach 1R: Pretreatment Channel

Inflow Area = 5.640 ac, 0.00% Impervious, Inflow Depth > 0.48" for WQv event
 Inflow = 4.28 cfs @ 12.01 hrs, Volume= 0.224 af
 Outflow = 3.05 cfs @ 12.08 hrs, Volume= 0.221 af, Atten= 29%, Lag= 4.4 min

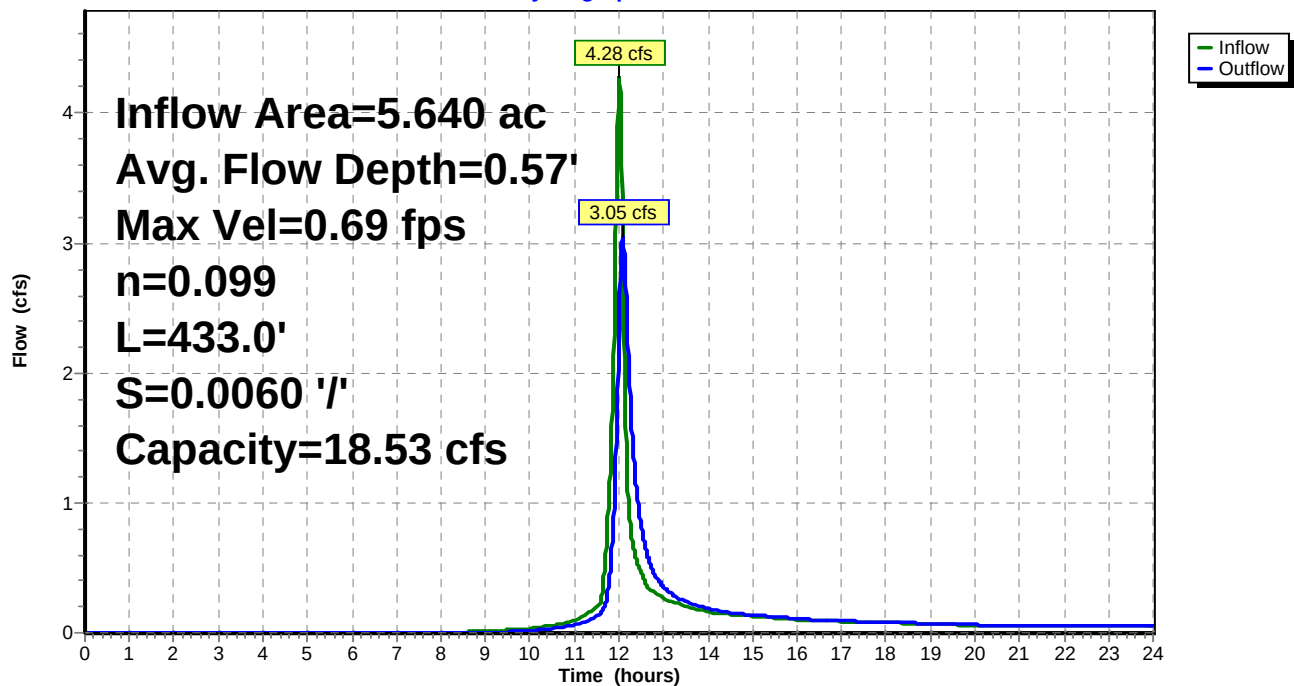
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 0.69 fps, Min. Travel Time= 10.4 min
 Avg. Velocity = 0.20 fps, Avg. Travel Time= 35.9 min

Peak Storage= 1,908 cf @ 12.08 hrs
 Average Depth at Peak Storage= 0.57'
 Bank-Full Depth= 1.50' Flow Area= 15.8 sf, Capacity= 18.53 cfs

6.00' x 1.50' deep channel, n= 0.099
 Side Slope Z-value= 3.0 '/' Top Width= 15.00'
 Length= 433.0' Slope= 0.0060 '/'
 Inlet Invert= 112.35', Outlet Invert= 109.75'

