Albion Town Landfill

Conservation and Management Plan

2020-2025

Freshkills Park, NYC, a case study in a landfill converted to parkland, recreational areas, wildlife refuges and solar energy installations

Town of Cumberland

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Executive Summary

Actively receiving trash and industrial waste from the mid 1950's to the early 1980's, the Cumberland town dump (Albion landfill site) was never formally capped, remediated and closed to the regulatory standards of the US Environmental Protection Agency (EPA) and Rhode Island Department of Environmental Management (RIDEM). With the enactment of federal hazardous waste management statutes and regulations starting in the late 1970's, more than 100 municipal landfills in Rhode Island are now subject to the federal "Superfund" act and RIDEM Landfill Closure regulations.

A RIDEM survey in the early 1990's identified landfills with high levels of contamination warranting a "Superfund Site" status. Unlike the nearby Peterson-Puritan landfill site, the Albion landfill is not on the Superfund National Priorities List. Regulatory enforcement is therefore delegated from EPA to RIDEM.

Today, most municipal landfills have been remediated, capped and closed to RIDEM regulatory standards. Cumberland's landfill has not. The process is complicated, time-consuming and expensive. However, there are two important reasons for Cumberland to move ahead. First, RIDEM or EPA could initiate legal proceedings against the Town to force action. Second, with the passage of time it becomes more challenging to document those industrial waste generators and others who can be forced to help the Town pay for the capping and closure.

There are two other incentives to initiating action at this time. The Town has secured a RIDEM grant of $150,000 to hire an environmental consultant to investigate the site to determine how to permanently and safely remediate, cap and close the landfill. The grant is also funding a legal investigation to try and secure Potentially Responsible Parties (PRP's) to help share the remediating, capping and closure costs. The Town has also hired outside counsel with a specialty in environmental law to advise the Town and negotiate financial contributions from any PRP's.

The Town could otherwise absorb the balance of the remediation and capping cost if the entire site is to be managed as open space, with the disturbed area to be essentially a grassy field.

However, there is another potential source of income which could reduce or possibly eliminate the Town's share of the cost of remediating, capping and closing of the landfill. Municipalities throughout densely-populated areas of New England have achieved a new use for capped and closed landfills- by converting the landfills to solar farms. Typically, a municipality enters into a 20 or 25-year integrated Power Purchase Agreement (PPA) with a solar energy developer. The Town derives a revenue stream from leasing the site and could lock in a fixed below market price for its use of the energy.

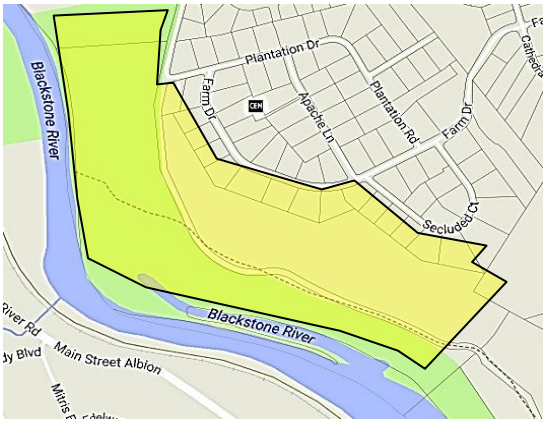
Re-using the landfill area as a solar farm would require the Town to create a separate lot consisting of the remediated and capped area, and re-zone that lot to allow a much higher lot coverage on the landfill-disturbed part of the site than the 20% allowed in the zoning ordinance. The rest of the land would remain zoned Open Space.

Regardless whether the site remains open space or has a solar farm in its center, it is important that the site design include a hiking trail system for public use. A potential trail extension north from Kennedy Court to Manville Hill Road along an existing Town right-of-way should be explored.

This Conservation and Management Plan includes case studies relating the landfill closure and solar farm conversion experiences of East Providence, North Providence, South Kingston, Coventry, Dartmouth MA and Scituate MA.

1. Introduction

Site. The 51.25-acre Albion Landfill property (Plat 55/Lots 2 and 12) is located along the Blackstone River and can be accessed from the Blackstone River By-Way (also known as Old Albion Road), which extends off Albion Road. Owned by the Town of Cumberland, an estimated 26 acres of the site is occupied by an unlined municipal landfill. The landfill area is wooded with the Blackstone River By-way passing approximately through the center line of a portion of the landfill property.



Albion landfill site abuts the Blackstone River

The property is bordered along the north by a 68-acre parcel (AP 54 lot 36) owned by the Cumberland Water Department and private homes located off Farm Drive and Secluded Court, to the east and west by privately-owned and State-owned undeveloped land, and to the south by the Blackstone River and two parcels totaling 28 acres, owned by the Joseph Rossetti family. There are two Exxon Mobil underground transmission pipes that run the length of the property.

Landfill History. The site was first used as a landfill in 1954. The Town purchased the property from the Cumberville Corporation on July 16, 1956.

The 29-year period (1954-1983) the "Cumberland Town Dump" was in active use before the enactment of comprehensive laws and regulations governing waste management (the Resource Conservation and Recovery Act was enacted in 1976). Industrial byproducts in particular were regularly disposed of in such sites along the Blackstone River. An unfortunate legacy of that time are a number of polluted sites that now require expensive clean ups. In fact, a nearby disposal site in Cumberland, now known as the J.M. Mills/Peterson Puritan Superfund site, is 62 acres and will cost the responsible parties as much as $40 million to remediate.

