TOWN OF BOURNE
Department of
Integrated Solid Waste Management

Mailing:
24 Perry Avenue
Buzzards Bay MA 02532
(508) 759-0600, ext. 4

Location:
201 MacArthur Blvd
Bourne MA 02532

February 18, 2020

Ms. Tori Kim, Director
Executive Office of Energy and Environmental Affairs (EEA)
100 Cambridge St., Suite 900 (9th Floor)
Attn: MEPA Office
Boston MA, 02114

RE: Town of Bourne Integrated Solid Waste Management Facility EEA #11333.
Expanded Notice of Project Change.

Dear Ms. Kim,

Enclosed for your review is our original, signed Expanded Notice of Project Change (ENPC) form, with supporting narrative and attachments, for the Bourne Integrated Solid Waste Management Facility, EEA #11333, for publication in the Environmental Monitor at your earliest convenience. Also included is one additional copy of the ENPC, the first three pages of the ENPC and a flash drive with an electronic copy of the ENPC.

As noted in the final Certificate for Phase 6 in June 2018, the Secretary stated that "... the Town will submit a NPC to address development of Phase 7 and 8. This subsequent NPC should provide an updated development plan for Phase 7, Phase 8, the residential recycling center and relocated offices. The NPC should provide a cumulative assessment of potential impacts and avoidance, minimization, and mitigation measures for Phase 7 and Phase 8. As stated previously subsequent phases may result in a "Take" of the Eastern Box Turtle and require a CMP from the NHESP."

The submittal of this ENPC is in accordance with that path, however this NPC is in an expanded form so that it can act, in effect, as an Expanded Environmental Notification Form (EENF) in preparation for a Single Supplemental Environmental Impact Report (SSEIR) which the Town is requesting and is the process utilized to review Phase 6. The proposed site development plan for horizontal and vertical expansions of the landfill into the 2040s with new landfill liners, will also require relocation of existing structures such as offices and transfer operations onto currently pervious land. Together, the new liner areas and the areas required for the new structures and associated pavement will result in an increase of more than ten acres of new impervious land and therefore the preparation of an EIR is required.

Further, an integral part of this long-range plan will be the need to work with the Massachusetts Department of Environmental Protection (MA DEP) to approve two Site Suitability applications for two parcels on-site that will need to be reviewed by the Bourne Board of Health at public Site

Assignment hearings. This ENPC includes a section that discusses, in draft form, how the Town will meet both Facility-Specific Site Suitability Criteria and General Site Suitability Criteria for these parcels. To provide MA DEP ample time to review this information during the comment period, the Town is voluntarily willing to extend the normal comment period by two weeks. Formal submittals to MA DEP will occur separately after the MEPA review and will address any comments received. Once MA DEP has finished their review, the Bourne Board of Health will review submittals by the Town to modify its site assignment and schedule public hearings. These hearings are anticipated to occur in late 2020.

Through this ENPC, and the subsequent submittal required by the Secretary, it is the intention of the Town to make clear what a long-term site master development plan would look like in order to address all impacts, provide planning certainty to the Town and regulators, and meet the desire of the Secretary in the Final Environmental Impact Report (FEIR) certificate in 1999 which noted; *"Given that the ultimate development plan for the landfill has not yet been determined, the Town will need to submit its future plans to the MEPA office in the form of Notice(s) of Project Change."*

Please, feel free to contact me at 508-759-0600, extension 4240, if you need further information or have any questions. Thank you for your consideration.

Sincerely,

Daniel T. Barrett, General Manager

Enclosures

Cc: Distribution list.

NOTICE OF PROJECT CHANGE FORM

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs ■ MEPA Office

Notice of Project Change

The information requested on this form must be completed to begin MEPA Review of a NPC in accordance with the provisions of the Massachusetts Environmental Policy Act and its implementing regulations (see 301 CMR 11.10(1)).

For Office Use Only *Executive Office of Environmental Affairs*
MEPA Analyst: Phone: 617-626-

EEA # 11333		
Project Name: Bourne Integrated Solid Waste Management Facility		
Street Address: 201 MacArthur Boulevard		
Municipality: Bourne	Watershed: Cape Cod	
Universal Transverse Mercator Coordinates: N 4,6200,500 E 368,500	Latitude: 41° 43' Longitude: 70° 35'	
Estimated commencement date: Filling of Phase 9 ~ April 2023	Estimated completion date: 2041	
Project Type: Landfill	Status of project design: approximately 25% complete.	
Proponent: Town of Bourne, Department of Integrated Solid Waste Management		
Street Address: 24 Perry Avenue		
Municipality: Buzzards Bay	State: MA	Zip Code: 02532
Name of Contact Person: Daniel T. Barrett, General Manager.		
Firm/Agency: Town of Bourne, ISWM Department	Street Address: 24 Perry Avenue	
Municipality: Buzzards Bay	State: MA	Zip Code: 02532
Phone: 508-759-0600, ext. 4240	Fax: N/A	E-mail: dbarrett@townofbourne.com

With this Notice of Project Change, are you requesting:

a Single EIR? (see 301 CMR 11.06(8))	**X Yes** ☐ No
a Special Review Procedure? (see 301CMR 11.09)	☐ Yes **X No**
a Waiver of mandatory EIR? (see 301 CMR 11.11)	☐ Yes **X No**
a Phase I Waiver? (see 301 CMR 11.11)	☐ Yes **X No**

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

1.) Increase in impervious surfaces 301 11.03 1(a)(2)

Which State Agency Permits will the project require? MA Department of Environmental Protection: Authorization(s) to Construct, Authorization(s) to Operate, Corrective Action Design(s) to close, Site Suitability Report for a Major Modification of an Existing Site Assignment. MA Natural Heritage and Endangered Species Program: MESA Conservation and Management Permit.

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres. N/A.

PROJECT INFORMATION

In 25 words or less, what is the project change? The project describes expansion plans for the Bourne landfill, both horizontal and vertical, and development plans for all solid waste handling, administrative and support facilities.

See full project change description beginning on page 4.

Date of publication of availability of the ENF in the Environmental Monitor: (Date: 10/7/97)

Was an EIR required? **X Yes** ☐No; if yes,
was a Draft EIR filed? **X Yes** (Date: 12/3/98) ☐No
was a Final EIR filed? **X Yes** (Date: 10/15/99) ☐No
was a Single EIR filed? ☒Yes (Date: 5/9/2018) **No**

Have other NPCs been filed? **X Yes** (Date(s): 6/23/03, 4/17/07, 12/8/08, 12/29/15, 11/8/17)

If this is a NPC solely for lapse of time (see 301 CMR 11.10(2)) proceed directly to **ATTACHMENTS & SIGNATURES**. This is not a NPC solely for lapse of time.

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed: See Attachment 6 update list.

Are you requesting a finding that this project change is insignificant? A change in a Project is ordinarily insignificant if it results solely in an increase in square footage, linear footage, height, depth or other relevant measures of the physical dimensions of the Project of less than 10% over estimates previously reviewed, provided the increase does not meet or exceed any review thresholds. A change in a Project is also ordinarily insignificant if it results solely in an increase in impacts of less than 25% of the level specified in any review threshold, provided that cumulative impacts of the Project do not meet or exceed any review thresholds that were not previously met or exceeded. (see 301 CMR 11.10(6)) ☐**Yes** **X No;** if yes, provide an explanation of this request in the Project Change Description below.

FOR PROJECTS SUBJECT TO AN EIR

If the project requires the submission of an EIR, are you requesting that a Scope in a previously issued Certificate be rescinded?
☐**Yes** **X No;** if yes, provide an explanation of this request_____.

If the project requires the submission of an EIR, are you requesting a change to a Scope in a previously issued Certificate?
☐**Yes** **X No;** if yes, provide an explanation of this request_____.

SUMMARY OF PROJECT CHANGE PARAMETERS AND IMPACTS

Summary of Project Size & Environmental Impacts	Previously Reviewed	Net Change	Currently Proposed
LAND			
Total site acreage	74	38	112
Acres of land altered	74	38	112
Acres of impervious area	56.79 - 59.92	16.23	16.23
Square feet of bordering vegetated wetlands alteration	NA	No change	
Square feet of other wetland alteration	NA	No change	
Acres of non-water dependent use of tidelands or waterways	NA	No change	
STRUCTURES			
Gross square footage	-19,943	59,000	59,000
Number of housing units	NA	No change	
Maximum height (in feet)	NA	No change	
TRANSPORTATION			
Vehicle trips per day		No change	
Parking spaces	NA	No change	
WATER/WASTEWATER			
Gallons/day (GPD) of water use	NA	No change	
GPD water withdrawal	NA	No change	
GPD wastewater generation/ treatment	NA	No change	
Length of water/sewer mains (in miles)	NA	No change	

Notes

1. The area of the Phase 7 and Phase 8 landfill liner over areas that are currently pervious, combined with the planned relocation of the transfer stations and offices onto the 12-acre parcel, will create approximately 16.23 acres of new impervious area exceeding the EIR threshold. Attachment 3 contains a detailed layout.
2. The previous submittal discussed the removal of a structure which is why there is a negative number.

Does the project change involve any new or modified:

1. conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97? ☐Yes **X No**
2. release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction? ☐Yes **X No**
3. impacts on Rare Species**?** ☐Yes **X No**
4. demolition of all or part of any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth? ☐Yes **X No**
5. impact upon an Area of Critical Environmental Concern? ☐Yes **X No**

If you answered 'Yes' to any of these 5 questions, explain below:

PROJECT CHANGE DESCRIPTION (attach additional pages as necessary). The project change description should include:

(a) a brief description of the project as most recently reviewed

(b) a description of material changes to the project as previously reviewed,

(c) if applicable, the significance of the proposed changes, with specific reference to the factors listed 301 CMR 11.10(6), and

(d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a draft of the modified Section 61 Finding (or it will be required in a Supplemental EIR).

(a) A brief description of the project as most recently reviewed

In May 2018, the Town of Bourne, Department of Integrated Solid Waste Management (ISWM) submitted a Single Supplemental Environmental Impact Report for the expansion of Phase 6 of the landfill, access to lands protected by Article 97 and to provide an overview of further landfill expansion into Phase 7 and Phase 8 and the effects on existing infrastructure.

(b) A description of the material changes to the project as previously reviewed

The purpose of this ENPC, which in effect is acting as an Expanded Environmental Notification Form (EENF), is to provide a comprehensive view of the full build-out potential of the Bourne Landfill and associated facilities. As noted in the final Certificate for Phase 6 in June 2018, the Secretary stated that "... the Town will submit a NPC to address development of Phase 7 and 8. This subsequent NPC should provide an updated development plan for Phase 7, Phase 8, the residential recycling center and relocated offices. The NPC should provide a cumulative assessment of potential impacts and avoidance, minimization, and mitigation measures for Phase 7 and Phase 8. As stated previously subsequent phases may result in a "Take" of the Eastern Box Turtle and require a CMP from the NHESP."

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Further, an integral part of this long-range plan will be the need to work with the Massachusetts Department of Environmental Protection (MA DEP) to approve two Site Suitability applications for two parcels on-site that will need to be reviewed by the Bourne Board of Health at public Site Assignment hearings. This ENPC includes a section that discusses, in draft form, how the Town will meet both Facility-Specific Site Suitability Criteria and General Site Suitability Criteria for these parcels. To provide MA DEP ample time to review this information during the comment period, the Town is voluntarily willing to extend the normal comment period by two weeks. Formal submittals to MA DEP will occur separately after the MEPA review and will address any comments received. Once MA DEP has finished their review, the Bourne Board of Health will review submittals by the Town to modify its site assignment and schedule public

hearings. These hearings are anticipated to occur in late 2020.

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The development plans described in this submittal have been communicated to the residents of Bourne in public meetings over the last several months and have been reviewed by the Bourne Board of Selectmen who unanimously voted to pursue permitting for the maximum landfill development in a public meeting on November 5, 2019. Attachment 7 includes a copy of the Certificate of Vote recording this decision.

Introduction

The Town of Bourne, Department of Integrated Solid Waste Management (ISWM) operates as an enterprise fund for the Town of Bourne. It was created in 1998 and oversees all planning, permitting, construction and operation of the solid waste management facilities located at 201 MacArthur Boulevard, including all ancillary structures and equipment.

Currently, this facility has several integrated operations including:

- a modern double-lined landfill, with leak detection, that predominantly accepts municipal waste combustor ash from Covanta SEMASS located in Rochester, MA
- a residential recycling center that accepts materials from Bourne property owners and residents via a sticker program. Residents from neighboring communities are allowed limited access but only by paying for transactions at the scale where loads are weighed in and out
- a construction and demolition debris transfer station
- a single stream recyclables transfer station
- a compost site, including yard waste and brush
- an area for asphalt, brick and concrete recycling
- a landfill gas collection system and flare for thermal destruction of landfill gas generated by the Bourne Landfill
- a leachate load-out system for off-site management of landfill leachate generated at the Bourne Landfill

Bourne has invested significant resources to modernize the entire facility and has fulfilled the intent as described in the original Final Environmental Impact Report (FEIR) to build a multi-faceted facility that would serve a regional need. This mission will continue even after the last phase of the landfill is constructed and closed. Attachment 7 contains a series of historical aerials of the facility encompassing approximately forty-seven years. These photos clearly show the extensive improvements to the site infrastructure and layout that the Town has made, especially since the creation of the Department of Integrated Solid Waste Management (ISWM) in 1998 and issuance of the FEIR certificate in 1999. A more complete history of the department, and important documents and videos discussing its development, including a presentation regarding the proposed landfill expansions described in this document, can be found at the ISWM website at https://www.townofbourne.com/integrated-solid-waste-management.

Since 1998, ISWM has been operated as an Enterprise Fund, separate from the General Fund which is funded primarily by the real estate tax levy. The ISWM Enterprise Fund, which is regulated by the MA Department of Revenue (DOR), primarily derives revenue from gate receipts for its various operations, however, overwhelmingly the landfill operation is the source of funds. All operations, debt service, insurance and closure and post-closure accounts are paid by the Enterprise Fund. In addition, as approved by DOR, ISWM Department pays for the curbside collection and management of MSW and single-stream recyclables generated by Bourne residents. ISWM also pays a per ton fee, known as the Host Community Fee to the General Fund, for each ton it manages at the site. This fee was as a result of a Home Rule petition by the Town of Bourne for the General Court to amend an existing law, which requires privately owned and operated solid waste management disposal facilities to pay the host community a tax, to be applicable to the facility in Bourne. The amount of the Host Community Fee is adjusted each year in accordance with the Boston Consumer Price Index and is currently

$3.75 per ton. In total, the ISWM Enterprise Fund provides approximately $4,000,000 per year in value to the residents and taxpayers of Bourne, directly and indirectly, and as a result, the operations at ISWM, and in particular the landfill, have become an integral part of the annual budget to operate the Town.

Phase 6 (update)

On June 29, 2018, MEPA issued a certificate from the Secretary that determined Bourne's SSEIR submittal "... adequately and properly complies with MEPA and its implementing regulations." Additionally, on November 15, 2018, the Cape Cod Commission (CCC) approved Bourne's Development of Regional Impact (DRI) application. These approvals, along with the Authorization to Construct Phase 6 approval from DEP, issued on July 16, 2018, allowed ISWM to hire a contractor to construct the Preferred Phase 6 design that was described in the previous SSEIR submittal. On January 17, 2020, the Massachusetts Department of Environmental Protection (MA DEP) issued an Authorization to Operate (ATO) the Phase 6 landfill. Additionally, the Cape Cod Commission (CCC) has issued a Certificate of Compliance for Phase 6. Based on these approvals, ISWM began landfill operations in Preferred Phase 6 (PP6) on January 24, 2020.

PP6 is a 6.69 acre horizontal expansion that will yield 920,000 cubic yards of capacity and has an expected operating life to late 2023. The design of PP6 is such that it will accommodate further site development into potential Phase 7 and Phase 8 landfill expansions thereby extending landfill operations. This option was discussed in detail in the previous SSEIR submittal in 2018. Attachment 2 includes the plans that were previously reviewed. By not constructing liner over the side slope of the existing road to the south of Phase 6, ISWM will maintain maximum flexibility for Phase 7 and Phase 8 construction in a contiguous manner. This is advantageous because, once a liner is constructed over the virgin soil supporting the road, it will become operationally and financially infeasible to try to reclaim the significant lost airspace underneath the road later by removing the waste placed over it. Such a scenario would needlessly create a separation between phases and leave a sizeable portion of volume unutilized.

Future Development (Phases 7, Phase 8 and Phase 9)

In 2016, the Town acquired approximately twelve acres of undeveloped land, abutting the residential recycling center at the extreme southern boundary of the site. This has enabled the Town to contemplate a site development plan whereby offices, maintenance and handling facilities would be relocated to that new parcel. By doing this, Phase 7 and Phase 8 could be developed on the 25-acre parcel thereby extending the life of the landfill operations. Currently this parcel is site-assigned only for solid waste handling and is the location of the C&D transfer station, single stream recyclables transfer station, the residential recycling center and other facilities. In order to expand the landfill into this area, the site assignment will need a major modification from the Bourne Board of Health. This process is contemplated to be undertaken in late 2020 after MA DEP has reviewed all of the necessary permitting criteria and has completed its review. Attachment 3 contains plans for the site master plan that show the phasing options for the landfill and a conceptual layout of relocated infrastructure on the 12-acre parcel.

Furthermore, the site assignment will need to be modified to allow solid waste handling operations

on the 12-acre parcel where facilities would be relocated. Prior to developing this parcel, the Town must mitigate Eastern Box Turtle habitat, a species of Special Concern, as designated by the Massachusetts Division of Fisheries and Wildlife (MA DFW) and its Natural Heritage and Endangered Species Program (NHESP) which will review plans prior to any removal of habitat. Attachment 7 contains a fact sheet on the Eastern Box Turtle. The Town is working in close coordination with NHESP to submit a Conservation and Management Permit that will address and affected areas on the 12-acre parcel and the 25-acre parcel as well. Phase 7, Phase 8, Phase 9, and surrounding areas outside of the delineated habitat line are exempt from further Massachusetts Endangered Species Act (MESA) review. A letter confirming this determination by NHESP is included in Attachment 7. Delineation of the habitat line is shown on plans in Attachment 3.

In addition to Phase 7 and Phase 8, the Town is proposing a vertical expansion, designated as Phase 9. The Town is endeavoring to provide plans for the maximum long-term site development master plan so that the Bourne community and regulators understand the full potential of the Bourne Landfill to service the region with an active landfill. On August 12, 2019, these plans were shared in a public meeting that received wide-spread media coverage, in order to provide a comment period. After receiving positive feedback from the community, the Bourne Board of Selectmen voted on November 5, 2019, to pursue a full build-out site development plan which contemplates a 40 foot vertical expansion over the entire footprint of the currently permitted landfill. Attachment 7 contains a copy of the Certificate of Vote which records the vote by the Board supporting this course of development.

The first phase of the vertical expansion is designated as Phase 9. Phase 9 will increase the maximum height of the landfill from elevation 185' MSL to elevation 225' MSL over previously lined and filled areas of the landfill including Phases 2, 2A/3A, 3, 4, 5 and 6. By increasing the height of the landfill over already constructed phases in previously site-assigned areas, the Town can utilize the time that this capacity will provide to develop a detailed plan for how and when to relocate structures that will be replaced by Phase 7 and Phase 8, thereby maximizing the useful lifespan of transfer station assets which represent significant capital investments by the Town.

Some of the technical issues associated with Phase 9 that will have to be resolved and approved by MA DEP are modifications to components of the existing landfill gas collection system that is within the Phase 9 overfill footprint. Additionally, Phase 9 will be constructed above portions of the landfill that will receive a long-term intermediate cover system versus a permanent cover system that will be construction on outside slopes that have reached final design capacity. This will avoid the step of capping an area that will then be disturbed again within a few years to accommodate new capacity. This approach has been previously utilized along the southern slope of Phase 3, Stage 3 which is now being incorporated into the recently constructed Phase 6 landfill. A similar approach will be proposed for each successive southern slope as the phase moves southward into Phase 7 and Phase 8. Once the final southern slope is reached, a final cover system will be applied. ISWM has discussed this with MA DEP in-depth and all environmental impacts must be addressed prior to final approval.

The addition of a vertical expansion to elevation 225' MSL for Phase 9 will also have an effect on the landfill overall as expansions move southward by allowing for more capacity in Phase 7 and Phase 8 than had been previously contemplated because those phases will be constructed in a manner to match the elevation of Phase 9. The total volumes for Phase 7 and Phase 8 would be 3,920,000 cubic yards which could provide up to fourteen years of capacity.

The Phase 9 vertical expansion alone will provide approximately 1,255,000 cubic yards of additional airspace which could extend the life of the landfill up to four and a half years. As noted earlier, by permitting and operating Phase 9 as the next area of landfill development after Phase 6, the Town will have the time necessary to create a schedule for the required permitting, financing and relocation of existing operations and site preparation for Phases 7 and 8, including excavating nearly 500,000 cubic yards of virgin soils.

The combination of Phase 7, Phase 8 and Phase 9 will ensure that ISWM can continue to provide vitally needed landfill capacity to the region into the 2040s. Attachment 7 includes a table summarizing the volumes for all current and future phases as contemplated under this master plan. Attachment 3 includes detailed plans showing all the landfill phases, as well as a conceptual layout for relocated facilities on the 12-acre parcel. Also, included in Attachment 3 are photographic renderings of what the landfill will look like at elevation 225' MSL from various viewsheds in comparison to the existing elevation of 185' MSL. These renderings were shown to the public in the summer of 2019 and are included to ensure that stakeholders understand the long-term plans for site development.

In addition to working with our local government and elected leaders, ISWM will continue its close working relationship with the Southeast Regional office of MA DEP to ensure that the design of the new expansions, as well as the closure of completed phases, are engineered to the highest standards and meet or exceed all regulations.

Need

Landfill capacity projections from the latest MA DEP 2030 Solid Waste Master Plan (SWMP) issued in draft form in September 2019 are shown in Attachment 7 and reveal a significant reduction in the amount of landfill disposal capacity in Massachusetts in 2021 and even more significant reductions in 2025 and 2030. Projections show a reduction from 842,245 tons of capacity in 2019 to 86,000 tons per year in 2027. Locating greenfield areas for a new landfill or even expansions of sites that have an old unlined landfill with room to grow, are exceedingly difficult to permit because of local resistance. Therefore it is critical that existing sites be utilized to their full potential.

The SWMP outlines an aggressive goal to reduce waste disposal tonnage from a baseline of 5.7 million tons in 2018 to 4 million tons by 2030, representing a 30% reduction. By 2050, the state has goals of reducing disposal to 570,000 tons per year, or a 90% reduction. However, the SWMP plan notes that, "Massachusetts has a projected capacity shortfall of 700,000 tons/year by 2030, even assuming we meet our 2030 waste reduction goal. Massachusetts will retain capacity for municipal waste combustion within the existing 3.5 million tons of annual capacity." The MA DEP further states that "... solid waste disposal capacity in Massachusetts and throughout the Northeast has continued to shrink as more landfills close and they are not replaced by new in-state disposal capacity. This tightening of disposal capacity has weakened the resiliency of Massachusetts waste disposal infrastructure and facility outages that were routine in the past are causing frequent operational problems."

Recognizing that in-state capacity needs to be managed and maintained, MA DEP discusses several strategies, two of which aptly describe the multi-faceted, integrated facility in Bourne and are shown in the SWMP excerpts below.

- Continue to consider applications received for permitting of solid waste facilities consistent with statutes, regulation and this Master Plan Update.

- Discuss development and permitting of integrated solid waste management facilities to improve management capacity. This could include co-siting integrated operations.

Landfills play a unique role in sound environmental management of waste. Every process for addressing the materials that a society generates, including composting, recycling and energy recovery, all generate wastes themselves. Additionally, beyond what the individual produces and places at the curbside, commercial, industrial and institutional generators create wastes as well which often must go to a landfill. This capacity also addresses the many types of wastes as well as who generates the waste. This includes: household and commercial trash, processing residuals, storm/disaster debris, municipal waste combustor ash, contaminated soils from brownfield development project in urban areas such as Boston, dredge spoils from waterway maintenance and special wastes. Much of this waste is only suitable for landfilling and cannot be recycled, composted or combusted.

Capacity of all types in MA is under enormous stress as new facilities are slow to come on-line. Even the slightest disruption in the existing network of permitted facilities, such as a few days of downtime for maintenance at one the municipal waste combustors, or the closure of a C&D processing facility at midday because it has reached its daily tonnage, has a huge ripple effect on an already stressed system in order to make up the shortfall. Haulers are being forced to look at options for disposal as far away as Ohio, Virginia and New York which increases cost, inconvenience and the carbon footprint to transport loads. Having infrastructure in MA to respond to these disruptions, including natural disasters such as floods, hurricanes or other severe weather events, is essential to keep municipal operations functional, maintain economic activity and protect public health and the environment by ensuring that waste is managed at permitted facilities and not illegally dumped in unmonitored areas or left at the curbside which could create a public health concern. Bourne's facility has already played an important role in stabilizing the southeastern MA region during such events and the proposed master plan will ensure that it will continue do so into the 2040s. Bourne's presence in the region serves to smooth operational surges, provide emergency capacity and offers a check on market forces that results in competitive pricing options.

Bourne has a demonstrated record of being an integrated facility that provides not only disposal options, but also facilities to divert items from disposal. It has also been a regional leader in such Cape-wide innovative projects as mattress recycling and latex paint take-back events. The site master plan described in the application will ensure that Bourne will continue to meet those needs for decades to come even after the landfill is closed. Such an integrated regional approach to solid waste management is specifically mentioned in the latest version of the Regional Policy Plan of the Cape Cod Commission (CCC) which oversee the facilities in Bourne in addition to MEPA and MA DEP.

Expanded Notice of Project Change

It is the position of the Town that based on the over twenty-year planning horizon for this site that has included a Draft EIR (DEIR), an FEIR and multiple Notices of Project Change reviewed by both MEPA and the CCC, that an Expanded Notice of Project Change (ENPC), followed by a SSEIR, will provide adequate and ample review of the final site master plan of this project. This

ENPC meets the intent of the Town to discuss the plans for the Phase 7, Phase 8, and Phase 9 landfill expansions and the relocation of the solid waste handling facilities, which was already discussed and evaluated in the May 2018 SSEIR, and provides a more detailed review of the remaining landfill development plan beyond Phase 6, as discussed in the November 2017 submittal to the Secretary.

The following points are presented to guide the Secretary in his decision.

a) The Town has spent several years meeting with the staff at MEPA and the CCC as well as MA DEP to evaluate potential options for the development of the landfill as originally described in the EIR. The most recent submittal for Phase 6 provided a detailed review of the history of the project and how the Town determined the phasing plan it proposed along with any associated impacts. This submittal fulfills the vision outlined in 2017 and proposes operation of the same type of facility and addresses impacts that have been previously reviewed. It is also consistent with the final certificate issued in 2018 which noted "...the Town will submit a NPC to address development of Phase 7 and 8. This subsequent NPC should provide an updated development plan for Phase 7, Phase 8, the residential recycling center and relocated offices. The NPC should provide a cumulative assessment of potential impacts and avoidance, minimization, and mitigation measures for Phase 7 and Phase 8. As stated previously subsequent phases may result in a "Take" of the Eastern Box Turtle and require a CMP form the NHESP." ISWM is not proposing any changes in tonnage or types of wastes that are accepted. The only threshold that is exceeded that would trigger an EIR is the increase of more than ten acres of new impervious area in order to provide lined landfill capacity and paved areas for relocated facilities displaced by the landfill. As demonstrated, there is a critical need for well-managed lined landfill capacity in Massachusetts which will only become more acute in the coming years. The alternative, to prematurely closing the Bourne Landfill once Phase 6 is filled and not constructing Phase 7, Phase 8, or Phase 9, will be to exacerbate the shortfall of landfill disposal capacity in Massachusetts and will result in less options for the region the ISWM facility serves.

b) The work outlined in this submittal documents the long history of analysis, planning, design and collaboration that the Town has undertaken for nearly twenty years to address and avoid environmental impacts. The Town is confident that providing desperately needed long-term, regional, solid waste management infrastructure is now and will continue to be a net positive environmental benefit.

GHG emissions analysis

Under the Massachusetts Environmental Policy Act (MEPA), M.G.L. c. 30, ss. 61-621 and its implementing regulations at 301 CMR 11.00, project proponents are required to study the environmental consequences of projects, and take all feasible measures to avoid, minimize and mitigate Damage to the Environment. During 2007, the state agency responsible for implementing MEPA (the "MEPA Unit"), broadened the definition of "Damage to the Environment" to include greenhouse gas (GHG) emissions from certain projects already subject to MEPA review. For those projects subject to the MEPA GHG Policy, a quantitative analysis is required to assess project alternatives and to establish the mitigation measures of GHG emissions of the proposed alternative to a baseline scenario.

The initial MEPA GHG Policy and Protocol was drafted by the MEPA Unit during 2007 and revised several times, most recently on November 8, 2017 when the Town submitted an Expanded Notice of Project Change which focused on the Phase 6 landfill expansion and discussed the potential development of Phase 7 and Phase 8. Below is an update to this submittal. This update addresses the landfill master plan described herein, which includes Phase 6, Phase 7, Phase 8 and Phase 9, which together consist of horizontal and vertical expansions. The GHG emissions for these phases include methane and carbon dioxide that are formed through the natural biological decomposition of solid waste.

The ISWM Department has aggressively pursued options to reduce impacts of its landfill operations as a matter of practice and has already done mitigation to reduce emissions of greenhouse gases as outlined below. This is followed by an analysis of the projected emissions of two baseline scenarios. Supporting figures and calculations are contained in Attachment 7.

Existing mitigation:

1. Utilization of a utility flare that destroys methane that would otherwise be emitted to the atmosphere.
2. Landfill phases are capped regularly as final design grades are filled to capacity.
3. Horizontal and vertical landfill gas collection systems and wells are installed regularly to capture approximately 95% of all gas generated at the landfill. Emissions are so low that Environmental Protection Agency (EPA) has allowed Bourne to stop reporting them. ISWM reports greenhouse gas emission to DEP via the Greenhouse Gas Emission Reporting Program.
4. Current operations consume approximately 86% of the permitted annual tonnage with inert municipal waste combustor ash vs. MSW.
5. Reduced truck traffic significantly after switching to ash because of density of loads for the transportation of ash which means fewer trucks per day.
6. Providing a local option for ash from Covanta SEMASS and soils projects reduces hauling to other more remote locations. As landfill capacity, including that which is predominantly for municipal waste combustor ash or so-called "monofills", continues to shrink, options for disposal are increasingly at distant landfills including options in NH, NY, VA and OH which would significantly increase the carbon footprint associated with transportation whether by rail haul or long-haul trucking.
7. Providing a viable site for renewable energy projects with the necessary infrastructure, permits and political and community support. For example, the Town expended $400,000 to develop an anaerobic digester project with Harvest Power, Inc., however the project failed through no fault of the Town.
8. The Town pursued and has a current permit for an on-site landfill gas-to-energy power plant and/or leachate evaporation unit.
9. Heavy machinery on-site is new and has the latest Tier 4 emissions reduction devices.
10. ISWM provides transfer stations for single-stream recyclables for Bourne, Falmouth and local businesses thereby creating efficiencies in transportation and reducing emissions. This is also true for waste that is transferred through its construction and demolition debris transfer station. Both provide a regional benefit to Cape Cod customers.

Landfill Expansion Scenarios

The Town of Bourne owns and operates the Bourne Landfill for the disposal of solid waste. The

Landfill is permitted to accept up to 219,000 tons of solid waste per year which can include municipal solid waste (MSW), which is biodegradable waste from residential and commercial sources, municipal combustor ash, which is inert and will not generate GHG, and other inert residuals wastes such as contaminated soils. The Town has operated the lined Landfill as a large regional disposal facility for residential and commercial waste since 1999. Prior to the construction of the first lined phase, the Town operated an unlined Landfill, beginning in 1967, which operated at much lower levels to accept residential and commercial solid waste predominantly from the Town.

Through 2014, the Landfill had accepted residential and commercial solid waste that was largely organic with an increasing percentage comprising ash. However, after significant discussion and planning in the community and with elected officials, the Town made a strategic decision to move from accepting largely biodegradable solid waste from commercial and municipal generators in the region, to accepting non-biodegradable ash material generated by the Covanta SEMASS (SEMASS) municipal waste combustor located in Rochester, MA. Specifically, the Town entered a 10-year contract with SEMASS that culminates at the end of 2021. The agreement requires SEMASS to deliver and the Town to accept for disposal at the Bourne Landfill, up to 189,000 tons per year of non-biodegradable ash residue beginning in 2015 after a ramp up period. During this ten-year contract term, the remaining 30,000 tons per year of the 219,000 tons of permitted solid waste disposal capacity is reserved for residential MSW from Bourne and from the Town of Falmouth also with a ten-year contract, soils and other difficult to manage wastes. This decision by the Town of Bourne has the impact of significantly reducing the baseline emissions below a projected baseline that would have occurred if the Town had stayed its course of providing large regional disposal facility for residential and commercial waste that was largely organic.

The Town therefore is weighing its options beginning in January 2022 after the conclusion of the current contract period with SEMASS. In the first scenario, the Town would extend the contract with approximately the same amount MSW consuming the remaining available annual tonnage and the resultant low gas generation or 189,000 tons per year of ash and 30,000 tons per year of biodegradable waste. In the second scenario, the Town would utilize its 219,000 tons per year of capacity entirely for MSW. Of course, the Town could allocate its tonnage in various combinations of ash and MSW depending on market conditions, but for the purposes of analysis it is presenting what could be considered bookends with regard to gas generation potential. Scenario 1 would generate the least amount of gas going forward and Scenario 2 would generate the maximum gas as all the waste would be biodegradable.

A scenario that envisions accepting only ash was not considered as it is more likely that at a minimum, the Town would continue to dispose of its own MSW in the landfill and potentially one other municipal customer. Eliminating this alternative provides a more realistic projection of gas generation at the facility

Figure 1 and Figure 2 found in Attachment 7, along with the respective calculations, show GHG projections as CO2 equivalents, for Scenario 1, represented by the orange line, and Scenario 2, represented by the blue line, over the life of the full build-out of the landfill, both horizontally and vertically.

Included in both scenarios, the landfill operations have incorporated very aggressive measures to capture, collect and destroy landfill gas thereby optimizing the LFG collection system to attain 95-percent collection of LFG produced in either scenario, versus the default value assumed by

EPA of 75-percent collection. These measures include:

- Continued expansion of the LFG collection system into new areas of waste disposal. The expansion of the LFG collection system includes installation of horizontal collectors into active areas of waste disposal primarily to collect LFG as it first starts to be generated. Horizontal collectors are typically installed every 30-feet in waste depth and are placed approximately 300 feet apart. When areas of the Landfill reach their final grade, vertical wells are installed.

- Continued inspection, monitoring, repair and replacement of vertical wells to maintain the full performance of the LFG collection system.

- LFG collection system monitoring and adjustment to maintain a balanced operational system. Bourne dedicates a technician to monitor each extraction point of the LFG collection system. Using a handheld instrument, the technician measures LFG composition, static pressure, temperature and flow at each point and based on these readings makes an adjustment to flow to extract an optimal level of LFG from the extraction point to maintain the LFG collection system in balance. The technician performs a full LFG collection system balancing once every two weeks.

- Installing new equipment on a regular basis, such as the recent installation of a new flare that also included new redundant flare blowers specifically engineering with special components and coatings to handle LFG. Each blower can collect all the LFG from the LFG collection system and combust it in the new flare. The flare blowers can be switched from one to the other and the flare restarted quickly. Operation of the blowers are alternated periodically to ensure that both blowers are functional and can perform when called upon.

Attempted GHG Mitigation Measures

The Town has assessed the feasibility of several projects and pursued the development of those environmental projects that were likely to be technically and economically feasible. These projects included the following:

LFG conversion to pipeline natural gas

National Grid approached the Town to conduct a feasibility assessment to treat LFG generated from the Landfill to remove all components and contaminates other than methane so that the methane could be injected into a nearby natural gas pipeline. National Grid conducted the study over a period of 6-months, and determined that the project was not feasible to pursue. The feedback that the Town received from National Grid was that the LFG had too high concentrations of oxygen, nitrogen and contaminants and too low a quantity of methane to make a commercially viable project both technically and economically. No impact on reduction to GHGs was provided, however, the reduction would have been approximately the quantity of methane that would be injected into the pipeline from such a project. The Town will monitor this technology as it continues to develop as well as government incentive programs that provide financial support for renewable gas sources. The combination of cheaper technology and new revenue streams may provide an opportunity in the future.

