

COMMONWEALTH OF MASSACHUSETTS  
TOWN OF BOURNE  
BOARD OF HEALTH

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In the Matter of: )	
Town of Bourne )	Public Hearing on Application for
Integrated Solid Waste Management Facility) )	Major Modification of Site Assignment
201 MacArthur Boulevard )	Application No. 21-SW38-0001-APP
Bourne, MA 02532 )	
_____ )	

**PREFILED DIRECT TESTIMONY OF**  
**A. RAYMOND QUINN, P.E.**

I, A. Raymond Quinn, hereby state as follows.

**INTRODUCTION**

I am employed as a professional engineer by SITEC Environmental, Inc., at a business address of 769 Plain St., Marshfield, MA. I have been employed by SITEC Environmental since June of 1997. I am currently semi-retired, working on a part-time basis. My position title is Senior Project Manager. When I worked full-time my position titles were President and Director of Engineering Services, which included overall responsibility for all work conducted by SITEC Environmental.

I received a Bachelor of Science degree in Civil Engineering from Northeastern University in 1971. I have been a registered professional engineer ("PE") since 1980. I am currently registered as a PE in Massachusetts and Rhode Island. Since becoming semi-retired I have let other licenses expire, which include my registration as a PE in New Hampshire, Maine, Vermont and Pennsylvania. I was also a Licensed Site Professional (a/k/a hazardous waste site cleanup professional) in Massachusetts, before letting that license expire. I am a member of the American Society of Civil Engineers.

Over the past 30 years, my professional work has primarily consisted of projects that have included the design and engineering of landfills, the design and engineering of handling facilities for municipal solid waste and construction and demolition debris, the design and construction administration of wastewater treatment facilities, and site assessment and remediation projects at sites impacted by the release of oil or hazardous materials. Among the many projects I have worked on in my professional career, I have conducted permitting,

design, construction oversight or environmental assessment work for more than 30 solid waste facilities (landfills or handling facilities). Attached as Exhibit 1 is my resume.

SITEC Environmental was engaged by the Town of Bourne's Department of Integrated Solid Waste Management (ISWM) to design, permit and oversee the construction of a number of the on-site facilities at 201 MacArthur Boulevard, also known as Route 28, in Bourne, including landfill expansions, landfill closures, and a construction and demolition material transfer station, as well as conducting and reviewing environmental assessment work. I have been the primary engineer from SITEC Environmental working with ISWM since approximately 2001. In 2019 ISWM requested that SITEC Environmental and I assist with the permitting of an expansion of the Bourne Landfill (the "project"). Currently the site of the proposed site assignment modification is an active solid waste operation including landfilling and solid waste handling on approximately 99 acres (99.0 ac.).

## **BACKGROUND**

SITEC Environmental's work on this project included the preparation of an application for modification of an existing site assignment ("Application") that was submitted to the Town of Bourne's Board of Health (the "Board") and the Massachusetts Department of Environmental Protection ("MassDEP") pursuant to the Solid Waste Act, G.L. c. 111, §§ 150A and 150A½, and the Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 *et seq.* The Application describes the requested modification of the existing site assignment to allow landfilling on a portion of the 25-acre parcel currently site assigned for solid waste handling and a vertical landfill expansion on a 74-acre parcel (collectively referred to herein as the "facility"). The Application also provides a conceptual description of the facility's design<sup>1</sup> and provides a sufficient level of detail to demonstrate that the proposed landfill expansion meets the site suitability criteria of the Site Assignment Regulations and that it does not by itself, or in combination with other sources, constitute a danger to public health, safety, or the environment.

MassDEP found that the proposed facility meets the site suitability criteria in the Site Assignment Regulations and issued a positive Site Suitability Report. The remainder of this testimony describes how the proposed facility meets the site assignment criteria.