The Albion landfill accepted household, industrial, institutional and commercial waste. Landfilling operations began in the southwestern portion of the site, and then continued to move north and along the Blackstone River.

The Mossberg/Hubbard Pressed Steel Company disposed of liquid plating waste at the Albion landfill starting in 1971, depositing about 6,000 gallons per day. That amount increased to about 11,000 by 1980. Mossberg ceased this activity in 1983. The only documented area of disposal was into a 20 foot-wide by 20 foot-long by 3-foot deep pit located to the northeast of the site entrance. There may have been more than one liquid disposal pit. The potential disposal pits areas are located within the southwestern portion of the site and are adjacent to the existing access road.

Owens-Corning Fiberglass Corporation also dumped substantial amounts of chemical wastes before 1978, and as of 1978 was depositing about 7500 yards of fiberglass waste per year. That year, Owens-Corning closed its facility in the historic Ashton Mill. All of their chemical waste (including organic chemicals, solvents, and acids) were documented by RIDEM to be disposed of at the Albion landfill. Up to that point, about 7,800 cubic yards per year of fiberglass waste generated by Owens-Corning, were being landfilled at the site.

The Town's landfill license expired in February 1979, but small-scale disposal is thought to have continued on approximately three acres until 1983.

In the intervening 37 years the site has been managed as open space, with the Town responding to occasional nuisance complaints such as illegal dumping and ATV use. Otherwise, the land is used for hiking.

2. Town Liability

Over the years RIDEM has notified the Town of its responsibility to remediate and properly cap the landfill. Prolonging inaction is not now a viable option, as at some point either RIDEM will initiate legal action against the Town and/or surrender the case to the Environmental Protection Agency, which has its own methods of forcing property owners to take action. Further, the longer the delay, the more difficult it can be to secure the legal commitment of Potentially Responsible Parties (PRP's) to help pay for the remedial action and permanent closure of the site.

State and Federal Requirements. The Albion landfill is listed on RIDEM's State Solid Waste Facilities/Landfill list and "State Sites" inventory, and is subject to CERCLIS (Comprehensive Environmental Response, Compensation and Liability, or "Superfund"). RIDEM has primary oversight responsibility for the investigation. The site is not on the Superfund National Priorities List.

The landfill is subject to two RIDEM regulatory programs:

1. *Solid Waste Program* (due to its former use as a solid waste disposal facility)
Solid Waste Regulation #2; and the Closure Policy for Inactive or Abandoned Solid Waste Landfills (see Appendix A)

2. *Site Remediation Program* (due to its CERCLIS designation).
The Town is required to submit to RIDEM a Site Investigation Work Plan (SIWP), andInvestigation and Remediation of Hazardous Materials Releases.

Site Investigations. There have been multiple inspections and testing of the property over the years:

1967	RI Dept. of Natural Resources	*Documentation of landfill waste*
1978	Roy F. Weston	*Groundwater Study*-federal standards exceeded
1988	NUS Corporation	*Site Reconnaissance and Sampling Trip Report*
1989	NUS Corporation	*Final Screening Site Inspection Letter Report*
1993	RIDEM	*Sediment sampling study*
1993	RIDEM	*Field Investigation Report*
1993	RIDEM	*Field Investigation Report*
1993	RIDEM	*Site Inspection Prioritization Final Report*
2011	GZA Environmental	*Site evaluation relating to Brookenick project**

*In 2011 the Town was involved in a legal dispute with the owner of a property abutting the landfill site that was proposed for a residential subdivision, over alleged contamination emanating from the landfill. The Town engaged GZA Environmental to perform necessary testing. The Town ultimately settled the case with the owner by acquiring the property.

RIDEM issued a report on November 30, 1994 "Cumberland Municipal Landfill Site Inspection" (RID-980512701), which details a number of findings up to that point.

3. Initial investigation and design

In late 2016 the Town initiated a series of discussions with RIDEM to review the status of the Albion Landfill case. One of the outcomes was a $150,000 grant (the source being an Owens-Corning settlement fund) to the Town to help pay for the investigation phase of the site clean-up, including for the following purposes:

a. *Site Investigation Work Plan (SIWP)*. This project was completed by GZA Environmental in August 2017 and was approved by RIDEM that November. The Plan is based on a cursory site investigation and review of RIDEM case files. The Plan establishes the anticipated landfill site limits and prescribes a soil and groundwater testing regimen.

b. *Investigative services*. In 2018 the Town hired an investigator who performed an evidentiary review to identify Potentially Responsible Parties (PRP's) who could be required to share the cost of remediation and proper closure of the landfill.

c. *Legal Services.* The Town is in the process of selecting a law firm specializing in landfill closures. The firm will review all records and the 2018 investigation report, advise Town officials and represent the Town's interests relative to negotiating with PRP's.

d. *Site Investigation and design of remediation and landfill cap*. The Town is selecting an environmental engineering firm to complete the site investigation. They will delineate the area of hazardous waste material by digging test pits, installing groundwater and soil gas monitoring wells, sampling excavated material, analyzing groundwater and soil gas and evaluating leachate breakouts. The firm will prepare a Site Investigation Report that includes detailed remediation and capping specifications. The Report will serve as the basis for a Request for Proposals for the remediation of the site and the installation of an impermeable cap. The consultant will also remain to provide technical supervision during the remediation and construction project.