**Reach 1R: Pretreatment Channel**

Hydrograph



BMP Size - SaltShed BMP MSGP

Type II 24-hr WQv Rainfall=0.90"

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Page 5

Summary for Pond 3P: Wet Pond

Inflow Area = 5.640 ac, 0.00% Impervious, Inflow Depth > 0.47" for WQv event
 Inflow = 3.05 cfs @ 12.08 hrs, Volume= 0.221 af
 Outflow = 2.38 cfs @ 12.18 hrs, Volume= 0.219 af, Atten= 22%, Lag= 6.1 min
 Primary = 2.38 cfs @ 12.18 hrs, Volume= 0.219 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Starting Elev= 109.25' Surf.Area= 10,970 sf Storage= 15,006 cf

Peak Elev= 109.38' @ 12.18 hrs Surf.Area= 11,166 sf Storage= 16,393 cf (1,387 cf above start)

Flood Elev= 110.75' Surf.Area= 13,004 sf Storage= 29,972 cf (14,966 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 12.3 min (854.1 - 841.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	107.75'	29,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.75	9,062	409.8	0	0	9,062
108.00	9,371	419.6	2,304	2,304	9,717
109.00	10,643	433.3	10,000	12,304	10,740
109.25	10,970	438.0	2,702	15,006	11,084
110.50	13,004	466.3	14,966	29,972	13,197

Device	Routing	Invert	Outlet Devices									
#1	Primary	109.25'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63									

Primary OutFlow Max=2.38 cfs @ 12.18 hrs HW=109.38' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 2.38 cfs @ 0.95 fps)

BMP Size - SaltShed BMP MSGP

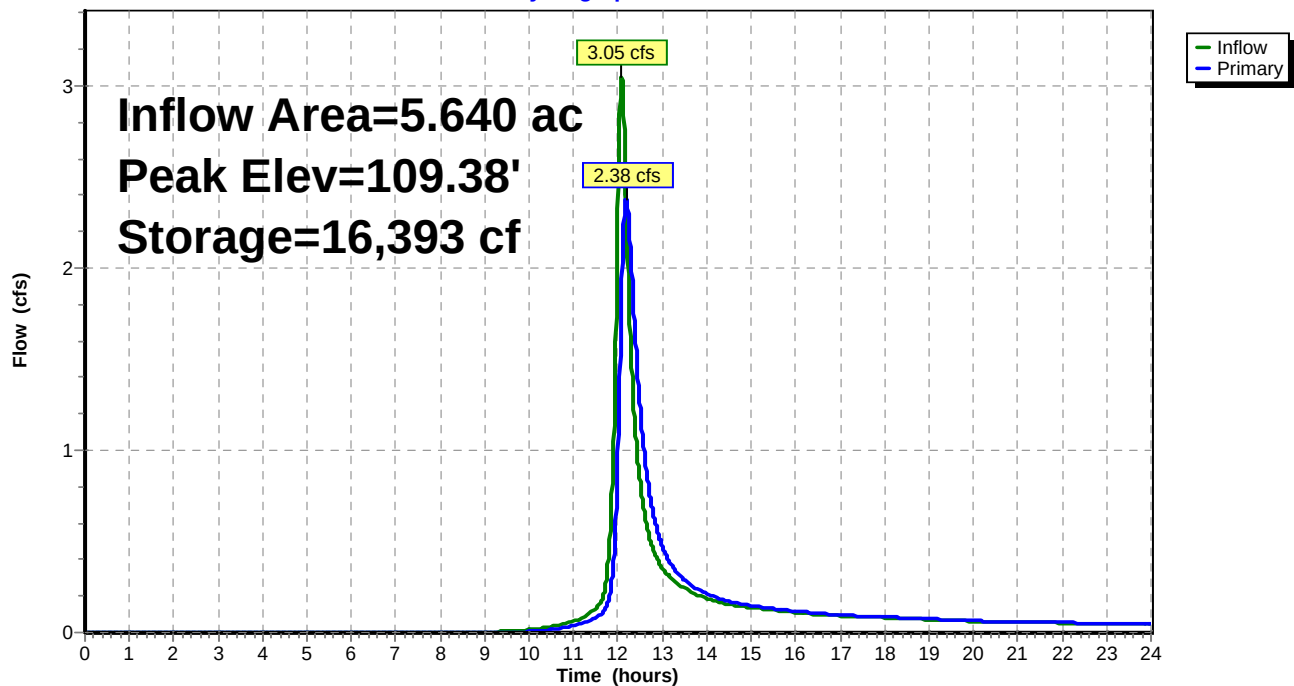
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Type II 24-hr WQv Rainfall=0.90"