## **DESCRIPTION OF THE PROPOSED FACILITY**

### **Project Description**

The site is presently site-assigned for a 99-acre solid waste management facility located on two parcels of land. A 25-acre parcel is site-assigned for solid waste handling; it is currently the location of the construction and demolition debris transfer station, a single stream recyclables transfer station, the residential recycling center, and other facilities. The Application seeks a modification of the site assignment to allow landfilling in 17.34 acres of the 25-acre parcel. The

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<sup>1</sup> The actual site design may vary in its final form from the conceptual plans included in the Application.

proposed (horizontal) landfill expansion, designated as Phase 7 and Phase 8, consists of approximately 17.34 acres of new landfill cells. The remaining 74-acre parcel is currently site-assigned as a landfill and consists of active and closed landfill cells. The Application seeks a modification of the site assignment for this area to allow a vertical expansion, designated as Phase 9, to be built over the existing landfill areas. Phase 9 would increase the maximum height of a portion of the landfill by approximately 40 feet.

The Town also owns an undeveloped 12-acre parcel of land, located immediately south of the 25-acre parcel, which it acquired in 2016. As part of its overall plans for the solid waste facility ISWM intends to seek a site assignment and permits to relocate the existing handling facility to the new parcel. The 12-acre parcel is not the subject of the current Application, however.

Attached as Exhibit 2 is an updated set of plans dated December 9, 2021 (and provided to MassDEP on December 9, 2021) that depict the site and the areas that ISWM is proposing a modification of its site assignment to accommodate vertical and horizontal landfill expansions. The expansion areas are identified as Phases 7, 8, and 9. The site plans were originally included in the Application as Attachment 3.

The Phase 9 vertical expansion will provide approximately 1,255,000 cubic yards of additional airspace which could extend the life of the landfill at least four and a half years. By permitting and operating Phase 9 as the next area of landfill development after Phase 6, the Town will have additional time to create a schedule for the required permitting, financing and relocation of existing handling operations and site preparation for Phases 7 and 8. The combination of Phases 7, 8 and 9 will ensure that ISWM can continue to provide vitally needed landfill capacity to the region into the late 2030s or early 2040s, by adding a total volume of 5,175,000 cubic yards of capacity.

In accordance with previous discussions with MassDEP, the Site Suitability Report was a result of an application for a Major Modification of Existing Site Assignment (BWP SW 38). The project also required review under the Massachusetts Environmental Policy Act (MEPA), which included preparation of a Single Supplemental Environmental Impact Report (SSEIR). The MEPA review process was completed in 2020 with a Certificate from the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) stating that the SSEIR adequately and properly complied with MEPA. By regulation project review was also required by the Cape Cod Commission (CCC) as a Development of Regional Impact (DRI). The CCC voted to approve the DRI in September of 2021. The MEPA and DRI documents and approvals were submitted to MassDEP for consideration during the review of the application for modification of the site assignment. They are included in the MassDEP record, which is incorporated into the record of the Board's proceeding.

Assuming the Board issues the modification to the site assignment, separate applications for Authorization to Construct (ATC) and Authorization to Operate (ATO) each of the Phase 7, 8, and 9 expansions will be submitted to the Southeast Regional Office of MassDEP. The new areas will comply with all design standards and regulations for solid waste facilities, including leachate collection, landfill gas management, and stormwater management.

## **Facility Design**

The Site Assignment Regulations (310 CMR 16.40(1)(c)) require the Board to evaluate the Application with the presumption that the proposed facility shall be designed to meet all relevant regulatory and policy requirements. The review of the Application “shall not consider detailed facility designs or operations” except under certain circumstances, which do not apply to this project. 310 CMR 16.40(1)(c)2. Nonetheless, so that the Board has an understanding of the environmental protections included in the facility design, the following is a summary of the features of the current landfill design, which will be carried out in the new landfill areas.

The existing landfill operations include leachate collection and storage facilities, landfill gas collection and treatment systems, and an environmental monitoring system that is sampled and evaluated for impacts to groundwater and soil gas conditions in the vicinity of the landfill. (See the Application, Attachment 3, Figure 9 for – *Existing Environmental Monitoring Systems* plan.) These systems will be expanded and maintained for the proposed expansion areas. The final design of the new landfill areas (Phases 7, 8, and 9) will be subject to review and approval by MassDEP in the ATC.