Microturbines fueled by LFG

Through a Mass Technology Collaborative (MTC) grant, the feasibility of using microturbines fueled by LFG to serve the electric loads of the vacuum blower and flare station was assessed and the study found that the microturbines were not technically feasible due to limitations on their output/turndown capability that preclude operation at the anticipated load levels. Furthermore, the study found that microturbines would not be economically feasible to install due to the high capital cost and high operating costs for the fuel conditioning systems that microturbines require when using landfill gas as fuel. The study also assessed microturbines to serve all the Facility loads at the site, which would require the Town to modify the on-site electrical distribution system such that all Facility loads on the site are served by one master meter at the primary voltage level (23.5 kV). To do so, the Town would need to (a) purchase transformers, cables and other equipment owned by Eversource on-site; and (b) install a new meter and associated equipment at the new service entrance to the site. Even if the site is converted to master-metering, it is not feasible to meet electric site loads by installing any of the microturbines studied to utilize landfill gas to provide electricity behind the meter. It would not be technically feasible to install microturbines due to limitations on their output turndown capability that preclude operation at the anticipated load levels. The study recommended that the Town proceed to pursue development of a facility to utilize the LFG to generate electricity for on-site use and to export excess electricity for sale. Depending on ISWM's internal assessment of its capabilities and potential benefits and costs, the Town may pursue such development either (a) through a facility to be owned and managed by ISWM; or (b) through a facility to be owned and developed by a third party that provides benefits to ISWM in exchange for the development rights. Such a facility might feasibly involve multiple microturbines served by a common fuel conditioning system as described herein, or might involve an alternative approach utilizing reciprocating internal combustion engines or other equipment.

LFG-to-energy facility

Following the recommendation of the preceding feasibility study, the Town applied for and obtained MDEP Air Permits for a LFG-to-energy facility using internal combustion engine-generator sets to generate up to 4.5 megawatts and recover heat to evaporate up to 18 Million gallons of Landfill leachate. LFG-to-energy facility would require up to 1,785 scfm of LFG at 50-percent methane content to operate at capacity. The production of electricity by the LFG-to-energy facility would result in 19,400 tons of CO2 indirect reductions annually using a CO2 marginal emission rate factor of 1,036 pounds of CO2 per MWhr, which emission rate factor is established in "ISO New England 2015 Air Emissions Report". The indirect reduction of CO2 emissions is the quantity of CO2 emissions avoided from the reduced use of the marginal mix of power plant sources in ISO New England. The evaporation of leachate by recovered heat from the LFG-to-energy facility would result in 155 tons per year of CO2 emissions reductions from avoiding trucking of leachate. The Town conducted a procurement to obtain proposals for use of the LFG over a 25-year period at a designated site adjacent to the Landfill. However, no proposals were received to develop a stand-alone LFG-to-energy facility.

After the procurement process, the Town made the strategic decision to pursue disposal of primarily ash residue, which changed the projected LFG generation rates so that a 4.5 MW LFG-to-energy facility could not be supported by the projected LFG quantities. Although a much smaller LFG-to-energy facility (e.g. 1.8 to 2.7 MW) may be supported by the projected LFG quantities, the combination of lower prices in both the power

market and renewable energy certificates market under the Massachusetts Renewable Energy Portfolio Standards (RPS) and the inability to obtain long-term power purchase agreements has made development of new smaller LFG-to-energy facility very uncertain and difficult to develop economically

Anaerobic digestion of organic materials and biogas-to-energy

After the Town's procurement process that requested proposals for use of LFG and/or waste management options at the ISWM facility, the Town selected a combined proposal and negotiated and signed a site lease agreement with Harvest Power to develop a private anaerobic digestion (AD) facility to digest up to 342 tons per day of organic material, such as food waste and biosolids, to produce biogas. The proposal included mixing the biogas generated by the AD facility with the LFG generated by the Landfill to obtain up to 2,400 scfm of gas at 50-percent methane content to fuel a LFG/biogas-to-energy facility to generate up to 6.4 MW of electric power.

The production of electricity by the LFG/biogas-to-energy facility would result in 27,589 tons of CO2 indirect reductions annually using a CO2 marginal emission rate factor of 1,036 pounds of CO2 per MWhr, which emission rate factor is established in "ISO New England 2015 Air Emissions Report". The indirect reduction of CO2 emissions is the quantity of CO2 emissions avoided from the reduced use of the marginal mix of power plant sources in ISO New England. The evaporation of leachate from recovered heat from the LFG/biogas-to-energy facility would result in 74 tons per year of CO2 emissions reductions from avoiding trucking of leachate. The anaerobic digestion of organic material results in reduction of GHGs but no protocols to our knowledge are in place to quantify these GHG reductions.

Harvest Power spent several years developing the proposed project, but terminated the development because (1) the failure to obtain a long-term power purchase agreement; and (2) the added costs, uncertainty, and risks posed by DEP insistence on biogas treatment and post-combustion controls on emissions from the LFG/biogas-to-energy facility. The increased cost resulted in Harvest Power proposing a very high cost per kWh for its power to Eversource when it sought renewable energy proposals for biogas projects. This cost caused Eversource to reject Harvest Power's proposal with no option to negotiate. Without the ability to obtain a long-term power purchase agreement (PPA), project financing was untenable and therefore Harvest Power terminated the lease with the Town.

Unfortunately, the Harvest Power Project was originally going to be the Proposed Mitigation case beyond the base case scenarios. Both the Town and Harvest Power invested substantial amounts of resources in time and money to move this project forward and were greatly disappointed the project did not go forward. For its part ISWM invested approximately $400,000 in legal, procurement and consulting costs to secure a lease arrangement. DEP also awarded the Town a grant of $350,000 to build supporting infrastructure that later had to be rescinded. Nevertheless, the work ISWM has done has set a template for future development projects and will save considerable time and money should another project come forward. ISWM will continue to study available technologies, companies and opportunities that may arise. Indeed, ISWM has already been approached by vendors interested in our facility and is carefully considering options for the future.

Other GHG Mitigation

The Town is in the process of assessing the feasibility and/or developing additional environmental projects that could have a potential reduction in greenhouse gas emissions at the site.

- Recovering thermal energy. Heat from the flare was utilized to heat water which is piped into a 6,500-gallon liquid storage tank used to store sodium hydroxide, which is a reagent used to remove hydrogen sulfide from the landfill gas. The heat was required to maintain temperature above freezing and to heat small pump and valve chambers. The quantity of methane displaced from recovery of waste heat was estimated at 140 tons per year. This recovery heat has been discontinued because H2S levels in the LFG have dropped below levels requiring removal and therefore the chemicals in the wet scrubber system are no longer needed. However, the system is maintained and can be restarted should H2S rise to the 200 PPM level which would require treatment.

- LFG-to-energy facility. Reconsideration of developing the LFG-to-energy facility will be renewed subject to increasing LFG quantities as a result of returning to disposal of 219,000 tons per year of residential and commercial waste that is largely organic.

- LFG Blower Power. ISWM purchased and installed in 2015 two new LFG blowers, each driven with a 40 HP motors. The motors are belt-driven with rotary sheaves selected to minimize energy consumption at desired flow rates. The Town performs on-going maintenance, replacing bearings and belts as necessary to reduce motor load. The piping to convey LFG within the blower and flare system was oversized resulting in low pressure drops and energy consumption across the new flare system. ISWM makes routine adjustments to the landfill gas collection system and blower inlet throttle valve position to optimize the flow of landfill gas and reduce electricity consumption of the blowers. ISWM considered purchasing variable frequency drives (VFDs) for these new blowers but decided against the VFDs for two reasons. First, the LFG flow rates are very constant over large periods of time (e.g. months), and therefore the VFD does not provide improved efficiency that VFDs typically provide in variable motor speed applications. Second, while ISWM did acquire a VFD on the old blower configuration after an energy audit from the Cape Light Compact, it did experience significant reliability problems that resulted in numerous unplanned outages of LFG collection and flaring system, especially as adjustments to the wellfield were made. Based on this experience, ISWM designed the new LFG blower and flare system with reliability in mind. This priority reduces the overall impact of fugitive landfill gas emissions to the environment and increases the destruction of methane which is a major greenhouse gas. Additionally, given the lack of variation in LFG flow, there is little, if any, change in motor load between the throttle adjusted belt driven blowers that exist and VFD driven blowers. Note that the consumption of electricity by the blowers was 23 kW or 31 HP on an annual average basis or 75% of rated capacity. This resulted in approximately 75 tons of CO2e of indirect emissions annually, using a CO2 average emission rate factor of 747 pounds per MWhr (200.78 MWhr per year * 747 lb. CO2e/MWhr / 2000 lb./ton) from the ISO New England 2015 Air Emissions Report.

- Photovoltaic (PV) Solar. The Town has the potential to install and operate up to 6.2 MW of PV solar over the final closed plateau of the landfill and an existing facility roof as shown in a conceptual plan contained in Attachment 7. With a capacity factor of 13%, a

PV solar array of 6.2 MW would result in approximately 3,714 tons of CO2e indirect reductions annually using the CO2 marginal emission rate factor of 1,036. This is a significant reduction as compared to our application in 2017 because the current application envisions a final elevation of 225' for the capped landfill versus an elevation of 185' which reduces the plateau upon which panels can be installed on level grade. Additional PV solar may be installed along finished side-slopes as has been done at the closed landfill along Route 24 in Randolph. Installation of PV solar arrays on sloped surfaces is a relatively new development and the Town will investigate the feasibility of applying it to the landfill in Bourne at the appropriate time. While solar projects at landfills has become very common in MA in recent years, these projects are usually developed on closed landfills that have been inactive for decades. The landfill operated by ISWM is still active and even though sections have been closed for a number of years, a careful evaluation of traffic patterns and topography must be evaluated prior to any installation. This was stressed in the MA Department of Energy Resources document entitled *The Guide to Developing Solar Photovoltaics at Massachusetts Landfills*, which noted on page 8, *"As part of any feasibility assessment, the host municipality will need to inspect the landfill to evaluate a number of potential issues that may impact site development, including storm water, landfill gas, and settlement."* ISWM will work with its consulting engineering team to determine when and where a potential area will become available for development. However, given the relatively recent deposition of waste and its composition, it may take at least five years or even longer for an area to become suitably stable. ISWM will look at this carefully along with various procurement options, business models, to determine the earliest time that at least a portion of the facility could be utilized for a solar array which will be expanded over time. Nevertheless, the long-term ISWM facility is a good candidate for solar once it is fully capped and closed.

- On-site leachate treatment. The Town is continuing its efforts to develop a project to treat leachate on-site to avoid trucking leachate off-site to a wastewater treatment facility. The Town is evaluating a recent proposal to utilize LFG to evaporate a portion of the leachate. The remaining volume of leachate might then be treated on-site, with a specialized system, to discharge standards. However, the Town must continue to ensure that it has an array of off-site disposal options that are as close to the facility as possible. This includes participating in discussions by towns on the Upper Cape with the MA Air National Guard to take over operation of the wastewater treatment facility on Joint Base Cape Cod and potentially expand its capacity and capabilities, including treatment of leachate. Considering that the facility is within ten miles of the landfill, this would represent a significant reduction in emissions from transportation to more distant treatment facilities as well as a savings in capital through cost sharing.

- Animal crematory. The Town is contemplating hosting an animal crematory that would use the LFG as a fuel. Such an application would displace the use of natural gas from other sources.

- Additional thermal recovery from LFG combustion. The Town is considering assessing the financial feasibility to recover thermal energy from combustion of LFG to heat the existing permanent structures on site. ISWM intends to keep a storage/maintenance garage near the existing leachate tank along the eastern boundary approximately 1,500 feet from the flare at which a heating system might be installed. While this facility alone

might prove to be too costly, ISWM, as part its site master plan, will construct permanent administrative and maintenance facilities at the extreme southern end of the facility on a 12-acre parcel that was recently acquired. Systems to provide hot water and heat could be run by the LFG and would need to be evaluated against the cost of utilizing electricity, which is the current method used at the temporary administrative office trailers. The site does not have a natural gas line, and oil heat would not be a preferred option. Therefore, with the inclusion of these capital assets and their energy needs in mind over decades, the feasibility may improve considerably versus considering just the existing maintenance facility in isolation. Further research will need to be done.

- Vertical axis wind turbines. As with solar technology, advances are made every year, and this applies to wind turbines as well. There may be a potential for interspersing small scale turbines amongst a solar array to take advantage of steady winds from Buzzards Bay that blow across the top the landfill. However, as with solar arrays, settlement and stability issues will need to be carefully evaluated.

- CNG for trucks. Increasingly, landfill gas is being compressed and utilized in garbage collection vehicles around the nation. ISWM will carefully monitor these developments and evaluate if Bourne is a candidate for investing the necessary infrastructure and fleet conversion for such a project, especially if diesel fuel prices increase and if credits are available for use of renewable fuels.

- Regional composting. Planning entities have shared a strong interest on the Cape to have a local food waste composting site. ISWM has been approached by a firm that has partnered with a technology company that has a covered windrow system that utilizes forced air blowers to accelerate decomposition of organic matter. The cover would also contain odors. Such a regional approach would reduce CO2 emissions by creating a saleable high-quality compost. ISWM is part of a regional group of solid waste professionals and municipal officials on the Cape that are exploring such options. Additionally, as the site master plan options become clearer and space becomes available, ISWM may contemplate issuing a request for proposals.

- Platform for technology development. As has been noted, ISWM has excellent potential for hosting developing technologies. ISWM staff constantly monitors industry development and looks at how potential vendors may fit into a site master plan and be suitable for this region. Additionally, as companies continue to approach ISWM, ISWM will carefully review all options based on its experience with Harvest Power.

Draft Site Suitability Criteria

The Facility-Specific Site Suitability Criteria and General Site Suitability Criteria that are applicable to the modification of the existing Solid Waste Handling Facility Site Assignment that applies to the 25-acre parcel to a Site Assignment for a Landfill Facility and the further modification of the existing Site Assignment to allow a Solid Waste Handling Facility Site Assignment on portions of an immediately adjacent 12-acre parcel, are presented below (in italics) as they appear in, or are paraphrases of, the regulations at 310 CMR 16.40 (3)(a) Criteria for Landfill Facilities, 310 CMR 16.40 (3)(d) Criteria for Solid Waste Handling Facilities and 310 CMR 16.40 (4) General Site Suitability Criteria, respectively, or on the BWP SW 38 Application Form. In addition, the applicability of the provisions of 310 CMR 16.22 Modifications to and Rescissions and Suspensions of Site Assignment to this Application are discussed, as this section may limit the evaluation of criteria to only those that are affected by the modification, as determined by MA DEP. Please note that the Phase 9 vertical expansion is all within previously site assigned areas and therefore no site assignment modification is required for the Phase 9 expansion. Furthermore, the discussion below is a **draft** response. A formal application will be submitted to MA DEP after MEPA review and will address comments received.

In accordance with M.G.L. c. 111, § 150A½, MA DEP regulations, codified at 310 CMR 16.00, establish the criteria that MA DEP uses in determining whether a site is suitable for a site assignment under M.G.L. c. 111, § 150A for a Solid Waste Management Facility. Local boards of health are also required to use these criteria to make a determination whether to grant or deny a Site Assignment. A local board of health shall assign a place requested by an applicant as a site for a new or modified facility unless the board makes a finding, based on the siting criteria established by M.G.L. c. 111, § 150A½, that the siting thereof would constitute a danger to the public health or safety or the environment. M.G.L. c. 111, § 150A. 310 CMR 16.40 (3)(a) Criteria for Landfill Facilities, 310 CMR 16.40 (3)(d) Criteria for Solid Waste Handling Facilities and 310 CMR 16.40 (4) General Site Suitability Criteria 310 CMR 16.40(3)(a) are described and evaluated below in terms of the proposed modification of the existing Solid Waste Handling Site Assignment to a proposed Landfill Site Assignment on the 25-acre parcel and the proposed modification of the existing Site Assignment by a proposed expansion of the existing Solid Waste Handling Site Assignment on to a portion of the adjacent 12-acre parcel at the ISWM facility which does not have an existing site assignment. Attachment 8 includes a plan delineating those areas that need to be modified or site-assigned for the first time.

25-acre parcel Facility-Specific Site Suitability Criteria

The Facility-Specific Site Suitability Criteria that are applicable to the proposed modification of the solid waste handling facility site assignment of the 25-acre parcel to a landfill facility site assignment are presented below (in italics) as they appear in, or are paraphrases of the regulations. Each criterion is addressed with respect to the proposed project.

310 CMR 16.40(3)(a) Criteria for Landfill Facilities

No site shall be determined to be suitable or be assigned as a solid waste landfill facility where:

1. *Any area of waste deposition would be within the Zone II of a public water supply well;*

   The Bourne Landfill is not within an IWPA or a Zone II of an existing public water supply well. The nearest Zone II is approximately one third of a mile to the south of the 25-acre

parcel.

2. *Any area of waste deposition would be within the Interim Wellhead Protection Area (IWPA) of an existing public water supply provided that the proponent may conduct a preliminary Zone II study, approved of by the Department, to determine if the facility would be beyond the Zone II of the public water supply well in question;*

   The Bourne Landfill is not within an IWPA or a Zone II of an existing public water supply.

3. *Any area of waste deposition would be within a Zone II or Interim Wellhead Protection Area (IWPA) of a proposed drinking water source area, provided that the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR;*

   The Bourne Landfill is not within an IWPA or a Zone II of a proposed drinking water source area.

4. *Any area of waste deposition would be within 15,000 feet upgradient of the existing public water source well or proposed drinking water source area for which a Zone II has not been calculated; the proponent may conduct a preliminary Zone II study, approved of by the Department, to determine if the facility would be beyond the Zone II of the public water supply well or proposed drinking water source area in question;*

   The nearest public drinking water supply well is about 0.55 miles south and cross-gradient (not downgradient) to the 25-acre parcel. The Facility is not upgradient of an existing or potential public water supply. The Facility is not located within a "Current Drinking Water Source Area", but the Facility is located within a "Potential Drinking Water Source Area" due to the presence of a potentially productive aquifer. A majority of the areas hydraulically downgradient of the Facility are located over a Potentially Productive Aquifer. However, portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "non-potential drinking water source areas" in accordance with the Massachusetts Contingency Plan ("MCP").

5. *It is determined by the Department that a discharge from the facility would pose a danger to an existing or proposed drinking water source area;*

   The nearest public drinking water supply well is about 0.55 miles south and cross-gradient (not downgradient) to the 25-acre parcel. The Facility is not upgradient of an existing or potential public water supply. The Facility is not located within a "Current Drinking Water Source Area". While the Landfill and the downgradient area are within the medium yield, sole source Cape Cod aquifer, areas downgradient have been designated as Non Potential Drinking Water Source Areas on MA DEP resource maps and the Bourne Water District has stated in a letter that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply

system.

6. *Any area of waste deposition would be over the recharge area of a Sole Source Aquifer, unless all of the following criteria are met:*

   a. *There are no existing public water supplies or proposed drinking water source areas downgradient of the site;*

   There are no public drinking water supply wells downgradient of the Bourne landfill. The Facility is not upgradient of an existing or potential public water supply.

   b. *There are no existing or potential private water supplies downgradient of the site; however, the applicant may have the option of providing an alternative public water supply to replace all the existing or potential downgradient private groundwater supplies; and*

   The Bourne Water District has stated in a letter that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

   c. *There exists a sufficient existing public water supply or proposed drinking water source area to meet the municipality's projected needs;*

   The Bourne Water District public water supply system is capable of meeting the municipality's projected needs.

7. *Any area of waste deposition is within the zone of contribution of an existing public water supply or proposed drinking water source area, or the recharge area of a surface drinking water supply, pursuant to a municipal ordinance or by-law enacted in accordance with M.G.L. c. 40A, § 9;*

   The nearest public drinking water supply well is about 0.55 miles south and cross-gradient (not downgradient) to the 25-acre parcel. The Facility is not upgradient of an existing or potential public water supply. The Facility is not located within a "Current Drinking Water Source Area", but the Facility is located within a "Potential Drinking Water Source Area" due to the presence of a potentially productive aquifer. A majority of the areas hydraulically downgradient of the Facility are located over a Potentially Productive Aquifer. However, portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "non-potential drinking water source areas" in accordance with the Massachusetts Contingency Plan ("MCP"). The Bourne Water District has stated in a letter that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

8. *Any area of waste deposition would be within the Zone A or Zone B of a surface drinking water supply;*

The Bourne Landfill site is not within a Zone A or Zone B of a surface drinking water supply.

9. *Any area of waste deposition would be less than 400 feet upgradient, as defined by groundwater flow or surface water drainage, of a perennial water course that drains to a surface drinking water supply which is within one mile of the waste deposition area;*

The Landfill is not located less than 400 feet upgradient, as defined by groundwater flow or surface water drainage, of a perennial water course that drains to a surface drinking water supply which is within one mile of the waste deposition area.

10. *Any area of waste deposition would be within a Potentially Productive Aquifer unless:*

a. *The proponent demonstrates to the Department's satisfaction, based on hydrogeological studies, that the designation of the area as a potentially productive aquifer is incorrect;*

The Facility is not located within a "Current Drinking Water Source Area", but the Facility is located within a "Potential Drinking Water Source Area" due to the presence of a potentially productive aquifer. A majority of the areas hydraulically downgradient of the Facility are located over a Potentially Productive Aquifer. However, portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "non-potential drinking water source areas" in accordance with the Massachusetts Contingency Plan ("MCP"). The Bourne Water District has stated in a letter that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

b. *The proponent demonstrates to the Department's satisfaction, based on hydrogeological studies, that the aquifer cannot now, nor in the reasonably foreseeable future, be used as a public water supply due to existing contamination of the aquifer; or*

The Facility is not located within a "Current Drinking Water Source Area", but the Facility is located within a "Potential Drinking Water Source Area" due to the presence of a potentially productive aquifer. A majority of the areas hydraulically downgradient of the Facility are located over a Potentially Productive Aquifer. However, portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "non-potential drinking water source areas" in accordance with the Massachusetts Contingency Plan ("MCP"). The Bourne Water District has stated in a letter that it does not have, nor will it seek to locate

future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

c. *The area has been excluded as a "Non-Potential Drinking Water Source Area" pursuant to 310 CMR 40.0932, or as otherwise defined at 310 CMR 40.0006: The Massachusetts Contingency Plan.*

Portions of aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard have been classified as "non-potential drinking water source areas" in accordance with the Massachusetts Contingency Plan ("MCP"). See the responses above.

11. *Any area of waste deposition would be within 1000 feet upgradient, and where not upgradient, within 500 feet, of a private water supply well existing or established as a potential supply at the time of submittal of the application; provided, however, the applicant may show a valid option to purchase the restricted area, including the well and a guarantee not to use the well as a drinking supply, the exercise of which shall be a condition of any site assignment;*

The Bourne Landfill area is currently served by municipal water. There are no known private drinking water supply wells within 1,000 feet of the Bourne Landfill site. Additionally, there are no known potential private water supplies, as defined in 310 CMR 16.02, within 500 feet of the Bourne Landfill site. The Bourne Water District has stated in a letter that it does not have, nor will it seek to locate future drinking water sources downgradient of the Landfill. Additionally, the Bourne Board of Health has issued a regulation that prohibits the installation of any public or private water supply wells downgradient of the Landfill. All previously identified water supply wells have been replaced with connections to the public water supply system.

12. *The maximum high groundwater table is within four feet of the ground surface in areas where waste deposition is to occur or, where a liner is designed to the satisfaction of the Department, within four feet of the bottom of the lower-most liner;*

The maximum groundwater table varies across the property from an elevation of approximately 49 feet along its eastern edge to 42 feet adjacent to MacArthur Boulevard along the facility's western edge. The design elevation of the bottom of the low permeable soil at the leachate sump is the point to which the design groundwater separation distance of four feet is to be established. The anticipated design for the Phase 7 and Phase 8 Landfills will be that leachate from Phase 7 will drain to the Phase 6 leachate sump, which has been designed and approved to meet the minimum separation requirements, as part of the Phase 6 ATC approval process. A separate leachate collection and sump system will be designed for the Phase 8 Landfill, which will also meet that criteria.

13. *The outermost limits of waste deposition or leachate containment structures would be within a resource area protected by the Wetlands Protection Act, M.G.L. c. 131, § 40, including the 100 year floodplain;*

The limits of the waste deposition area or leachate containment structures are not within any resource areas protected by the Wetlands Protection Act, M.G.L. c. 131, § 40, including the 100 year floodplain.

14. *Any area of waste deposition or the leachate containment structures would be less than 400 feet to a lake, or 200 feet to a Riverfront Area as defined in 310 CMR 10.00, that is not a drinking water supply;*

The area of waste deposition or the leachate containment structures will not be less than 400 feet to a lake, or 200 feet to a Riverfront Area as defined in 310 CMR 10.00, that is not a drinking water supply

15. *Any area of waste deposition would be within 1000 feet of an occupied residential dwelling, health care facility, prison, elementary school, middle school or high school or children's pre-school, licensed day care center, senior center or youth center, excluding equipment storage or maintenance structures; provided, however, that the applicant may show a valid option to purchase the restricted area, the exercise of which shall be a condition of any site assignment; or*

There are no occupied residential dwellings, health care facilities, prisons, elementary schools, middle schools or high schools or children's pre-schools, licensed day care centers, senior centers or youth centers within 1,000 feet of the proposed waste deposition area. The limit of waste has been designed to maintain a minimum distance of 1,000 feet from a store with an upstairs apartment that is part of the Bay View Campground. This structure meets the definition of an "occupied residential dwelling". Within the 1,000 foot radius of the waste deposition area are campsites. These are used seasonally and occupied by tents, campers and trailers, which do not meet the definition of an "occupied residential dwellings".

16. *Waste deposition on the site would result in a threat of an adverse impact to groundwater through the discharge of leachate, unless it is demonstrated to the satisfaction of the Department that a groundwater protection system will be incorporated to prevent such threat.*

A groundwater protection system will be incorporated into the design of the Landfill that will be a double composite liner with interstitial leak detection, which will meet or exceed MA DEP requirements for a groundwater protection system, as stipulated at 310 CMR 19.110.

12-acre parcel Facility-Specific Site Suitability Criteria

The Facility-Specific Site Suitability Criteria that are applicable to the modification of the existing Site Assignment to expand to portions of the 12-acre parcel to the south of the 25-acre parcel at the Bourne ISWM facility are presented below (in italics) as they appear in, or are paraphrases of the regulations at 310 CMR 16.40 (3)(d) or on the BWP SW38 Application Form.

Criteria for Solid Waste Handling Facilities 310 CMR 16.40(3)(d)

No site shall be determined to be suitable or be assigned as a solid waste facility where:

1. *The waste handling area would be within the Zone I of a public water supply.*

   The proposed solid waste handling area at the Bourne facility is not within Zone I of a public water supply.

2. *The waste handling area would be within the Interim Wellhead Protection Area (IWPA) or a Zone II of an existing public water supply well within a proposed drinking water source area, provided that the documentation necessary to obtain a source approval has been submitted prior to the earlier of either the site assignment application, or if the MEPA process does apply, the Secretary's Certificate on the Environmental Notification Form or Notice of Project Change, or where applicable, the Secretary's Certificate on the EIR or Final EIR, unless restrictions are imposed to minimize the risk of an adverse impact to the groundwater; and either*

   a. *The proponent can demonstrate to the satisfaction of the Department that the facility cannot reasonably be sited outside of the IWPA or Zone II; or*

   b. *There would be a net environmental benefit to the groundwater by siting the facility within the Zone II or the IWPA where the site has been previously used for solid waste management activities.*

   The proposed solid waste handling area at the Bourne facility is not within an IWPA or a Zone II of an existing public water supply. The nearest Zone II is approximately .25 miles to the south of the 12-acre parcel.

3. *The waste handling area would be within the Zone A of a surface drinking water supply.*

   The proposed solid waste handling area at the Bourne facility is not within the Zone A of a surface drinking water supply.

4. *The waste handling area would be within 500 feet upgradient, and where not upgradient, within 250 feet, of an existing or potential private water supply well existing or established as a Potential Private Water Supply at the time of submittal of the application, provided however, the applicant may show a valid option to purchase the restricted area including the well and a guarantee not to use the well as a drinking water source, the exercise of which shall be a condition of any site assignment.*

   There are no existing or potential private drinking water supply wells within 500 feet of the proposed solid waste handling area at the Bourne facility.

5. *The waste handling area of (a) a transfer station that proposes to receive less than or equal to 50 tons per day of solid waste and utilizes a fully enclosed storage system such as a compactor unit .....(b) any other transfer station or any handling facility is 500 feet from: (i) an occupied residential dwelling; or(ii) a prison, health care facility, elementary school, middle school or high school, children's preschool, licensed day care center, or senior center or youth center, excluding equipment storage or maintenance structures.*

   b.i. There are no occupied residential dwellings within 500 feet of the proposed solid waste handling area at the Bourne facility.

b.ii. There are no prisons, health care facilities, elementary schools, middle schools or high schools, children's preschools, licensed day care centers, or senior centers or youth centers within 500 feet of the area proposed to be used for waste handling at the Bourne facility.

6. *A waste handling area would be within the Riverfront Area as defined at 310 CMR 10.00.*

The proposed solid waste handling area at the Bourne facility is not within a Riverfront Area.

7. *The maximum high groundwater table is within two feet of the ground surface in areas where waste handling is to occur unless it can be demonstrated that a two foot separation can be designed and operated to the satisfaction of the Department.*

The maximum groundwater table varies across the property from an elevation of approximately 49 feet along its eastern edge to 42 feet adjacent to MacArthur Boulevard along the facility's western edge. From the Site Plan included in Attachment 3 the approximate surface elevation of the proposed waste handling area is in the range of 100 feet. Based upon this information, there is a vertical separation distance between groundwater and proposed or potential waste handling areas of at least 50 feet, which far exceeds the minimum 2 feet separation distance required for handling facilities.

General Site Suitability Criteria for both the 25-acre parcel and the 12-acre parcel

The General Site Suitability Criteria outlined in 310 CMR 16.40(4) apply to all types of solid waste management facilities, and address concerns such as traffic and access to a site, threatened and endangered species, and Areas of Critical Environmental Concern. The General Site Suitability Criteria apply equally to both handling facilities and landfills. Since the 25-acre parcel was demonstrated to meet all of the General Site Suitability Criteria as part of the site assignment process for a handling facility, modification to a landfill site assignment will not affect the results of the previous evaluation of the General Site Suitability Criteria.

Consequently, the Town may request MA DEP to determine in writing that the only criteria affected by the modification of the existing Solid Waste Handling Site Assignment on the 25-acre parcel are the Facility-Specific Site Suitability Criteria and that the application need not address the General Site Suitability Criteria since none of those criteria are affected by the modification, in accordance with 310 CMR 16.22(2). The modification of the existing Site Assignment to expand solid waste handling operations onto a portion of the 12-acre parcel will require evaluation of the General Site Suitability Criteria.

Notwithstanding the anticipated determination that the General Site Suitability Criteria need not be addressed for the potion of this application that modifies the existing Solid Waste Handling Site Assignment to a Landfill Site Assignment, as discussed above, a summary of how modification of the 25-acre parcel site assignment meets the criteria of the General Site Suitability Criteria is presented below, as well as those required for the 12-acre parcel. Each criterion is presented in italics, followed by an evaluation of the relationship between that criterion and the proposed Bourne Landfill facility.

310 CMR 16.40(4) General Site Suitability Criteria

The following Site Suitability Criteria shall apply to all types of solid waste management facilities.

a. *Agricultural Lands. No site shall be determined to be suitable or would be assigned as a solid waste management facility where:*

1. *The land is classified as Prime, Unique, or of State and Local Importance by the United States Department of Agriculture, Natural Resources Conservation Service; or*

A *Custom Soil Resource Report for Barnstable County, Massachusetts, Town of Bourne, ISWM Department* was prepared by the United States Department of Agriculture, Natural Resources Conservation Service and is included in Attachment 8. In that report, the included soil map identifies the western portion of the 12-acre parcel and the 25-acre parcel, as well as the state-owned abutting land along the western boundary, to be Soil Group *431B, Barnstable sandy loam, 3 to 8 percent slopes, very stony* and *431C, Barnstable sandy loam, 8 to 15 percent slopes, very stony* with a Farmlands Classification of, "Farmland of statewide importance." The remaining portions of the town-owned parcels are identified as Soil Group *435B, Barnstable loamy coarse sand, 3 to 8 percent, very* stony, with a Farmlands Classification of, "Not prime farmland."

The 25-acre parcel is currently site-assigned for solid waste handling and has been completely disturbed by historical clearing and gravel mining operations and approved solid waste handling operations. Historical aerial photos shown in Attachment 7 indicate this parcel was substantially disturbed prior to acquisition by the Town and subsequent site assignment of the land, and may not have met the agricultural land classifications when ISWM acquired it. Included in Attachment 8 are site specific soil analysis reports for each parcel prepared by a Certified Professional Soil Scientist/Soil Classifier from LEC Environmental Consultants. These reports document and delineate the actual soil conditions of the two parcels as they relate to this criterion.

A figure in Attachment 8, titled *Proposed Site Assignment Modifications*, indicates the specific areas where modifications to the site assignment are, or are not, proposed. The blue area on the figure is that portion of the 25-acre parcel where the existing solid waste handling site assignment is currently proposed to be modified for landfilling and represents the conceptual footprint of the Phase 7 and Phase 8 landfills. The yellow area is that portion of the 12-acre parcel that is not site assigned but is currently proposed to be modified by a site assignment for solid waste handling, as defined by the property line and the 100-foot offset from the "Farmland of statewide importance." The green area is that area where no site assignment modifications are currently proposed, which on the 25-acre parcel means the solid waste handling site assignment remains in effect and on the 12-acre parcel the area will remain without a site assignment.

2. *The land is deemed Land Activity Devoted to Agricultural or Horticultural Uses, except where the facility is an agricultural facility; and*

The Bourne Landfill is not deemed to be *Land Activity Devoted to Agricultural or Horticultural Uses.*

3. *A 100 foot buffer would not be present between the facility and those lands classified at 310 CMR 16.40(4)(a)1 or 2.*

   On the 12-acre parcel and the 25-acre parcel, there will be a 100 foot buffer between the delineated "Farmland of statewide importance" and the areas that are proposed to be site-assigned for landfilling or for solid waste handling.

b. *Traffic and Access to the Site. No site shall be determined to be suitable or be assigned as a solid waste management facility where traffic impacts from the facility operation would constitute a danger to the public health, safety, or the environment taking into consideration the following factors: (1) traffic congestion, (2) pedestrian and vehicular safety, (3) road configurations, (4) alternate routes, and (5) vehicle emissions.*

1. Traffic congestion- Site access, volume and regional impacts of traffic coming and going from the Bourne ISWM were thoroughly analyzed during the EIR/DRI Joint review process with MEPA and CCC. Additionally, traffic impacts were again reviewed in 2003 when ISWM filed a Notice of Project Change (NPC) with MEPA, and a Major Modification with the Cape Cod Commission (CCC), to accept MSW at the landfill. All reviews, including those by the CCC, are complete. Since the Town is not proposing to increase the permitted tonnage to the site and thereby not changing the traffic volume that has been previously evaluated and approved, or changing the site access, there will be no change to the existing traffic impacts which have already been well evaluated, therefore the facilities' operation will not constitute a danger to the public health, safety, or the environment.

Attachment 7 includes the traffic assessment and plan showing infrastructure improvements. This assessment and plan were part the most recent MEPA ENPC and SSEIR submittal in 2018 as well as the submittal to the CCC for its Development of Regional Impact (DRI) review.

2. Pedestrian and Vehicular Safety- The subject parcels are located south of the existing site assigned 74-acre landfill parcel which is accessed by a deceleration lane on the Route 28 north bound lane. This is the only site access point and it has been thoroughly reviewed for safety concerns as noted above. Pedestrians are not allowed along Route 28, therefore potential conflicts with pedestrian traffic will not arise. Furthermore, traffic coming to the site will use major highways and will not be traveling through or near congested urban areas, residential neighborhoods or schools.

3. Road Configurations- As previously noted, access to the site is solely through the deceleration lane located on the Route 28, north bound lane, which has been approved by the Massachusetts Department of Transportation, Highway Division (MA DOT), constructed and has been operational for several years. Internal roads accessing the subject parcels consist of the existing main access road along the western perimeters of the 74-acre and 25-acre parcels, which have been used for access to the existing landfill, the residential recycling center area and the C&D transfer station, and to roads and areas along the eastern side of the site, that are not accessible to the general public, which are used primarily for operations purposes. Adjustments and extensions to

this network will be constructed once access to the 12-acre parcel is achieved.