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Pond 3P: Wet Pond**Hydrograph**



Computations

Project: Shelburne Transload	Project #: 57762.00
Location: Shelburne, Vermont	Sheet: 1 of 1
Calculated by: Robert Wildey	Date: August 31, 2016
Checked by:	Date:
Title: West Pond Average Peak Discharge Rates for WQV Storm Event	

Hour During WQV Event	1-Hr Average Peak Flow (cfs) ¹
0	
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	1.1
13	1.4
14	0.5
15	0.2
16	0.1
17	0.1
18	0.1
19	0.1
20	0.1
21	0.1
22	0.1
23	0.1
24	0.1

Calculation of Average Flow Resulting from 0.9-inch WQv Event over 4-Day period	
0.219	acre-feet ²
43,560	acre-feet per cubic feet
9,540	cubic feet
86,400	seconds per day
4	number of days
0.03	cubic feet per second

1. 1-hr Peak Average flow during hour of 24-hr WQV storm event, per HydroCAD model
2. Runoff Volume resulting from 24-hr WQV storm event, per HydroCAD model



Computations

Project:	Shelburne Transload	Project #:	57762.00
Location:	Shelburne, Vermont	Sheet:	1 of 1
Calculated by:	Robert Wildey	Date:	August 31, 2016
Checked by:		Date:	
Title: Chloride Sensitivity Analysis During WQV Storm Event			
Chloride Concentration of 100 mg/L in Stormwater Runoff			

Acute (1-Hr) Chloride Analysis

Potential Discharge During WQV Event

100	mg / liter chloride ¹
1.4	cubic feet / sec ²
40	liter / second
3,965	mg / second
0.00	kg / second
14	kg chloride during 1 hr event
0.65	chloride fraction of NaCl
22	kg NaCl required
34	density of bulk salt (kg/cf)
0.4	cf of NaCl required
0.02	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.01	kg / second
5,098	mg / second
2.2	cubic feet / sec
62	liter / second
82	mg / liter chloride ⁴

Chronic (4-Day) Chloride Analysis

Potential Discharge During WQV Event

100	mg / liter chloride 1
0.03	cubic feet / sec ⁵
1	liter / second
78	mg / second
0.0001	kg / second
27	kg total during 4 day event
0.65	chloride fraction of NaCl
42	kg NaCl required
34	density of bulk salt (kg/cf)
0.8	cf of NaCl required
0.03	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.00	kg / second
1,211	mg / second
0.83	cubic feet / sec
23	liter / second
52	mg / liter chloride ⁶

1. Sensitivity analysis assumption of the chloride concentration in stormwater discharged from the West Pond
2. Average one-hour peak discharge from West Pond during 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
3. Estimated background concentration of chloride in LaPlatte River
4. Resulting one-hour peak chloride concentration in LaPlatte River for sensitivity analysis using 100 mg/L discharge from site.
5. Four day average discharge from West Pond resulting from 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
6. Resulting four-day peak chloride concentration in LaPlatte River for sensitivity analysis using 100 mg/L discharge from site.