### **Leachate collection and storage**

The leachate collection and storage systems include a double composite liner system with primary and secondary leachate collection and monitoring capabilities. The double composite liner system consists of 12 inches of low permeable soil, upon which multiple layers of geosynthetic liner materials are installed. These include primary and secondary geosynthetic clay liners (GCL) and 60-mil HDPE geomembranes, with an interstitial leak detection/drainage layer material that drains to a secondary sump and allows for the measurement of leachate that might leak through the primary liner system. On top of the primary geomembrane is a leachate collection system consisting of a network of pipes and 18 inches of drainage sand which allows for the collection and discharge of leachate to the primary leachate sump. There are pumps installed in both the primary and secondary leachate sumps, which pump the collected leachate through a force main to one of two leachate storage tanks. The stored leachate is transferred to tanker trucks and hauled to licensed wastewater treatment plants for treatment and disposal.

The leachate collection system will be expanded to Phase 7 by extending the existing Phase 6 leachate collection system. It is anticipated that Phase 8 will be designed and constructed with its own collection system and leachate sump. Phase 9 will use the existing leachate collection system; it will be developed by removing any final or intermediate cover systems onto which the Phase 9 landfill area will be built, so that leachate will flow vertically into the existing landfill phases and collection system. See the Application, Attachment 3, Figures 4, 5, 6, and 7 for phased site development plans.

### **Landfill gas collection and treatment**

The current landfill facilities also include an existing, extensive gas collection and treatment system. These will be extended and modified as needed to expand the capacity for the

collection of landfill gas from Phases 7, 8, and 9. The system for the management of gas generated within the landfill includes vertical extraction wells and horizontal gas collectors. There is an extensive network of piping to collect generated landfill gases and convey them to a flare station for treatment. The existing flare station is located to the northeast of the Phase 2 landfill area and prevents the occurrence of odors and the off-site migration of landfill gas.

The landfill gas collection system will be expanded by modifying the existing header system, by relocating portions of the headers to the perimeter side slopes to prevent them from otherwise being buried by the Phase 9 vertical expansion. Existing gas extraction wells located within the proposed footprint of Phase 9 will be modified by converting the wells to having remote wellheads, also located along the perimeter side slopes. New landfill Phases 7 and 8, as well as the additional waste deposition area of Phase 9 (sometimes referred to as “overfill”), will have new extraction wells installed and operated in the same manner as the existing extraction wells. The existing flare treatment system was replaced and upgraded a few years ago and is adequately sized for future conditions, including the additional waste areas in Phases 7, 8, and 9.

### **Environmental Monitoring**

Potential impacts from the landfill to the environment have been monitored for several decades by a groundwater and soil gas monitoring program. The monitoring program has consisted of quarterly sampling that began in the 1990s. This program has contributed to the development and approval of a Final Comprehensive Site Assessment (FCSA) for the site. The scope of the current monitoring program was established in MassDEP’s approval of the FCSA in 2017. As described in the Application, the Town connected all downgradient private well users to the Bourne Water District public water supply in the early 2000s and the Board passed a regulation prohibiting installation of private or public water supply wells downgradient of the site as shown by particle tracking conducted by the United States Geological Survey (USGS). ISWM anticipates that MassDEP approvals for Phases 7 and 8 will include the placement of additional groundwater and gas monitoring wells along their perimeter. See the Application, Attachment 3, Figure 9 - *Existing Environmental Monitoring Systems*, which shows the existing monitoring systems. In addition, ISWM acknowledges its responsibility to make notification to MassDEP regarding any identified reportable release of oil or hazardous materials in accordance with Massachusetts Contingency Plan (MCP) requirements and to further modify its environmental monitoring program to characterize any potential release. ISWM will fully conform with MassDEP Asbestos Regulations (310 CMR 7.15) when demolishing any of its buildings during site development work for Phases 7 and 8.