4. Remediation, Capping and Closure

The landfill area lies within the red border above, covering 26 acres of the 51-acre parcel. The Site Investigation Work Plan implementation will include accurately delineating the depth and breadth of contamination by digging test pits and installing monitoring wells. These field results will determine the scope and specifications for the design and installation of landfill cap. The large volume of gravel and soil required is usually the most expensive component of a capping project. One potential source would be the Narragansett Bay Commission's Combined Sewer Overflow tunnel extension project, where the NBC is seeking repositories of the generated "clean" fill.

If levels of contamination are low, a simple earthen cap may be feasible, along with grading and shaping of material, grass mulching and seeding and monitoring. If environmental conditions require it, a multi-layer engineered cap may be required. An engineered cap typically consists of an impermeable layer (either plastic or clay) that protects infiltration of rainwater into the landfill. That is topped with a layer of sand for drainage, then vegetation.

The cost of remediation to the Town will depend on the approved specifications and the success in securing PRP's to help pay for the project. State programs that might be able to help defray costs include: RIDEM Brownfields grants, Clean Water Revolving Fund loans, Efficient Building Fund loans and Infrastructure Bank loans.

5. Option: Open Space

If the Town wishes to absorb the cost of the remediation and capping, the site could be managed as open space, with the disturbed area (in yellow) to be essentially a grassy field. A public hiking trail system should be designed for post closure use. A potential trail extension north from Kennedy Court to Manville Hill Road along an existing Town right-of-way (in white) north of the landfill, along the east edge of the Cumberland Water wellhead property (in orange) should be explored.

6. Proposed re-use: solar farm and hiking trails

Converting the Albion landfill to a solar farm could significantly defray the Town's share of the cost of landfill remediation, capping and closure. EPA's "Repowering America's Land" (https://www.epa.gov/re-powering) webpage provides valuable insights into siting renewable energy projects on landfills and other contaminated sites

The Town declares its interest in determining the feasibility of installing a solar farm on as much of the 26-acre landfill area as practicable. If so, conversion of the landfill to a solar farm must be incorporated into the Site Investigation Report as part of the remedy. In Rhode Island, landfills consume approximately 6.6 acres of area to generate 1 MW of photovoltaic power. As such, the Albion might support the development of as much as 3 megawatts of electrical energy.

Developing Landfill Solar. As a first step, the Town would first issue an RFQ/RFP for a technical assistance contract (TAC) to engage a consulting firm specializing in developing specifications for the site's reuse as a solar farm and assisting the Town in selecting a developer in a way that tightly controls the development and provides maximum financial benefit to the Town. The pre-development and permitting process for the solar farm development should be initiated at the same time the environmental Site Investigation Work Plan implementation is being conducted.

The Town should consider negotiating with a solar developer an "integrated" Power Purchase Agreement (PPA), which is a long-term contract to buy renewable electricity at a predetermined rate. The term "integrated" refers to the complement of services secured through the agreement: financing, turnkey construction and operations and maintenance.

The PPA developer absorbs the costs of design, construction, operation, and maintenance. The developer would have to complete an Impact Study, costing as much as $100,000, which details how the solar energy installation would connect to National Grid's system.

The Town would realize a "renewable tariff", a lowering its lower utility bill as it purchases the clean solar electricity produced at a predetermined below-market rate. This would protect the Town from escalating energy rates. Attached to the local utility grid, the Town substitutes a portion of its traditional monthly electric bills with the bill for the solar energy used. The PPA developer consumes any available solar incentives and passes the savings on to the Town.

A typical PPA includes: a 20-year contract length; a positive cash flow in year one; a fixed escalator of 2-4% per year; multiple buy out options or the system can be removed at the end of the contract; and an option to extend the contract beyond its original term.

The Town would also realize tangible property taxes on the solar equipment.

The Renewable Energy Growth (REG) Program supports the development of locally-based wind, solar, anaerobic digestion and small scale hydropower projects. It governs long term renewable energy contracts relating to power purchase agreements for utility-scale projects, such as the Deepwater Wind offshore wind farm. Under the program, the Distributed Generation Board sets ceiling prices that developers can charge for renewable energy. The prices vary based on the type of system and its size by taking into consideration the costs of individual technologies, returns on investment and economies of scale. Projects bid within their classes with prices that do not exceed the ceiling. The winning bids are rewarded with 15 or 20-year tariff payment contracts with National Grid.

Tariff payments have been approved for more than twenty medium, commercial, and large solar projects. In the case of the East Providence City landfill conversion project, solar developer CME Energy was awarded a contract that pays 23.9 cents per kilowatt hour, a price significantly higher than that for power generated from fossil fuels. This higher rate was critical to the financial feasibility of the project.(http://www9.nationalgridus.com/non_html/CM6021RenewableDistribution3_17.pdf)

Possible site constraints. Developing landfill solar projects can be challenging. The Town of Charlestown's dump initially looked promising, but the closest suitable power grid connection was four miles away. An informal assessment shows there is three phase capacity located not far from the Albion landfill. There would have to be a confirmation of a right-of-way access that allows vehicular access and the installation of transmission lines. Security fencing and adequate vegetative buffers protecting neighboring residential areas would have to be carefully designed.

For the Albion site, solar arrays would have ballasted tray mounts so as not to perforate the landfill seal. The Exxon Mobil transmission pipeline would have to be avoided.

