

VTM Engineering, PLC

2941 Shelburne Falls Road
Hinesburg, Vermont 05461
Phone: (802) 233-7531
Email: spalmer@vtmengineering.com

June 15, 2022

Ms. Valerie Capels
Bristol Town Administrator
1 South Street
PO Box 249
Bristol, Vermont 05443

RE: Bristol Landfill – 2022 Annual Inspection
Solid Waste Identification Number AD080
ANR Project Identification Number RU95-0205

Dear Ms. Capels:

VTM Engineering, PLC is pleased to provide this report summarizing VTM's annual inspection as well as recommendations for post closure care for the Bristol Landfill.

If you have any questions regarding the inspection or findings, please feel free to contact me.

Respectfully,
VTM ENGINEERING, PLC

DocuSigned by:

Steven Palmer

17868D749EF94B4...

Steven L. Palmer, P.E.
President

Attachments:
Bristol Landfill – 2022 Annual Inspection Report

**BRISTOL LANDFILL
2022 ANNUAL INSPECTION REPORT**

**Prepared for:
Town of Bristol, Vermont**

**Prepared By:
VTM Engineering**

June, 2022

BRISTOL LANDFILL

2022 ANNUAL INSPECTION REPORT

VTM Engineering, PLC was contracted by the Town of Bristol, Vermont to conduct an annual inspection of the former municipal landfill located at the west end of Pine Street in Bristol, Vermont. Prior to conducting the annual inspection, VTM reviewed the 2021 Annual Inspection Report. Additionally, VTM reviewed the approved Landfill Post Closure Permit for the facility (Permit) dated January, 30, 2017 as well as an associated Permit Amendment dated September 7, 2021. The amendment was specific to a solar array that was constructed on top of the former landfill in 2021. Finally, VTM reviewed the approved Post Closure Plan for the facility dated September 30, 2016 prepared by LE Environmental.

1.0 PERMIT REQUIREMENTS

1.1 Landfill Post Closure Permit and Permit Amendment

A Post Closure Permit was issued by the Vermont Agency of Natural Resources in 2017. The permit includes the following annual inspection requirements: *“On or before June 15th each certification year, the Permittee shall submit an annual evaluation of the Facility. This inspection shall be performed by a registered engineer or other qualified professional. The engineer or qualified professional shall evaluate at a minimum the integrity of the final cover system and vegetative cover, the drainage systems and surface water runoff, and the gas ventilations system. The inspection shall be performed during the month of May of each certification year.”*

An Amendment to the Post Closure Permit pertaining to the solar arrays was issued in 2021. The Amendment added the following annual inspection requirement: *“Commencing upon installation of the solar array, the annual evaluation required under Condition 10 (of the original permit) shall also incorporate, any notable differential settlement and lateral foundation movement, ballast integrity, and solar system components.”*

1.2 Landfill Post Closure Plan

In addition to the permit and permit Amendment, a landfill Post Closure Plan was prepared and submitted as part of the original 2017 Permit application. The Post Closure Plan was made part of the Permit by reference. The Post Closure Plan contains the following language pertaining to annual maintenance *“A majority of the maintenance efforts will be on an "as-needed" basis. They include annual mowing of the vegetated cover for aesthetics, woody growth control, weed control to promote growth of the desired species, and regrading and re-vegetation should vegetative growth fail and/or soil erosion occurs. Drainage control features will be periodically inspected to ensure that erosion, differential settlement and sediment build-up have not occurred that may jeopardize the original design intent. These occurrences should be promptly corrected. Burrowing animals should be removed from the landfill, to avoid the creation of large holes in the cap. The gate and warning sign should be maintained, and the gate kept locked to prevent future dumping, to minimize vandalism and to protect the public.”*

2.0 SITE INSPECTION AND ASSOCIATED FINDINGS

Steven Palmer, P.E. of VTM Engineering conducted the inspection of the former landfill facility on May 31, 2022. Items were evaluated per the Permit and Post Closure Plan Requirements. Photographs documenting the inspection observations are attached.

2.1 Entry Gate

The landfill entry gate was noted to be in place and locked. No debris or garbage was noted in or around the area.

2.2 Final Cover System & Vegetative Cover

No areas containing significant differential settlement were noted during the inspection. Small bushes/trees were noted to be growing within the former landfill limits in a number of areas indicating that annual mowing of the vegetated cover does not appear to have been conducted recently. The vegetative cover (grass) itself appears to be receding and in decline over much of the landfill cover area. This decline is likely due in part to a lack of recent mowing. A number of areas particularly near the solar arrays were noted to have little to no vegetative cover whatsoever. The vegetative cover in these areas had been disturbed during construction of the solar arrays (as would be expected). Minor erosion was noted to have occurred in a number of areas, predominately on the north and west sides of the former landfill. It was also noted that several larger areas on the north side of the landfill had recently been smoothed and repaired. It did not appear at the time of the inspection that seed, mulch or other efforts to re-establish growth of the vegetative cover where needed had been conducted. On June 15, 2022 the Bristol Town Administrator, Valerie Capels and Steven Palmer participated in a follow up meeting with the solar array project manager for Acorn, Nick Morehouse. Mr. Morehouse confirmed that the solar array construction was not fully complete as of the date of the annual inspection and that additional work to address re-establishment of the vegetative cover concerns was planned.