4. Alternate Routes- Access to the facility is limited to the Route 28, north bound lane as described above.

5. Vehicle Emissions- ISWM has submitted and received approval of its Cumulative Impact Assessment (CIA) which included analysis of potential emissions from the facility. Since the total permitted tonnage at the site will not change, emissions are not expected to changes. ISWM has implemented a Best Management Practice program described in the CIA, in order to reduce diesel emissions from its heavy equipment. ISWM's policy for purchasing all new equipment requires that they meet or exceed all current air emissions standards applicable to heavy equipment operations.

c. *Wildlife and Wildlife Habitat. No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would:*

1. *have an adverse impact on Endangered, Threatened, or Special Concern species listed by the Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife in its data base;*

   As identified by a representative from Natural Heritage and Endangered Species Program (NHESP) and Horsley & Witten, Inc., the 25-acre parcel provides a small area of habitat for the Eastern Box Turtle, an area of Special concern. These areas are identified in the plans in Attachment 3, along the eastern boundary abutting the Joint Base Cape Cod facility. The Town has committed to maintaining a buffer along this boundary to protect this habitat. This buffer may include boulders, fencing or earthen berms to physically separate this area and protect it from disturbance. As indicated in a letter dated July 17, 2001, NHESP agreed that rare species will not be directly impacted so long as this area is maintained as a buffer.

   The entire 12-acre parcel is Eastern Box Turtle Habitat. Any portions that are taken for use by ISWM will have to be mitigated with suitable habitat that is placed under a new conservation restriction at a ratio of 1.5 acres for each acre that is taken. The Town has identified such land and is in the process of acquiring it for this purpose. ISWM is working closely with NHESP staff on this issue and no disturbance of the area will occur until all requirements are met including the preparation of a Conservation and Management Permit. NHESP has determined that Phase 7, Phase 8, Phase 9 and surrounding areas outside of the delineated habitat line are exempt from further Massachusetts Endangered Species Act (MESA) review.

2. *have an adverse impact on an Ecologically Significant Natural Community as documented by the Natural Heritage and Endangered Species Program in its data base; or*

   NHESP has confirmed that there will be no impact on an Ecologically Significant Natural Community.

3. *have an adverse impact on the wildlife habitat of any state Wildlife Management*

Area.

A review of the MassWildlife Lands viewer confirms that the ISWM facility is not in a Wildlife Management Area.

d. *Areas of Critical Environmental Concern. No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting*:

1. *would be located within an Area of Critical Environmental Concern (ACEC), as designated by the Secretary of the Executive Office of Environmental Affairs; or*

2. *would fail to protect the outstanding resources of an ACEC as identified in the Secretary's designation if the solid waste management facility is to be located outside, but adjacent to the ACEC.*

The Bourne ISWM facility is not within an ACEC. The nearest ACEC is the Bourne Back River estuarine system. The boundary for the Bourne Back River ACEC is located along the western edge of Route 28, across the highway and within 500 feet of the site. However, the Secretary of the Executive Office of Environmental Affairs' Designation of the ACEC clearly identified that the watershed boundary is not part of the ACEC. The ACEC is limited to identified wetlands resource areas and their 100 foot buffer zones.

e. *Protection of Open Space. No site shall be determined to be suitable or be assigned as a solid waste management facility where such siting would have an adverse impact on the physical environment of, or on the use and enjoyment of:*

1. *State forests;*
2. *State or municipal parklands or conservation land or other open space held for natural resource purposes in accordance with Article 97 of the Massachusetts Constitution;*
3. *MDC reservations;*
4. *Lands with conservation, preservation, agricultural, or watershed protection restrictions approved by the Secretary of the Executive Office of Environmental Affairs; or*
5. *Conservation land owned by private non-profit land conservation organizations and open to the public.*

In December, 2004, ISWM staff met with the Environmental Manager and Natural Resources Manager of the Massachusetts Army National Guard's (Guard) Environmental and Readiness Center and the Environmental Officer of the Environmental Management Commission (EMC) to discuss ISWM's application to expand the original 74-acre site assignment to allow solid waste handling operations to be conducted on the 25-acre parcel and to address any concerns.

Together, the Guard and the EMC manage the habitat of Camp Edwards, a 15,000-acre parcel located on the Joint Base Cape Cod (JBCC) adjacent to the Town's parcel, to ensure that military training operations do not have an adverse impact on habitat, species or the groundwater. This is especially critical because

this area has been designated as the Upper Cape Water Supply Reserve (Chapter 47 of the Acts of 2002 of the Massachusetts General Court) to recognize and protect the area as a drinking water source for the Upper Cape. To that end, the Guard, through its Groundwater Protection Policy, has chosen to treat this area as if it were a Zone II. In addition, this law created the EMC to oversee implementation of environmental management principles agreed to by the Guard. The EMC reports to three agencies that are part of the EOEA and therefore this land could be considered open space as defined in items 2 and 4 listed above.

The Town wishes to support these efforts by eliminating any potential impacts its operations could have on the JBCC property. Therefore, ISWM has developed the following best management practices (BMPs) to help protect this land. In addition, ISWM will continue to work with officials overseeing the management of the Upper Cape Water Supply Reserve to make modifications to its operations, as necessary.

Litter - It is possible that wind-blown litter might escape the property while landfill operations are being conducted. To address this concern, ISWM has developed and implements a plan containing the following measures.

- Strategically placed permanent litter fencing.
- Use of temporary moveable litter fences.
- Use of tarps over temporary stockpiles to contain recyclables.
- Restrictions on loading and unloading operations on high wind days.
- Regular litter patrols along Canal View Road adjacent to the entire parcel and on Town property.

Dust - Landfill operations will be conducted on soil or ash surfaces that have the potential for creating dust. Therefore, mitigation of dust generation will be an active component of the Landfill's operation. ISWM will continue to use Town owned street sweepers and water trucks to maintain site roads to control dust. ISWM will also conduct active water applications to open surfaces that may generate dust, with particular attention being paid to the Landfill's access roads where heavy equipment operation is conducted.

Stormwater/Groundwater - The proposed site assignment modification is to convert solid waste handling operations to landfilling operations on the 25-acre parcel and to relocate existing handling and administration operations to the 12-acre parcel. The Phase 7 and Phase 8 landfill (cells) will be constructed in accordance with the current MA DEP groundwater protection standards, as stipulated at 310 CMR 19.111. These standards require that at least a double composite liner with leak detection be installed. All liners, except for Phase 1-ABC (no liner) and Phase 2 (single composite liner) have been installed to meet the current design standard. Therefore, the risk of potential releases to groundwater is minimal, as determined by the current MA DEP groundwater protection system standards. All stormwater will be managed on site through the

use of diversion berms, swales, culverts, retention basins and infiltration basins. This includes the existing large infiltration/sedimentation basins that are located at the southeast and northwest corners of the site.

Buffer - As noted previously, ISWM will maintain the natural buffer along the eastern boundary of the 25-acre and 12-acre parcels to protect the potential Eastern Box Turtle habitat. ISWM may utilize a variety of techniques to physically separate operations from the area including: earthen berms, fencing, boulders and infiltration basins.

f. *Potential Air Quality Impacts. No site shall be determined to be suitable or be assigned as a solid waste management facility where the anticipated emissions from the facility would not meet required state and federal air quality standards or criteria or would otherwise constitute a danger to the public health, safety or the environment, taking into consideration*:

1. *the concentration and dispersion of emissions;*
2. *the number and proximity of sensitive receptors; and*
3. *the attainment status of the area.*

1. The concentration and dispersion of emissions - The proposed facility will not constitute a danger to the public health, safety, or the environment from anticipated air emissions. ISWM submitted a comprehensive document entitled, *Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility*. The analysis examined all current solid waste management activities at the site, including disposal of municipal waste combustor ash, and a projection of a full landfill build-out that assumed a maximum tonnage of 1,000 tons per day.

   After reviewing the report and supplemental information, Carol Rowan West, Director of MA DEP's Office of Research and Standards, stated in her letter dated July 1, 2003, "*We therefore recommend that this Facility Based Impact evaluation be approved with the caveats discussed above and detailed below.*" This review was accepted by MA DEP as part of the ATC application approval for the Phase 3, Stage 3 lined landfill expansion. ISWM has implemented a Best Management Practice program presented in the CIA as described above, in order to reduce diesel emissions from its heavy equipment.

2. The number and proximity of sensitive receptors - The closest school is the Bourne Middle School on Waterhouse Road, which is located approximately one mile northwest of the site. The Bourne Manor Health Care Facility is located greater than one half mile from the 25-acre parcel. There are condominiums on Waterhouse Road and at Brookside as well as a campground that are located within one half mile of the facility. All of these receptors are located across Route 28 from the facility. While there are some sensitive receptors in the general, but not immediate area of the Bourne ISWM Landfill, there will be an insignificant level of air pollution emissions from the site, with resulting unperceivable impacts to those sensitive receptors.

3. The attainment status of the area – Barnstable County has attained all of the national ambient air quality standards (NAAQS) established by EPA for sulfur dioxide (SO2), particulate matter (PM2.5 and PM10), ozone, lead, carbon monoxide and nitrogen dioxide (NO2.)

g. *Potential for the Creation of Nuisances.* No *site shall be determined to be suitable or be assigned as a solid waste management facility where the establishment or operation of the facility would result in nuisance conditions which would constitute a danger to the public health, safety, or the environment, taking into consideration the following factors: (1) noise; (2) litter; (3) vermin such as rodents and insects; (4) odors, (5) bird hazards to air traffic, and (6) other nuisance problems.*

1. Noise - Certain levels of noise are associated with the operation of trucks and heavy equipment at the Facility. The operation of equipment, the dropping of tailgates and the sound of back up signals are some of the more common and unavoidable sounds at the Facility. Back up signals are a requirement meant to provide a safer environment for the workers and visitors to the Facility.

   Active operation and concurrent construction activities have occurred regularly at the Facility, without any indication that receptors have been adversely impacted by noise. The site is well buffered by distance, traffic noise along Route 28 and vegetation, mitigating potential impacts as confirmed in a previous noise survey. The construction and operation of a landfill expansion on the 25-acre parcel and handling operations of the 12-acre parcel will not result in any significant change of conditions from present and past noise impacts.

2. *Litter* - Facility operations must be conducted to minimize blowing litter within the handling facility area. The level of effort needed to control windblown litter is dictated by waste materials accepted, weather conditions and wind directions. Methods available to control windblown litter include the following:

   Portable litter fence. The most suitable location for litter control fence should be determined on a daily, or even more frequent, basis, based on the wind's direction. The fencing should be placed as close to the active face as practical without disturbing the landfilling operations. The fencing should be constructed to allow the wind to pass through it.

   Permanent litter fencing. Litter fencing has been installed along the northern, eastern and western property lines. The permanent, existing fencing will be extended southerly from the limit of the existing fencing along the eastern and western property lines to the southern limits of the proposed Phase 7 and Phase 8 Landfill expansion.

   Application of cover material. Cover material should be applied frequently on the active face on windy days, if required, to minimize the blowing of lightweight waste materials.

Active face on interior slopes. On windy days, the active face should be maintained on interior slopes, if possible. Waste disposal on outer slopes should be avoided when it is windy.

Litter patrols. Litter collection crews are deployed regularly and as needed to gather windblown litter. In addition, these crews must routinely police areas along MacArthur Boulevard and properties abutting the Facility, including JBCC.

Temporary fence. Fence is installed at strategic locations within the operating landfill to create additional interception and collection points for wind-blown liter.

Covering Vehicles. All vehicles entering or leaving the facility should be covered to prevent wind-blown litter.

Indoor loading and unloading. Whenever possible loads that have the potential of generating wind-blown litter should be loaded and unloaded under cover. When that is not feasible, care should be taken to minimize the potential by loading/unloading in an area shielded from the wind or in an area protected by litter nets.

3. *Vermin* - Vermin (vector and rodent) control at the landfill and at the handling facility may be accomplished by employing the following control methods:

Periodic application of cover material. If vermin are a problem, cover material should be placed more often.

Immediate application of cover material. Waste loads that attract vermin should be covered immediately to discourage the proliferation of vermin.

Mixing waste with soil. Some waste loads may be mixed with soil materials to discourage vermin contact.

Limiting storage of putrescible materials. Putrescible materials that could provide a feedstock for vermin should be removed from the site as quickly as possible.

Exterminator. Contracting with a licensed exterminator who conducts rodent control actions.

By far the best method for minimizing vermin is the timely application of cover materials and placing cover materials in sufficiently thick layers to prevent vermin contact with the waste.

In order to reduce the presence of vermin, the Facility maintains a contract with a licensed exterminator to conduct vermin control actions, such as setting bait stations on a regular schedule and as needed.

Proper compaction techniques and the application of six-inches of daily cover soil or ash at the end of daily operations will reduce the presence of rodents. Additionally, the size of the daily operating area at the Landfill's face will be kept to a minimum. This promotes good compaction and helps to control litter and odors that might attract rodents to the operating face. The contracted, licensed exterminator also conducts rodent control actions concurrent with vector controls.

4. *Odors* - A potential source of odor is at the operating face of the Landfill and within the handling and transfer operations. Proper compaction and covering methods (daily and intermediate cover) help to minimize odors generated at the operating face. The operators are instructed to immediately deal with odors at the operating face, should they arise. Measures such as the placement of daily cover and/or dry lime, as needed, to the surface of the area(s) that may be generating excessive odors are effective mitigation measures that are used at the Facility. The elimination of accepting C&D residuals and fines materials and shifting to a waste stream that is predominantly ash has significantly reduced the occurrence and/or magnitude of any odor generation. Another odor mitigation measure that is employed is the expansion and maintenance of the existing, active landfill gas collection and flare system. This system will continue to be expanded, as the Landfill expands. Within the handling and transfer operations, odors are best mitigated by covering waste holding containers, and moving waste from floors and other accessible location and putting it into closed containers and removing them from the site or putting them in the Landfill.

5. *Bird Hazards* – The operation of the Phase 7, Phase 8 and Phase 9landfill expansions and the relocation of handling operations will not result in a bird hazard to aircraft. This has been demonstrated by the long-term operation of the Facility. While the Facility abuts the Joint Base Cape Cod, which includes Otis Air National Guard Base and Camp Edwards, the Facility is at least 4.5 miles from the closest runway area. No incidents involving bird hazards have been reported. It is unlikely that continued operation of these facilities will have any impact.

6. *Other* - Due to the nature of landfilling and handling operations, dust will be generated during dry periods of the year. The following control measures are employed at the Facility:

   Soil wetting. Facility access roads, on and off the landfill, are wetted using a water truck. This task is regularly performed several times during an operating day in the summer months.

   Application of calcium chloride. Calcium chloride, a soil wetting agent, may be used to control dust. However, using calcium chloride in large quantities is costly and may affect groundwater quality.

   Vegetative cover. Inactive landfill areas may be seeded to encourage the growth of vegetation and reduce barren soils.

   Secure Material Delivery. All Trucks delivering MSW, ash, stone, soil or any other material to the site must have their loads covered.

Pavement sweeping. The Facility operates a sweeper that it regularly uses to remove accumulated dirt from paved areas of the site. Removal of this dirt reduces dust generation.

h. *Size of Facility. No site shall be determined to be suitable or be assigned as a solid waste management facility if the size of the proposed site is insufficient to properly operate and maintain the proposed facility. The minimum distance between the waste handling area or deposition area and the property boundary shall be 100 feet, provided that a shorter distance may be suitable for that portion of the waste handling or deposition area which borders a separate solid waste management facility.*

A 100 foot buffer will be maintained along the eastern and western boundaries of the 25-acre and 12-acre parcels and the southern boundary of the 12-acre parcel, as will all other buffers for receptors, as required by the Site Assignment Regulations. The northern boundary of the 25-acre parcel is adjacent to the current 74-acre parcel upon which ISWM currently operates the Landfill. Full landfill build-out of the 74-acre parcel, through the Phase 6 expansion, will extend landfill operations to the boundary of the 25-acre parcel. The current access roads and paved open areas within the 25-acre and 74-acre parcels, and those proposed for the 12-acre parcel, provide more than adequate room to maneuver and queue vehicles for all of the solid waste handling operations at the facility.

i. *Areas Previously Used for Solid Waste Disposal. Where an area adjacent to the site of a proposed facility has been previously used for solid waste disposal the following factors shall be considered by the Department in determining whether a site is suitable and by the board of health in determining whether to assign a site:*

1. *The nature and extent to which the prior solid waste activities on the adjacent site currently adversely impact or threaten to adversely impact the proposed site.*

2. *The nature and extent to which the proposed site may impact the site previously used for solid waste disposal.*

3. *The nature and extent to which the combined impacts of the proposed site and the previously used adjacent site adversely impact the public health, safety, and the environment taking into consideration:*
   a. *whether the proposed site is an expansion of or constitutes beneficial integration of the solid waste activities with the adjacent site;*
   b. *whether the proposed facility is related to the closure and/or remedial activities at the adjacent site;*
   c. *the extent to which the design and operation of the proposed facility will mitigate existing or potential impacts from the adjacent site.*

The modification of the existing site assignment, so as to allow landfilling to occur on the 25-acre parcel that is currently site assigned for solid waste handling and to expand the site assignment so as to allow solid waste handling to occur on a portion of the 12-acre parcel, will provide beneficial, long term solid waste management capacity for Bourne and the greater Cape Cod region. Fortunately for the Town, it was able to acquire the 25-acre and 12-acre parcels, allowing it to proceed with its development of long term

integrated solid waste management plans. The expansion of the proposed landfilling activities onto the 25-acre parcel is fully compatible with the current and projected build out of landfilling operations on the 74-acre parcel. The projected impacts from the future extension of landfill operations into Phase 7, Phase 8 and Phase 9 will provided added disposal capacity and extended life to the Facility. The construction and operation of these phases will be the same as construction and operation of the existing landfill phases. With the build out of Phases 7 and 8, the solid waste handling, materials storage, residential recycling center and administration operations that currently occur on the 25-acre parcel, will be relocated to the 12-acre parcel.

The use of the 25-acre parcel as the Phase 7 and Phase 8 landfill phases will allow the Town to maximize the potential utilization of the site for its solid waste management activities. ISWM can more fully use the combined parcels for landfilling, thereby providing a critical regional service as evidenced by the shortfall of disposal capacity in Massachusetts. The existing solid waste handling operations are intended to be relocated onto a 12-acre parcel that is immediately to the south of the 25-acre parcel, which was recently purchased by the Town. This relocation of solid waste handling operations will require another modification to the site assignment that will allow solid waste handling operations to be permitted on the 12-acre parcel which will provide regional solid waste management services, after the landfill has closed.

j. *Existing Facilities. In evaluating proposed sites for new solid waste management facilities the Department and the board of health shall give preferential consideration to sites located in municipalities in which no existing landfill or solid waste combustion facilities are located. This preference shall be applied only to new facilities which will not be for the exclusive use of the municipality in which the site is located. The Department and the board of health shall weigh such preference against the following considerations when the proposed site is located in a community with an existing disposal facility:*

1. *the extent to which the municipality's or region's solid waste needs will be met by the proposed facility;*
2. *the extent to which the proposed facility incorporates recycling, composting, or waste diversion activities.*

Since the proposed expansion of landfill operations into Phase 7 and Phase 8 and the relocation of solid waste handling operations do not constitute a new facility, this criteria is not applicable. However, according to lists provided by the MA DEP on their website there are four existing landfills in Bourne. The inactive landfills are: Bourne Dump (SL0036.0020), MacArthur Boulevard; Nightingale Stump Landfill (SD0036.001), 260 MacArthur Boulevard; and Otis Air Force Base Landfill (SL 0036.003) Connery Road. The only active landfill is the Bourne Landfill (SL 0036.004), 201 MacArthur Boulevard, which is owned and operated by the Town. This is located on the currently site assigned 74-acre parcel that is site assigned for landfill operations and the immediately adjacent 25-acre parcel that is site assigned for solid waste handling operations and is the subject of this Modification Application. Specifically, this Application seeks to modify the site assignment of the 25-acre parcel to allow solid waste landfill operations to occur in this area and to extend the current site assignment to include the 12-acre parcel allowing relocation of the solid waste handling operations to the adjacent 12-acre parcel. There are no combustion facilities in Bourne.

The proposed Phase 7 and Phase 8 expansion of landfill operations onto the 25-acre parcel will require the relocation of the handling operations onto the 12-acre parcel, located immediately south and contiguous to the 25-acre parcel. This will allow the continuation of services on a regional basis including MSW disposal, C&D transfer, recycling and composting, as well as the residential drop off and recycling center. ISWM currently provides services to several municipalities on Cape Cod and the South Shore for management of C&D and recyclables. Therefore, the site will not be for the exclusive use of the Town of Bourne and should be given preferential consideration.

k. *Consideration of Other Sources of Contamination or Pollution. The determination of whether a site is suitable and should be assigned as a solid waste management facility shall consider whether the projected impacts of the proposed facility pose a threat to public health, safety or the environment, taking into consideration the impacts of existing sources of pollution or contamination as defined by the Department, and whether the proposed facility will mitigate or reduce those sources of pollution or contamination.*

In accordance with previous Department guidance, ISWM submitted an analysis entitled, *Interim Risk Evaluation and Cumulative Impact Assessment of the Proposed Phased Landfill Development of the Town of Bourne Integrated Solid Waste Management Facility* (CIA). This examined the potential impact of the theoretical build out of the facility in conjunction with other local potential sources of contamination or pollution. The conclusion of the CIA is that there will be no significant impacts to receptors in the vicinity of the site and that Best Management Practices will be employed to mitigate any potential impacts from the facility. In addition, a review of the state's database revealed that local emissions of volatile organic compounds (VOCs) are insignificant.

l. *Regional Participation. The Department and the board of health shall give preferential consideration to sites located in municipalities not participating in a regional disposal facility. The Department and the board of health shall weigh such preference against the following considerations when the proposed site is located in a community participating in a regional disposal facility:*

1. *the extent to which the proposed facility meets the municipality's and the region's solid waste management needs; and*

   The proposed facility contributes to the Town of Bourne and the region's ability to provide an economic and efficient means for the private and public sectors to dispose solid waste. The MA DEP's Solid Waste Master Plan clearly shows a need for capacity of all types and use of this land will enable Bourne to better assist in fulfilling those needs by significantly extending the operating life of the Landfill. The CCC Regional Policy Plan also specifically identifies the need for integrated solid waste management infrastructure.

2. *the extent to which the proposed facility incorporates recycling, composting, or waste diversion activities.*

   The proposed Phase 7, Phase 8 and Phase 9 landfill expansions are intended for disposal of residual materials resulting from recycling operations, municipal solid waste collection and ash resulting from combustion of MSW and is not for the disposal of C&D. The relocation of solid waste handling operations will permit

the continuation of the existing recycling, composting and other waste diversion activities.

Proposed Emergency Operations

In the face of dwindling disposal capacity in Massachusetts, the vulnerability of the day-to-day disposal network to even minor, temporary interruption at any of the operating facilities, becomes extremely problematic. Most disposal facilities are currently operating at or near permitted capacity on a daily basis. When unanticipated upsets in capacity occur, haulers find themselves with nowhere to tip and the system backs up creating an emergency situation. Whether it is a catastrophic failure resulting in a prolonged capacity shortfall or simple mechanical failure that can be rectified in a week, the need for immediate backup capacity is indisputable. Unlike waste-to-energy and rail transfer facilities, landfills have the ability to provide additional capacity almost immediately by temporarily extending operating hour and increasing daily tonnage limits.

Under future emergency conditions on Cape Cod, it is anticipated that the Bourne Landfill will be asked to play a leading role in providing responses that will ensure that the public health and the environment are protected. Such an occasion occurred in 2007 when Bourne was asked to accept all of the MSW from Cape Cod municipalities after a fire disrupted operations at another disposal facility in southeastern MA that serviced Cape Cod communities. ISWM is requesting that, as part of the scope to be approved by the Secretary, MEPA waive its review process for such emergencies, including submittal of any Notices of Project Change (NPC), defer to MA DEP for any technical oversight and pre-approve expanded operations as proposed below. It is the intent of the Town to make arrangements with other permitting agencies such as MA DEP, the Bourne Board of Health and the Cape Cod Commission, to include similar waivers or pre-approvals in their review processes based on the past performance of ISWM and the updated capabilities it now has.

It is therefore the proposal by the Town that in the event of an emergency, upon verbal or electronic notification only, ISWM be presumptively approved to operate any or all of its facilities 24 hours per day, with a total inbound tonnage not to exceed 1,500 tons in any 24-hour period, for a minimum of five (5) consecutive days, or 120 hours.

(c) The significance of the proposed changes, with specific reference to the factors listed 301 CMR 11.10(6)

The Project Change will not significantly increase potential environmental consequences when considering all the criteria listed in 301 CMR 11.10(6)(a) through (g) as described below.

a) Expansion of Project.

The expansion includes Phase 7 and Phase 8, which were reviewed in the previous SSEIR submittal in 2018, however the current site assignment for these areas will need to be modified for landfilling. Also, include is Phase 9 which will be located over portions of the landfill previously reviewed in multiple submittals and is already site assigned for landfilling. Attachment 3 provides details of the plans including cross sections that clearly show how this is intended to be constructed. The daily tonnage and waste composition will remain the same as that which is in place currently. Attachment 7 includes a volume summary of all phases. The Phase 7, Phase 8 and Phase 9 vertical and horizontal expansions will provide an estimated 5,175,000 cubic yards of disposal capacity and will extend the life of the landfill into the 2040s.

b) Generation of further impacts.

The major impacts of the proposed Project Change were addressed in the May 2018 Single Supplemental Environmental Impact Report (SSEIR). One additional change from the SSEIR is the inclusion of the Phase 9 vertical landfill expansion. The Project Change will be located on both previously disturbed and undisturbed (12-acre parcel) land. Existing roads will provide access to and around the site, with new roads added on the 12-acre parcel. All environmental baseline, impacts and mitigation have been reviewed as part of the MEPA process for this site area. The proposed plan will not significantly change the operations and the way waste is currently and has historically been managed at the facility.

A summary of the findings for each of the environmental criteria evaluated during the MEPA review process for the Phase 7, Phase 8 and Phase 9 Landfill expansions and the relocation of solid waste handling operations, is provided below.

- Rare Species The project includes previously disturbed land (25-acre parcel and existing landfill area) and undisturbed land (12-acre parcel), that does not contain a habitat of rare species, vernal pools, priority sites of rare species or exemplary natural communities, and therefore, no alteration of designated significant habitat or taking of an endangered or threatened species will occur. However, the 12-acre parcel in its entirety, and small portions of 25-acre parcel, do contain Eastern Box Turtle habitat, a species of Special Concern. This habitat is delineated on plans in Attachment 3. Any taking of this land will require mitigation in close coordination with NHESP. Attachment 7 includes a fact sheet on the Eastern Box Turtle as well as a letter from NHESP that confirms that Phase 7, Phase 8, Phase 9, and areas outside of the delineated habitat, are exempt from further MESA review.

- Historical/archaeological resources The project site does not include any structure, site or district listed in the State Register of Historic Places or inventory of historic and archaeological assets of the Commonwealth. Therefore, the Project will not destroy or alter or have any impacts on any historical or archaeological resource.

- Areas of Critical Environmental Concern The proposed change will have no impact on the nearby Back River ACEC.

- Land The development of the Landfill will involve the expansion of impervious land beyond the footprint discussed in the FEIR but previously discussed in the May 2018 SSEIR. Additionally, there will be an expansion of new impervious land on the 12-acre parcel to accommodate relocated infrastructure. The total new impervious area exceeds the ten acre threshold and therefore a new EIR is required. The Town is proposing this be reviewed as an SSEIR. Attachment 3 includes a plan delineating these areas.

- Wetlands The Project Change will not alter any wetlands, waterways or tidelands, and the work performed to construct the Project Change will not be within a 100-foot buffer zone of bordering vegetative wetlands.

- Water Water use by the Project will not change from current usage rates.

- Wastewater The wastewater from the landfill, including leachate and condensate, will continue to be managed by a groundwater protection system similar to the one installed for the current operation. Liquid is conveyed to one of two large on-site storage tanks and will be either removed from the site via trucks, as it always has been, or potentially managed on-site at a future waste water treatment plant. The Town is reviewing options for the possible construction of a leachate pre-treatment system on-site as well as construction of a full treatment system. If the latter option is pursued, the Town will connect to a clean effluent line on JBCC via an easement from the MA Department of Fish and Game. An additional easement will need to be obtained from the U.S. Army Corps of Engineers as well as use agreements with the MA Air National Guard, 102nd Intelligence Wing.

- Transportation The Project Change will not result in a change in traffic. In fact, traffic has been reduced at the landfill since January 2015 once ash became the primary wastestream accepted for disposal. Ash is delivered in large trailers that contain nearly twice the tonnage per trip as would packers containing MSW. Furthermore, the only MSW accepted at the facility is from the Town of Bourne packer trucks and from contracted trucks bringing waste from the Town of Falmouth which is an abutting community. Both the ash, comprising 189,000 tons per year, and the MSW representing about 18,000 tons per year, are under long-term agreements or is generated by the Town of Bourne, which will stabilize the traffic conditions well into the future. However, if the Town decides to resume accepting all MSW and no ash, it has the infrastructure to safely accommodate this traffic configuration as it has demonstrated in the past. Attachment 7 contains a traffic assessment and plan discussing this infrastructure. Finally, should the Town's plans to treat leachate on-site come to fruition, there is a potential to further reduce truck traffic by approximately 2,000 trips per year. Please note that as a result of the Phase 1D reclamation and relocation of the residential recycling center further south, the site entrance has been significantly improved with a relocated scale house and scales, better traffic patterns and longer queues for both inbound and outbound traffic.

- Energy The Project Change does not meet the size thresholds for MEPA review under

energy.

- Air A major air plan approval has already been obtained from MA DEP and has also received an Operating Permit "application shield" for the initial application as MA DEP reviews the application. The primary impacts to air quality were from emissions of LFG. The Proponent made commitments to LFG collection and control in order to mitigate the air quality impacts. The Project currently has a flare as the primary pollution control device for mitigating emissions of LFG to the environment. The secondary air emissions from the flaring of LFG are subject to DEP permit conditions.

- Solid and hazardous waste The mitigation of impacts from solid waste disposal at the landfill was adequately addressed and as was mentioned before, no increase in tonnage is proposed. As with all phases before, the construction and operation of Phase 7, Phase 8 and Phase 9, as well as all solid waste transfer and handling operations, will be subject to the requirements of permits that will be issued by the DEP. ISWM has considerable experience in managing all types of waste streams including accepting all MSW at the landfill as in previous years, or with the current model with approximately 86% ash consuming the annual tonnage allotment. Ash is an inert, homogenous material that is unattractive to vectors, does not produce gases or odors and is easily shaped and compacted. Additionally, several years ago the Town barred acceptance of construction and demolition debris fines at the landfill that previously were the source of odors at the facility.

c) Change in expected date for commencement of the Project

There is no change, as this project is a continuation of approved activities currently performed.

d) Change of the Project site

There is no change to the site location.

e) New application for a Permit

The proposed changes will be addressed by the Bourne Board of Health by major modifications to the existing site assignment for changes in operation on the 25-acre parcel and 12-acre parcel. Additionally, MA DEP will issue Authorization-to-Construction and Authorization-to-Operate permits, the CCC will review an application for a DRI and local permitting authorities such as the Bourne Planning Board and Building Inspector will issue permits in accordance with local bylaws as applicable.

f) For a Project with net benefits

The ENPC does not prevent or delay the benefits that are provided by the Project.

g) For a Project involving a lapse of time

N/A.

(d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a proposed modification of the Section 61 Finding (or it will be required in a Supplemental EIR).

None. Previous Section 61 findings will not need to be modified. No new measures resulting from the Project Change are required to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts.

ATTACHMENTS & SIGNATURES

Attachments:

1. Secretary's most recent Certificate on this project
2. Plan showing most recent previously-reviewed proposed build condition
3. Plan showing currently proposed build condition
4. Original U.S.G.S. map or good quality color copy (8-1/2 x 11 inches or larger) indicating the project location and boundaries
5. List of all agencies and persons to whom the proponent circulated the NPC, in accordance with 301 CMR 11.10(7)

Signatures:

2/18/20	2/18/20
Date Signature of Responsible Officer or Proponent	Date Signature of person preparing NPC (if different from above)
Daniel T. Barrett General Manager	Philip A. Goddard Manager of Facility Compliance and Technology Development
Name (print or type)	Name (print or type)
Town of Bourne, ISWM Department	Town of Bourne, ISWM Department
Firm/Agency	Firm/Agency
24 Perry Avenue	24 Perry Avenue
Street	Street
Buzzards Bay, MA 02532	Buzzards Bay, MA 02532
Municipality/State/Zip	Municipality/State/Zip
508-759-0600, extension 4240	508-759-0600, extension 4241
Phone	Phone

ATTACHMENT 1

MOST RECENT CERTIFICATE

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1081
http://www.mass.gov/eea

June 29, 2018

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
SINGLE SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Bourne Integrated Solid Waste Management Facility
PROJECT MUNICIPALITY	: Bourne
PROJECT WATERSHED	: Cape Cod
EOEA NUMBER	: 11333
PROJECT PROPONENT	: Town of Bourne
DATE NOTICED IN MONITOR	: May 23, 2018

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G. L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA regulations (301 CMR 11.00), I have reviewed the Single Supplemental Environmental Impact Report (Single Supplemental EIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations.

Project Description

As described in the Single Supplemental EIR, the project consists of Phase 6 of the Bourne Integrated Solid Waste Management Facility (ISWMF) project. Phase 6 of the project consists of the construction of a lined landfill cell that will incorporate leachate collection and landfill gas management infrastructure. It is proposed on previously disturbed land. Existing roads will provide access to and around the site. The 6.69-acre expansion will provide 920,000 cubic yards (cy) of capacity.

Phase 6 is designed to support Phase 7 and Phase 8 which could yield another 3,830,000 cy of capacity and extend the life of the landfill to 2034. The Single Supplemental EIR also provides an updated conceptual development plan for Phase 7, Phase 8 and for the proposed residential recycling center and proposed relocated offices.

Procedural History

Review of the Bourne ISWMF project was initiated with the submission of an Environmental Notification Form (ENF) in 1997. As described in the 1997 ENF, the ISWMF project entailed the development of a regional waste management facility within the Bourne Landfill located off MacArthur's Boulevard (Route 28). The project was intended to meet a regional need for the processing and disposal of construction and demolition (C&D) material, and Difficult-To-Manage (DTM) wastes on Cape Cod. The project included the capping and/or mining of previously landfilled areas, as well as the development of a number of new lined landfill phases for regional non-municipal solid waste. The average disposal rate was identified as 300 to 500 tons per day (tpd). The project was designed to accept a maximum of 825 tpd of waste materials at full build-out. As described in the ENF, approximately 400 tpd would be disposed of on-site, 250 tpd of C&D waste would be processed; 100 tpd would be recycled; 50 tpd would be composted; and 25 tpd would consist of diverted waste. The ENF was followed by a Draft and a Final EIR in 1998 and 1999 (respectively), both of which were determined to be adequate. The Certificate on the FEIR, issued November 29, 1999, acknowledged that certain aspects of the landfill project, including Phase 6, were conceptual and required that the Town submit Notices of Project Change (NPCs) to the MEPA Office to address development of subsequent phases.

NPC-1 was submitted in April 2003 and expanded the waste stream to include Municipal Solid Waste (MSW) and Municipal Combustor Ash (MCA), increased the quantity of MCA it received, and allowed it to be co-mingled with MSW for landfilling with the Facility. NPC-1 did not increase the maximum permitted capacity (825 tpd) accepted for disposal, reuse, composting, and recycling. The Town committed to cease accepting unprocessed C&D material by January 1, 2004 in accordance with the Authorization to Operate (ATO) permit. The August 7, 2003 Certificate on NPC-1 determined that the potential impacts associated with the proposed project change did not warrant the preparation of an EIR.

On April 2, 2007, the MEPA Office determined that the Bourne ISWMF's temporary increase in capacity of 500 additional tpd of MSW (1,325 tpd total) qualified as an Emergency Action pursuant to the MEPA regulations. The additional MSW would be diverted from the SEMASS waste-to-energy facility in Rochester, MA which was damaged by a fire on March 31, 2007. A second NPC (NPC-2) was filed on April 17, 2007 under the Emergency Action provisions of the MEPA Regulations to address these actions and the Certificate issued on May 25, 2007 determined that the emergency action did not warrant the preparation of an EIR.

In December 2008, the Town submitted a third NPC (NPC-3) which included the phased construction of five landfill gas (LFG) reciprocating engine/electric generator sets with equipment to recover and convert LFG from the facility to electricity. The proposed energy facility was designed to generate up to 4.3 megawatts (MW) of electricity. The Certificate issued

on January 23, 2009 determined that the potential impacts associated with NPC-3 did not warrant the preparation of an EIR.

In January 2016, the Town submitted a fourth NPC (NPC-4) which included an update on the Phase 1D landfill reclamation project and a final development plan for Phase 5 of the landfill. The NPC proposed a hybrid version of two scenarios that were considered in prior MEPA review. The February 5, 2016 Certificate on NPC-4 determined that the potential impacts associated with the proposed project change did not warrant the preparation of an EIR.