Computations

Project:	Shelburne Transload	Project #:	57762.00
Location:	Shelburne, Vermont	Sheet:	1 of 1
Calculated by:	Robert Wildey	Date:	August 31, 2016
Checked by:		Date:	
Title: Chloride Sensitivity Analysis During WQV Storm Event			
Chloride Concentration of 500 mg/L in Stormwater Runoff			

Acute (1-Hr) Chloride Analysis

Potential Discharge During WQV Event

500	mg / liter chloride ¹
1.4	cubic feet / sec ²
40	liter / second
19,824	mg / second
0.02	kg / second
71	kg chloride during 1 hr event
0.65	chloride fraction of NaCl
110	kg NaCl required
34	density of bulk salt (kg/cf)
2	cf of NaCl required
0.1	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.02	kg / second
20,957	mg / second
2.2	cubic feet / sec
62	liter / second
336	mg / liter chloride ⁴

Chronic (4-Day) Chloride Analysis

Potential Discharge During WQV Event

500	mg / liter chloride ¹
0.03	cubic feet / sec ⁵
1	liter / second
391	mg / second
0.000	kg / second
135	kg total during 4 day event
0.65	chloride fraction of NaCl
208	kg NaCl required
34	density of bulk salt (kg/cf)
4	cf of NaCl required
0.1	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.002	kg / second
1,524	mg / second
0.83	cubic feet / sec
23	liter / second
65	mg / liter chloride ⁶

1. Sensitivity analysis assumption of the chloride concentration in stormwater discharged from the West Pond
2. Average one-hour peak discharge from West Pond during 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
3. Estimated background concentration of chloride in LaPlatte River
4. Resulting one-hour peak chloride concentration in LaPlatte River for sensitivity analysis using 500 mg/L discharge from site.
5. Four day average discharge from West Pond resulting from 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
6. Resulting four-day chloride concentration in LaPlatte River for sensitivity analysis using 500 mg/L discharge from site.



Computations

Project:	Shelburne Transload	Project #:	57762.00
Location:	Shelburne, Vermont	Sheet:	1 of 1
Calculated by:	Robert Wildey	Date:	August 31, 2016
Checked by:		Date:	
Title: Chloride Sensitivity Analysis During WQV Storm Event			
Chloride Concentration of 1,000 mg/L in Stormwater Runoff			

Acute (1-Hr) Chloride Analysis

Potential Discharge During WQV Event

1,000	mg / liter chloride ¹
1.4	cubic feet / sec ²
40	liter / second
39,648	mg / second
0.04	kg / second
143	kg chloride during 1 hr event
0.65	chloride fraction of NaCl
220	kg NaCl required
34	density of bulk salt (kg/cf)
4	cf of NaCl required
0.2	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.04	kg / second
40,781	mg / second
2.2	cubic feet / sec
62	liter / second
655	mg / liter chloride ⁴

Chronic (4-Day) Chloride Analysis

Potential Discharge During WQV Event

1,000	mg / liter chloride ¹
0.03	cubic feet / sec ⁵
1	liter / second
782	mg / second
0.001	kg / second
270	kg total during 4 day event
0.65	chloride fraction of NaCl
416	kg NaCl required
34	density of bulk salt (kg/cf)
8	cf of NaCl required
0.3	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.002	kg / second
1,915	mg / second
0.83	cubic feet / sec
23	liter / second
82	mg / liter chloride ⁶

1. Sensitivity analysis assumption of the chloride concentration in stormwater discharged from the West Pond
2. Average one-hour peak discharge from West Pond during 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
3. Estimated background concentration of chloride in LaPlatte River
4. Resulting one-hour peak chloride concentration in LaPlatte River for sensitivity analysis using 1,000 mg/L discharge from site.
5. Four day average discharge from West Pond resulting from 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
6. Resulting four-day peak chloride concentration in LaPlatte River for sensitivity analysis using 1,000 mg/L discharge from site.