Subdivision, Zoning and Comprehensive Plan. The site presently consists of two large lots located either side of an existing Town right-of-way, both zoned Open Space. The Town Administrative Officer would realign the lots, to have one consist of the landfill area and the other the surrounding open space. The Town Council would then change the zoning designation of the new landfill lot to allow the installation of a solar energy system.

The Cumberland Town Comprehensive Plan supports Action Item P10 specifies: “The Town should pursue… siting its own solar energy installations, where appropriate, on parcels or structures with institutional use.”

However, the Town Council would also have to amend Action Item L3 of the Town Comprehensive Plan: “Refrain from granting zone changes representing a “significant” intensification and density increase (with the exception of appropriate affordable housing)”.

Hiking trails. This site is quite scenic and valuable for passive recreation. The redesign of the site should include a hiking trail system that is independent of the solar farm. Town staff should work with the Cumberland Conservation Commission, Friends of the Blackstone and Cumberland Land Trust to this end.

7. Landfill Closure Case Studies

The RIDEM Division of Waste Management maintains a list of municipal landfills in the process of being remediated, capped and closed: http://www.dem.ri.gov/programs/benviron/waste/pdf/swfacs.pdf.

A sampling of municipal landfills in the process of closure includes:

Johnston A Street Cece/Macera landfill
The Town is in the process of re-grading their landfill cap for proper drainage, and intends to install a solar farm

New Shorham Block Island landfill
The Town is out to bid to cap and re-grade the landfill, installing a stone revetment on the seaward slope. Project expected to be completed by end of 2018.

North Kingston Hamilton Allenton Rd landfill
The project is at the planning stage for closure. The Town has torelocate a drainage pipe that exists underneath the landfill.

Portsmouth Town landfill
The Town is currently capping the landfill, and reuse of property has yet to be decided.

The following is a more in-depth case studies of six area municipal landfills:

a. East Providence



The City of East Providence bought the Forbes Street property in 1965 and operated it as a dump for household and commercial waste from 1969 to 1979. The City closed the landfill in 1980 but it was never properly capped. The City determined there were no PRP's and would have to self-finance the remediation.

In 2010, the City turned to solar power. The landfill is a mile from the Kent Street substation operated by National Grid and electrical lines are nearby on Forbes Street. That fall, a request for proposals was released to interested developers.

CME Energy and Hecate Energy were chosen over six other bidders. William Martin, the Boston-based developer of the project is a project finance specialist. Their proposal was backed by D.E. Shaw & Co., the New York investment firm that also financed Deepwater Wind's wind farm off the Rhode Island coast. Under an agreement with East Providence, CME pays $40,000 annually to lease the land and another $30,600 in lieu of taxes. It paid $20,000 to retain on option on expanding the project. If the solar panels generate more than 95 percent of their potential output, the City receives $20 per additional megawatt up to $31,000.

The Rhode Island Commerce Corporation awarded CME a $200,000 grant from the state Renewable Energy Fund, which is supported by a surcharge on electric ratepayers. A few months later, the Corporation granted another $100,000 in federal stimulus funds.

In 2012, the City initiated the remediation for the 30-acre section of its 70-acre former landfill. The City hired engineering firm Terenzia and Associates to provide technical services and public outreach relating to the landfill closure. The City Highway division cleared and graded the site. The City saved $1 million by being able to secure 50,000 square feet of gravel and demolition debris from the I-195 reconstruction project, delivered to the site by RIDOT at no cost, for cover material.

CME Energy, and its solar energy specialist partner Hecate Energy, installed the solar arrays over a five month period in 2013. They capped the landfill with clean soil, leveled it and then 35 workers trained by contractor SolBright Renewable Energy started mounting the solar panels.They secured aluminum trays to the ground using foot-long spikes and weighed them down with 35-pound concrete blocks. Racks, also made of aluminum, are attached to the trays.

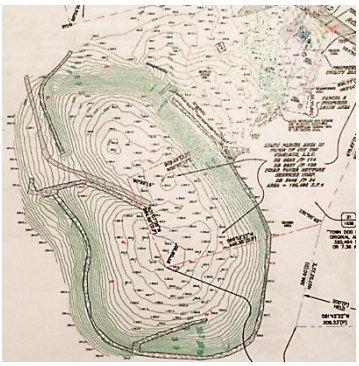
Completed in 2014, the 12,848 panel facility generates 3.7 megawatts of power to National Grid under a 15-year purchase agreement. The developers, CME and Hecate recently signed a 20-year PPA with National Grid to expand the project with an additional 4.07 megawatts of power.

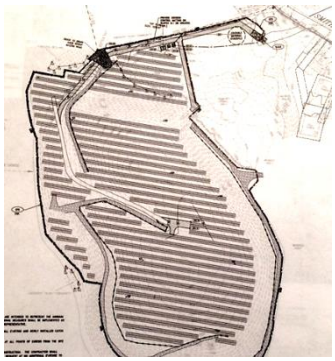
This solar farm development is part of a $9-million project to transform the one-time trash dump intoone of the largest solar farms in Rhode Island. It also is the first one built on a landfill in the state. Twenty-two acres of tainted land with no other use has been repurposed to generate clean electricity, enough to supply about 500 typical Rhode Island homes. https://vimeo.com/187720872

When the solar farm is fully expanded, East Providence will be paid as much as $250,000 a year to lease the land, earning as much as $5 million over the next 25 years.(sources: Providence Journal 10/5/2013 and CME-Energy.com)

b. North Providence

In 2016, the Town approved leasing part of the closed landfill off Smithfield Road for a 2.5 megawatt solar farm. The development of 7000 panels on 13 acres of the landfill property is consistent with guidelines spelled out in the town's Comprehensive Plan.