The Proponent submitted an Expanded NPC in December 2017 for Phase 6 with a request that I allow a Single Supplemental EIR to be prepared in lieu of a Draft and Final Supplemental EIR. The Certificate issued on January 12, 2018 granted that request.

Project Site

The Bourne ISWMF, located at 201 MacArthur Boulevard (Route 28), is comprised of a 74-acre site-assigned parcel which contains landfill operations and facilities. In 2001, a 25-acre parcel immediately abutting the landfill to the south was purchased and has been used for recycling and transfer operations. The landfill contains lined and unlined waste disposal areas. Phases 1A, 1B, 1C, and 1D are unlined cells that comprise the oldest portion of the landfill. Phases 1A, 1B, and 1C are closed and capped. Phase 1D was part of a pilot landfill reclamation project with the Massachusetts Department of Environmental Protection (MassDEP) that removed the solid waste in this area to create additional landfill space. Phases 2 and 3 are both lined, closed, capped and contain leachate collection systems. Phase 4, an active landfill cell, is located in the area previously occupied by Phase 1D. Phase 5 addressed a vertical expansion proposed over Phases 1A, 1B, and 1C. MassDEP issued an Authorization to Construct (ATC) and ATO Permit in 2017.

Permits and Jurisdiction

The development of Phase 6 is undergoing MEPA review because it consists of a material change to the project prior to the taking of all Agency Actions. The project change exceeds the mandatory EIR threshold at 301 CMR 11.03 (1)(a)(2) because it will create more than 10 acres of new impervious area. The project also exceeds the ENF threshold at 301 CMR 11.03(1)(b)(3) because it includes conversion of land held for natural resources purposes in accordance with Article 97 to any purpose not in accordance with Article 97. The Phase 6 requires an ATC and an ATO from MassDEP. Because it requires an EIR, the project is subject to review in accordance with the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ("GHG Policy").

The project will also require a modification to a Development of Regional Impact (DRI) from the Cape Cod Commission (CCC).

Because the Town is not seeking Financial Assistance, MEPA jurisdiction is limited to the subject matter of required or potentially required state Permits that have the potential to cause

Damage to the Environment, as defined in the MEPA regulations. MEPA jurisdiction extends to land alteration, solid waste, Article 97 land and GHG emissions.

Review of the Single Supplemental EIR

The Single Supplemental EIR described the project, identified existing conditions, and described potential environmental impacts and mitigation measures. It provided a brief description of applicable statutory and regulatory standards and requirements, and described how the project will meet those standards. The Single Supplemental EIR provided a list of required local, state, and federal permits and provided an update on the status of each of these actions.

Comments from State Agencies did not identify any significant impacts that were not reviewed in the Single Supplemental EIR or identify additional alternatives for further review. The Proponent intends to commence construction of the landfill liner in the summer of 2018 which will allow adequate time for construction and review by MassDEP prior to making a determination regarding an ATO in early 2019.

According to the Single Supplemental EIR, Phase 6 will not result in increased environmental impacts compared to the project reviewed in the 1999 FEIR, nor will it require modification of any previously issued Section 61 Findings. The daily tonnage and waste composition will remain consistent. Phase 6 is proposed on site-assigned land approved by the Bourne Board of Health.

Phase 6 consists of a double composite lined landfill cell which includes constructing a new primary composite liner and leachate collection system and a secondary composite liner with leak detection and includes, from bottom to top:

- A subgrade layer of compacted soil;
- A low-permeability soil barrier layer comprised of twelve inches of compacted low permeability soil (natural soils);
- A secondary geocomposite clay liner barrier layer;
- A secondary geomembrane barrier layer consisting of a high density polyethylene (HDPE) flexible membrane liner (FML);
- A secondary geocomposite leak detection layer consisting of a hi-planar HDPE bonded on both sides with a non-woven geotextile geocomposite drainage layer; and,
- A leachate collection layer consisting of a minimum of 18-inches of sand.

The Single Supplemental EIR identifies Phase 7 and 8 as contiguous phases constructed in progression southward from Phase 6. Phase 7 would be constructed over the southern slope of Phase 6 and Phase 8 would be constructed over the southern slope of Phase 7. Both phases would be constructed using the double composite lined landfill design with leak detection designed to meet regulatory requirements for liner construction. Phase 7 and Phase 8 are proposed in areas that are currently used for site-assigned solid waste handling activities. The Town will be required to modify its Site Assignment with the Board of Health prior to developing either Phase 7 or Phase 8. In 2016, the Town acquired approximately twelve acres

abutting the residential recycling center at the southern boundary of the site. If Phase 7 and 8 proceed, the Town may also relocate offices and handling facilities to the 12-acre parcel.

Article 97

The Single Supplemental EIR identifies the Town's analysis of alternatives for construction of an on-site leachate system. Currently, leachate is conveyed to a large on-site storage tank and is removed from the site via trucks. Any on-site treatment will require discharge of clean, treated effluent. The Joint Base Cape Cod (JBCC), which is adjacent to the landfill site, includes a clean effluent pipeline used for the discharge from the wastewater treatment plant at JBCC. The pipeline is located within the boundary of the Upper Cape Water Supply Reserve (the Reserve), which is state conservation land protected in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth (Article 97). The construction of a connection requires an easement over 2,500 sf of Article 97 land.

The Single Supplemental EIR identified the Article 97 land impacted by the project and indicated that the conversion was authorized by a two-thirds vote of the legislature and codified by the General Court in Chapter 223 of the acts of 2016 which was signed by Governor Baker on August 10, 2016. The legislation authorizes the Massachusetts Department of Fish and Game (DFG) to transfer an approximately 2,500 square foot (sf) easement on Canal View Road at JBCC within the Upper Cape Regional Water Supply Reserve. The authorizing legislation is limited to installation and maintenance of a pipe to connect to the Wastewater Treatment Plant.

The Single Supplemental EIR addresses consistency with the EEA Article 97 Land Disposition Policy which guides the circumstances under which an EEA Agency may transfer Article 97 land or support a transfer of Article 97 land. The goal of the Policy is to ensure no net loss of Article 97 lands under the ownership and control of the Commonwealth and its political subdivisions. The Single Supplemental EIR includes a description of the land proposed for disposition (size, location, presence of resource areas, etc.), an alternatives analysis and identification of compensatory open space. The Town of Bourne will record a permanent conservation restriction (CR) over 77 acres of municipal land managed by the Bourne Conservation Commission and the CR will be held by DFG.

Greenhouse Gas Emissions (GHG)

The project is subject to the GHG Policy because it exceeds thresholds for a mandatory EIR. The Policy requires Proponents to quantify carbon dioxide (CO_2) emissions and identify measures to avoid, minimize or mitigate such emissions. The Policy directs proponents to use applicable building codes to establish a project emissions baseline that is "code-compliant." However, there is no building energy code equivalent that applies specifically to landfills or energy use models (such as eQUEST) designed to estimate the projected energy use of the landfill energy loads. Therefore, prior to the submittal of the Expanded NPC the Town had consulted with the MEPA Office and the Department of Energy Resources (DOER) in development of the GHG analysis. The Expanded NPC identified current MSW/MCA contract scenarios, the decrease in LFG associated with each, the actual LFG collection system efficiency

compared to industry standards, and the flare efficiency. It also quantified GHG emissions from direct (flaring and fugitive emissions) and indirect (flare and LFG collection motors) sources.

Currently, the Town mitigates the emission of GHG through an extensive landfill gas collection system and thermal destruction system. A major reduction in the production of GHGs has been achieved by shifting the waste it accepts. Approximately 86 percent of its annual tonnage is in the form of municipal waste combustor ash which does not produce gases.

The Supplemental Single EIR evaluates and quantifies the potential GHG reduction associated with LFG measures based upon the following system assumptions: LFG conversion to pipeline natural gas; microturbines fueled by LFG; LFG-to-energy facility; and, anaerobic digestion of organic materials and biogas-to-energy. In addition, the Town is assessing the feasibility of and the potential development of:

- Recovering thermal energy;
- LFG Blower Powers with 40 horsepower motors;
- Photovoltaic (PV) Solar - potential 12.6 MW solar installation over 30-acres of landfill and on the roof of an existing facility;
- Operation of an animal crematory that would use the LFG as a fuel.
- Additional thermal recovery of LFG from combustion to heat the maintenance building;
- Vertical axis wind turbines;
- Use of compressed natural gas for trucks; and,
- Regional composting.

Rare Species

Portions of the project site are mapped as Priority Habitat for the Eastern Box Turtle (*Terrapene carolina*), a species state-listed as Special Concern according to the Massachusetts Natural Heritage Atlas (14th Edition). This species and its habitats are protected pursuant to the Massachusetts Endangered Species Act (MGL c.131A) and its implementing regulations (MESA; 321 CMR 10.00).

The Natural Heritage and Endangered Species Program (NHESP) has determined, in a letter dated January 19, 2018, that the Phase 6 Landfill Expansion, as currently proposed, is exempt from MESA review pursuant to 321 CMR 10.14.

Comments from NHESP indicate that the Town has consulted with NHESP regarding Phases 7 and 8. The NHESP comments indicate that it is unclear whether Phases 7 and 8 will be exempt from MESA review (321 CMR 10.14) or require a direct filing with the NHESP (321 CMR 10.18). Projects resulting in a "take" of state-listed species may only be permitted if they meet the performance standards for a Conservation and Management Permit (CMP; 321 CMR 10.23). In order for a project to qualify for a CMP, the Town must demonstrate that the project has avoided, minimized and mitigated impacts to state-listed species consistent with the following performance standards: (a) adequately assess alternatives to both temporary and permanent impacts to the state-listed species, (b) demonstrate that an insignificant portion of the local population will be impacted, and (c) develop and agree to carry out a conservation and management plan that provides a long-term net benefit to the conservation of the state-listed species.

Construction Period

Construction is anticipated to commence in summer 2018. The Single Supplemental EIR identified measures to prevent or minimize impacts during the construction period. The Town was asked to submit a Stormwater Pollution Prevention Plan (SWPPP) required as part of the National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP). The Single Supplemental EIR states that the Town is not required to file a NPDES CGP because all stormwater will be contained on-site within two large basins and will be infiltrated.

The Town will use ultra-low sulfur diesel (ULSD) fuel in its diesel-powered construction equipment and will require its contractors to do the same. The project will also comply with MGL c.90 §16A and MassDEP anti-idling regulations (310 CMR 7.11(1)(b)) and will comply with MassDEP Solid Waste and Air Quality Control regulations, pursuant to M.G.L. Chapter 40, Section 54, during construction. All construction activities should be undertaken in compliance with the conditions of all State and local permits.

Future Submissions

The Single Supplemental EIR indicates that the Town will submit a NPC to address development of Phase 7 and 8. This subsequent NPC should provide an updated development plan for Phase 7, Phase 8, the residential recycling center and relocated offices. The NPC should provide a cumulative assessment of potential impacts and avoidance, minimization, and mitigation measures for Phase 7 and Phase 8. As stated previously subsequent phases may result in a "Take" of the Eastern Box Turtle and require a CMP from the NHESP.

Conclusion

Based on a review of the Single Supplemental EIR, comment letters and consultation with State Agencies, I find that the Single EIR adequately and properly complies with MEPA and its implementing regulations. The project may proceed to permitting. State Agencies and the Town should forward copies of the final Section 61 Findings to the MEPA Office for publication in accordance with 301 CMR 11.12.

June 29, 2018
Date

Matthew A. Beaton

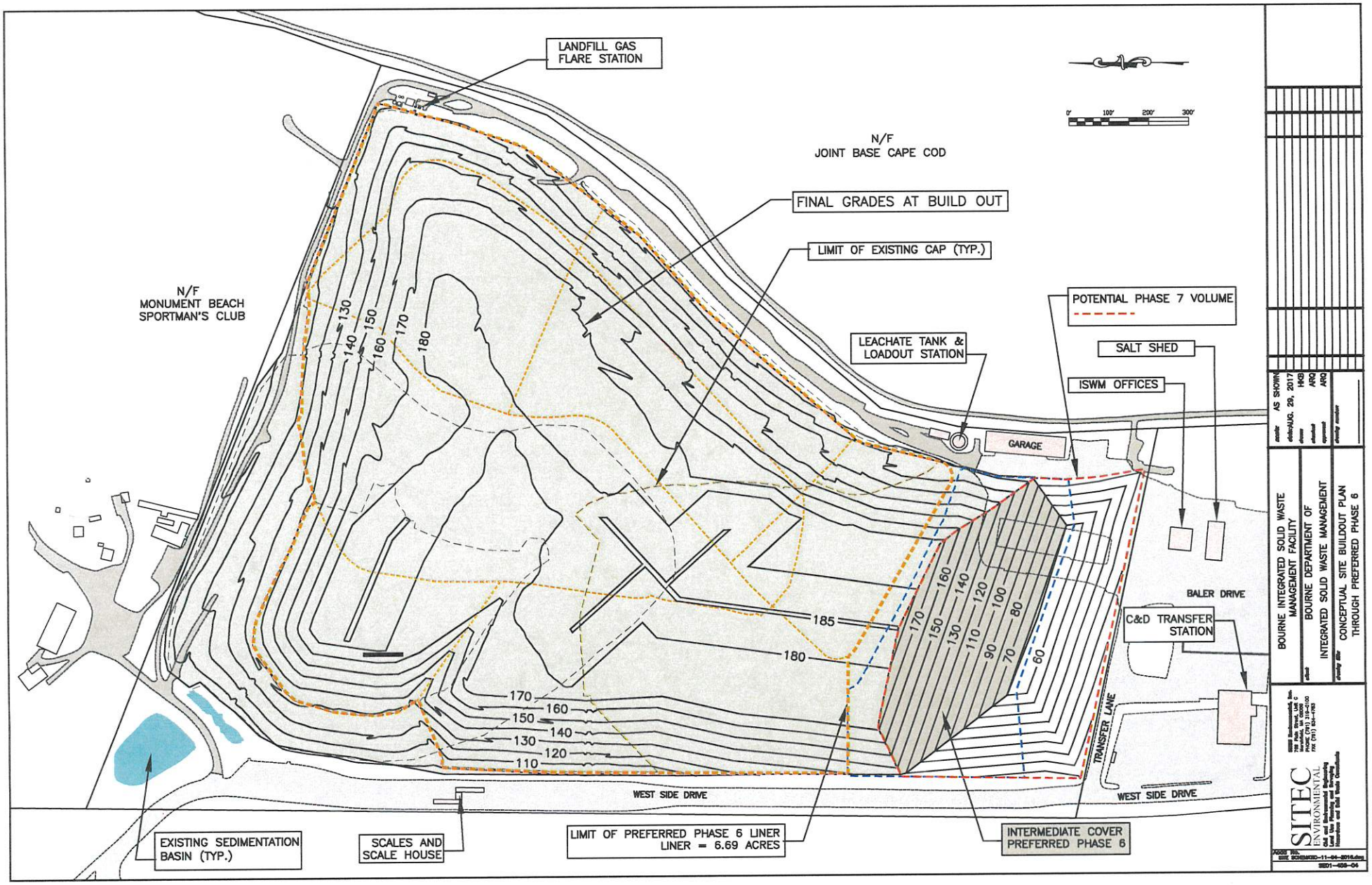
Comments received:

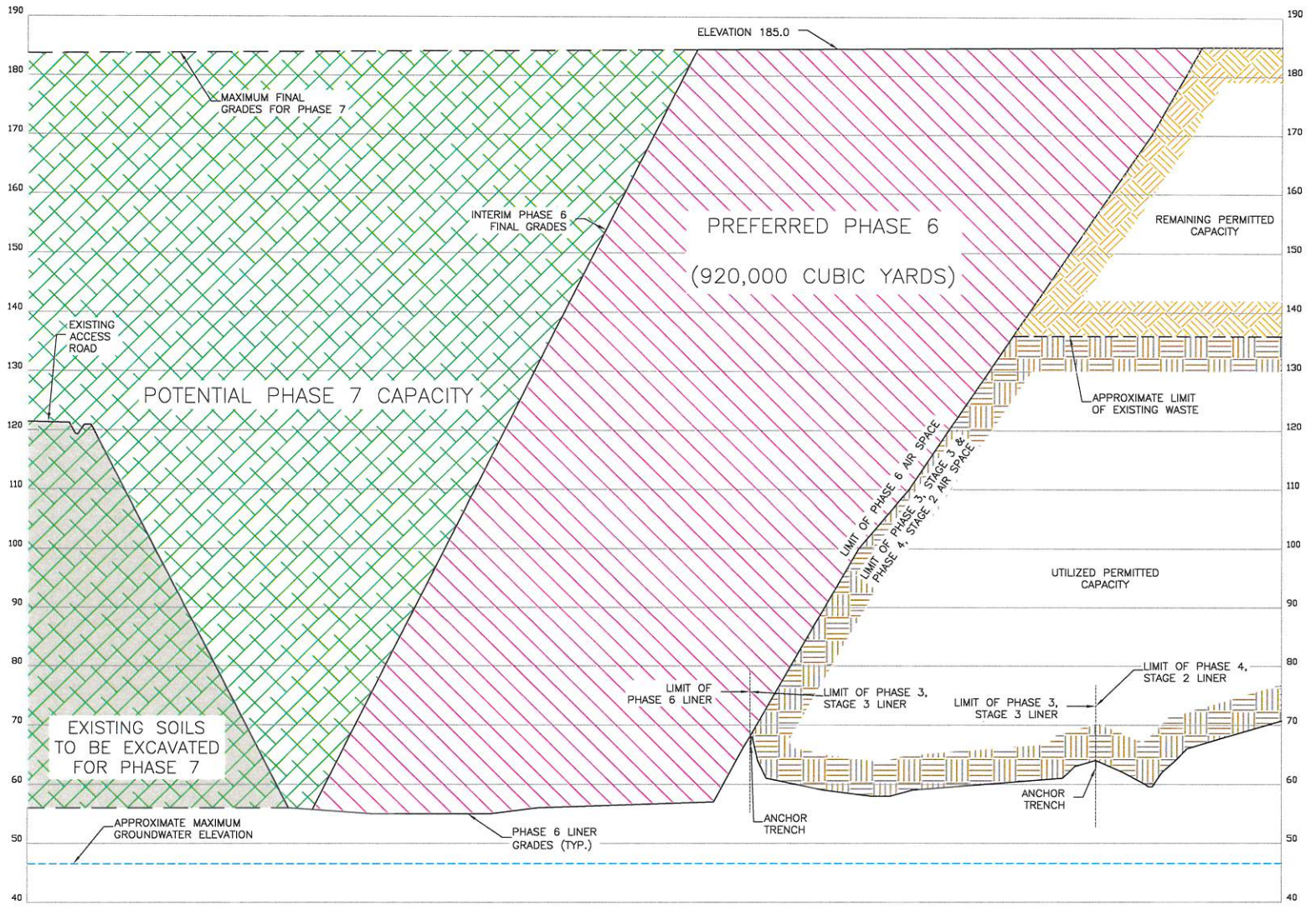
06/19/2018 Natural Heritage and Endangered Species Program (NHESP)
06/22/2018 Massachusetts Department of Environmental Protection (MassDEP) – Southeast Regional Office (SERO)

MAB/ACC/acc

ATTACHMENT 2

MOST RECENT PREVIOUSLY REVIEWED BUILD-OUT CONDITION


LANDFILL GAS FLARE STATION
N/F
JOINT BASE CAPE COD
FINAL GRADES AT BUILD OUT
LIMIT OF EXISTING CAP (TYP.)
N/F
MONUMENT BEACH
SPORTMAN'S CLUB
POTENTIAL PHASE 7 VOLUME
LEACHATE TANK & LOADOUT STATION
SALT SHED
ISWM OFFICES
GARAGE
BALER DRIVE
C&D TRANSFER STATION
TRANSFER LANE
WEST SIDE DRIVE
WEST SIDE DRIVE
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
LIMIT OF PREFERRED PHASE 6 LINER
LINER = 6.69 ACRES
INTERMEDIATE COVER PREFERRED PHASE 6
0'
100'
200'
300'
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
CONCEPTUAL SITE BUILDOUT PLAN THROUGH PREFERRED PHASE 6
SITEC ENVIRONMENTAL



project: BOURNE LANDFILL
PHASE 6 LANDFILL EXPANSION

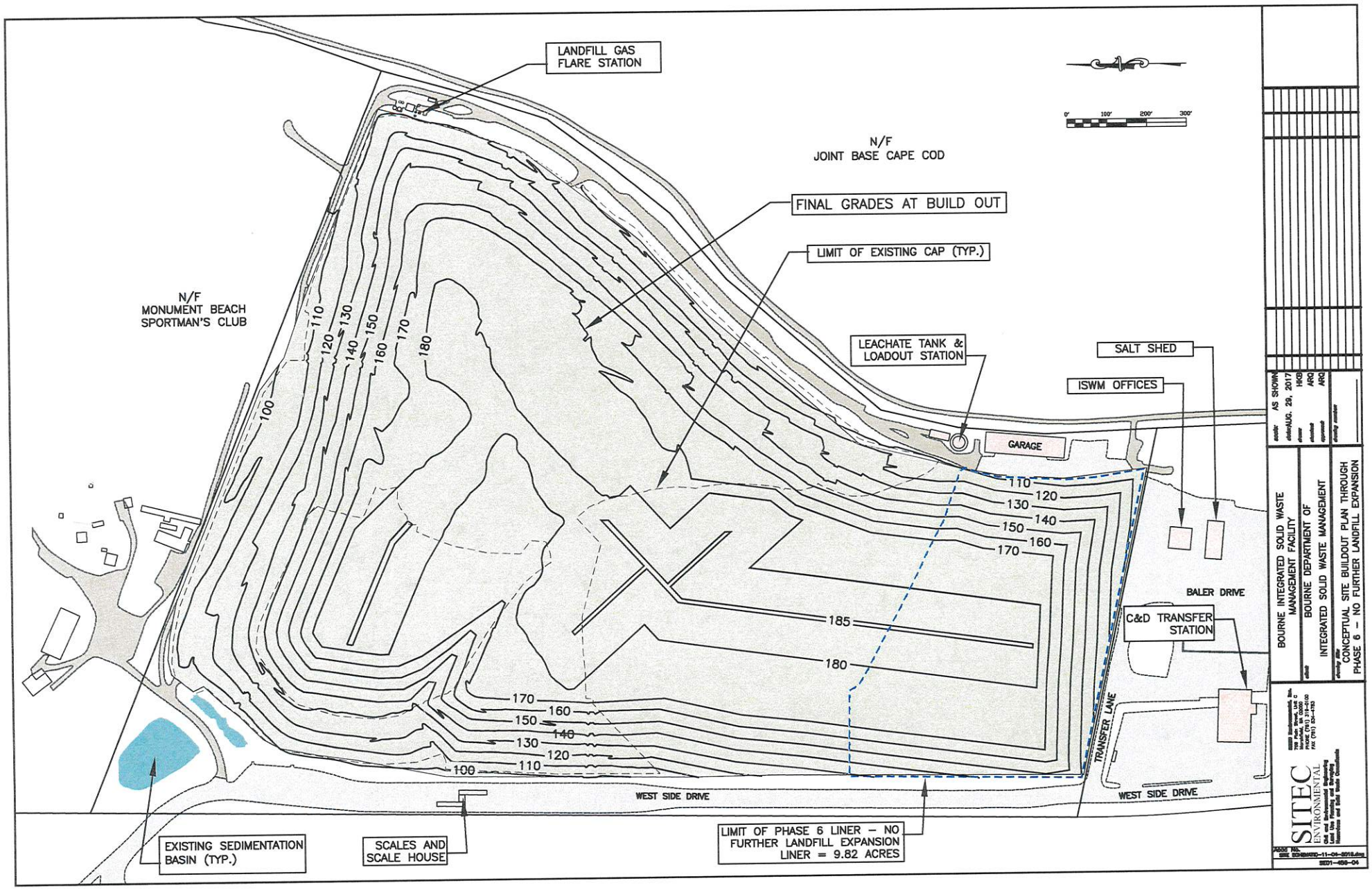
client: TOWN OF BOURNE
DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT

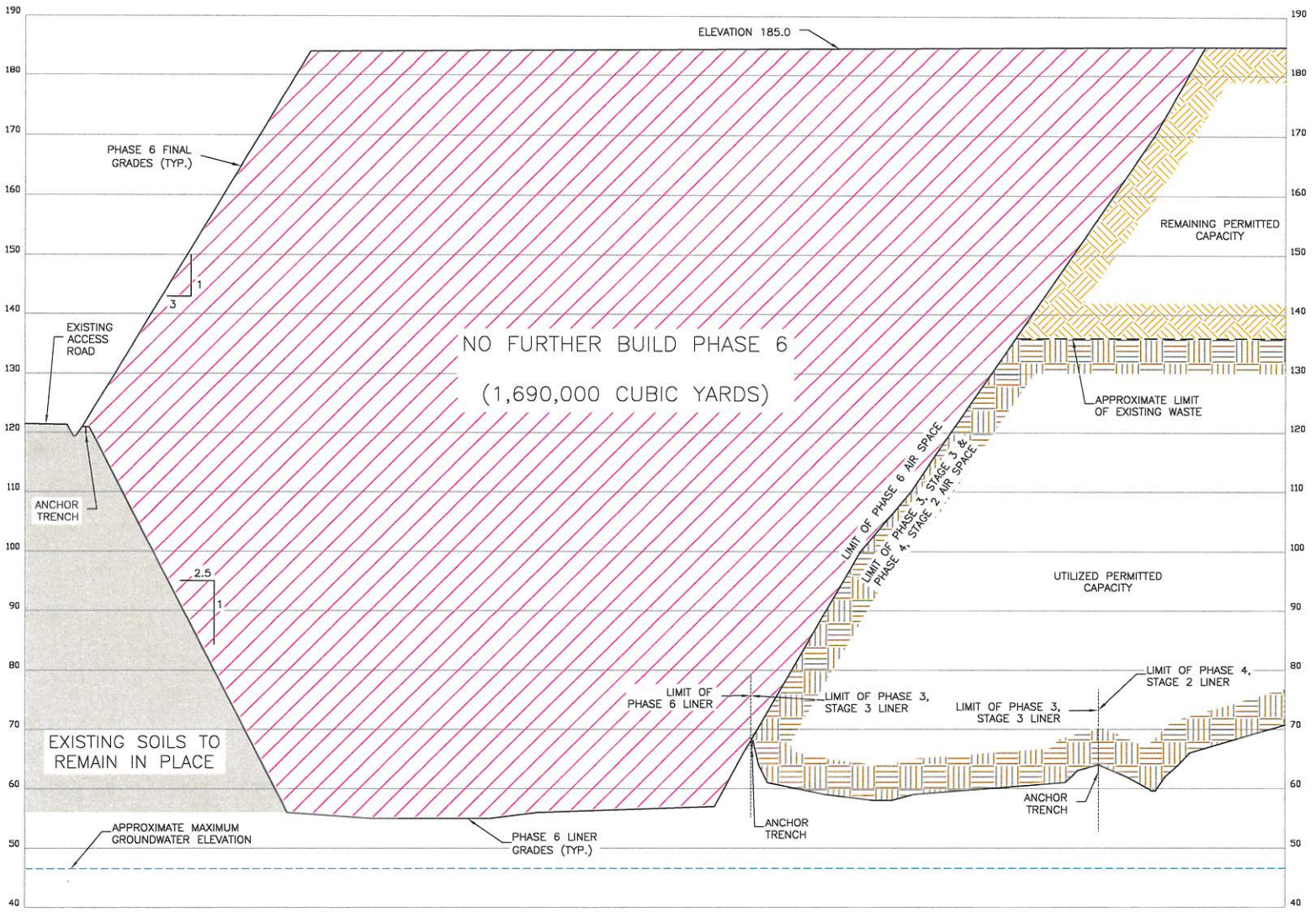
drawing title: ALTERNATIVE PHASE 6 BUILDOUT PROFILES
PREFERRED PHASE 6

scale: AS SHOWN
date: JULY 27, 2017
drawn: ARQ
checked: ARQ
approved:
drawing number:

SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Planning and Surveying
Hazardous and Solid Waste Consultants

Acad No. PHASE 6 CONCEPT.dwg
SE01-456-11


LANDFILL GAS FLARE STATION
N/F JOINT BASE CAPE COD
FINAL GRADES AT BUILD OUT
LIMIT OF EXISTING CAP (TYP.)
N/F MONUMENT BEACH SPORTMAN'S CLUB
LEACHATE TANK & LOADOUT STATION
SALT SHED
ISWM OFFICES
GARAGE
BALER DRIVE
C&D TRANSFER STATION
TRANSFER LANE
WEST SIDE DRIVE
WEST SIDE DRIVE
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
LIMIT OF PHASE 6 LINER – NO FURTHER LANDFILL EXPANSION LINER = 9.82 ACRES
0' 100' 200' 300'
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
CONCEPTUAL SITE BUILDOUT PLAN THROUGH PHASE 6 – NO FURTHER LANDFILL EXPANSION
SITEC ENVIRONMENTAL



scale: AS SHOWN
date: JULY 27, 2017
drawn: ARQ
checked:
approved: ARQ
drawing number:

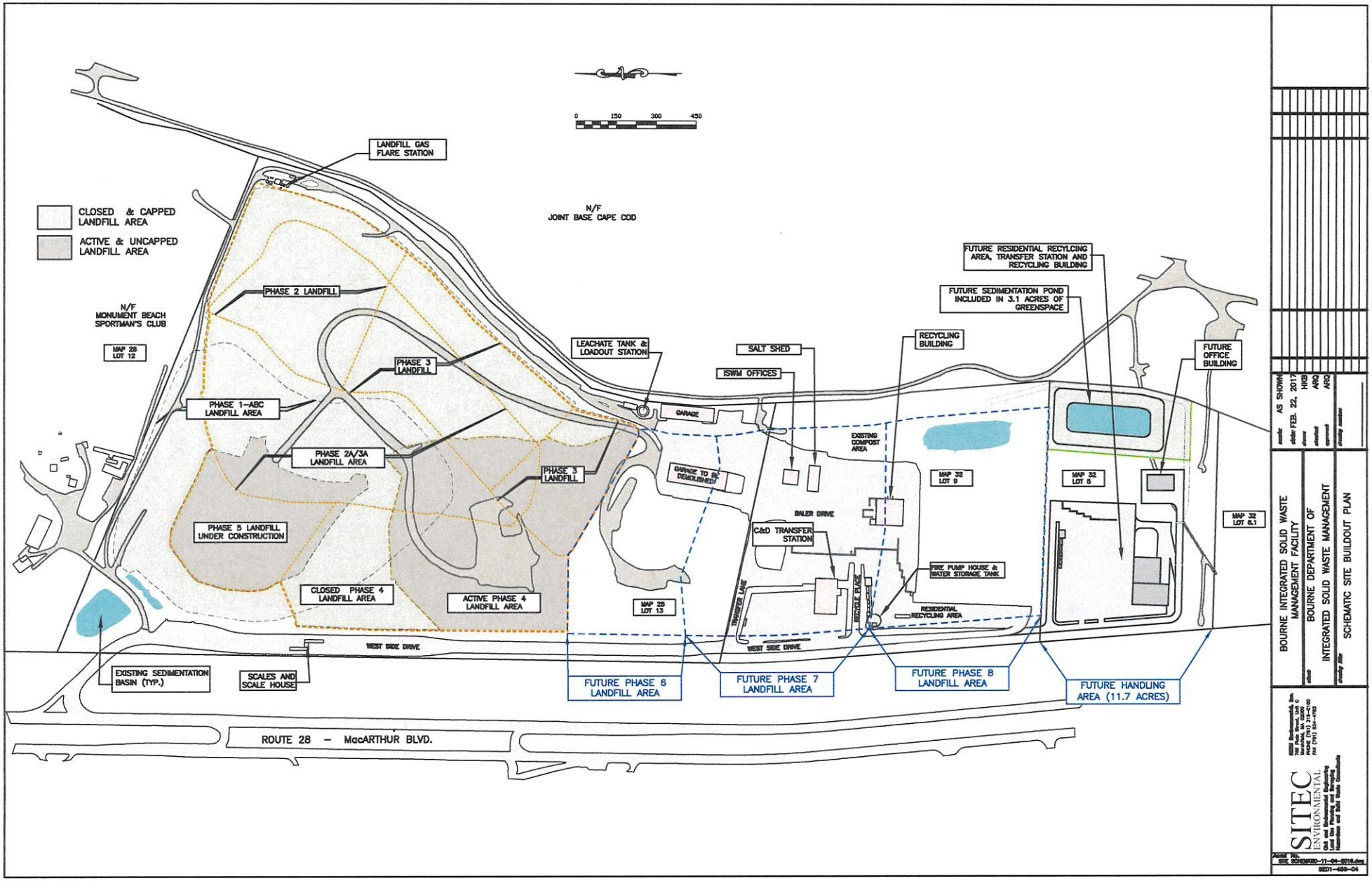
project: BOURNE LANDFILL PHASE 6 LANDFILL EXPANSION

client: TOWN OF BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT

drawing title: ALTERNATIVE PHASE 6 BUILDOUT PROFILES NO FURTHER BUILD PHASE 6

SITEC ENVIRONMENTAL
SITEC Environmental, Inc.
739 Main Street, Unit C
West Barnstable, MA 02668
PHONE (781) 319-0100
FAX (781) 934-1193
Civil and Environmental Engineering
and Land Planning Consultants
Hazardous and Solid Waste Consultants

Acad No. PHASE 6 CONCEPT.dwg
SED1-456-11



BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY

BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT

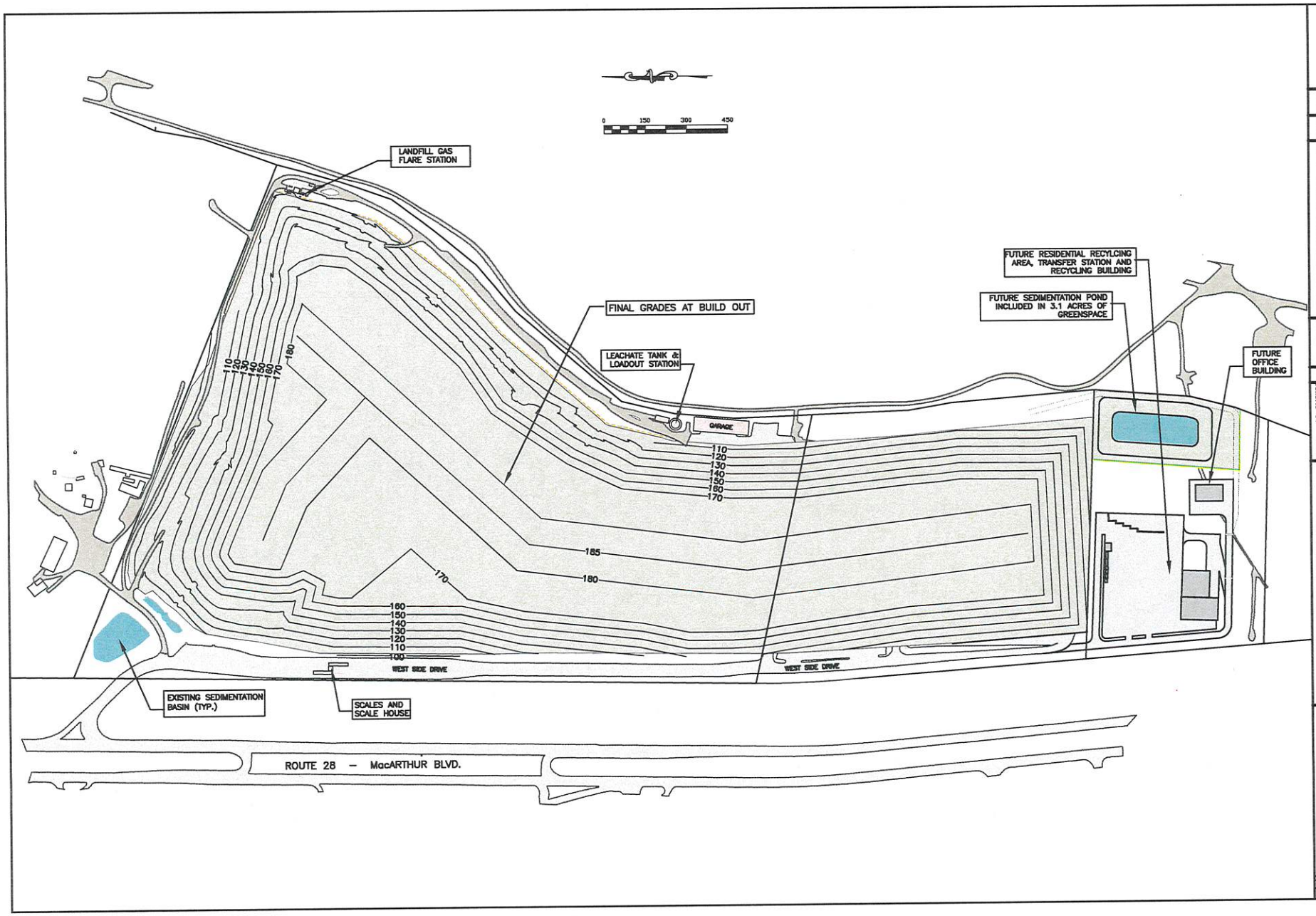
SCHEMATIC SITE BUILDOUT PLAN

scale AS SHOWN
date FEB. 22, 2017
drawn HWB
checked ARQ
approved ARQ

SITEC ENVIRONMENTAL

Civil and Environmental Engineering
Land Use Planning and Surveying
Hazardous and Solid Waste Consultants