Computations

Project: Shelburne Transload	Project #: 57762.00
Location: Shelburne, Vermont	Sheet: 1 of 1
Calculated by: Robert Wildey	Date: August 31, 2016
Checked by:	Date:
Title: Chloride Analysis During WQV Storm Event	
Runoff Concentration That Results In Chronic Criterion	

Acute (1-Hr) Chloride Analysis

Potential Discharge During WQV Event

5,450	mg / liter chloride ¹
1.4	cubic feet / sec ²
40	liter / second
216,082	mg / second
0.22	kg / second
778	kg chloride during 1 hr event
0.65	chloride fraction of NaCl
1197	kg NaCl required
34	density of bulk salt (kg/cf)
23	cf of NaCl required
0.8	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.22	kg / second
217,214	mg / second
2.2	cubic feet / sec
62	liter / second
3,486	mg / liter chloride ⁴

Chronic (4-Day) Chloride Analysis

Potential Discharge During WQV Event

5,450	mg / liter chloride ⁵
0.03	cubic feet / sec ⁶
1	liter / second
4,260	mg / second
0.004	kg / second
1,472	kg total during 4 day event
0.65	chloride fraction of NaCl
2265	kg NaCl required
34	density of bulk salt (kg/cf)
43	cf of NaCl required
1.6	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.005	kg / second
5,393	mg / second
0.83	cubic feet / sec
23	liter / second
230	mg / liter chloride ⁷

1. Chloride concentration that results in an exceedance of the VWQS chronic criterion is used here to evaluate the effect of that concentration during the VWQS acute criterion timespan.
2. Average one-hour peak discharge from West Pond during 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
3. Estimated background concentration of chloride in LaPlatte River
4. VWQS acute criterion for chloride, 1 hour average concentration not be exceeded more than once every 3 years
5. Calculated chloride concentration representing the concentration that would result in the VWQS chronic criterion being met.
6. Four day average discharge from West Pond resulting from 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
7. VWQS chronic criterion for chloride, 4 day average concentration not be exceeded more than once every 3 years



Computations

Project: Shelburne Transload	Project #: 57762.00
Location: Shelburne, Vermont	Sheet: 1 of 1
Calculated by: Robert Wildey	Date: August 31, 2016
Checked by:	Date:
Title: Chloride Analysis During WQV Storm Event	
Runoff Concentration That Results In Acute Criterion	

Acute (1-Hr) Chloride Analysis

Potential Discharge During WQV Event

1,323	mg / liter chloride ¹
1.4	cubic feet / sec ²
40	liter / second
52,454	mg / second
0.05	kg / second
189	kg chloride during 1 hr event
0.65	chloride fraction of NaCl
291	kg NaCl required
34	density of bulk salt (kg/cf)
6	cf of NaCl required
0.2	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.05	kg / second
53,587	mg / second
2.2	cubic feet / sec
62	liter / second
860	mg / liter chloride ⁴

Chronic (4-Day) Chloride Analysis

Potential Discharge During WQV Event

1,323	mg / liter chloride ⁵
0.03	cubic feet / sec ⁶
1	liter / second
1,034	mg / second
0.001	kg / second
357	kg total during 4 day event
0.65	chloride fraction of NaCl
550	kg NaCl required
34	density of bulk salt (kg/cf)
11	cf of NaCl required
0.4	cy of NaCl required

LaPlatte River - 7Q10 Low Flow

50	mg / liter chloride ³
0.8	cubic feet / sec
23	liter / second
1,133	mg / second
0.001	kg / second

Resulting Combined Flows

0.002	kg / second
2,167	mg / second
0.83	cubic feet / sec
23	liter / second
92	mg / liter chloride ⁷

1. Calculated chloride concentration representing the concentration that would result in the VWQS acute criterion being met
2. Average one-hour peak discharge from West Pond during 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
3. Estimated background concentration of chloride in LaPlatte River
4. VWQS acute criterion for chloride, 1 hour average concentration not be exceeded more than once every 3 years
5. Chloride concentration that results in an exceedance of the VWQS acute criterion is used here to evaluate the effect of that concentration during the VWQS chronic criterion timespan.
6. Four day average discharge from West Pond resulting from 24-hr 0.9-inch rainfall event, as calculated by HydroCAD
7. VWQS chronic criterion for chloride, 4 day average concentration not be exceeded more than once every 3 years