After a competitive process, Town officials selected Southern Sky Renewable Energy RI LLC and RJB Properties LLC to develop the property. A 25-year deal with Southern Sky is expected to bring some $150,000 in annual revenue to the town and allow officials to power municipal buildings at a reduced rate.

A small building is to be constructed next to the landfill to store electrical equipment. Solar collectors will send electricity from the solar panels to National Grid through a connection on the other side of the building. The Town is responsible for monitoring and maintenance of the landfill cap, while the solar company assumes any responsibility for damage done as part of operation of the solar site. (source: Town of North Providence, Valley Breeze)

c. South Kingstown and Narragansett

The 20-acreRose Hill landfill Superfund site is located in an abandoned sand and gravel quarry and encompasses approximately 70 acres. From 1967 to 1983, it was operated by the Town of South Kingstown under a RIDEM permit, receiving waste from residents and industries within the Towns of South Kingstown and Narragansett. In October 1983, the site reached its permitted maximum capacity.

EPA began an investigation into the nature and extent of contamination as well as the impact of the site to public health and the environment in three separate disposal areas. In 1994 Metcalf & Eddy completed a remedial investigation and in 1998 a feasibility study for the site. EPA selected a final cleanup remedy for the site in 1999, requiring "horizontal containment" (capping), landfill mining, leachate collection and on-site treatment, combined with gas collection and treatment. A Final Remedial Design Work Plan was completed in 2003 and a Field Investigation Summary Report in 2004. A Final Cap Design Report was completed in December 2004, and contract documents (plans and specifications) for Phase I were completed in January 2005.

Contract documents (plans and specifications) for Phase II were completed in May 2006. A contract to perform the work was awarded to E.T.& L. Corporation with Notice to Proceed issued by RIDEM in September 2006. Construction technical support and construction quality assurance (QA) services during Phase II remedial activities were provided by Berger. Landfill closure work performed by E.T.& L. was judged to be substantially complete by Berger on September 27, 2007. (source: Louis Berger, Rose Hill Landfill Superfund Site Post-Closure Operations and Maintenance Plan 2008)

In 2015 the Town of South Kingstown engaged Competitive Engineering Services of Portland, Maine under a blanket contract through the University of Rhode Island. Competitive Engineering Services is paid a monthly retainer. The firm drafted an RFP "On-Site Solar PV and Excess Renewable Net Metering Credits Power Purchase Agreement" requiring submissions by November 20, 2015.

"Solar bidders" were to "clearly specify the fixed price per kilowatt hour, along with and escalators possible, for each year of the proposed term". Rose Hill is one of two parcels offered for lease. Specifications detail the solar installation, operations and maintenance, and other contingencies.

The South County Solar Consortium, comprised of the Towns of Narragansett and South Kingstown and the University of Rhode Island (with consulting assistance from Competitive Energy Services) selected Kearsarge Energy of Watertown, MA (www.kearsargeenergy.com) for the Rose Hill Superfund Site Solar Energy Facilities project.

Kearsarge's agreement includes a "Net Metering Credit Sales Agreement" (NMCSA) that defines the financial terms for the flow of energy credits and revenues from each site to the Consortium. Kearsarge will finance, develop, own, operate, and maintain the solar energy generation facilities at two sites. The project is expected to qualify under the State's net metering regulatory framework as an eligible energy producer, and will therefore generate Net Metering Credits for each kilowatt hour of electricity that is produced at each site. Those credits have a tangible value, and the Consortium partners will each receive said value (discounted per the accepted offer terms from Kearsarge during the Request for Proposal phase) – Kearsarge will sell the credits to them, less a percentage discount.

Under this model, the financial risk to develop, own, operate, and maintain the Solar Energy Facilities project rests with Kearsarge, and over the life of the Agreement (twenty years), Kearsarge recovers their costs by retaining a percentage of the value of the energy credits. To the Consortium members, the savings will be reflected in their monthly electrical energy generation bills. The final percentage discount will relate to the interconnection costs for the project to convey power to National Grid. (source: Narragansett Town Council meeting memo October 2, 2017)

d. Dartmouth MA

This 1.3 megawatt solar array on the Town's capped landfill is designed to replace 20 percent of the Town's electricity use. The Dartmouth landfill solar power installation consists of 5,369 Yingli 240 watt solar modules mounted on solar Flex Rack equipment affixed to the ballasted ground-mount system. The modules are wired in 413 strings of 13 modules and strung to two SMA 500kW inverters.