SED1-488-04



BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY

BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT

CONCEPTUAL SITE BUILDOUT PLAN

scale AS SHOWN
date DEC. 6, 2016
drawn HKB
checked ARQ
approved ARQ
drawing number

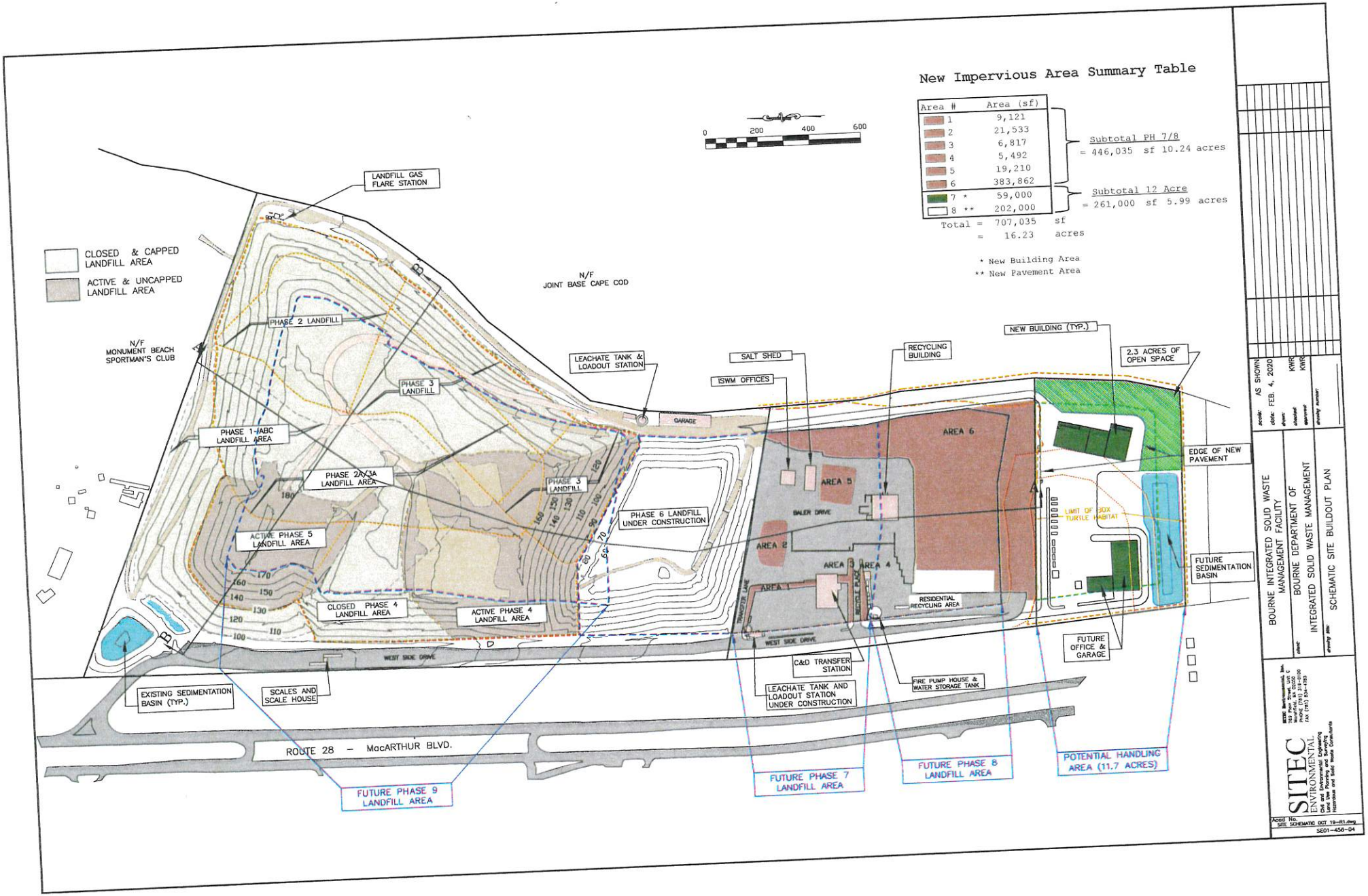
SITEC ENVIRONMENTAL

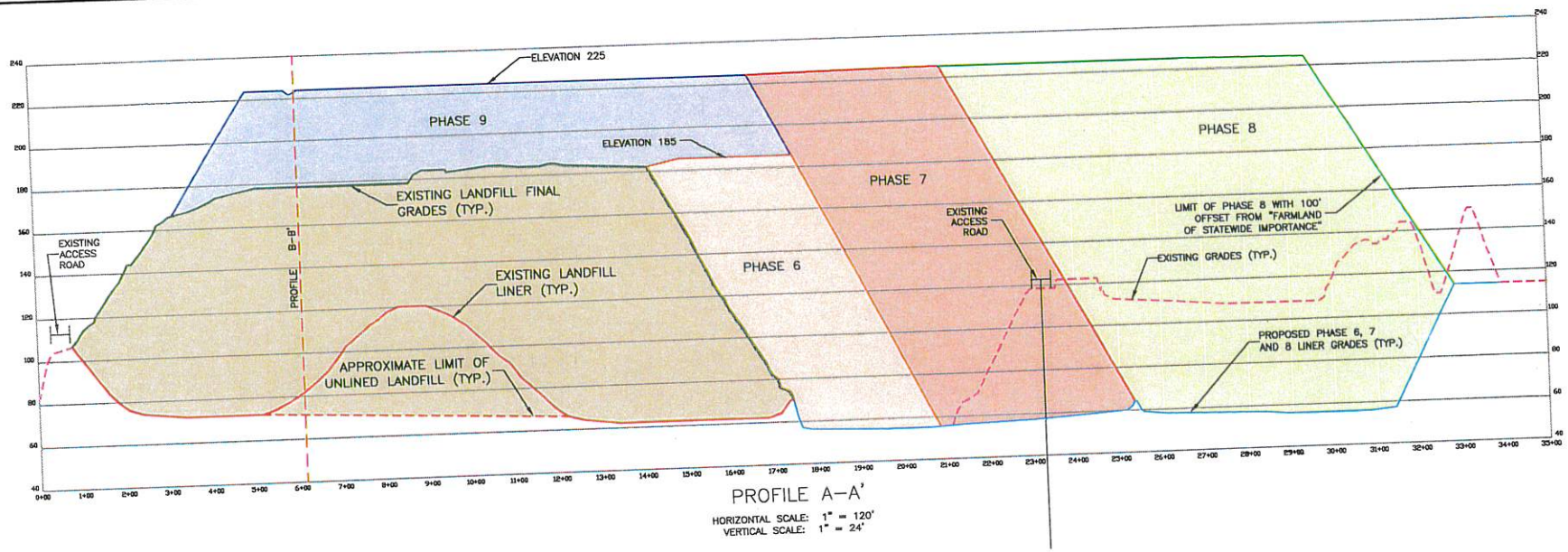
Land Use Planning and Engineering
Hazardous and Solid Waste Consultants

Project No.
SEDI-409-04

ATTACHMENT 3

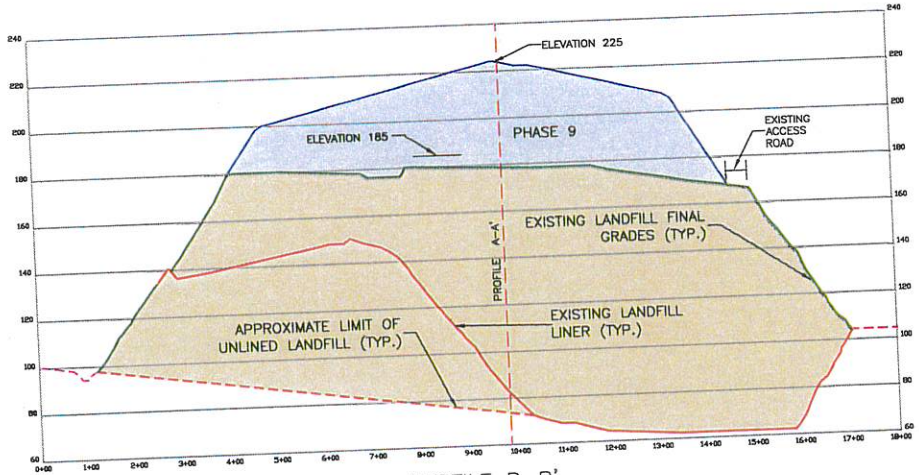
SITE DEVELOPMENT PLANS


New Impervious Area Summary Table
Area # Area (sf)
1 9,121
2 21,533
3 6,817
4 5,492
5 19,210
6 383,862
Subtotal PH 7/8
= 446,035 sf 10.24 acres
7 * 59,000
8 ** 202,000
Subtotal 12 Acre
= 261,000 sf 5.99 acres
Total = 707,035 sf
= 16.23 acres
* New Building Area
** New Pavement Area
0 200 400 600
CLOSED & CAPPED LANDFILL AREA
ACTIVE & UNCAPPED LANDFILL AREA
LANDFILL GAS FLARE STATION
N/F JOINT BASE CAPE COD
N/F MONUMENT BEACH SPORTMAN'S CLUB
PHASE 2 LANDFILL
PHASE 3 LANDFILL
PHASE 1-1ABC LANDFILL AREA
PHASE 2A\3A LANDFILL AREA
ACTIVE PHASE 5 LANDFILL AREA
CLOSED PHASE 4 LANDFILL AREA
ACTIVE PHASE 4 LANDFILL AREA
PHASE 5 LANDFILL
PHASE 6 LANDFILL UNDER CONSTRUCTION
LEACHATE TANK & LOADOUT STATION
GARAGE
SALT SHED
ISWM OFFICES
RECYCLING BUILDING
NEW BUILDING (TYP.)
2.3 ACRES OF OPEN SPACE
EDGE OF NEW PAVEMENT
AREA 6
AREA 5
AREA 2
AREA 3
AREA 4
AREA 1
BALER DRIVE
TRANSFER LANE
RECYCLE PLACE
WEST SIDE DRIVE
RESIDENTIAL RECYCLING AREA
LIMIT OF SOX TURTLE HABITAT
FUTURE SEDIMENTATION BASIN
FUTURE OFFICE & GARAGE
C&D TRANSFER STATION
LEACHATE TANK AND LOADOUT STATION UNDER CONSTRUCTION
FIRE PUMP HOUSE & WATER STORAGE TANK
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
ROUTE 28 – MacARTHUR BLVD.
FUTURE PHASE 9 LANDFILL AREA
FUTURE PHASE 7 LANDFILL AREA
FUTURE PHASE 8 LANDFILL AREA
POTENTIAL HANDLING AREA (11.7 ACRES)
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
SCHEMATIC SITE BUILDOUT PLAN
scale: AS SHOWN
date: FEB. 4, 2020
drawn: KWR
checked: KWR
approved:
drawing number:
SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Planning and Surveying
Hazardous and Solid Waste Consultants
Acad No. SITE SCHEMATIC OCT 19-R1.dwg
SE01-456-04



PROFILE A–A'

HORIZONTAL SCALE: 1" = 120'
VERTICAL SCALE: 1" = 24'



PROFILE B–B'

HORIZONTAL SCALE: 1" = 120'
VERTICAL SCALE: 1" = 24'

BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY

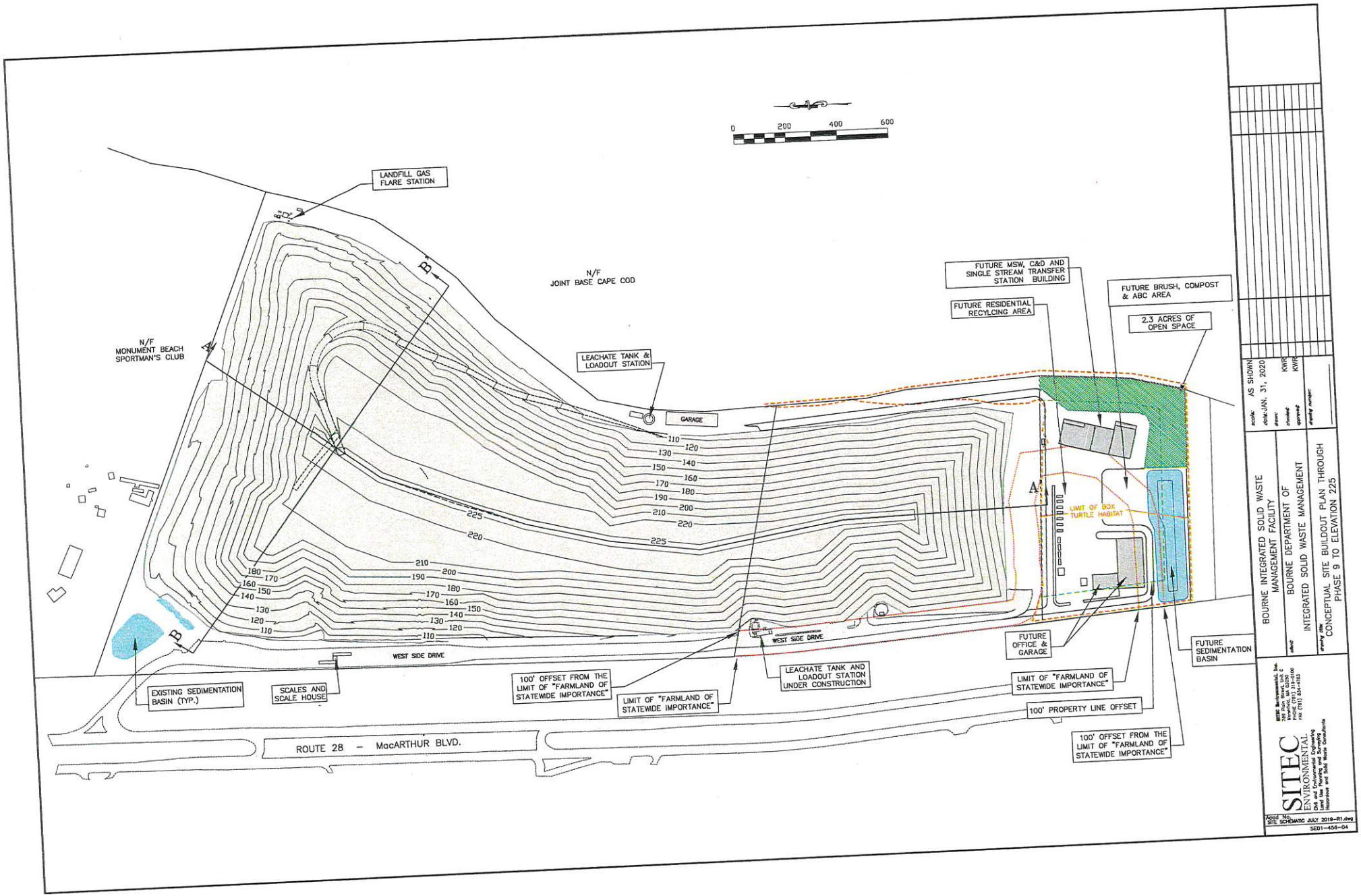
client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT

drawing title: SITE BUILDOUT PROFILES

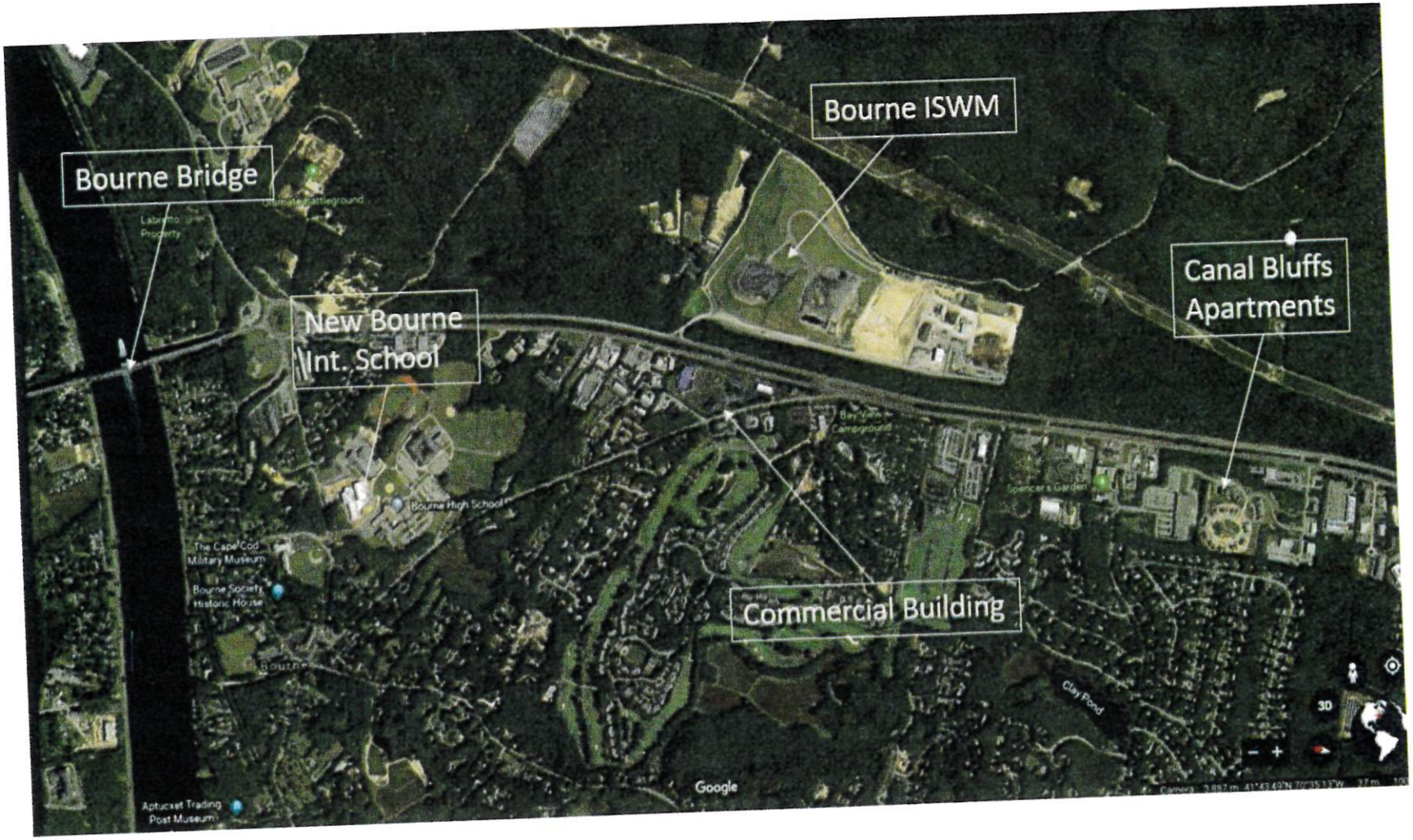
scale: AS SHOWN
date: JAN. 31, 2020
drawn: KWR
checked: KWR
approved:
drawing number:

SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Planning and Permitting
Hazardous and Solid Waste Consultants
148 Main Street, Unit C
Litchfield, NH 03052
PHONE (781) 316-2100
FAX (781) 934-4183

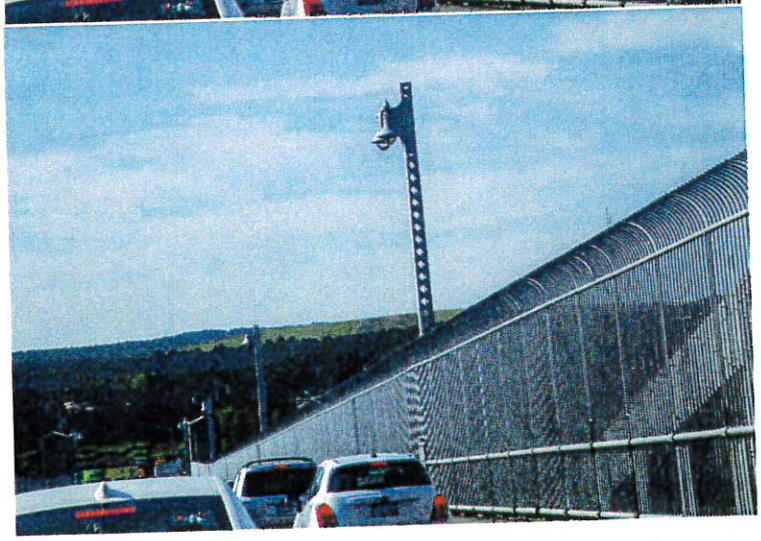
Acad No. BUILDOUT PLAN FEB 2019-02.dwg
SED1-456-124


0
200
400
600
LANDFILL GAS FLARE STATION
N/F
JOINT BASE CAPE COD
N/F
MONUMENT BEACH SPORTMAN'S CLUB
FUTURE MSW, C&D AND SINGLE STREAM TRANSFER STATION BUILDING
FUTURE BRUSH, COMPOST & ABC AREA
FUTURE RESIDENTIAL RECYCLING AREA
2.3 ACRES OF OPEN SPACE
LEACHATE TANK & LOADOUT STATION
GARAGE
LIMIT OF BOX TURTLE HABITAT
WEST SIDE DRIVE
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
100' OFFSET FROM THE LIMIT OF "FARMLAND OF STATEWIDE IMPORTANCE"
LIMIT OF "FARMLAND OF STATEWIDE IMPORTANCE"
LEACHATE TANK AND LOADOUT STATION UNDER CONSTRUCTION
FUTURE OFFICE & GARAGE
FUTURE SEDIMENTATION BASIN
100' PROPERTY LINE OFFSET
ROUTE 28 – MacARTHUR BLVD.
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
CONCEPTUAL SITE BUILDOUT PLAN THROUGH PHASE 9 TO ELEVATION 225
SITEC ENVIRONMENTAL
SITE SCHEMATIC JULY 2019-R1.dwg
SE01-456-04

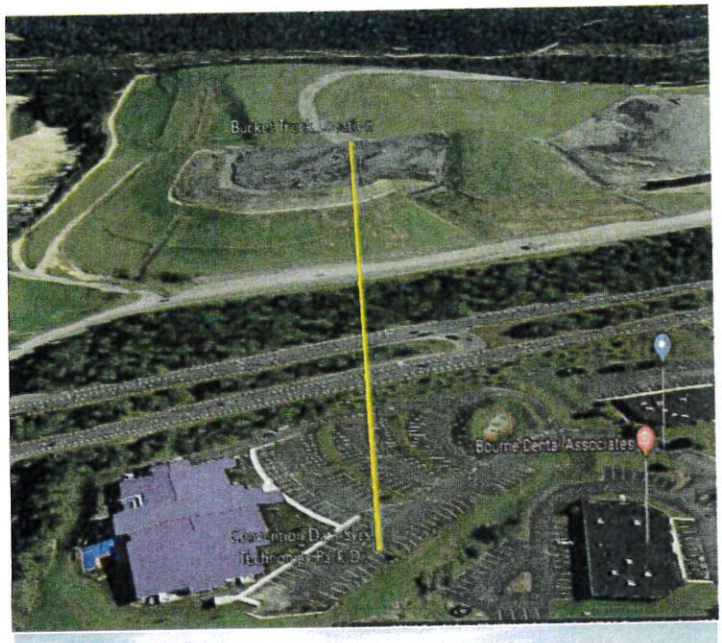
Viewshed locations



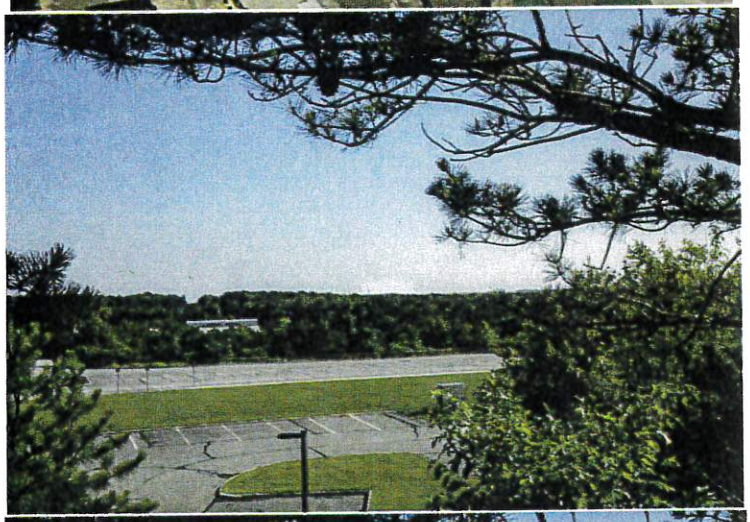
Bourne Bridge

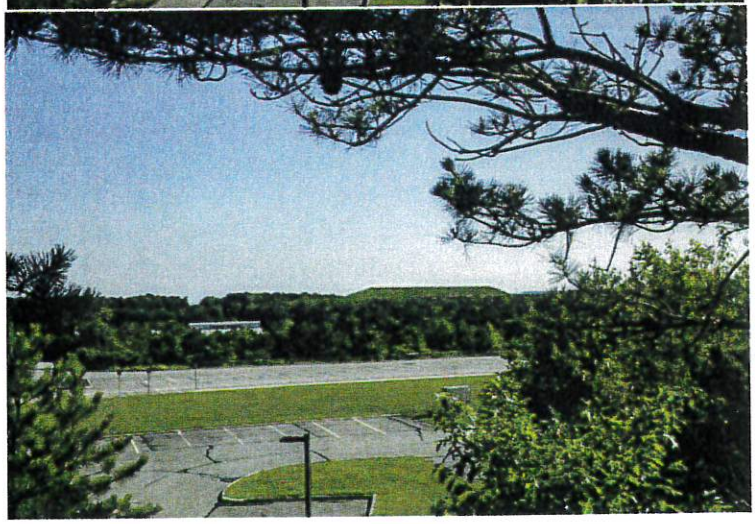


Convention Data Services

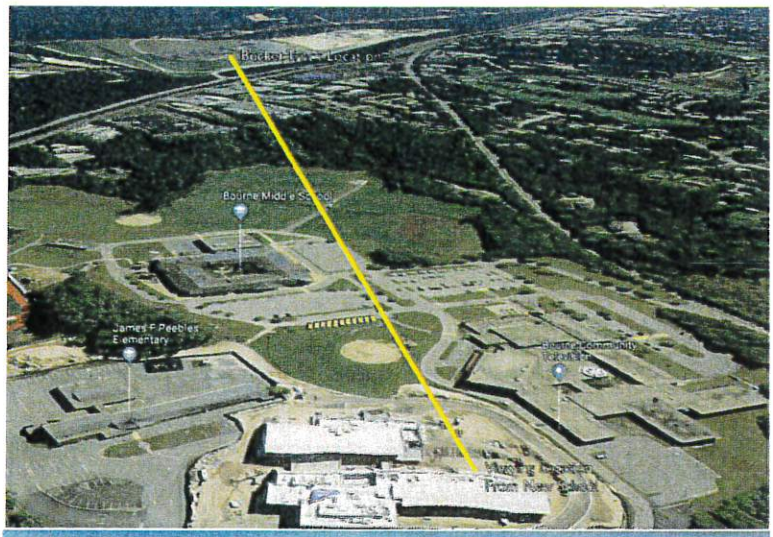


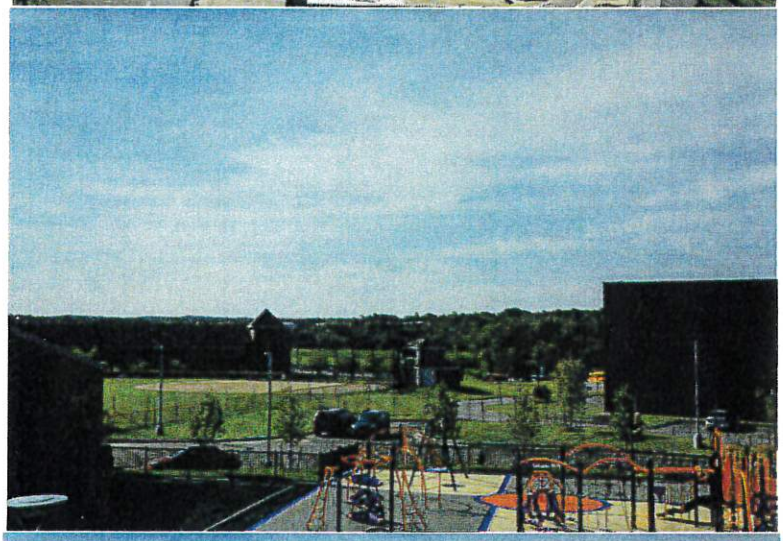
Canal Bluffs Apartments





Bourne Intermediate School

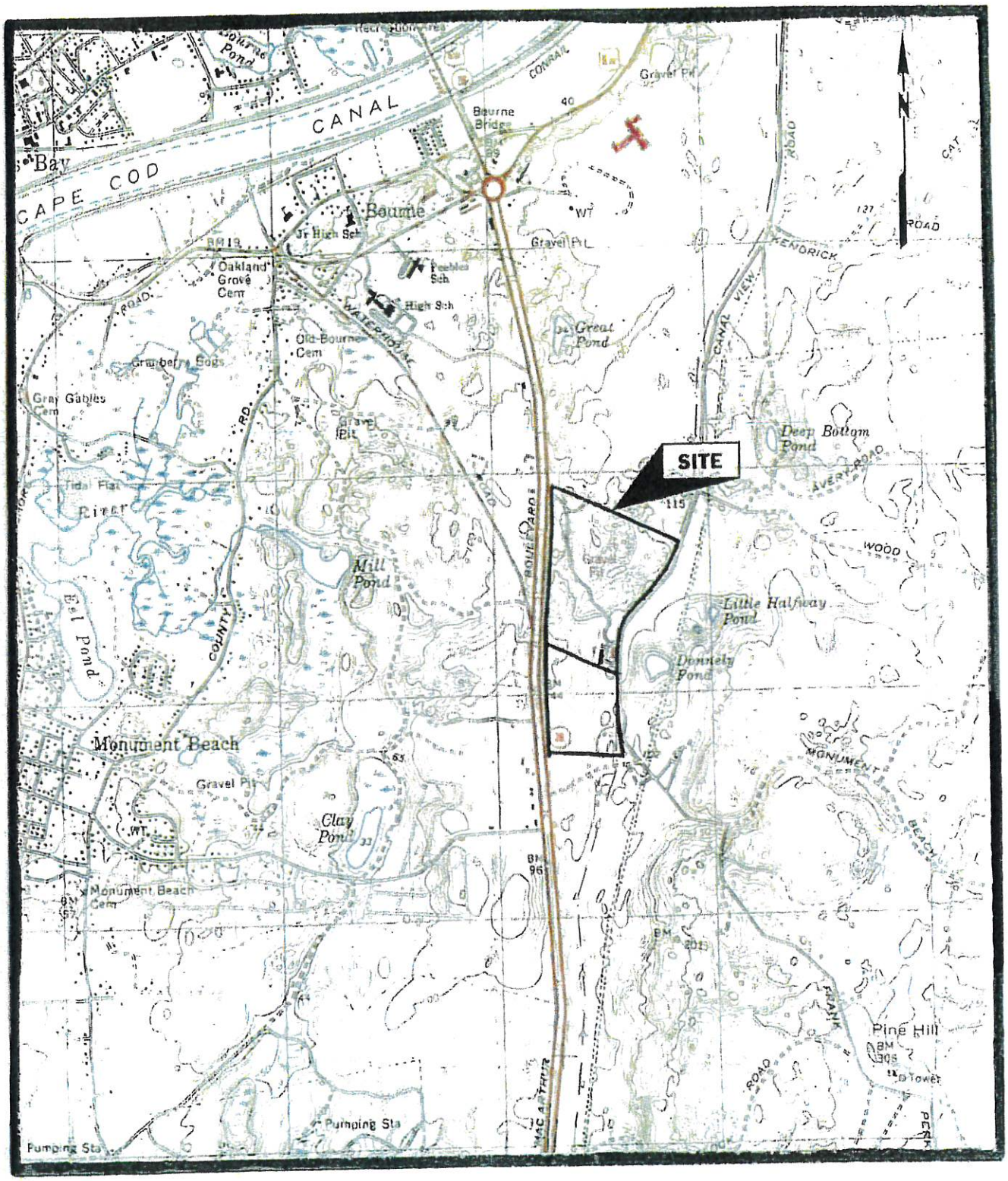




ATTACHMENT 4

U.S.G.S. MAP

USGS SITE LOCUS MAP



SCALE 1:25,000
1 centimeter on the map represents
250 meters on the ground.
1 inch on the map represents
2,083 feet on the ground.
Contour Interval 10 feet

Town of Bourne
Bourne Landfill Expansion
Bourne, MA

ATTACHMENT 5

DISTRIBUTION LIST

Ms. Tori Kim, Director
MA EOEEA, MEPA Unit
100 Cambridge Street, Suite 900
Boston, MA. 02114

Mass. Dept. of Environmental Protection
Bureau of Waste Prevention
One Winter Street
Boston, MA. 02108

Bourne Public Library
19 Sandwich Rd.
Bourne, MA. 02532

Mr. Mark Dakers, Section Chief
MA. Dept. of Environmental Protection S.E.
Regional Office
20 Riverside Drive
Lakeville, MA 02347

Mass. Office of Coastal Zone Management
251 Causeway Street, Suite 900
Boston, MA 02114-2138

Ms. Amy Stitely, Bureau Director
Mass. Dept. of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02114

Mass. Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, MA 02114

Mr. Sean O'Brien
Barnstable County Dept. of Health & Environment
P.O. Box 427
Barnstable, MA 02630

Mr. Mike Ciaranca, Ph.D.
Massachusetts Army National Guard
Environmental and Readiness Center
Buildings 1204 & 1203 West Inner Rd.
Camp Edwards, MA 02542

Commander Camp Edwards
Building 3468
Camp Edwards, MA. 02542-5003

Massachusetts Air National Guard
102 FW/CE
971 South Outer Road
Otis ANGB, MA 02542

Town of Bourne
Board of Selectmen
24 Perry Ave.
Buzzards Bay, MA 02532

Massachusetts Historical Commision
220 Morrissey Blvd.
Boston, MA 02125

Mr. Jonathon Idman, Chief Reg. Officer
Cape Cod Commission
P.O. Box 226
Barnstable, MA 02630

Town of Bourne
Planning Board
24 Perry Ave.
Buzzards Bay, MA 02532

Town of Bourne
Board of Health
24 Perry Ave.
Buzzards Bay, MA 02532

Town of Bourne
Bourne Conservation Commission
24 Perry Ave.
Buzzards Bay, MA. 02532

Town of Bourne
DPW
24 Perry Ave.
Buzzards Bay, MA 02532

Monument Beach Sportsmen's Club
P.O. Box 331
Monument Beach, MA 02553

Mr. Anthony E. Schiavi
Bourne Town Administrator
24 Perry Ave.
Buzzards Bay, MA 02532

Mr. Dave Ritchie, Owner
Bayview Campgrounds
260 MacArthur Blvd.
Bourne, MA 02532

Mr. Bernard McCourt, District Highway Director
Mass. Hwy. Dept. - District #5
1000 County Street
Taunton, MA 02780

Mr. Daniel C. Hostetter
770 Main Street
Osterville, MA 02655

Mr. John A. Largay Jr.
770 Main Street
Osterville, MA 02655

Bourne County Limited Partnership
P.O. Box 779
Monument Beach, MA 02553

MA Dept. of Public Works
10 Park Plaza, Suite 6160
Boston, MA 02116

SJC Properties LLC
170 MacArthur Boulevard
Bourne, MA 02532

Paesano Realty Trust
P.O. Box 3139
Pocasset, MA 02559

MacArthur Boulevard LLC
Sharkansky LLP, Mr. David Orloff
1350 Belmont Street
Brockton, MA 02301

General Manager
Champion City Recovery
1093 North Montello Street
Brockton, MA 02301

Mr. Richard Conron
Cape Cod Commission Representative
29 Mashnee Road
Bourne, MA 02532

Ms. Elizabeth Saunders
Clean Water Action
88 Broad St., lower level
Boston, MA 02110

Mr. Mark Popham, R.S.
21 Highland Street
Orange, MA 01364

Mr. Dave Murphy, P.E.
Tighe & Bond
446 Main Street, 13th Floor
Worcester, MA 01608