As noted above, Phase 9 will be a vertical expansion of landfilling over existing double composite lined landfill phases. Some of the phase areas have final cap installations that will require the removal of those cap components, including geomembrane barriers. Other areas upon which Phase 9 will be developed (i.e., Phase 4, Stage 2 and Phase 5) are currently capped on the side slopes. The other portions of the Phase 9 overfill area will be constructed over the future plateau area of the active Phase 6 landfill area, when those approved grades

are achieved. A geotechnical analysis has been conducted which determined that Phase 9 will not have any adverse instability impacts on the underlying, existing landfill areas. With the approval of Phase 9 (including ATC/ATO approvals) ISWM plans to develop Phase 9 in stages. The first stage will be to fill the area that is over the Phase 5 landfill. This will allow the final closure of the northwest corner of the landfill, which includes the currently uncapped Phase 5 side slopes. The second stage would be to fill over the capped Phase 4, Stage 2 plateau and the completed Phase 6 plateau. This sequence will allow the postponement of removal of the existing final cap over the remainder of the Phase 9 footprint and will allow for the progressive modification to the existing gas collection system that underlays the Phase 9 landfill area. The completion of the Phase 9 overfill will require sequentially removing stages of the existing final caps of the Phase 2, Phase 2A/3A, Phase 3 and Phase 4, Stage 1 landfills. The sequential cap removal work will be done in a manner that will minimize the area of open landfill surface that exists at any one time. In accordance with a Corrective Action Design (CAD) approved by MassDEP for Phases 4 and 5 of the landfill there will be an intermediate cover layer installed over areas with no final cover that are awaiting filling under Phase 9. Because of the possible long-term exposure of the intermediate cover material until Phase 9 is constructed, the cover soil material will be applied across the subgrade surface so as to form an intermediate cover that is at least twelve inches (12") thick, which, when combined with existing daily cover, will provide a total of eighteen inches (18") of cover. See the Application, Attachment 3, Figure 5 – *Initial Construction Phases Plan* for a plan that shows the anticipated sequential development of Phase 9.

## **OPINION ON SITE SUITABILITY**

There are a number of criteria that are to be evaluated in the site assignment process to determine if a site is suitable for a proposed solid waste facility. There are Facility Specific Site Suitability Criteria for Landfill Facilities that are contained at 310 CMR 16.40(3)(a) and General Site Suitability Criteria applicable to all types of solid waste management facilities contained at 310 CMR 16.40(4).

Because the Application is for a modification of an existing site assignment for an existing facility, MassDEP established the criteria that are applicable for review. For the Phase 9 vertical expansion, MassDEP stated that the setback criteria in 310 CMR 16.40(3)(a) need not be addressed. All setback criteria must be addressed for the horizontal expansion of Phases 7 and 8. The site meets all the Facility Specific Site Suitability Criteria for Landfill Facilities contained in section 16.40(3)(a), however; therefore, the Application does not discuss the phases of landfill expansion separately with regard to the setback criteria.

All applicable criteria were evaluated in the preparation of the Application for modification of the site assignment. The regulations are phrased in the negative; in other words, the criteria are stated such that no site shall be determined to be suitable or be site assigned as a solid waste facility if the criteria identified are met. Conversely, if a proposed facility is not prohibited by the factors set forth in the criteria, it may be site assigned. Each criterion is set forth below in italics (in some cases with abbreviated or paraphrased language), followed by

an evaluation of the relationship between that criterion and the ISWM Phases 7, 8 and 9 landfill expansion.

**SITE SUITABILITY CRITERIA FOR LANDFILL FACILITIES  
(310 CMR 16.40(3)(a))**

*No site shall be determined to be suitable or be site assigned as a 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 a Zone II of an existing public water supply well. The nearest Zone II is approximately 0.4 miles to the south of the 25-acre parcel. See the Application, Attachment 3, Figure 12 - *Water Resources Plan*. **The site meets this criterion.**

- 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 of an existing public water supply. See the Application, Attachment 3, Figure 12 - *Water Resources Plan*. **The site meets this criterion.**

- 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. **The site meets this criterion.**

- 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 0.83 miles south and cross-gradient (not downgradient) to the 25-acre parcel. See the Application, Attachment 3, Figure 12 - *Water Resources Plan*. The facility is therefore not upgradient of an existing

public water supply well. The site is not in a proposed drinking water source area as the Bourne Board of Health has issued a regulation that prohibits (makes illegal) the installation of any public or private water supply wells downgradient of the landfill. **The site meets this criterion.**