Panel strings are spaced to accommodate any ground settling that might occur over the life of the system. Through a no-money down, third-party financed, power purchase agreement (PPA) with Borrego Solar, Dartmouth is able to purchase the generated power from the landfill solar project at a rate of $0.08 per kilowatt-hour, about $0.05 per kilowatt-hour less than what local utility NSTAR charges. The savings generated from the landfill solar energy system are approximately $3 million over the 20-year life of the PPA term. Dartmouth also generates revenue by collecting taxes from the solar project as it was constructed within the town limits. *"We have a little business here that we project will generate us about $13 million in savings over 20 years."* David G. Cressman Town Administrator, Dartmouth (source:borregosolar.com)

e. Coventry

The 10-acre site located near the Centre of New England business park was active from the late 1940s to the late 1970's, accepting household to commercial waste from around the state. Soil placed on top of the waste eventually eroded. In 2003 RIDEM targeted it for proper closure. The site contained industrial waste that had been disposed of by a number of companies who are now required to pay for remediation, estimated at $5 million. The Town is responsible for the majority of the cleanup costs. Six private parties are responsible for the remainder of the costs-Mallinckrodt; Chevron; CNA Holdings; Arkwright/OCE; Sunoco and Teknor. All other companies "bought out" of the site and have no further responsibility.

The Town's consultants Alliance Environmental and GZA Environmental are designing the remediation and capping of the site. The Town is accepting up to 300,000 cubic yards of DEM-approved BUD (Beneficial Use Determination) material, which allows the Town to charge a fee to accept slightly contaminated soils through to acceptto be used beneath the cap. The project is expected to be completed in 2021. (source: Coventry Courier 10/17/17)

f. Scituate MA

Scituate's town-owned landfill operated from 1976 until 1999, accepted solid waste, construction debris, and residuals from a wastewater treatment facility. In 2000, the landfill was capped. In 2010, the Town issued a RFP and selected Brightfields Development, a Wellesley, MA developer. Brightfields worked with the Town, National Grid, and others to tackle challenges and ensure the installation of what is now home to a 3-megawatt (MW) PV installation that, in combination with a nearby wind turbine, provides Scituate with 100% of its municipal power needs from renewable sources.

The site was capped and confirmed compliant with Massachusetts Department of Environmental Protection (MassDEP) standards. The site being relatively flat, unshaded and sloped southward and out of the view of residential neighborhoods made it a good candidate for a solar farm. The RFP response prices were more competitive than expected, with proffered Power Purchase Agreement (PPA) prices in line with those of the Town's wind turbine.

To ensure the selection of a sufficiently experienced and credible developer that would see the project to fruition, the town pared down RFP responses based on qualitative factors before reviewing price estimates. The Town eventually selected Brightfields, who offered the town an 8.4 cent/kWh PPA price through Main Street Power, with Brightfields retaining the solar renewable energy credits (SRECs). Brightfields is also affiliated with Renova Partners, a national brownfields investment and development company.

In addition to selecting a qualified developer with relevant experience, Scituate officials also benefitted from MassDEP's support. The state agency was proactive in supporting the required post closure permits, and responded quickly to draft documents and inquiries with thorough and helpful feedback. The project sponsors submitted an application and supporting engineering documents in May 2011 to MassDEP for a "Post-Closure Use Permit" (which is required for any closed landfill that is being re-purposed for other uses). MassDEP issued the necessary permit in September 2011.

While site conditions and liability were addressed in the full site evaluation and lease agreement, the installation encountered roadblocks, beginning with connectivity issues to the grid. The initial evaluation indicated the project would be a fairly simple interconnection to a three-phase distribution line adjacent to the site. However, the circuit to which the solar array would connect already hosted the Town's wind turbine at the nearby wastewater treatment site. National Grid was concerned about the capacity of the existing 10 MW 13.8-kilovolt (kV) distribution line to manage up to 5 MW of variable power without risk to circuit integrity. Utility officials initially estimated upgrades of as much as $900,000 would be needed to accommodate the solar PV system.

Rather than cancel or revise the project, Brightfields worked with National Grid to research the concern and see whether it could be addressed in other ways. Using studies from the U.S. Department of Energy's National Renewable Energy Laboratory and other data, Brightfields and National Grid conducted extensive modeling and analysis. The team determined the wind and solar would actually complement one another in terms of time of energy generation, and that the anticipated impact on the area grid was not a major factor. Good communication and collaboration between the utility and the developer resulted in the interconnection being completed with minimal upgrades.

The second roadblock Brightfields faced was financing because of the way in which Massachusetts' SREC market had evolved. In Massachusetts, as in most other states with Renewable Portfolio Standards (RPS) requirements, utilities purchase SRECs to meet state-mandated RPS solar carve-out requirements. Brightfields based its original financials for the Scituate project in part on the assumption that SRECs generated by the project would be worth at least $285,00 in accordance with the floor price set by the state's Department of Energy Resources Solar Credit Clearinghouse Auction. However, a secondary market evolved for the Massachusetts SRECs, with utilities choosing to buy SRECs only one year forward. As a result, SREC prices were driven substantially lower than expected. This changed the financial assumptions of the Scituate project and forced Brightfields to seek a new financial partner. Brightfields worked with the town to secure project extensions on its contractual deadlines while it sought new financing.

To help town leadership assure residents it was holding the developers accountable to see the project through, while simultaneously reconfirming Brightfields' commitment to the project, Brightfields and its financial partner Syncarpha Capital submitted a $109,500 security deposit from which liquidated damages were subtracted for each day the project remained incomplete past the initial June 15, 2013 deadline. The Town also maintained the option to cancel the entire contract if the project remained incomplete as of the new December 15, 2013 deadline. Brightfields and Syncarpha were eventually able to close a financial deal with MS Solar Solutions and proceed with the installation.

In September 2013, Scituate officials joined Brightfields and its partners to proudly flip the switch on the Town's landfill solar installation. The developer also partnered with Town officials and school personnel to develop and implement a solar curriculum for K-12 students in the town.