Ms. Charlene Perkins
Lynnfield Engineering
2 Electronics Ave., Suite 41
Danvers, MA 01923

Ms. Korrin Petersen
Buzzards Bay Coalition
114 Front Street
New Bedford, MA 02740

Mr. John Merritt
Merritt Environmental Solutions Inc.
152 North Main Street
Natick, MA 01760-2725

Mr. George Aronson, Principal
CRMC
29 Billings Street
Sharon, MA 02067

Mr. Dick Keller, P.E.
P.O. Box 1265
Middleboro, MA 02346

Mr. Derek Grasso, Reg. Env. Manger
Covanta Southeastern Connecticut
132 Military Highway
Preston, CT 06365

Environmental Officer
United States Coast Guard
Air Station Cape Cod
Otis ANGB, MA. 02545-5005

Chief Norman Sylvester
Bourne Fire/ Rescue Dept.
130 Main Street
Buzzards Bay, MA 02532

Mr. & Mrs. Richard Conron
29 Mashnee Rd.
Bourne, MA 02532

Mr. John Ballam
MA Dept. of Energy Resources
100 Cambridge St., Suite 1020
Boston, MA 02114

Mr. George Zoto, MEPA Coord.
Mass. DEP, S.E. Regional Office
20 Riverside Drive
Lakeville, MA 02347

Mr. Doug Jones, Chairman
Falmouth Board of Selectmen
59 Town Hall Square
Falmouth, MA 02540

Mr. Mike Quatromoni, S.P.E.
SITEC Environmental Inc.
769 Plain Street, Unit C
Marshfield, MA 02050

Honorable Variato DeMacedo
Massachusetts Senate
State House, Room 212
Boston, MA 02133

Honorable David Vieira
Mass. House of Representatives
State House, Room 167
Boston, MA 02133

Honorable Randy Hunt
Mass. House of Representatives
State House, Room 136
Boston, MA 02133

Ms. Christine Kirby
MA Dept. of Env. Protection
One Winter Street
Boston, MA 02114

Paesano Co. LLC
P.O. Box 3139
Pocasset, MA 02559-3139

Waterhouse Properties LLC
124 Waterhouse Road
Bourne, MA 02532

William S. Anthony TR
Bourne Technology Park Realty
107 Waterhouse Road, Dept. 118
Bourne, MA 02532

Janet M. Murphy, Thomas F. Murphy TRS
JMM Nominee Trust
290 MacArthur Boulevard
Bourne, MA 02532

Commonwealth of Massachusetts, MMR
C/O Commander
158 Reilly Street, Box 3
Otis ANGB, MA 02542

U.S. Army Corps of Engineers
Mr. Alan Anacheka-nasemann
NE Dist. Reg. & Permitting Enforce.
696 Virginia Road
Concord, MA 01742-2751

Ms. Briony Angus
Tighe and Bond
53 Southampton Road
Westfield, MA 01085

Mr. Franco Raponi, Trustee
Paesano Realty Trust
P.O. Box 3139
Pocasset, MA 02559

Mr. John P. Fletcher Trustee
Bourne Tech. Park Real. Trust
C/O Mercantile Property Mgmt.
P.O. Box 790
Buzzards Bay, MA 02532

Mr. Ernest Boch
774 A Neponset Street
Norwood, MA 02062

Circle O LLC & Mac. Park Place LLC
C/O Coastal Management
270 Communication Way, Unit 7B
Hyannis, MA 02601

Trustee
Charles W. Austin Trust
P.O. Box 1088
Pocasset, MA 02559-1088

JMM Real Estate LLC
290 MacArthur Boulevard
Bourne, MA 02532

NSTAR Electric
P.O. Box 270
Hartford, CT 06141-0270

Ms. Elizabeth Wroblicka, Chief of Wildlands
Division of Fisheries and Wildlife
Department of Fish & Game
1 Rabbit Hill Road
Westborough, MA 01581

Beverly Vucson, Acting General Counsel
Department of Fish & Game
251 Causeway St, Suite 400
Boston, MA. 02114-2152

Mr. Thomas Mackie
Mackie, Shea, PC
20 Park Plaza, Suite 1118
Boston, MA 02116

Ms. Kirstie Pecci
Conservation Law Foundation
62 Summer Street
Boston, MA 02116

Mr. Tom Yeransian, Principal
Commonwealth Resource Management Corp.
29 Billings Street
Sharon, MA 02067

Mr. Tom Cushing
Chief Permit Section
MA DEP, SERO
20 Riverside Drive
Lakeville, MA 02347

ATTACHMENT 6

LIST OF PERMITS

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed.
Below is a lis of permits related to the landfill and appurtenances since the last NPC in 2015.
MA DEP = Massachusetts Department of Environmental Protection
MASS DOT = Massachusetts Department of Transportation
MA EEA = Massachusetts Executive Office of Energy and Environmental Affairs
MA HC = Massachusetts Historical Commission

Description	Date	Agency
Sustainable Materials Recovery Program Municipal Grant for the Mattress Recycling Grant. Subsidization for mattress recycling for Bourne and grantee towns in the area.	Fall 2015	MA DEP
Sustainable Materials Recovery Program Municipal Grant of $350,000 for the Organics Capacity Grant. Later recinded.	Fall 2015	MA DEP
Adminstrative Completeness, Application Shield for Operating Permit Application SE-15-023.	12/4/2015	MA DEP
Approval of Variance Requests from Solid Waste Management Regulations Scope of Work for Major Demonstration Project, BWP SW 32 Injection of Effluent from Existing Hydrogen Sulfide Scrubbers and Collected Landfill Gas Condensate to Enhance Landfill Gas Production.	12/17/2015	MA DEP
Permit Approval, BWP SW 32, Scope of Work for Major Demonstration Project Injection of Effluent from Existing Hydrogen Sulfide Scrubbers and Landfill Gas Condensate.	12/17/2015	MA DEP
Certifcate of the Secretary of Energy and Environmental Affaris on the Fourth Notice of Project Change, EOEA #11333.	2/5/2016	MA EEA
Authorization to Construct Medium Landfill Expansion, Phase 5 Lined Landfill.	6/14/2016	MA DEP
Authorization for Major Moifcation for Construction of Drainage Facilities.	6/15/2016	MA DEP
Article 97 approval for an easement from the Department of Fish and Game on land located on Joint Base Cape Cod.	8/10/2016	MA General Court and the Governor
Landfill Post Closure Account Access For Phase 2A/3A Landfill Gas Extraction Well Repair.	8/30/2016	MA DEP
Sustainable Materials Recovery Program Municipal Grant, Small-Scale Initiative: $1,500.	9/7/2016	MA DEP
Conditional Approval, BWP SW 43, Landfill Closure Completion, Phase 1 (A, B, and C), Phase 2, Phase 3 (Stage 1, 2, and 3) and Phase 2A/3A Landfill Areas.	9/29/2016	MA DEP
Authorization to Operate Phase 5 landfill	3/30/2017	MA DEP
Approval of Project Notification Form.	2/8/2017	MA HC
Final Permit Approval With Conditions, BWP SW 23, Comprehensive Site Assessment.	6/5/2017	MA DEP
Permit Approval, BWP SW 11, Landfill Major Modification.	6/13/2017	MA DEP
Permit Approval, BWP SW 07, Modification To Large Handling Facility Structure and Fire Suppression System.	6/14/2017	MA DEP
Sustainable Materials Recovery Program Municipal Grant, Small-Scale Initiative: $1,250	9/20/2017	MA DEP
Sustainable Materials Recovery Program Municipal Grant, Cape Cod Latex Paint Collection and Recycling Initiative: $71,000; later amended to $81,800	11/15/17, 11/21/17	MA DEP

MA DEP = Massachusetts Department of Environmental Protection
MASS DOT = Massachusetts Department of Transportation
MA EEA = Massachusetts Executive Office of Energy and Environmental Affairs
MA HC = Massachusetts Historical Commission

Description	Date	Agency
Certifcate of the Secretary of Energy and Environmental Affaris on the Expanded Notice of Project Change EOEA # 11333	1/12/2018	MA EEA
Certifcate of the Secretary of Energy and Environmental Affaris on the Single Supplemental Environmental Impact Report EOEA # 11333	6/29/2018	MA EEA
Authorization to Construct Large Landfill Expansion, Phase 6 Lined Landfill, BWP SW 26	7/16/2018	MA DEP
Recycling Dividends Program under the Sustainable Materials Recovery Program: 10,400	8/21/2018	MA DEP
Administrative Consent Order and Amendments ACO-SE-96-4016, Determination of Completion and Approval of Landfill Closure Completion Phase 1D Reclamation Project Certification Report BWP SW 43	10/10/2018	MA DEP
Approval to replace two existing monitoring wells and sample a total of seven wells periodically	11/1/2018	MA DOT
Conditional Approval, BWP SW 43, Landfill Closure Completion, Phase 4, Stage 1Landfill Area	10/11/2018	MA DEP
Approval With Conditions BWP SW 25, Corrective Action Design, Phase 2 Final Cover Repair	2/15/2019	MA DEP
Recycling Dividends Program under the Sustainable Materials Recovery Program: 16,900	10/9/2019	MA DEP
Partial Authorization to Operate Phase 6 Landfill Expansion, BWP SW 10	10/10/2019	MA DEP
Access to Phase 4 and Phase Closure Accounts	11/27/2019	MA DEP
Authorization to Operate Phase 6 Landfill Expansion, BWP SW 10	1/17/2020	MA DEP

ATTACHMENT 7

TRAFFIC ASSESSMENT
GREENHOUSE GAS CALCULATIONS
CONCEPTUAL SOLAR ARRAY PLAN
DEP CAPACITY PROJECTIONS
BOURNE LANDFILL PHASES VOLUME SUMMARY
MA DFW EASTERN BOX TURTLE FACT SHEET
MA DFW MESA EXEMPTION LETTER
ISWM FACILITY HISTORICAL AERIALS
BOURNE BOARD OF SELECTMEN CERTIFICATE OF VOTE

TEPP LLC TRANSPORTATION ENGINEERING, PLANNING AND POLICY

MEMORANDUM

93 Stiles Road, Suite 201, Salem, New Hampshire 03079 USA
800 Turnpike Street, Suite 300, North Andover, Massachusetts 01845 USA
Phone (603) 212-9133 and Fax (603) 226-4108
Email tepp@teppllc.com and Web www.teppllc.com

Ref: 789

Subject: Traffic Assessment
Integrated Solid Waste Management Facility
Bourne, Massachusetts

From: Kim Eric Hazarvartian, Ph.D., P.E., PTOE
Principal

Date: August 31, 2017

INTRODUCTION

TEPP LLC has prepared this traffic-assessment memorandum at the request of the Town of Bourne Department of Integrated Solid Waste Management (ISWM) to provide readers with an overview of how traffic management has been significantly improved at the site during the intervening years since the original FEIR certificate was issued.

TEPP LLC INVOLVEMENT WITH THE ISWMF

TEPP LLC has for many years:

- been involved with transportation engineering for the Integrated Solid Waste Management Facility (ISWMF)
- analyzed traffic operations related to the ISWMF
- participated in the development of extensive infrastructure improvements at the ISWMF

COMPLETED INFRASTRUCTURE IMPROVEMENTS

Substantial on-site infrastructure improvements were completed in 2012. SITEC Environmental, Inc. has prepared a graphic, attached to this memorandum, which shows site infrastructure configurations at the driveway and scale area both before and after the improvements.

The infrastructure improvements include:

- eliminating opposing-traffic conflicts inside and outside the scale area
- designing and constructing a new residential recycling center in a new location

- designing and constructing new incoming and outgoing landfill-truck scales in new locations
- designing and constructing a new central scale house in a new location
- providing about 1,000 feet of inbound driveway length from MacArthur Boulevard northbound to the scale
- providing one landfill-truck lane each, for both incoming and outgoing directions
- providing one landfill-truck surge lane to accommodate additional queuing each, for both incoming and outgoing directions
- providing one residential drop-off/employee traffic lane each, that bypasses the scales, for both incoming and outgoing directions

These infrastructure improvements have made the driveway and scale area significantly more safe, efficient, simple and attractive.

IMPETUS FOR THE INFRASTRUCTURE IMPROVEMENTS

The ISWMF was permitted during 1999 by the Commonwealth of Massachusetts to operate at 825 tons per day. The permitting process did not require the infrastructure improvements described above.

The infrastructure improvements came after the permitting process, at the volition of ISWM. ISWM recognized the potential benefits of infrastructure improvement and took proactive advantage of the opportunity for infrastructure improvements that was created by:

- acquiring the abutting 25-acre parcel located south of the landfill in 2001
- relocating the residential recycling center from just inside the scale area onto that parcel
- completion of the Phase 1D landfill reclamation, part of which was underneath the former residential recycling center, in 2011

OPERATIONAL IMPROVEMENTS

In recent years, ISWM has changed the incoming waste stream for deposition into the landfill. As a result of a contract with Covanta SEMASS, located in Rochester, Massachusetts, ISWM now accepts approximately 85 percent of its permitted annual tonnage at the landfill as municipal-waste combustor ash. The ash is delivered via 30-ton transfer trailers, as opposed to municipal-solid waste, which is delivered in packer trucks that have a capacity of 12 to 15 tons. This results in less truck traffic per ton delivered.

ISWM intends to continue this arrangement through 2021 and is considering the possibility of extending the arrangement further.

In addition, ISWM is evaluating options for processing and treating leachate from the landfill at an on-site wastewater-treatment works. The clean, treated effluent would be then discharged to a pipeline and associated infrastructure located at the abutting Joint Base Cape Cod, as further described in another section of this filing. Currently, ISWM has a contractor remove leachate by tanker truck to a variety of off-site treatment facilities. Constructing the on-site treatment facility could, depending on annual precipitation, reduce the number of truckloads by approximately 1,000 to 2,000 per year.

attachment: SITEC Environmental, Inc. graphic

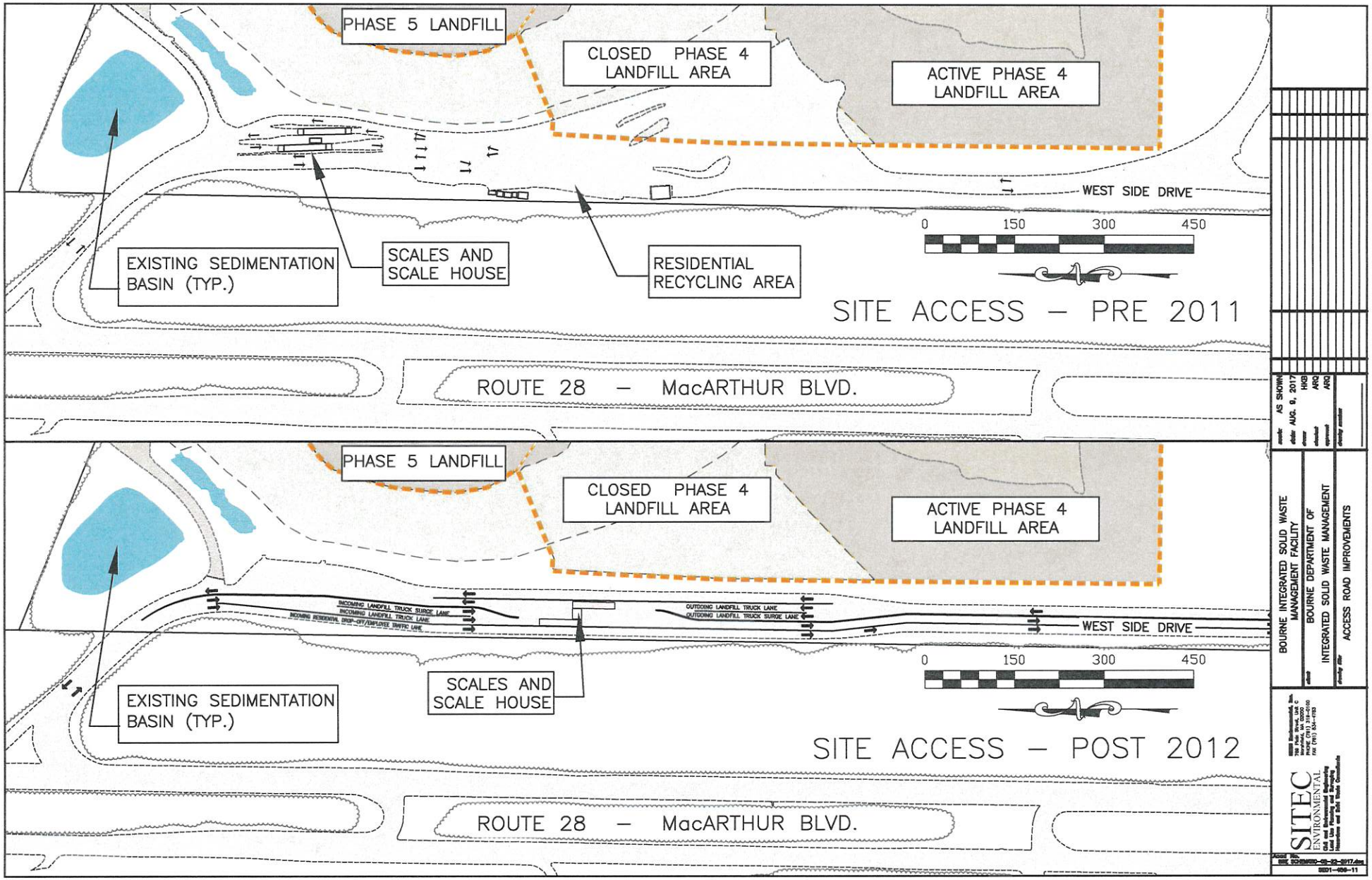

PHASE 5 LANDFILL
CLOSED PHASE 4 LANDFILL AREA
ACTIVE PHASE 4 LANDFILL AREA
WEST SIDE DRIVE
0 150 300 450
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
RESIDENTIAL RECYCLING AREA
SITE ACCESS – PRE 2011
ROUTE 28 – MacARTHUR BLVD.
PHASE 5 LANDFILL
CLOSED PHASE 4 LANDFILL AREA
ACTIVE PHASE 4 LANDFILL AREA
INCOMING LANDFILL TRUCK SURGE LANE
INCOMING LANDFILL TRUCK LANE
INCOMING RESIDENTIAL DROP-OFF/EMPLOYEE TRAFFIC LANE
OUTGOING LANDFILL TRUCK LANE
OUTGOING LANDFILL TRUCK SURGE LANE
WEST SIDE DRIVE
0 150 300 450
EXISTING SEDIMENTATION BASIN (TYP.)
SCALES AND SCALE HOUSE
SITE ACCESS – POST 2012
ROUTE 28 – MacARTHUR BLVD.
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
ACCESS ROAD IMPROVEMENTS
SITEC ENVIRONMENTAL

Figure 1
Measured and Predicted Quantities of LFG Collected from the Landfill

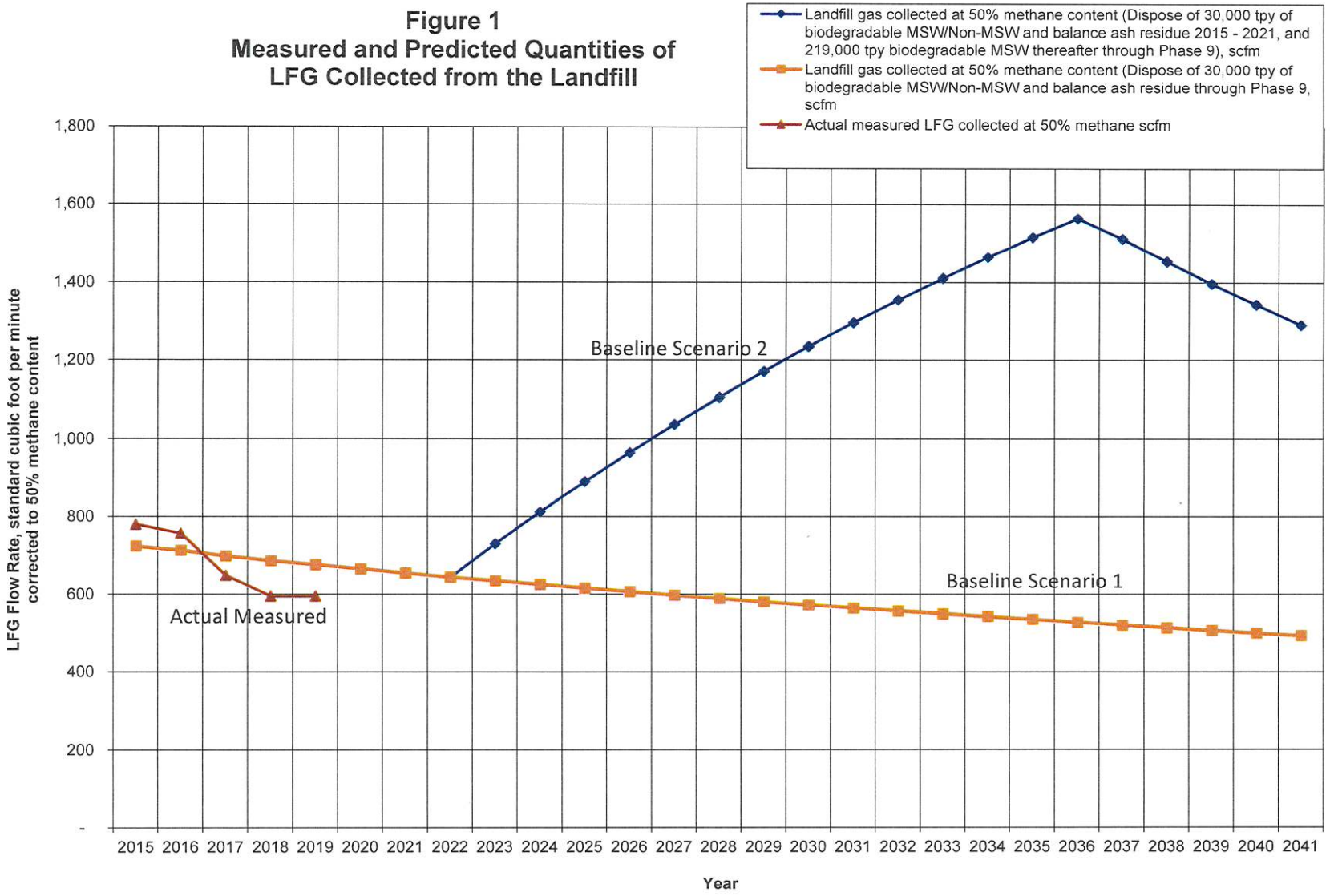
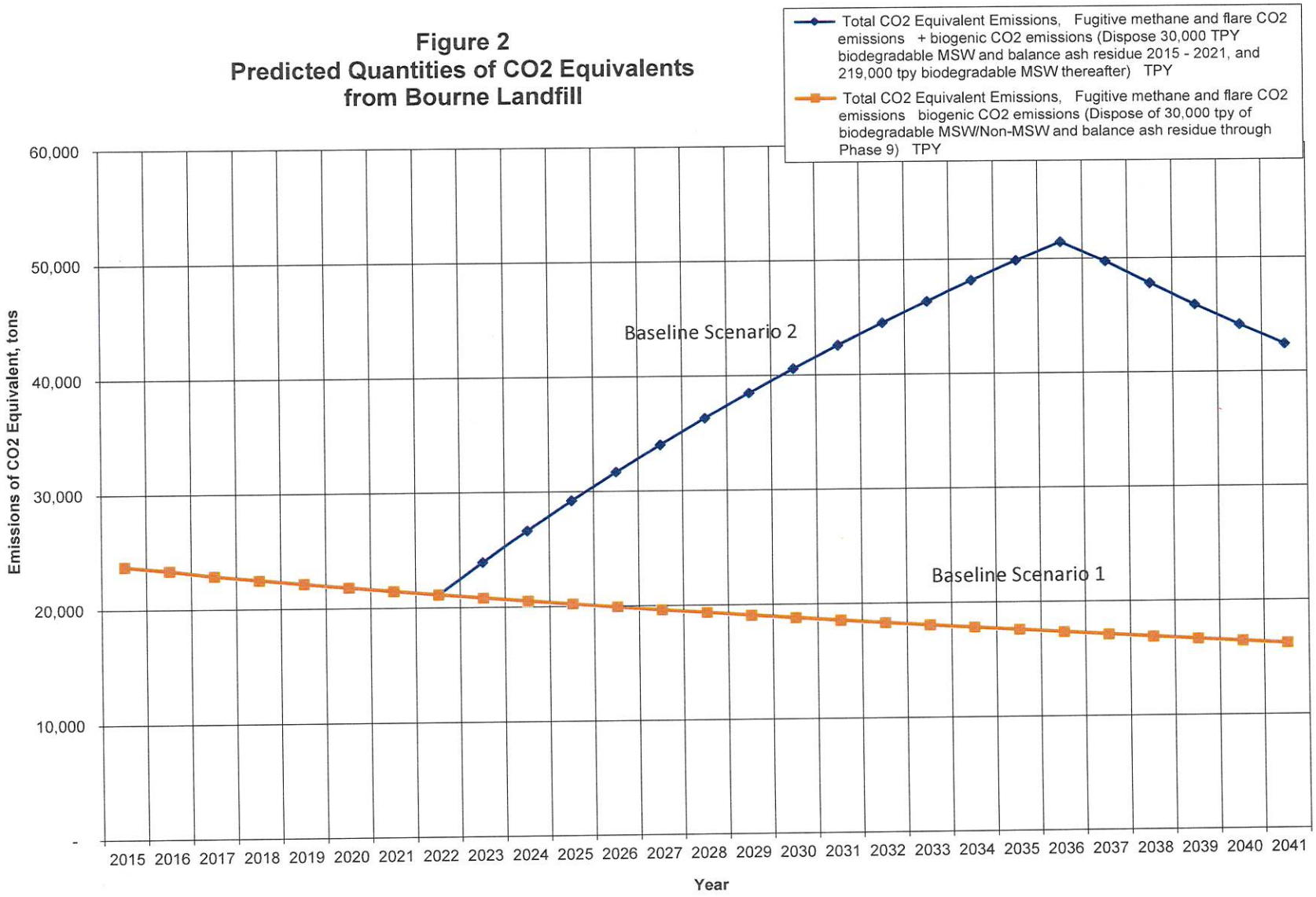


Figure 2
Predicted Quantities of CO2 Equivalents from Bourne Landfill



BOURNE LANDFILL

BASELINE SCENARIO 1 GHG EMISSIONS

	LFG Produced		Fugitive Emissions @ 5% loss		A.	Emissions from flare combustion		B.	A + B	Proposed Case Harvest Power
Year	Methane tons	CO2 tons	Methane tons	CO2 tons	CO2e tons	CO2 from methane combustion tons	CO2 in LFG tons	CO2e tons	GHG Emissions CO2e tons	GHG Emissions CO2e reductions tons *
2015	4,247	8,184	212	409	4,868	11,095	7,775	18,870	23,738	
2016	4,180	8,055	209	403	4,792	10,921	7,653	18,573	23,365	
2017	4,095	7,891	205	395	4,694	10,698	7,497	18,195	22,890	
2018	4,022	7,750	201	388	4,610	10,507	7,363	17,869	22,479	(27,663)
2019	3,964	7,639	198	382	4,544	10,356	7,257	17,612	22,156	(27,663)
2020	3,899	7,514	195	376	4,470	10,186	7,138	17,324	21,793	(27,663)
2021	3,836	7,393	192	370	4,398	10,023	7,023	17,046	21,444	(27,663)
2022	3,776	7,277	189	364	4,329	9,866	6,913	16,779	21,108	(27,663)
2023	3,719	7,166	186	358	4,263	9,715	6,808	16,522	20,785	(27,663)
2024	3,663	7,059	183	353	4,199	9,570	6,706	16,275	20,474	(27,663)
2025	3,609	6,956	180	348	4,138	9,430	6,608	16,038	20,175	(27,663)
2026	3,554	6,849	178	342	4,074	9,285	6,506	15,791	19,865	(27,663)
2027	3,501	6,746	175	337	4,013	9,145	6,408	15,553	19,566	(27,663)
2028	3,449	6,646	172	332	3,954	9,010	6,314	15,324	19,278	(27,663)
2029	3,399	6,551	170	328	3,897	8,881	6,223	15,104	19,000	(27,663)
2030	3,351	6,458	168	323	3,842	8,755	6,135	14,890	18,732	(27,663)
2031	3,305	6,369	165	318	3,789	8,634	6,051	14,685	18,474	(27,663)
2032	3,260	6,283	163	314	3,738	8,518	5,969	14,487	18,225	(27,663)
2033	3,217	6,200	161	310	3,688	8,406	5,890	14,296	17,984	(27,663)
2034	3,176	6,120	159	306	3,641	8,297	5,814	14,111	17,752	(27,663)
2035	3,136	6,043	157	302	3,595	8,193	5,741	13,934	17,528	(27,663)
2036	3,092	5,959	155	298	3,545	8,078	5,661	13,739	17,283	(27,663)
2037	3,050	5,877	152	294	3,496	7,967	5,583	13,551	17,047	(27,663)
2038	3,009	5,798	150	290	3,449	7,861	5,508	13,369	16,819	(27,663)
2039	2,970	5,723	148	286	3,404	7,758	5,436	13,194	16,599	(27,663)
2040	2,932	5,649	147	282	3,361	7,659	5,367	13,026	16,386	(27,663)
2041	2,895	5,579	145	279	3,319	7,563	5,300	12,863	16,182	(27,663)

Dispose of 30,000 tpy of biodegradable MSW/Non-MSW and balance ash residue 2015 - 2041 at the permit limits.

* - 2015 Locational Marginal Unit (LMU) Marginal CO2 Emission Rate was 1,036 lb/MWhr. Annual renewable power output projected of 53,261 MWhr.

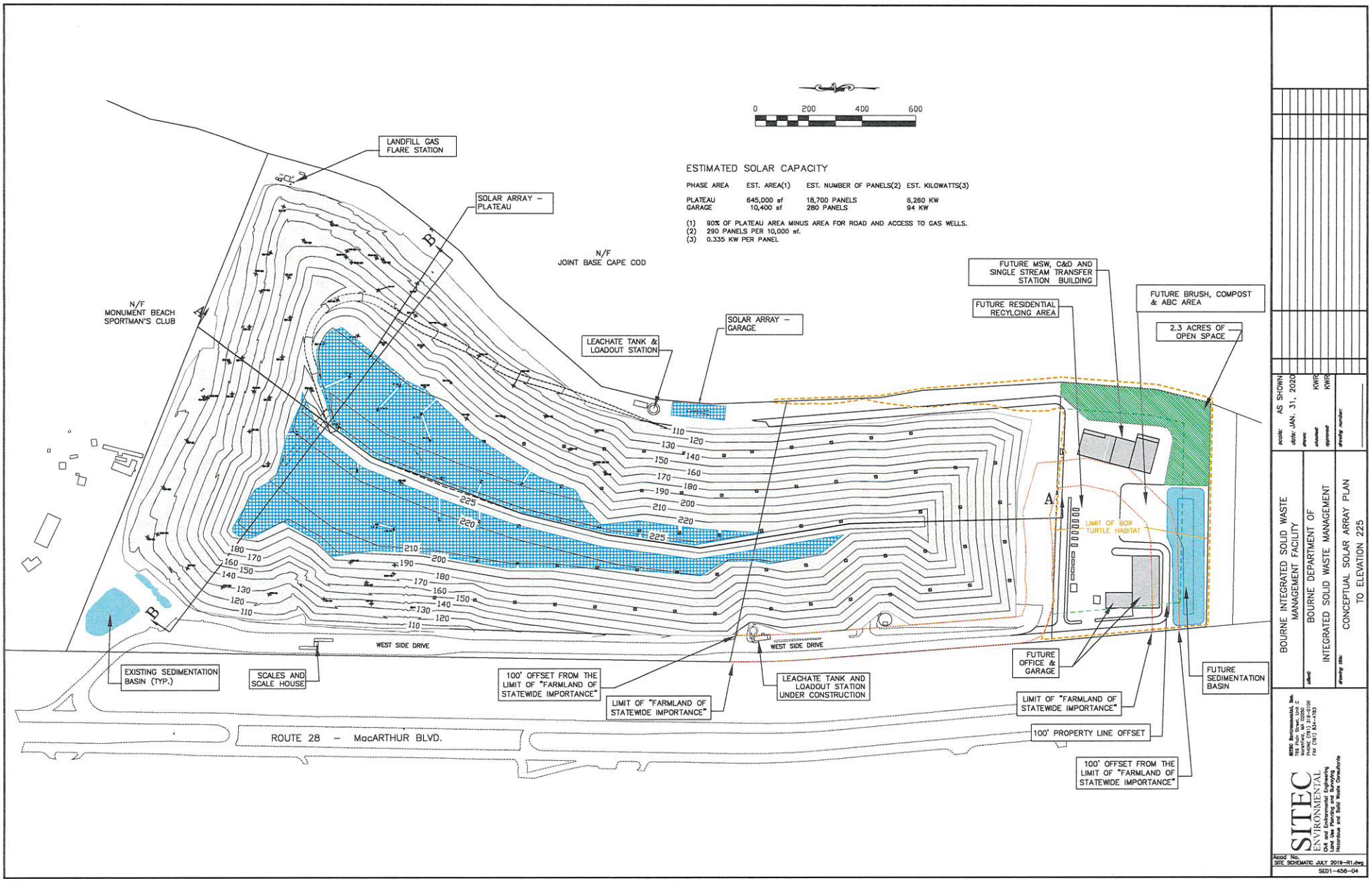
BOURNE LANDFILL

BASELINE SCENARIO 2 GHG EMISSIONS

	LFG Produced		Fugitive Emissions @ 5% loss		A.	Emissions from flare combustion		B.	A + B	Proposed Case Harvest Power
Year	Methane tons	CO2 tons	Methane tons	CO2 tons	CO2e tons	CO2 from methane combustion tons	CO2 in LFG tons	CO2e tons	GHG Emissions CO2e tons	GHG Emissions CO2e reductions tons *
2015	4,247	8,184	212	409	4,868	11,095	7,775	18,870	23,738	
2016	4,180	8,055	209	403	4,792	10,921	7,653	18,573	23,365	
2017	4,095	7,891	205	395	4,694	10,698	7,497	18,195	22,890	
2018	4,022	7,750	201	388	4,610	10,507	7,363	17,869	22,479	(27,663)
2019	3,964	7,639	198	382	4,544	10,356	7,257	17,612	22,156	(27,663)
2020	3,899	7,514	195	376	4,470	10,186	7,138	17,324	21,793	(27,663)
2021	3,836	7,393	192	370	4,398	10,023	7,023	17,046	21,444	(27,663)
2022	3,776	7,277	189	364	4,329	9,866	6,913	16,779	21,108	(27,663)
2023	4,279	8,247	214	412	4,906	11,180	7,834	19,014	23,920	(27,663)
2024	4,762	9,177	238	459	5,459	12,441	8,718	21,159	26,618	(27,663)
2025	5,225	10,070	261	503	5,990	13,651	9,566	23,218	29,208	(27,663)
2026	5,666	10,919	283	546	6,495	14,803	10,373	25,176	31,671	(27,663)
2027	6,089	11,734	304	587	6,980	15,907	11,147	27,054	34,034	(27,663)
2028	6,495	12,516	325	626	7,445	16,967	11,890	28,857	36,302	(27,663)
2029	6,884	13,266	344	663	7,891	17,984	12,602	30,586	38,478	(27,663)
2030	7,257	13,985	363	699	8,319	18,960	13,286	32,246	40,565	(27,663)
2031	7,616	14,676	381	734	8,730	19,896	13,942	33,838	42,568	(27,663)
2032	7,959	15,338	398	767	9,124	20,794	14,571	35,365	44,490	(27,663)
2033	8,289	15,974	414	799	9,502	21,656	15,175	36,831	46,333	(27,663)
2034	8,606	16,584	430	829	9,865	22,482	15,754	38,237	48,102	(27,663)
2035	8,909	17,169	445	858	10,213	23,275	16,310	39,585	49,799	(27,663)
2036	9,195	17,720	460	886	10,541	24,022	16,834	40,856	51,397	(27,663)
2037	8,889	17,130	444	857	10,190	23,223	16,274	39,497	49,687	(27,663)
2038	8,543	16,462	427	823	9,793	22,318	15,639	37,957	47,749	(27,663)
2039	8,210	15,820	410	791	9,411	21,448	15,029	36,477	45,888	(27,663)
2040	7,890	15,204	394	760	9,044	20,612	14,444	35,056	44,100	(27,663)
2041	7,583	14,612	379	731	8,692	19,809	13,881	33,691	42,383	(27,663)

Dispose of 30,000 tons per year of biodegradable MSW from 2015 to 2021 and 219,000 tons per year of biodegradable MSW thereafter until 2036 at the permit limits.