2.2 Drainage Systems and Surface Water Runoff

In general, the stone drainage ditches surrounding the site appear to be in good physical condition. No settlement or other similar damage was noted which would impact their operation. One section of the stone lined ditch on the south end of the former landfill appears to have recently been filled to facilitate vehicular access to the west side of the site. It is assumed that this was done to allow access during construction of the solar array (see attached photographs). Small amounts of sediment from erosion were noted directly below this area. Valerie Capels indicated that the Town would develop a plan to address this issue.

Lastly, the stone lined drainage ditch along the northwest side of the facility was noted to contain a moderate amount of brush and small trees. This ditch however appears to still be fully functional. Valerie Capels indicated that the Town would develop a plan to address this issue.

2.3 Gas Ventilation Systems

Each of the existing passive gas vents were observed during the inspection. No settlement or other visible issues were noted, and the gas vents appeared to be functioning.

2.4 Solar Array

In 2021, a new solar array was constructed on top of the former Bristol Landfill. The solar array appears to be a completely free-standing design with no buried foundations, wiring or other components that may have directly impacted the final cover integrity during construction. No notable differential settlement, lateral foundation movement, or ballast issues were noted, and the solar arrays appear to all be in excellent condition.

The majority of vegetive cover in and around the new solar arrays was limited or not existent. As previously stated, installation of the solar array project was not complete at the time of the annual inspection. According to the lease agreement with the Town, Acorn (the lessee) is required to seed all areas disturbed by construction activities with a “pollinator-friendly” seed mix. Mr. Morehouse stated that Acorn is working with “Bee the Change” to carry out that plan. Valerie Capels also confirmed that Town and Acorn are working on a plan to coordinate annual mowing of the landfill cap both inside and outside of the solar array areas. Photographs of the solar arrays are attached.

3.0 RECOMENDATIONS

The following recommendations are based upon specific items identified during the May 31, 2022, field inspection:

- A. All areas should be mowed at a minimum of once per year. Following the initial mowing, further evaluation of the vegetative cover and underlying vegetative cover layer should be performed. Mowing and re-establishment of vegetative cover (where needed) should be a priority. Where erosion is noted or vegetative cover is limited, areas should be filled (as necessary), smoothed, re-seeded and mulched. Maintenance of all newly seeded areas should be performed as needed.
- B. All brush and small tree growth within the former landfill area should be cut or mowed to prevent future root damage to the underlying final cover system.
- C. All brush and small tree growth within the existing stone perimeter drainage ditches should be removed. This appears to be an issue specific to the west side of the site.
- D. The portion of the stone lined ditch that was filled to provide access around the north side of the site should be addressed. The ditch should be re-established. If vehicular access is required in this area, a culvert could be installed and the access road re-established. In this instance, care should be taken to ensure that there are no adverse impacts to the existing final cover system.

Photographs



Photo #1 – Landfill Overview



Photo #2 – Landfill Overview



Photo #3 – Area in Need of Vegetative Cover

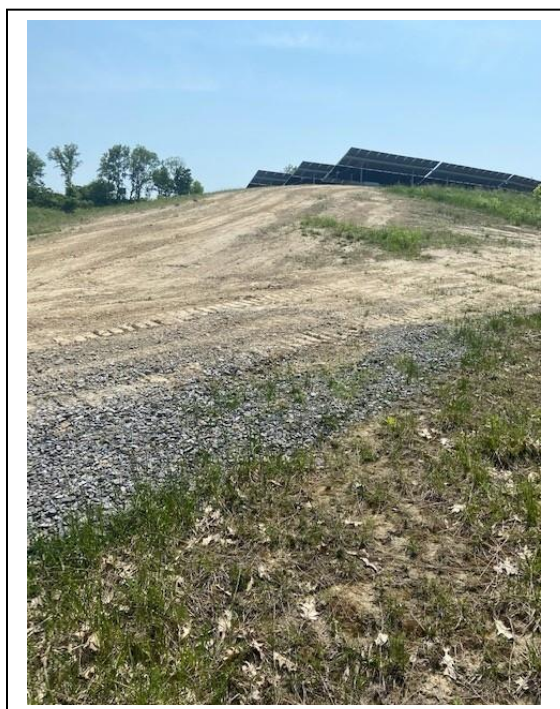


Photo #4 – Areas in Need of Vegetative Cover



Photo #5 – Solar Array



Photo #6 – Erosion



Photo #7 – Gas Well



Photo #8 – Stone Drainage Ditch Growth



Photo #9 – Filled Stone Drainage Ditch & Growth