Key Takeaways from Project Participants

• While costs are an important consideration, towns should also evaluate a developer's ability to deliver a finished project and overall areas of expertise. Scituate officials evaluated credibility, experience, permitting expertise, and financing abilities before considering price. Towns and developers should both consider the long term, which includes ensuring the underlying economics of a project make sense and that the selected developer can withstand changes in the market.

• Contracts should include clear and consistent deadlines, including milestones along the project development process. Not only does this set expectations early on and hold all parties accountable at appropriate phases in the project, it provides a means for regular communication and the chance to address roadblocks as soon as possible.

• Having a good understanding of site conditions is critical to the success of a project. Especially when considering a renewable energy project on a brownfield site or landfill, developers should gather as much information about the site as possible, including collecting information about the site's history and conducting site assessments as appropriate. Issues discovered during the assessment are not necessarily deal-breakers, but knowing the site and partnering with the town to determine liability ahead of time can reduce headaches, expense, and environmental issues.
• Support from state and local agencies can be crucial. Scituate notes that MassDEP was supportive of the landfill solar project, which saved the town and the developer both time and money. In particular, MassDEP offered clear and consistent permitting guidance, and was responsive to questions and permit submittals.

• Communicate with the community during all phases of the project. Though the Scituate community already had a demonstrated commitment to environmental and sustainability issues, the town made no assumptions about whether the community would support the solar project. Scituate officials engaged residents through town meetings and various public relations activities from the earliest phases of the project. The town was transparent about challenges as well as benefits.

• Communication among the developer, the Town, and other stakeholders is also crucial. Scituate officials, Brightfields, MassDEP, and other stakeholders such as National Grid maintained regular communication and insisted on transparency about progress and concerns. This facilitated the partnership approach that helped the project overcome technical and financial hurdles. (source: https://www.epa.gov/sites/production/files/2015-04/documents/scituate_landfill_case_study.pdf)

Appendix:
RIDEM Office of Waste Management
Closure Policy for Inactive or Abandoned Solid Waste Landfills

1.0 Applicability

This policy is applicable to all inactive or abandoned solid waste landfills1 that ceased operation (stopped accepting waste) prior to April 1992, and which have not received a final Certificate of Closure from the Department of Environmental Management (RI DEM) or the Department of Health (DOH).

2.0 Background

More than 100 landfills have been identified within Rhode Island and approximately 30 of these sites are already being evaluated through the Waste Facility Management Program, the State Site Remediation Program, the NPL/Department of Defense (Superfund/DOD) Program, and Superfund Site Assessment (CERCLA) Program. The majority of the remaining sites are abandoned municipal and private landfills, some of which were never licensed for solid waste disposal. Department records indicate that approximately forty of these landfills received oversight from the

Department's Solid Waste Program during the operation and/or closure of the landfill, but many did not complete the required closure procedures. Because the operating standards, closure and post-closure procedures that were required of these landfills were only minimally protective of human health and the environment, even those sites which did complete the minimal closure requirements (yet did not receive a Certificate of Closure) may still pose a potential or actual threat to human health and the environment.

To evaluate the potential threats posed by these sites, all of the landfills that were known to the Department in the 1980s were listed on the US EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), a federal inventory of actual or potential contaminated properties. By placing the sites on CERCLIS, this made them subject to investigation and remediation under Federal Superfund Legislation (CERCLA and SARA (Superfund Amendments and Reauthorization Act), as well as state regulations. During the 1980s and early 1990s, the EPA and RI DEM Site Assessment Programs completed an initial site assessment of the majority of these sites, providing limited information and environmental data. However, additional investigation has been forestalled due to limitations on funding and staff at the state and federal levels. As a result, the full extent of contamination and environmental impacts at many of these sites remains unknown.

In an effort to understand the impacts associated with these sites, the Department, in cooperation with the U.S. Environmental Protection Agency took the initiative and developed the Landfill Closure Program (LCP) in an effort to by-pass the Federal Superfund Process and streamline the investigation, remediation and closure of these inactive landfills. This alternative is both cost effective and much less time consuming when compared to the traditional Superfund process.
Under the Landfill Closure Program the Responsible Parties will be responsible for coordinating, contracting and funding (assistance may be available) the investigations and closure or remedial action plans under the guidance and oversight of Department personnel. This allows the Office of Waste Management to focus its resources on accelerating the review and approval process. The regulatory authority and oversight of the Site Remediation Program, Waste Facility Management Program, and CERCLA Site Assessment Program will be combined and coordinated, providing a simultaneous review of the assessment, remediation, and closure of these sites under all applicable state Solid Waste and hazardous Site Remediation Regulations. Parties that enter into the LCP may also be able to work toward beneficially reusing the property (dependent upon actual site conditions) for public works garages, transfer stations, cell phone towers, recreational activities, and/or other appropriate uses.

3.0 Purpose
This policy, which is the first step in the implementation of the LCP, is being established to clarify the applicability of current regulations and as an acknowledgement that improper closure or abandonment of solid waste landfills may pose a threat to human health or the environment through actual or potential releases of hazardous materials to soil, sediments, groundwater, surface water or air. Older landfills may pose an increased risk because there were no restrictions on the types of wastes accepted, resulting in the possible disposal of hazardous materials, hazardous wastes, liquid wastes and industrial wastes into many of these landfills. Coupled with a lack of requirements for liners and run-on/runoff controls, groundwater and surface water resources may be compromised. These factors formed the rationale in the 1980's and early 1990's of placing all the known landfills in Rhode Island on the EPA CERCLIS list of hazardous waste sites. The objectives of this Policy are:

1. To address actual or potential human health and environmental risks which may have resulted from abandonment or incomplete closure of landfills.