* - 2015 Locational Marginal Unit (LMU) Marginal CO2 Emission Rate was 1,036 lb/MWhr. Annual renewable power output projected of 53,261 MWhr.



ESTIMATED SOLAR CAPACITY

PHASE AREA	EST. AREA(1)	EST. NUMBER OF PANELS(2)	EST. KILOWATTS(3)
PLATEAU	645,000 sf	18,700 PANELS	6,260 KW
GARAGE	10,400 sf	280 PANELS	94 KW

(1) 90% OF PLATEAU AREA MINUS AREA FOR ROAD AND ACCESS TO GAS WELLS.
(2) 290 PANELS PER 10,000 sf.
(3) 0.335 KW PER PANEL

BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
CONCEPTUAL SOLAR ARRAY PLAN TO ELEVATION 225

scale: AS SHOWN
date: JAN. 31, 2020
drawn: KWR
checked:
approved: KWR
drawing number:

SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Planning and Surveying
Hazardous and Solid Waste Consultants

Acad No.
SITE SCHEMATIC JULY 2019-R1.dwg
SED1-456-04

DRAFT FOR PUBLIC COMMENT

Massachusetts 2030 Solid Waste Master Plan

September 2019

Table 8: Projected Disposal Capacity 2018-2030 (Tons Per Year)

Municipality	Permitted Capacity	End of current permitted capacity	Lifetime of LF	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Active Landfills															
Bourne	30,000	2021	**2024**	30,000	30,000	30,000	219,000	219,000	219,000	0	0	0	0	0	0
Carver	101,125	2020	**2020**	101,125	101,125	0	0	0	0	0	0	0	0	0	0
Dartmouth	115,000	2024	**2026**	115,000	115,000	115,000	115,000	115,000	115,000	115,000	115,000	0	0	0	0
Middleborough	60,000	2020	**2031**	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Nantucket	26,000	2029	**2029**	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	0
Taunton	120,120	2019	**2020**	120,120	120,120	0	0	0	0	0	0	0	0	0	0
Westminster	390,000	2024	**2024**	390,000	390,000	390,000	390,000	390,000	390,000	0	0	0	0	0	0
Municipal Waste Combustors															
Agawam	131,400			131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400
Haverhill	602,250			602,250	602,250	602,250	602,250	602,250	602,250	602,250	602,250	602,250	602,250	602,250	602,250
Millbury	529,575			529,575	529,575	529,575	529,575	529,575	529,575	529,575	529,575	529,575	529,575	529,575	529,575
North Andover	460,500			460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500
Pittsfield	84,000			84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000
Rochester	1,250,000			1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Saugus	460,500			460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500	460,500
	4,360,470	*3,518,225*													
TOTAL PERMITTTED COMBUSTION CAPACITY	*3,518,225*			*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*	*3,518,225*
ADJUSTED TOTAL COMBUSTION CAPACITY*				*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*	*3,190,000*
TOTAL PERMITTED CAPACITY				**4,360,470**	**4,024,225**	**3,964,225**	**3,934,225**	**3,934,225**	**3,934,225**	**3,544,225**	**3,544,225**	**3,544,225**	**3,544,225**	**3,544,225**	**3,518,225**
TOTAL POTENTIAL CAPACITY				**4,032,245**	**4,032,245**	**3,811,000**	**4,000,000**	**4,000,000**	**4,000,000**	**3,391,000**	**3,391,000**	**3,276,000**	**3,276,000**	**3,276,000**	**3,250,000**
KEY:															
Permitted Capacity	Number without shading														
Potential Additional Cap	Number with shading														
ESTIMATED TOTAL POTENTIAL AVAILABLE CAPACITY				**4,032,245**	**4,032,245**	**3,811,000**	**4,000,000**	**4,000,000**	**4,000,000**	**3,391,000**	**3,391,000**	**3,276,000**	**3,276,000**	**3,276,000**	**3,250,000**
100% of potential for LFs and 91 % of potential for combustion															
Actual combustion varies per year, has never reached capacity															
Total Potential Landfill Capacity				842,245	842,245	621,000	810,000	810,000	810,000	201,000	201,000	86,000	86,000	86,000	60,000

LANDFILL PHASES	PERMITTED VOLUME (CY)	POTENTIAL VOLUME (CY)	UTILIZED VOLUME (CY) (JANUARY 2020)	SCENARIO 1 TIME TO FILL	SCENARIO 2 TIME TO FILL
PHASE 1-A-B-C	1,071,000		1,071,000		
PHASE 2	618,000		618,000		
PHASE 3, STAGES 1 & 2	692,000		692,000		
PHASE, STAGE 3	320,000		320,000		
PHASE 2A/3A, STAGE 1	1,266,000		1,266,000		
PHASE 2A/3A, STAGE 2	558,000		558,000		
PHASE 4	1,470,000		1,470,000		
PHASE 5	200,000		200,000		
PHASE 6 (Preferred)	920,000			April-23	November-22
PHASE 9		1,255,000		September-27	January-26
PHASE 7		1,380,000		August-32	July-29
PHASE 8		2,540,000		September-41	January-36
TOTALS	7,115,000	5,175,000	6,195,000		

	cubic yards	
TOTAL COMBINED VOLUME	12,290,000	100.0%
LESS UTILIZED VOLUME	6,195,000	50.4%
NET REMAINING VOLUME	**6,095,000**	**49.6%**

NOTES:

SCENARIO 1 BASED ON PERMITTED FILLING RATE WITH ASH AND MSW

SCENARIO 2 BASED ON PERMITTED FILLING RATE WITH MSW ONLY AFTER 2021

Natural Heritage & Endangered Species Program

www.mass.gov/nhesp

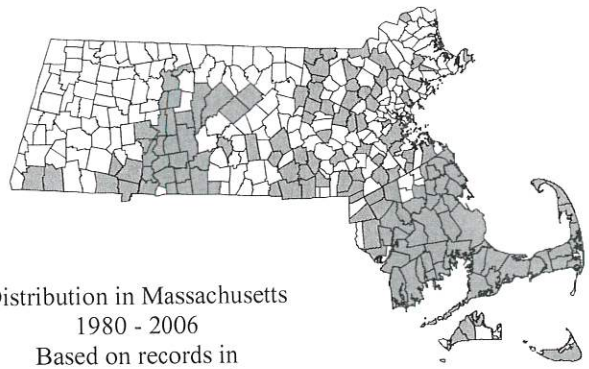
Massachusetts Division of Fisheries & Wildlife

Eastern Box Turtle
Terrapene carolina

State Status: **Special Concern**
Federal Status: **None**

DESCRIPTION: The Eastern Box Turtle is a small terrestrial turtle ranging from 11.4–16.5 cm (4.5–6.6 in.) in length. It is so named because a hinge on the lower shell (plastron) allows it to enclose head, legs, and tail completely within the upper (carapace) and lower shells. The adult box turtle has an oval, high-domed shell with variable coloration and markings. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish blotches. The plastron typically has a light and dark variable pattern, but some may be completely tan, brown, or black. The head, neck, and legs also vary in color and markings, but are generally dark with orange or yellow mottling. The Eastern Box Turtle has a short tail and an upper jaw ending in a down-turned beak. The male box turtle almost always has red eyes, and females have yellowish-brown or sometimes dark red eyes. Males have a moderately concave plastron (females' are flat), the claws on the hind legs are longer, and the tail is both longer and thicker than the females. Hatchlings have a brownish-gray carapace with a yellow spot on each scute (scale or plate), and a distinct light-colored mid-dorsal keel (ridge). The plastron is yellow with a black central blotch, and the hinge is poorly developed.

Photo by Liz Willey



Distribution in Massachusetts
1980 - 2006
Based on records in
Natural Heritage Database

SIMILAR SPECIES: The Blanding's Turtle (*Emydoidea blandingii*) may be confused with the Eastern Box Turtle. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull into its shell, but with less closure than in the Eastern Box Turtle. Both may have yellow markings on the carapace; however, the markings on a Blanding's Turtle are spots or flecks rather than blotches. An adult Blanding's Turtle is larger than the box turtle (15-23 cm; 6-9 in. in shell length). While both will be found nesting in similar habitat, the Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial. Eastern Box Turtle hatchlings could be confused with Spotted Turtle hatchlings, because both have spots on each scute. However, the Spotted Turtle lacks a mid-dorsal keel.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although Eastern Box Turtles occur in many towns in Massachusetts, they are more heavily concentrated in the southeastern section of the state.

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Massachusetts Division of Fisheries & Wildlife

1 Rabbit Hill Rd., Westborough, MA; tel: 508-389-6300; fax: 508-389-7890; www.mass.gov/dfw

HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a terrestrial turtle, inhabiting many types of habitats. It is found in both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland.

LIFE CYCLE & BEHAVIOR: The Eastern Box Turtle hibernates in the northern parts of its range from late October or November until mid-March or April depending on the weather. Box turtles overwinter in upland forest, a few inches under the soil surface, typically covered by leaf litter or woody debris. As soil temperatures drop, the turtles burrow into soft ground. Overwintering is usually not communal, although several may overwinter within close proximity of one another. Some individuals may emerge prematurely during warm spells in winter and early spring. When this occurs, they may perish from exposure if there is a sudden cold snap. During the spring, Box Turtles start to forage and mate in the forest and fields.

In summer, adult Box Turtles are most active in the morning and evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. They often scoop out a "form" (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms may be used on more than one occasion over a period of weeks. Though known as "land turtles", in the hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour.

The Eastern Box Turtle is omnivorous, feeding on animal matter such as slugs, insects, earthworms, snails, and even carrion. Box Turtles also have a fondness for mushrooms, berries, fruits, leafy vegetables, roots, leaves, and seeds.

Females reach sexual maturity at approximately 13 years of age. Mating is opportunistic and may take place anytime between April and October. Courtship begins with the male circling, biting, and shoving the female. Afterward, the premounting and copulatory phases take place. Females can store sperm and lay fertile eggs up to four years after mating.

Females nest in June or early July and can travel great distances to find appropriate nesting habitat. They may travel up to approximately 1600 m (1 mile), many of them crossing roads during their journey. Nesting areas may be in early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits. Females sometimes exhibit nest site fidelity, laying eggs in close proximity to the previous years' nest. Females typically start nesting in the late afternoon or early evening and continue for up to five hours.

THREATS: There are several reasons the Eastern Box Turtle is under threat in Massachusetts: habitat destruction resulting from residential and industrial development; road mortality; collection by individuals for pets; mowing of fields and early successional habitat during the active season; unnaturally inflated rates of predation in suburban and urban areas; disturbance of nest sites by ATVs; and genetic degradation due to the release of non-native (pet store) turtles. The release of non-native species could also transmit disease, which may become an issue in Massachusetts, but is not currently a problem.

MANAGEMENT RECOMMENDATIONS:
Using NHESP records, Eastern Box Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of box turtles. Other considerations should include the size and lack of fragmentation of habitat and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs).

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private landowners on the best management practices for box turtle habitat.

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrades and road-widening projects within box turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for turtle conservation.

Educational materials need to be developed and distributed to the public in reference to the detrimental effects of keeping our native box turtles as pets (an illegal activity that slows reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases numbers of natural predators on turtles), and driving ATVs in nesting areas from June to October. People should be encouraged, when safe to do so, to help box turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Motorized vehicle access to timber harvesting sites in box turtle habitat should be restricted to the times when box turtles are inactive during the winter, preferably when the ground is frozen. Motorized vehicles should not be used for soil scarification.

Finally, a statewide monitoring program is needed to track long-term population trends in Eastern Box Turtles.

Active Period

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

REFERENCES:

Babcock, H.L. 1971. *Turtles of the Northeastern United States*. New York: Dover Publications.

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DeGraaf, R.M., and D.D. Rudis. 1983. *Amphibians and Reptiles of New England.* Amherst, Massachusetts: The University of Massachusetts.

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Hunter, M.L., Jr., J. Albright, and J.E. Arbuckle. 1992. *The Amphibians and Reptiles of Maine.* Bulletin 838, The Maine Amphibian and Reptile Atlas Project. Orono, Maine: University of Maine, Maine Agricultural Experiment Station.

Lazell, J. 1974. *Reptiles and Amphibians of Massachusetts.* Lincoln, Massachusetts: Massachusetts Audubon Society.

Lazell, J. 1969. Nantucket Herpetology. *Massachusetts Audubon* 54 (2): 32-34.

Shiffer, C.N. 1990. Turtle in a Box. *Pennsylvania Angler*, pp. 23-24.

Simmons, T. 1988. All Outdoors. *Vineyard Gazette.*

Tyning, T.F. 1990. *A Guide to Amphibians and Reptiles.* Boston: Little, Brown and Company.

Willey, L. 2006. Personal communication. M.S. student at the University of Massachusetts, Amherst.

Updated 2015

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form, as these donations comprise a significant portion of our operating budget.
www.mass.gov/nhesp

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

February 5, 2020

Town of Bourne, ISWM Department
c/o Phil Goddard, Manager of Facility Compliance and Technology Development
24 Perry Avenue
Buzzards Bay, MA 02532

RE: Project Location: 201 MacArthur Boulevard, Bourne, MA
Project Description: Phases 7-9 Landfill Expansion
NHESP Tracking No.: 17-36534

Dear Applicant:

Thank you for submitting the project plans entitled "Schematic Site Buildout Plan" (dated February 4, 2020) and supporting documentation to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The project, as currently proposed, includes the expansion of an existing landfill in three phases (Phases 7, 8 and 9). All work associated with Phases 7-9 of the project shall occur within areas already disturbed by existing landfill operations and, in particular, shall occur outside of the "Limit of Box Turtle Habitat" shown on the project plans. Any future work proposed within the "Limit of Box Turtle Habitat" shown on the project plans shall require a direct filing with the Division for compliance with the MESA.

Based on a review of the information that was provided, the Division has determined that Phases 7, 8 and 9 of this project, as currently proposed, appear to be **exempt from a MESA review** pursuant to 321 CMR 10.14. Any changes to the proposed project or any additional work beyond that provided may require a filing with the Division pursuant to the MESA regulations. If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the Division so that it is received at the same time as the local conservation commission.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions about this letter, please contact Melany Cheeseman, Endangered Species Review Assistant, at melany.cheeseman@mass.gov or 508-389-6357.

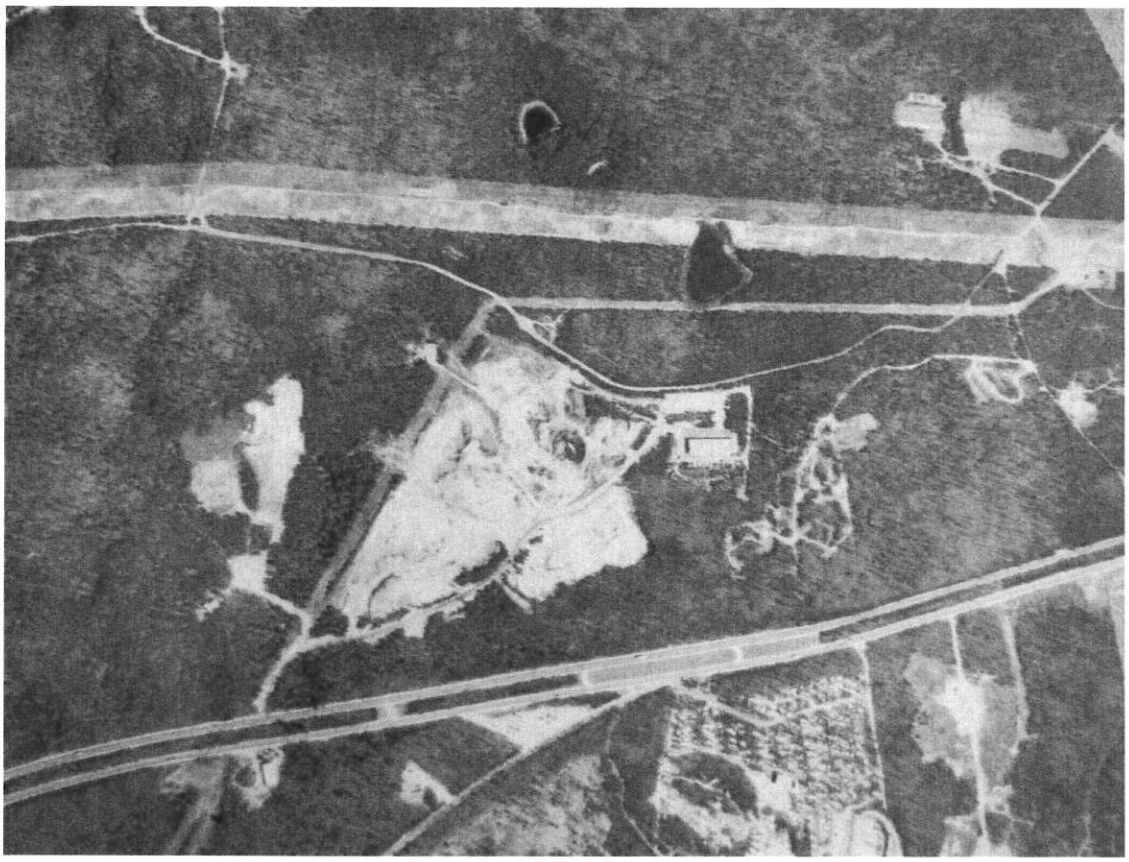
Sincerely,

Everose Schlüter

Everose Schlüter, Ph.D.
Assistant Director

cc: Amy Ball, Horsley Witten Group, Inc.

ISWM Facility circa 1972



ISWM Facility 1999


ISWM Facility December 2019

TOWN OF BOURNE
BOARD OF SELECTMEN
24 Perry Avenue
Buzzards Bay, MA 02532
Phone 508-759-0600 ext. 1503 – Fax 508-759-0620

CERTIFICATE OF VOTE

At a meeting of the Board of Selectmen of the Town of Bourne, held on November 5, 2019, at the Bourne Veterans' Memorial Community Center a quorum being present and voting throughout, upon a Motion duly made by Selectman Jared MacDonald, Seconded by Selectman Peter Meier, and unanimously voted 5-0-0.

VOTED:

To allow ISWM to pursue the expansion of Bourne's landfill facility as presented at the Joint meeting of the Board of Selectmen, Board of Health, Finance Committee and the Energy Advisory Committee on August 12, 2019.

BOARD OF SELECTMEN

Judith MacLeod Froman, Chair

James L. Potter, Vice Chair

George G. Slade, Jr., Clerk

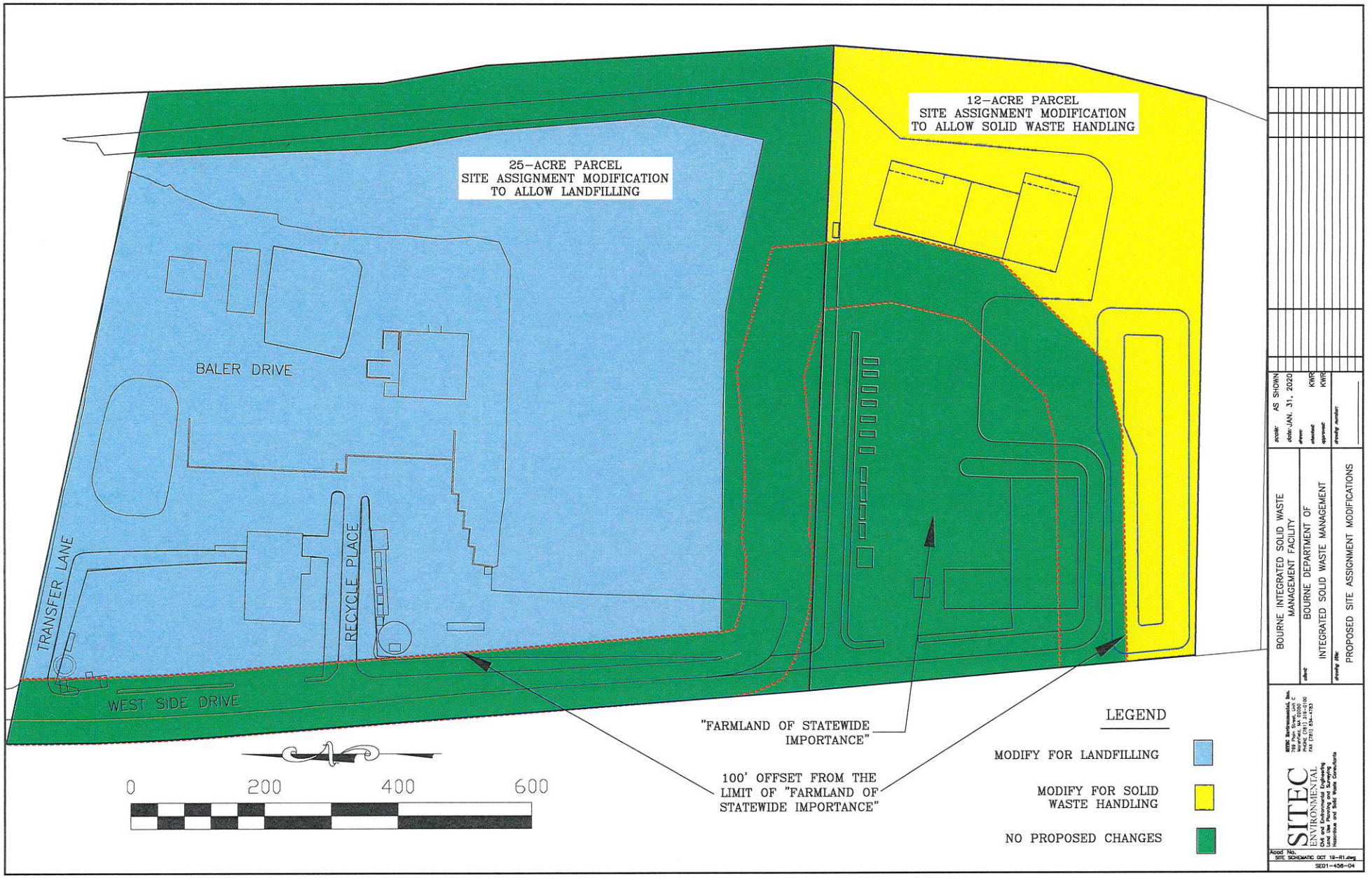
Peter J. Meier

Jared P. MacDonald

A True Copy,
Attest:
Town Clerk

ATTACHMENT 8

PLAN SHOWING AREAS FOR SITE SUITABILITY REVIEW
USDA CUSTOM SOIL RESOURCE REPORT
25-ACRE PARCE SOIL SURVEY
12-ACRE PARCEL SOIL SURVEY


25-ACRE PARCEL
SITE ASSIGNMENT MODIFICATION
TO ALLOW LANDFILLING
12-ACRE PARCEL
SITE ASSIGNMENT MODIFICATION
TO ALLOW SOLID WASTE HANDLING
BALER DRIVE
TRANSFER LANE
RECYCLE PLACE
WEST SIDE DRIVE
"FARMLAND OF STATEWIDE IMPORTANCE"
100' OFFSET FROM THE LIMIT OF "FARMLAND OF STATEWIDE IMPORTANCE"
0
200
400
600
LEGEND
MODIFY FOR LANDFILLING
MODIFY FOR SOLID WASTE HANDLING
NO PROPOSED CHANGES
BOURNE INTEGRATED SOLID WASTE MANAGEMENT FACILITY
BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT
PROPOSED SITE ASSIGNMENT MODIFICATIONS
scale: AS SHOWN
date: JAN. 31, 2020
drawn: KWR
checked:
approved: KWR
drawing number:
SITEC ENVIRONMENTAL
SITE SCHEMATIC OCT. 18-R1.dwg
SE01-456-04

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Barnstable County, Massachusetts

Town of Bourne, ISWM Department

May 2, 2016

Soil Map

Map Scale: 1:7,280 if printed on B portrait (11" x 17") sheet.

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 12, Sep 28, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—Oct 8, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Barnstable County, Massachusetts (MA001)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	1.9	0.4%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	20.8	4.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	33.4	7.0%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	4.5	0.9%
430B	Barnstable sandy loam, 3 to 8 percent slopes	31.5	6.6%
430C	Barnstable sandy loam, 8 to 15 percent slopes	9.4	2.0%
431B	Barnstable sandy loam, 3 to 8 percent slopes, very stony	72.2	15.1%
431C	Barnstable sandy loam, 8 to 15 percent slopes, very stony	42.5	8.9%
431D	Barnstable sandy loam, 15 to 25 percent slopes, very stony	6.8	1.4%
435B	Plymouth loamy coarse sand, 3 to 8 percent slopes	100.4	21.0%
435C	Plymouth loamy coarse sand, 8 to 15 percent slopes	11.3	2.4%
435D	Plymouth loamy coarse sand, 15 to 35 percent slopes	25.7	5.4%
483C	Plymouth-Barnstable complex, rolling, very bouldery	0.8	0.2%
484C	Plymouth-Barnstable complex, rolling, extremely bouldery	24.1	5.0%
484D	Plymouth-Barnstable complex, hilly, extremely bouldery	34.7	7.3%
600	Pits, sand and gravel	15.6	3.3%
652	Dumps, landfill	29.3	6.1%
665	Udipsamments, smoothed	13.2	2.8%
Totals for Area of Interest		478.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Minor Components

Nantucket
Percent of map unit: 10 percent

Plymouth
Percent of map unit: 10 percent

Carver
Percent of map unit: 5 percent

Merrimac
Percent of map unit: 5 percent

431B—Barnstable sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting
National map unit symbol: 98pv
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Barnstable and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam
H2 - 1 to 23 inches: sandy loam
H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 2.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Plymouth

Percent of map unit: 10 percent

Nantucket

Percent of map unit: 8 percent

Carver

Percent of map unit: 7 percent

431C—Barnstable sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 98pw
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Barnstable and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnstable

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable loamy ablation till over reworked sandy glaciofluvial deposits; loamy ablation till over reworked sandy outwash

Typical profile

H1 - 0 to 1 inches: sandy loam
H2 - 1 to 23 inches: sandy loam
H3 - 23 to 64 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 2.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Nantucket

Percent of map unit: 10 percent

Plymouth

Percent of map unit: 10 percent

Carver

Percent of map unit: 10 percent

431D—Barnstable sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 98px
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 55 degrees F

435B—Plymouth loamy coarse sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 98rs
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till; loose sandy ablation till and/or loose sandy glaciofluvial deposits; loose sandy ablation till and/or loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 29 inches: gravelly loamy coarse sand
H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Minor Components

Hinckley
Percent of map unit: 8 percent

Carver
Percent of map unit: 8 percent

Barnstable
Percent of map unit: 6 percent

Nantucket
Percent of map unit: 6 percent

Merrimac
Percent of map unit: 2 percent

435C—Plymouth loamy coarse sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 98rt
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Plymouth and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plymouth

Setting

Landform: Ice-contact slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loose sandy glaciofluvial deposits and/or loose sandy ablation till; loose sandy ablation till and/or loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 29 inches: gravelly loamy coarse sand
H3 - 29 to 64 inches: gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained

LEC

WETLANDS WILDLIFE WATERWAYS

August 9, 2018

Email (rquinn@sitecenv.com)

Raymond Quinn, PE
SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050

[LEC File #: SITEC \17-395.01]

Re: Site Specific Soil Survey Report
Bourne Landfill
Department of Integrated Solid Waste Management
201 MacArthur Boulevard
Bourne, Massachusetts

Dear Mr. Quinn:

On July 17, 2018, LEC Environmental Consultants, Inc. (LEC) performed a soil survey on approximately twenty acres of land at the solid waste disposal facility in Bourne Massachusetts. This soil survey was performed in accordance with USDA, Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey standards.

The purpose of the survey was to identify the boundaries of soil types at a more detailed level than the published NRCS Web Soil Survey[1]. The end-product is a Site-Specific Soil Survey for the purpose of determining the classification as Massachusetts prime, important, and unique farm land. The Farmland Classification is from the USDA-NRCS Field Office Technical Guide, Version 12, September 28, 2015 (Web source).

The base map used in the field for the site-specific soil survey consists of an existing conditions plan, with topography at two-foot contours overlaid by a color aerial photograph. The base map was produced by SITEC Environmental, Inc. and the Bourne Department of Integrated Solid Waste Management at a scale of 1" = 40'. This report and the site-specific soil map are two parts of the Site-Specific Soil Survey and are intended to be used together.

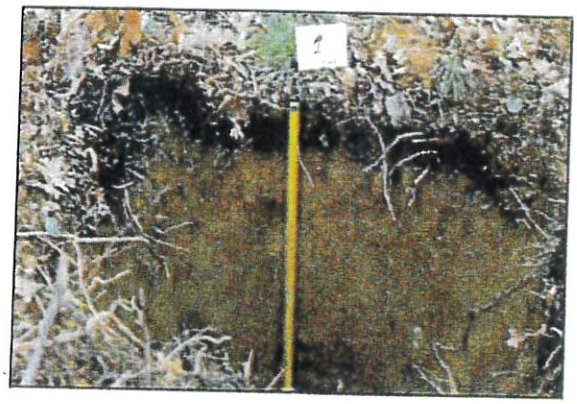
In the course of our field investigation, we collected twenty soil profile descriptions that represent the primary map units and additional data from hand-borings throughout the site that represent the various map units. The detailed soil descriptions are included in Appendix A. The survey area consists of the three principal soil map units described below.

[1] Soil Survey of Barnstable County Massachusetts, Web Soil Survey, July 27, 2018

LEC

Soil Map Unit Descriptions

Barnstable sandy loam, 3 to 8 percent (431B) consists of very deep, well drained soils formed in loamy glacial till overlying loose, sandy glacial-fluvial material. They are on nearly level to moderately steep soils of moraines. In this survey, these soils occur along the western and southern boundaries of the active landfill work area. Slopes range from 0 to 4 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. The seasonal, high water table is greater than 60 inches from the surface. Mean annual precipitation is about 43 inches (1092 millimeters) and mean annual temperature is about 48 degrees F (9 degrees C). These soils are classified as Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Typic Dystrudepts.

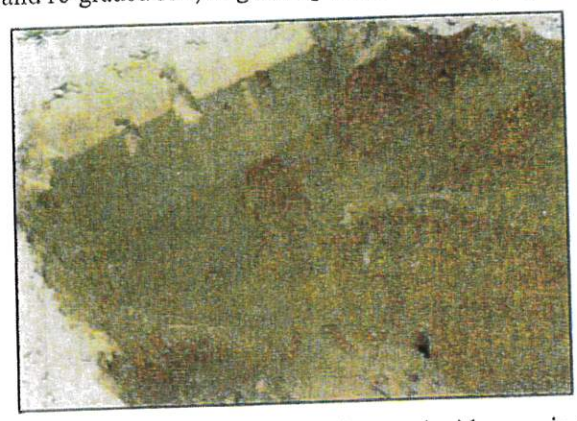


Included within this map unit are large areas that do not have stones on the surface. The A and B horizon (solum) textures range from very fine sandy loam to sandy loam. Coarse fragment content is less than 5 percent throughout the solum. Textures in the substratum are medium sand, coarse sand, very coarse sand. Course fragments, including gravel and small cobbles, make up less than 15 percent. No contrasting inclusions were encountered in this map unit and similar inclusions make up less than 5 percent of the map unit. Seven detailed soil profile descriptions (TP-3, TP-4, TP-16, TP-17, TP-18, TP-19, TP-20) were collected where this soil occurs and are included in Appendix A.

Urban Land (602). This nearly level to gently sloping unit dominates the survey area and consists of impervious surfaces including pavement (primarily asphalt) and buildings. Underlying soils are unknown but are most likely dominated by coarse sand from prior excavations of cutting and filling. This map unit supports the principal daily landfill activities of recycling, transport, and storage of useable soil and non-soil material.

Included with this unit in mapping are small areas of Udipsamments, smoothed and storage piles of non-soil debris including undecomposed yard waste, chipped woody debris, building rubble, stones and boulder piles, recycled material such as crushed glass, piles of crushed stone and rip-rap. The piles of non-soil material are constantly changing in size, distribution, and elevation as a result of machine handling. This Site-Specific Soil map identifies some of the non-soil areas as they existed at the time of this survey, adjusted from aerial photography taken in January of 2018.

Udipsamments, smoothed (655). These gently sloping to very steep areas consist of excavated, filled and re-graded soil, originating from the underlying substrata or manufactured on-site. Slopes range from



2 to 70 percent. The nearly level areas make up portions of the site where equipment is traveling. The remaining areas are dominated by steep side slopes (40 to 70 percent) of stored soil material and landscaped side slopes adjacent to some buildings. The soil textures are dominantly coarse and very coarse sand, excavated from a newly constructed land fill cell to the north of the survey area. Other stored piles contain various blends of "topsoil" constructed from mixing sand with organic material and compost. The topsoil storage piles have soil textures that range from very coarse sand to loamy sand and their gravelly analogs.

Included with this unit in mapping are small areas of non-soil debris, areas with extremely stony and boulder surfaces and areas where textures range to coarse sandy loam. The soil storage piles periodically change in size, distribution, and elevation, as a result of machine handling. This Site-Specific Soil map identifies the boundary of these areas as they existed at the time of this survey and based on aerial photography taken in January of 2018. Seven detailed soil profile descriptions (TP-1, TP-2, TP-5, TP-6, TP-7, TP-8, TP-9, TP-10, TP-11, TP-12, TP-13, TP-14, TP-15) were collected where this soil occurs and are included in Appendix A.

Non-soil Areas

Chipped Woody Debris (foreground)
Yard Waste background)

Asphalt, Brick, and Concrete Rubble

LEC

Soil Map Legend

The Soil Map Legend is correlated with the Barnstable County Soil Survey legend, referenced to the USDA-NRCS Web Soil Survey, July 27, 2018. The Farmland Classification is from the USDA-NRCS Field Office Technical Guide, Version 12, September 28, 2015 (Web). A number of non-soil areas are shown on the map and are considered to be map unit inclusions.

MA Statewide Numeric Symbol	Barnstable County Alpha-Numeric Symbol	Map Unit Name	Farmland Classification
431B	BbB	Barnstable sandy loam, 3 to 8 percent slopes, very stony	Farmland of Statewide Importance
602	Ur	Urban Land	None
665	Ud	Udipsamments, smoothed	None
Non-soil Areas			
1	W	Water (Sediment Pond)	None
N/A	N/A	Yard Waste	None
N/A	N/A	Woody Debris (chipped)	None
N/A	N/A	Asphalt, brick and concrete rubble	None

Conclusion

The re-surveyed area of this site is currently mapped Barnstable sandy loam, 3 to 8 percent slopes, very stony (431B) and classified as Farmland of Statewide Importance on the current NRCS Barnstable County Web Soil Survey. Based on our field investigation, the Barnstable map unit (431B) does not exist in most of the Bourne landfill work area. This area consists of soil and non-soil material that has been disturbed by human activity, related to the operation of the landfill. This Site-Specific Soil Survey redefines most of this area as Urban Land (602) and Udipsamments, smoothed (655), which are not Prime, Important or Unique Farmland in Massachusetts.

Thank you for the opportunity to assist the Bourne Department of Integrated Solid Waste Management with re-mapping of the solid waste disposal facility. Should you have any questions or need additional information I may be contacted in our Rindge, New Hampshire Office.

Sincerely,

LEC Environmental Consultants, Inc.