2. To satisfy all applicable state and federal regulations regarding solid waste facilities and remediation of contaminated sites in a single coordinated review process, potentially resulting in a Letter of Compliance from the RIDEM a letter of No Further Action from the US EPA and archival from CERCLIS.

3. To facilitate potential limited reuse of the landfill property once adequate investigation, risk assessment and, if necessary, remediation have been completed at the site. The allowable types of reuse would be stipulated on a land usage restriction recorded in the municipal land evidence record of the property.

4.0 Authority
This policy is applicable to those landfills that ceased operation prior to April 1992. The operation and closure of these sites was governed by three earlier versions of the Solid Waste Regulations that were promulgated in 1969, 1975 and 1982. Both the 1975 and 1982 Solid Waste Regulations provided for the issuance of a Certificate of Closure upon the Department's determination that closure of the landfill had been satisfactorily completed. Any landfill that ceased to

accept waste for landfilling prior to 1992 and has not been issued a Certificate of Closure from the Department is subject to closure under the Landfill Closure Program. All landfills subject to closure under the Landfill Closure Program must comply with: the Department's Rules & Regulations for the Investigation and Remediation of Hazardous Material.

Releases. Additionally, to prevent direct exposure to waste, all fill areas must be covered with at least two feet of clean fill. Finally, the Department may also require the landfill to comply with such provisions of its current Rules & Regulations for Solid Waste Management as may be necessary to address any actual or potential threats to human health or the environment presented by the landfill that would not otherwise be adequately addressed.

Where a release or potential for release of hazardous materials has been observed or documented, the site also becomes jurisdictional under the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations), as amended February 2004.

For the purposes of the Landfill Closure Program, the requirements of the Remediation Regulations and the Solid Waste Regulations are combined to provide a more streamlined regulatory approach to the assessment, remediation and closure of these landfills. At the completion of the required remedy and closure of the landfill through this Program, the site will have achieved compliance with both the Remediation Regulations and the Solid Waste Regulations. In addition, those sites listed in the Federal CERCLA Program may be eligible to receive a No Further Action letter from EPA and be archived from CERCLIS once the Program objectives have been met.

5.0 Implementation of the Landfill Closure Program

The initial phase of the LCP will address municipally owned or operated landfills. The Department shall contact municipalities and/or current owners of the sites to encourage voluntary participation in the Program by promoting the reduction of human health and environmental risks, decreased liability and potential beneficial reuse. Owners and operators of non-municipal landfills may also approach the Department for inclusion of their site(s) in the LCP.

Once a municipality or other responsible party decides to volunteer under the Landfill Closure Program, an environmental consultant should be hired to develop a Site Investigation Work Plan (SIWP). Upon Department approval of the SIWP, the responsible party and the Department will enter into a Memorandum of Agreement. This Agreement allows the Department to notify the USEPA that the site is being investigated through the State Program rather than under the Federal Superfund Assessment process. Once the Memorandum of Agreement is signed, the investigation of the landfill may commence.

The investigation of each landfill must adequately assess the nature and extent of contamination at the site and evaluate possible remedial alternatives for the site in accordance with Section 7.00 (Site Investigation) of the Remediation Regulations and Rule 2.1.09 (Closure and Post-Closure Plans and Financial Assurance) of the Solid Waste Regulations. The preferred remedy for the landfill shall satisfy Sections 9.00 and 11.00 (Remedial Action Work Plan and Remedial Action) of the Remediation Regulations. The Department may require, based on site specific information, implementation of certain closure requirements outlined in Rule 2.1.09 (Closure and Post-Closure Plans and Financial Assurance) of the Solid Waste Regulations as necessary to protect human health or the environment. Upon completion of the remedy and closure of the landfill, a professional engineer registered in the State of Rhode Island must certify that the landfill has been properly remediated and closed in accordance with the approved Remedial Action Work Plan and/or Closure Plan. Upon receipt of this certification, the Office of Waste Management will issue either a Letter of Compliance or Interim Letter of Compliance to the landfill owner recognizing satisfactory completion of the remedy and closure. A Letter of Compliance will be issued if there are no groundwater objective exceedances in accordance with the Remediation Regulations, whereas, an Interim Letter of Compliance will be issued if groundwater objective exceedances exist at the site. In either case, post-closure monitoring of the landfill shall be required in accordance with the Solid Waste Regulations.

Once the CERCLIS-listed sites have achieved compliance with the State Solid Waste and Remediation Regulations, an additional step is required to archive them from CERCLIS. The 1997 Superfund Memorandum of Agreement between the RIDEM Office of Waste Management and USEPA Region I allow all properties that have been satisfactorily investigated and remediated in accordance with RIDEM's Remediation Regulations to be archived from CERCLIS. Upon RIDEM approval of a Remedial Action Work Plan and/or Closure Plan RIDEM may request that EPA change the CERCLIS site status to be "subject of voluntary remediation pursuant to the Remediation Regulations". Following issuance of a Letter of Compliance or Interim Letter of Compliance, the Office of Waste Management may request that EPA archive the site, removing it from the list of active CERCLIS sites.