Thomas A. Peragallo, CPSS/SC
Certified Professional Soil Scientist/Soil Classifier

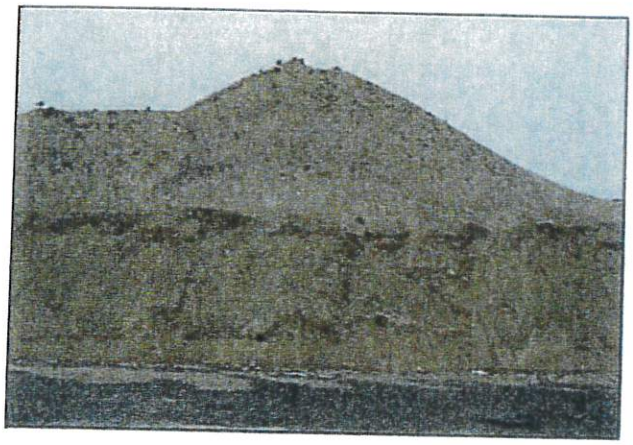
Attachments

Appendix A

Soil Profile Descriptions

Soil Profile Description

Observation Hole Number: TP-1					**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Sand storage pile, removed from recently excavated cell (north)					
Slope: 8-70 %		Aspect: north		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)		Depth to Bedrock: >20'	
Horizon	**Depth (inches)**	**Soil Texture**	**Moist Color**	**Redoximorphic Features**	**Other Features (structure, consist.)**
^C	0-60	Gravelly Coarse Sand (Gr CoS)	2.5Y 5/4	None	20% Gravel, loose, single grain



Landscape Setting

Soil Profile

Soil Profile Description

Observation Hole Number: TP-2	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: "Topsoil" storage pile, manufactured on-site from sand and composted yard waste	
Slope: 4-60 %	Aspect: south Stoniness: none
Soil Drainage Class: ED	Soil Series: Udipsamments (Great Group) Depth to Bedrock: >25'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-72	Loamy Coarse Sand (LCoS)	10YR 2/3 and 2/3 - mixed	None	10% woody debris 10% gravel, massive, mvfr buried log

Soil Profile

Soil Profile Description

Observation Hole Number: TP-3	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Aeolian material over glacial fluvial material Access way at the southern edge of the disturbed area, adjacent to undisturbed forest boundary	
Slope: 4 %	Aspect: south Stoniness: none
Soil Drainage Class: WD	Soil Classification: Barnstable (Series) Depth to Bedrock: >5'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
A	0-8	Very fine sandy loam (VFSL)	10YR 2/2	None	Mcopl, mfi compacted from machinery traffic
Bw	8-25	Very fine sandy loam (VFSL)	10YR 4/6	None	1mbsk, mfr
2C	25-48	GravellyCoarse Sand (GrCoS)	2.5Y 5/6	None	20% gravel, loose, single grain

Soil Profile

Soil Profile Description

Observation Hole Number: TP-4	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM Weather: Cloudy, 70's	
Landform, Landscape Position & Parent Material: Fill overlying aeolian and glacial fluvial mat. Access way at the southern edge of the disturbed area, adjacent to undisturbed forest boundary	
Slope: 4 % Aspect: south Stoniness: none	
Soil Drainage Class: WD Soil Classification: Barnstable (Series) Depth to Bedrock: >5'	

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
C^	0-6	Loamy Sand (LS)	2.5Y 5/4	None	Massive, mfr (Fill)
A	6-14	Very fine sandy loam (VFSL)	10YR 2/2	None	Mcopl, mfi compacted from machinery traffic
Bw	14-32	Very fine sandy loam (VFSL)	10YR 5/6	None	1mbsk, mfr
2C	32-48	Coarse Sand (CoS)	2.5Y 5/4	None	5% gravel, loose, single grain

Soil Profile

Soil Profile Description

Observation Hole Number: TP-5					**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Fill and non-soil debris overlying glacial fluvial material. On access way at the southern edge of the disturbed area, adjacent to undisturbed forest boundary					
Slope: 4 %		Aspect: south		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)			Depth to Bedrock: 4'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
C^	0-34	Loamy coarse sand (LCoS)	10YR 3/2 (mixed)	None	Massive, mfr 50% foreign debris: tailings, stones, wood, stumps
2C	34-48	Coarse Sand (CoS)	2.5Y 5/4	None	5% gravel, loose, single grain

Soil Profile

Soil Profile Description

Observation Hole Number: TP-6 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.

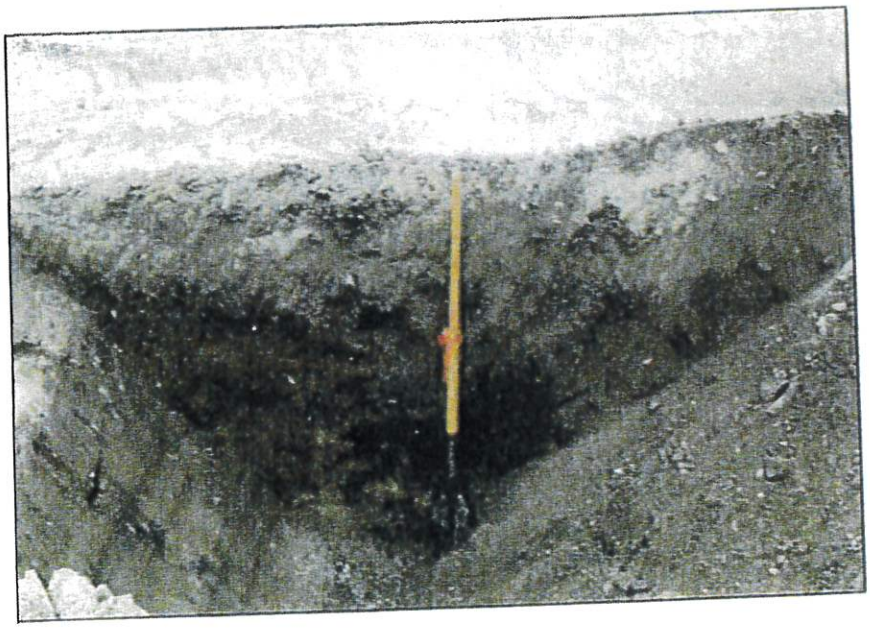
Time: AM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material: Sandy fill storage pile

Slope: 40% Aspect: north Stoniness: none

Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'

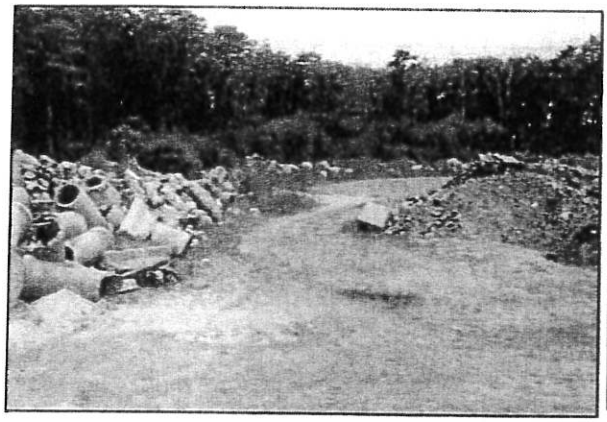
Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-14	Very gravelly loamy sand (VGrLS)	2.5Y 4/4	None	Massive, mfr 25% gravel
^C2	14-60	Coarse Sand & Loamy Sand (CoS &LS)	2.5Y 5/4 & 10YR 5/2	None	massive, mvfr, 10% gravel,



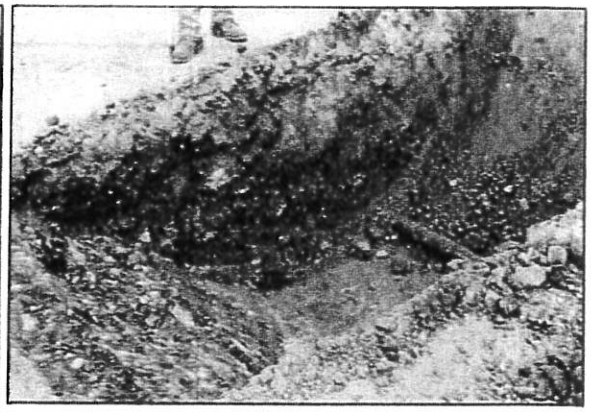
Soil Profile

Soil Profile Description

Observation Hole Number: TP-7				**Date: 7-17-18**	
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area					
Slope: 2%		Aspect: south		Stoniness: none	
Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'					
Horizon	**Depth (inches)**	**Soil Texture**	**Moist Color**	**Redoximorphic Features**	**Other Features (structure, consist.)**
^C	0-48	Loamy coarse sand (LCoS)	10YR 3/2	None	Massive, mfr About 25% asphalt, stone, bricks, steel debris



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-8 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: T. A. Peragallo, LEC Environmental Consultants, Inc.

Time: AM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area

Slope: 2% Aspect: south Stoniness: none

Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-32	Loamy coarse sand (LCoS)	10YR 3/2	None	Massive, mfr About 25% asphalt, stone, bricks, steel debris
^C2	32-50	Coarse sand (CoS)	2.5Y 5/4	None	Loose, single grain Refusal-boulder

Soil Profile

Soil Profile Description

Observation Hole Number: TP-9					**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: AM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area -access road					
Slope: 2%		Aspect: south		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)			Depth to Bedrock: >20'
Horizon	**Depth (inches)**	**Soil Texture**	**Moist Color**	**Redoximorphic Features**	**Other Features (structure, consist.)**
^C1	0-60	Gravelly Loamy coarse sand (GrLCoS), coarse sand (CoS) and sandy loam (SL) – Mixed	10YR 3/2 10YR 2/2 2.5Y5/3 2.5Y 5/4 (Mixed)	None	Massive, mfr 15% gravel About 10% asphalt, stone, bricks, rubble
Note: GrLCoS dominates the upper 12 inches					

Landscape Setting

Soil Profile

Soil Profile Description

Observation Hole Number: TP-10 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.

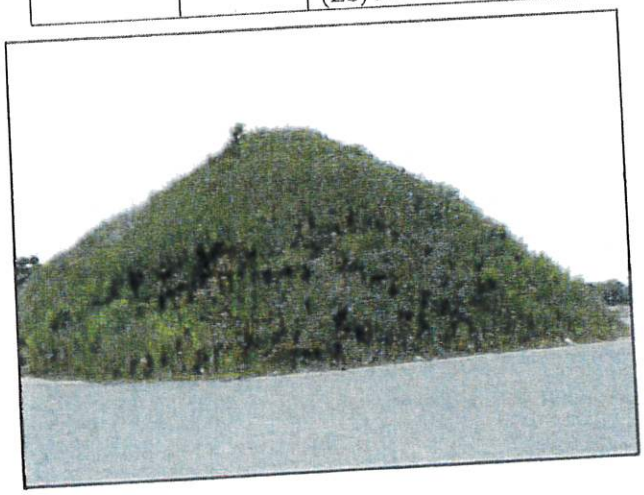
Time: AM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material:
Manufactured "topsoil" storage pile (east slope)

Slope: 70% Aspect: east Stoniness: none

Soil Drainage: WD-ED Soil Classification: Udorthents (Great Group) Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C	0-30	Coarse sandy loam (CoSL) & Loamy sand (LS) Mixed	10YR 3/3	None	Massive, mvfr



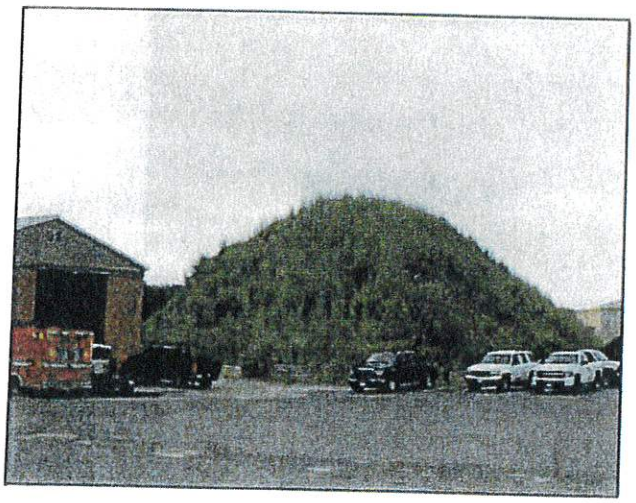
Landscape Setting

Soil Profile

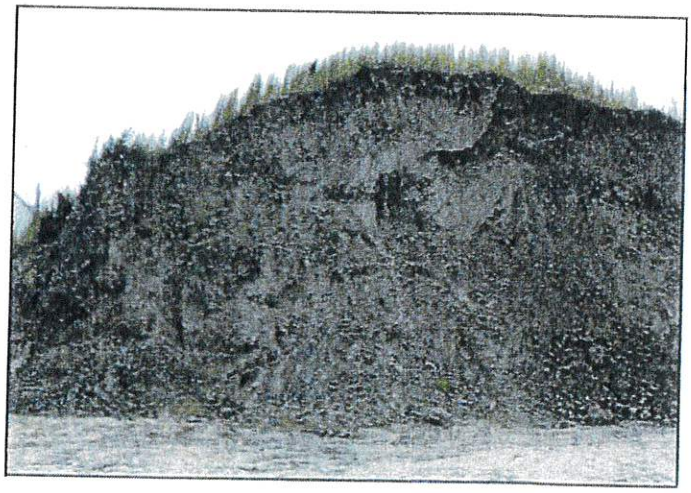
Soil Profile Description

Observation Hole Number: TP-11	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: AM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Manufactured "topsoil" storage pile near landfill office	
Slope: 70%	Aspect: east Stoniness: none
Soil Drainage: WD-ED	Soil Classification: Udorthents (Great Group) Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C	0-30+	Coarse sandy loam (CoSL), Coarse sand (CoS) & Loamy sand (LS) Mixed	10YR 3/3 (variable)	None	Massive, mvfr



Landscape Setting



Soil Profile

Soil Profile Description

Observation Hole Number: TP-12 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.

Time: AM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material:
Smooth re-graded area between soil storage piles

Slope: 3 % Aspect: north Stoniness: none

Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: N/A

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-10	Coarse Sand (CoS)	2.5Y 5/3 and 5/4 - mixed	None	5% cobbles, loose, single grain Extremely cobbly surface
^C2	10-40	Coarse Sand (CoS)	2.5Y 5/4	None	10% Gravel, loose, single grain

Landscape Setting

Soil Profile Description

Observation Hole Number: TP-13					**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental, Inc.					
Time: PM		Weather: Cloudy, 70's			
Landform, Landscape Position & Parent Material: Re-graded sandy fill in work area (SW corner), overlying glacial fluvial material					
Slope: 3%		Aspect: south		Stoniness: none	
Soil Drainage: ED		Soil Classification: Udipsamments (Great Group)			Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C1	0-3	Loamy sand (LS)	10YR 4/4	None	Massive, mvfr
^C2	3-20	Loamy coarse sand (LCoS)	10YR 5/4	None	Massive, mvfr
^C3	20-48	Coarse sand (CoS)	2.5Y 5/4	None	Loose, single grain

Landscape Setting

Soil Profile

Soil Profile Description

Observation Hole Number: TP-14 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.

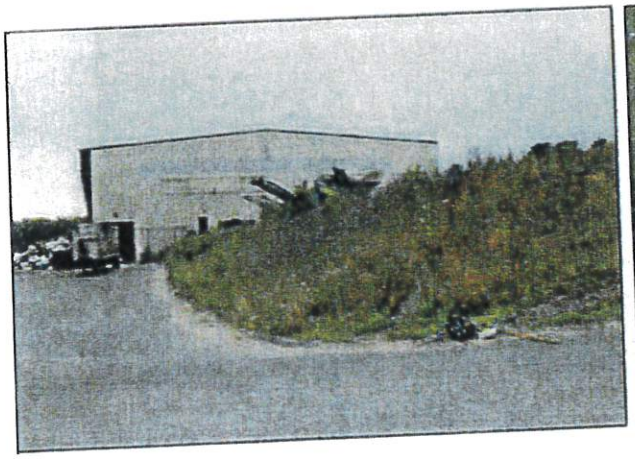
Time: AM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material: Fill on landscaped slope

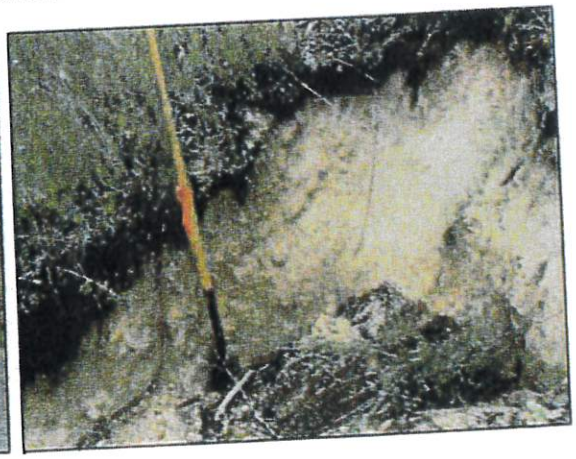
Slope: 30% Aspect: east Stoniness: none

Soil Drainage: ED Soil Classification: Udipsamments (Great Group) Depth to Bedrock: >15'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^A	0-3	Loamy sand (LS)	10YR 3/2 (variable)	None	Massive, mvfr
^C1	3-20	Loamy coarse and very coarse sand (LCoS & LVCoS)	2.5Y 5/6	None	Massive, mvfr
^C2	20-48	Coarse sand (CoS)	2.5Y 6/4	None	Loose, single grain



Landscape Setting

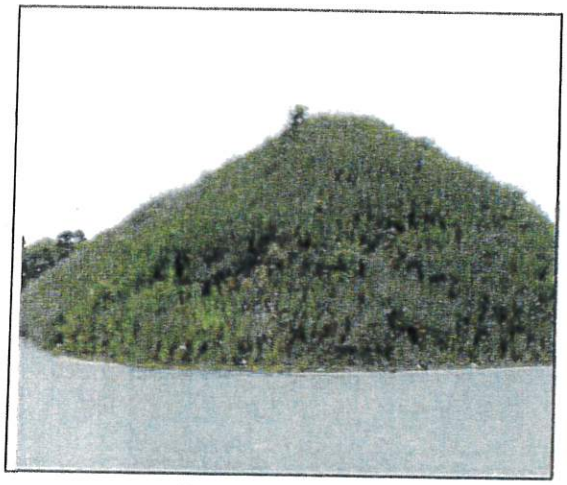


Soil Profile

Soil Profile Description

Observation Hole Number: TP-15	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: PM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Manufactured "topsoil" storage pile (west slope)	
Slope: 70%	Aspect: west Stoniness: none
Soil Drainage: WD-ED	Soil Classification: Udorthents (Great Group) Depth to Bedrock: >20'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
^C	0-60	Coarse sandy loam (CoSL) & Loamy sand (LCoS) Mixed	10YR 3/2	None	Massive, mfr



Landscape Setting

Soil Profile

Soil Profile Description

Observation Hole Number: TP-16 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.

Time: PM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material: Aeolian material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.

Slope: 2 % Aspect: south Stoniness: none

Soil Drainage Class: WD Soil Classification: Barnstable (Series) Depth to Bedrock: >4'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
A	0-3	Very fine sandy loam (VFSL)	10YR 3/2	None	wfgr, mvfr, CS
E	3-5	Loamy very fine sand (LVFS)	10YR 5/3	None	Massive, mvfr, CS
Bw	5-30	Very fine sandy loam (VFSL)	10YR 5/6	None	1mbsk, mfr, GW
C	30-40+	Very fine sandy loam (VFSL)	10YR 5/4	None	Massive, mvfr

Landscape Setting

Soil Profile Description

Observation Hole Number: TP-17 & TP-18					**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA					
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management					
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.					
Time: PM			Weather: Cloudy, 70's		
Landform, Landscape Position & Parent Material: Aeolian material overlying glacial fluvial material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.					
Slope: 3 %		Aspect: south		Stoniness: none	
Soil Drainage Class: WD		Soil Classification: Barnstable (Series)			Depth to Bedrock: >4'
TP-17:					
Horizon	**Depth (inches)**	**Soil Texture**	**Moist Color**	**Redoximorphic Features**	**Other Features (structure, consist.)**
Oe	2-0	Mpt	5YR 2.5/2	None	Hemic
A	0-1	Very fine sandy loam (VFSL)	10YR 2/2	None	wfgr, mvfr, CS
E	1-4	Loamy sand (LS)	10YR 5/2	None	Massive, mvfr, CS
Bs	4-18	Fine sandy loam (FSL)	7.5YR 4/6	None	Massive, mfr, GW
Bw	18-28	Loam sand (LS)	10YR 5/6	None	Massive, mvfr, CW
2C	28-40+	Coarse sand (CoS)	2.5Y 4/6	None	Loose, single grain
TP-18:					
Horizon	**Depth (inches)**	**Soil Texture**	**Moist Color**	**Redoximorphic Features**	**Other Features (structure, consist.)**
Oe	2-0	Mpt	5YR 2.5/2	None	Hemic
A	0-1	Very fine sandy loam (VFSL)	10YR 2/1	None	wfgr, mvfr, CS
E	1-5	Loamy sand (LS)	10YR 5/2	None	Loose, s.g., CS
Bs	5-14	Fine sandy loam (FSL)	7.5YR 4/6	None	Massive, mvfr, GW
Bw	14-24	Very fine sandy loam (VFSL)	10YR 5/6	None	Massive, mfr, GW
C	24-36	Fine sandy loam (FSL)	2.5Y 5/4	None	Massive, mfr, CW
2C	36-40+	Loamy sand (LS)	2.5Y 6/4	None	Loose, single grain

Soil Profile Description

Observation Hole Number: TP-19 **Date: 7-17-18**

Location: Bourne Landfill, Rte. 28, Bourne, MA

Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management

Described by: Thomas A. Peragallo, LEC Environmental, Inc.

Time: PM Weather: Cloudy, 70's

Landform, Landscape Position & Parent Material: Aeolian material overlying glacial fluvial material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.

Slope: 4 % Aspect: south Stoniness: stony - 50' apart

Soil Drainage Class: WD Soil Classification: Barnstable (Series) Depth to Bedrock: >4'

Horizon	Depth (inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
Oe	2-0	Mpt	10YR 2/2	None	Hemic
A	0-1	Loamy sand (LS)	10YR 2/2	None	Massive, mvfr, CS
E	1-2	Loamy sand (LS)	2.5Y 5/3	None	Loose, single grain, CS
Bs	2-20	Very fine sandy loam (VFSL)	7.5YR 4/6	None	1msbk, mfr, GW
Bw	20-23	Sandy loam (SL)	10YR 4/6	None	Massive, mfr, CW
2C	23-40+	Medium & Coarse sand (MS & CoS)	2.5Y 4/6	None	Loose, single grain

Soil Profile

Soil Profile Description

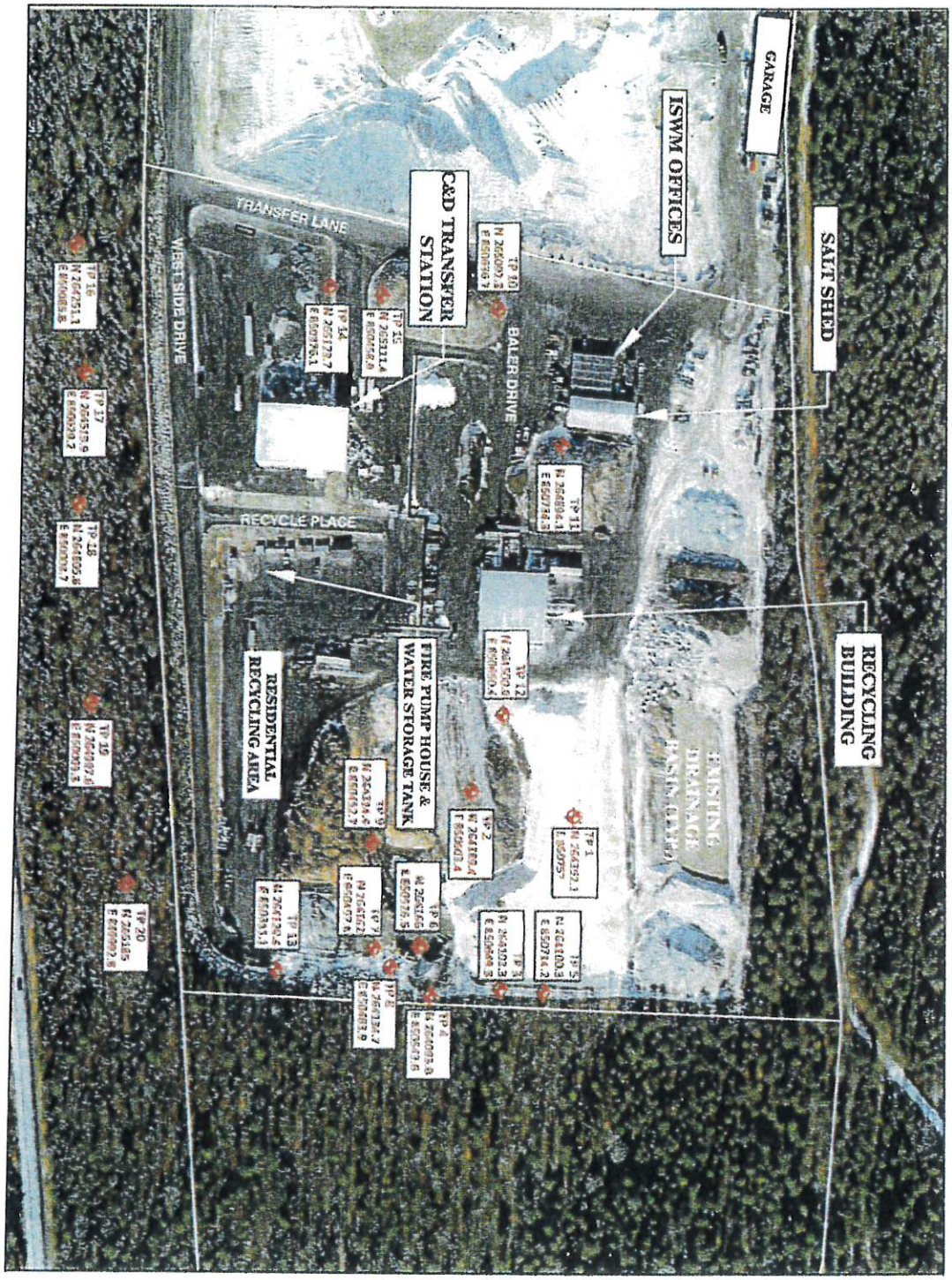
Observation Hole Number: TP-20	**Date: 7-17-18**
Location: Bourne Landfill, Rte. 28, Bourne, MA	
Requested by: SITEC Environmental, Inc. & Bourne Dept. of Integrated Solid Waste Management	
Described by: Thomas A. Peragallo, LEC Environmental Consultants, Inc.	
Time: PM	Weather: Cloudy, 70's
Landform, Landscape Position & Parent Material: Aeolian material overlying glacial fluvial material, along the western boundary of the landfill, east of Route 28. Natural soil in forested area.	
Slope: 3 %	Aspect: south Stoniness: Stony – 50' apart
Soil Drainage Class: WD	Soil Classification: Barnstable (Series) Depth to Bedrock: >4'

Horizon	Depth inches)	Soil Texture	Moist Color	Redoximorphic Features	Other Features (structure, consist.)
Oe	2-0	Mpt	10YR 2/2	None	Hemic
A	0-1	Very fine sandy loam (VFSL)	10YR 2/2	None	Massive, mvfr, CS
E	1-2	Loamy sand (LS)	2.5Y 5/3	None	Loose, single grain, CB
Bs	2-22	Very fine sandy loam (VFSL)	7.5YR 4/6	None	1msbk, mfr, GW
Bw	22-34	Fine sandy loam (FSL)	10YR 5/6	None	Massive, mfr, CW
2C	34-40+	Medium & Coarse sand (MS & CoS)	2.5Y 6/4	None	Loose, single grain

Appendix B

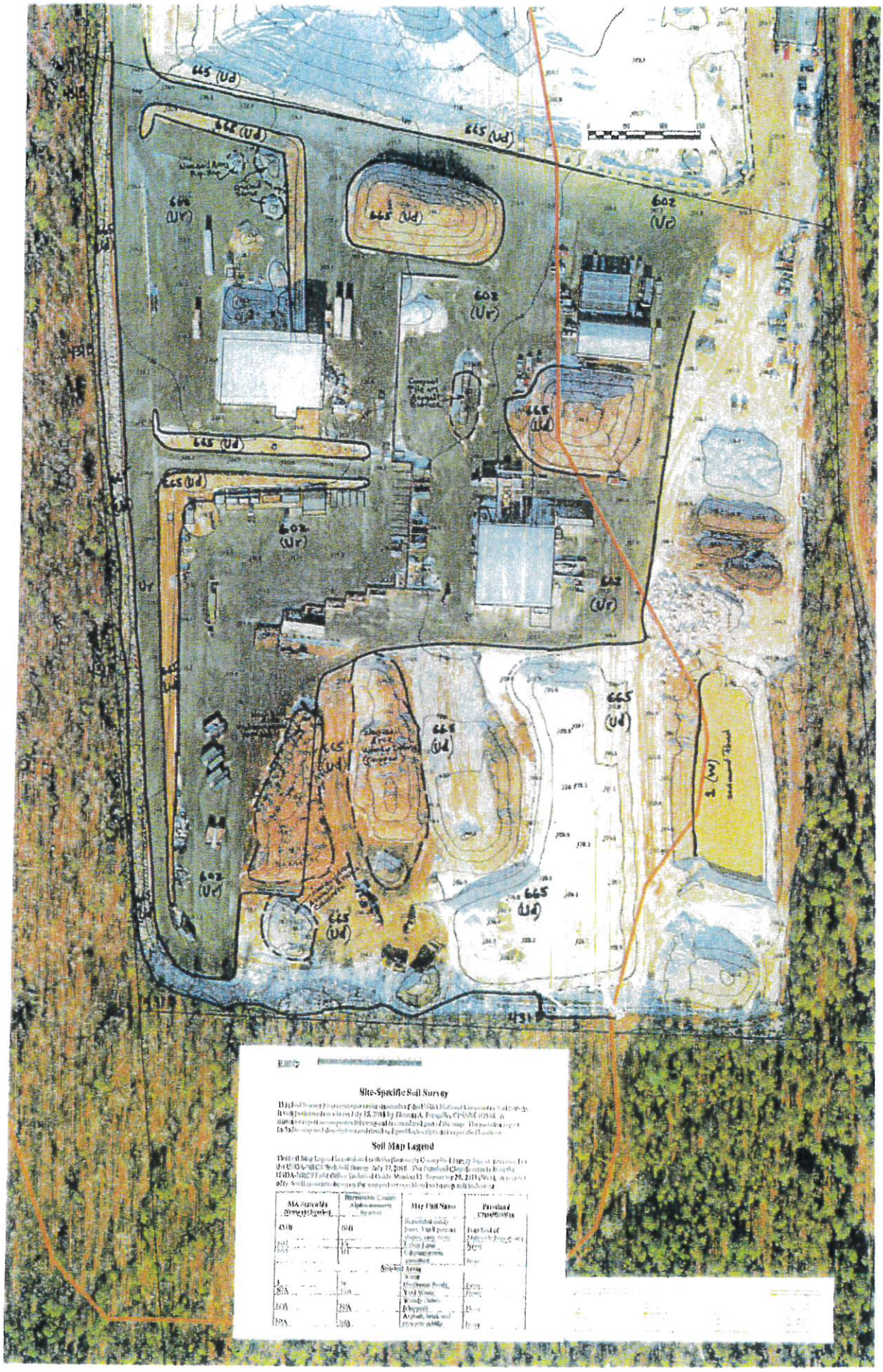
Detailed Soil Profile Description Locations

Detailed Soil Profile Description Locations



Appendix C

Site Specific Soil Survey Map


665 (Ud)
602 (Ur)
Site-Specific Soil Survey
Soil Map Legend

LEC WETLANDS WILDLIFE WATERWAYS

December 28, 2017

Email (rquinn@sitecenv.com)

Raymond Quinn, PE
SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050
Tel: 781-319-0100, Ext. 12
FAX: 781-834-4783

Re: Site Specific Soil Survey Report [LEC File #: SIEC \17-395.01]
SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050
For: Bourne Landfill, Town of Bourne, MA

Dear Mr. Quinn:

On November 28, 2017, we performed a site-specific soil survey of approximately four acres of land, adjacent and south of the solid waste disposal facility in Bourne Massachusetts. This soil survey was performed in accordance to USDA, Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey standards, at a more detailed level than the published NRCS Web Soil Survey[1]. The purpose of this site-specific soil survey was to determine if the published, NRCS map properly reflects actual soil composition on this site, in the area mapped as 431B (*Barnstable sandy loam, 3 to 8 percent slopes, very stony*). The 431B map unit is classified as "farmland of statewide importance" in Barnstable County, Massachusetts.

In the course of our field investigation, we collected three detail soil profile descriptions and data from fifteen additional soil borings within the 431B map unit. A soil profile description that represents the 431B map unit that we investigated, is included in the following narrative.

Data and Site Specific Soil Survey

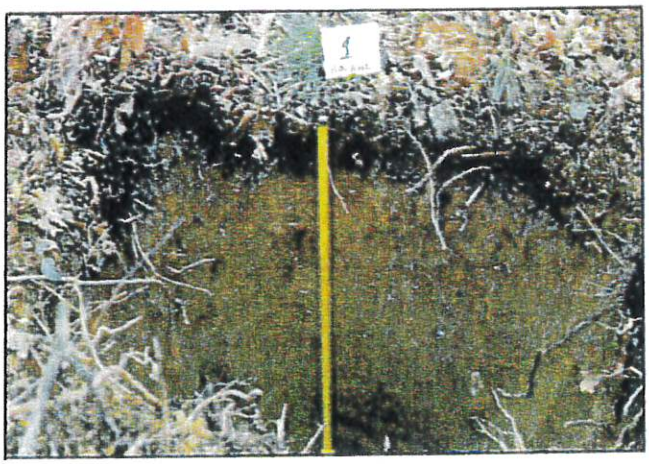
Soil data we collected is consistent with the published NRCS information. The soils in the study area consistently fall within the range of characteristics for the Barnstable Soil Series. The principal soil map unit in the study area is *Barnstable sandy loam, 3 to 8 percent slopes*. This map unit has the statewide numerical symbol *430B* and the Barnstable County published map unit symbol *BaB*.

[1] Soil Survey of Barnstable County Massachusetts, Web Soil Survey, December 4, 2017

The Barnstable series consists of very deep, well drained soils formed in loamy glacial till overlying loose, sandy glacial-fluvial material. They are on nearly level to moderately steep soils of moraines. On this site the slope ranges from 0 through 15 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. The seasonal high, water table is greater than 60 inches from the surface. Mean annual precipitation is about 43 inches (1092 mm) and mean annual temperature is about 48° F (9° C). These soils are classified as: Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Typic Dystrudepts.

The principal difference between the NRCS Web soil survey map and map unit specific to this site, is surface stoniness. The site is virtually stone-free (map unit 430), whereas the NRCS map unit for the site is described as *very stony* (map unit 431). The lack of surface stones does not change the farmland classification. Both map units: 430B and 431B, are classified as "farmland of statewide importance".

On this site, textures in the solum are sandy loam, fine sandy loam and very fine sandy loam and coarse fragment content is less than 5 percent. Textures in the substratum are medium sand, coarse sand, very coarse sand. Course fragments including gravel and small cobbles make up less than 15 percent in the substratum. No contrasting inclusions were encountered, similar inclusions make up less than 5 percent of the map unit.
A representative soil profile description of the Barnstable soils ("S-1") on this site is described as follows:
2-0" – Oe horizon of hemic material composed of partially and well decomposed pine needles, leaves and twigs.
0-2.5" – A horizon consisting of black (7.5YR 2.5/1) very fine sandy loam; massive; very friable with a clear irregular boundary.
2.5-3.5" – E horizon (discontinuous) consisting of gray (10YR 4/1) fine sandy loam; massive; very friable with a broken irregular boundary.
3.5-10" – Bs horizon; brown (7.5YR 4/4) very fine sandy loam; weak sub-angular blocky; friable; gradual wavy boundary.
10-27" – Bw horizon; dark yellowish brown (10YR 4/6) fine sandy loam; weak sub-angular blocky; friable; 5 percent gravel, 5 percent cobbles in the lower part; clear wavy boundary.
27-42" - 2C horizon; yellowish brown (10YR 5/4) coarse and very coarse sand; single grain; loose; 5 percent gravel.



Barnstable Soil Profile @ S-1

Conclusion

Eighteen soil profile observations all confirm that the Barnstable soil series dominates the entire portion of the parcel that we investigated. Based on our investigation, we cannot recommend adjusting or changing the NRCS published soil map at this specific location. As a result, the state farmland classification would remain: "Farmland of Statewide Importance".

Thomas A. Peragallo, CPSS/SC ASA #2148
Certified Professional Soil Scientist/Soil Classifier

Soil Map—Barnstable County, Massachusetts
(Bourne Landfill, Bourne, MA)

Map Scale: 1:9,410 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 14, Oct 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—Oct 8, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	2.1	0.6%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	20.6	6.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	40.5	11.9%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	5.9	1.7%
430B	Barnstable sandy loam, 3 to 8 percent slopes	31.7	9.3%
430C	Barnstable sandy loam, 8 to 15 percent slopes	9.4	2.8%
431B	Barnstable sandy loam, 3 to 8 percent slopes, very stony	57.9	17.0%
431C	Barnstable sandy loam, 8 to 15 percent slopes, very stony	23.2	6.8%
435B	Plymouth loamy coarse sand, 3 to 8 percent slopes	53.2	15.6%
435C	Plymouth loamy coarse sand, 8 to 15 percent slopes	6.5	1.9%
435D	Plymouth loamy coarse sand, 15 to 35 percent slopes	29.0	8.5%
436C	Plymouth loamy coarse sand, 8 to 15 percent slopes, very stony	0.4	0.1%
483C	Plymouth-Barnstable complex, rolling, very bouldery	3.4	1.0%
484C	Plymouth-Barnstable complex, rolling, extremely bouldery	0.0	0.0%
484D	Plymouth-Barnstable complex, hilly, extremely bouldery	7.9	2.3%
600	Pits, sand and gravel	15.6	4.6%
652	Dumps, landfill	29.3	8.6%
665	Udipsamments, smoothed	4.7	1.4%
Totals for Area of Interest		341.3	100.0%