*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 0.83 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 MassDEP resource maps (See the Application, Attachment 3, Figure 14 – *DEP Water Resource Map*) and the Bourne Water District has stated in a letter included in the Application (see Application, Attachment 6 - *Water Resources Correspondence*) 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, making it illegal to construct a water supply well, thus the entire area is a non-Potentially Productive Aquifer. A letter from the Bourne Board of Health confirming this regulation is also included in the Application, Attachment 6 – *Water Resources Correspondence*. All previously identified downgradient water supply wells have been replaced with connections to the public water supply system. **The site meets this criterion.**

*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 existing or proposed public drinking water supply wells downgradient of the Bourne Landfill. The facility is not upgradient of an existing or potential public water supply. The Bourne Board of Health has made it illegal to install water supply wells downgradient of the landfill. **The site meets this criterion.**

*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 existing, 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 makes it illegal to install 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. Consequently, there are no existing or potential private water supplies downgradient of the site. **The site meets this criterion.**

- 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 (BWD) is the water supply for the portion of Bourne that is on the Cape side of the Cape Cod Canal. The BWD is not responsible for providing sufficient water supplies to other parts of the municipality. BWD is supplied by ten different sources, seven are BWD gravel packed well sites and three are gravel packed well sites that are part of the Upper Cape Regional Water Supply Cooperative. Four of BWD well sites are in the Monument Beach area of the Town Forest and two wells are in the Cataumet area. The Bourne water supply includes the newly established well 4036000-08G which is located on Joint Base Cape Cod (JBCC). This well was developed as part of the United States Army Corps of Engineering (USACE) project to identify water supplies on JBCC known as the Upper Cape Water Supply Project in 2001. This well was carefully sited along with three others to thread Zone II areas between JBCC contaminant plumes. In addition, the Town was connected by a metering station at Connery Avenue to the other wells of the Upper Cape Water Supply Cooperative which have a total permitted yield of three million gallons per day (MGD).

This cooperative allows BWD to obtain water along with other cooperative members (Sandwich Water District, Falmouth, Mashpee and JBCC) to withdraw any needed supplemental water from the legislatively-established Upper Cape Water Supply Reserve. While currently permitted at 3 MGD, the three Reserve wells are capable of producing 6 MGD. If ever needed, the Cooperative has the ability to establish additional water sources within the Reserve. Based on land use in all Cooperative member jurisdictions and environmental impacts to sensitive environmental areas, along with the relatively low cost for the Cooperative to develop future water supply sources, it is anticipated that any such need on the Upper Cape will be from the Reserve. All portions of the Reserve are up-gradient from the landfill. **The site meets this criterion.**

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;*

All existing and proposed areas of waste deposition at the Bourne Landfill are not 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. The nearest public drinking water supply well is about 0.83 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 mapped presence of a Potentially Productive Aquifer. A majority of the areas hydraulically downgradient of the facility are located over the mapped Potentially Productive Aquifer. However, MassDEP has classified portions of the aquifer beneath the highway corridor associated with MacArthur Boulevard and some areas immediately west of MacArthur Boulevard as "Non-Potential Drinking Water Source Areas" in accordance with the Massachusetts Contingency Plan ("MCP"). The Bourne Water District has stated in a letter included in the Application, Attachment 6 – *Water Resources Correspondence*, 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, as confirmed in a letter also included in the Application, Attachment 6, 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. **The site meets this criterion.**

*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. **The site meets this criterion.**

*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. **The site meets this criterion.**

*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 located on Cape Cod and therefore, the site is defined in the MCP as being located in a Potentially Productive Aquifer. As further defined in the MCP the facility is not located within a "Current Drinking Water Source Area", but the facility is by this definition located within a "Potential Drinking Water Source Area" due to the presence of the Potentially Productive Aquifer. As noted above, portions of the aquifer downgradient

from the site 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 MCP. Other contamination sources downgradient of the site, and in particular downgradient of proposed Phases 7 and 8, are two closed and unlined landfills (Brookside Landfill and Nightingale Stump Landfill). In addition, hydrogeologic studies conducted for the facility (Mahoney and Douglas, April 11, 2003 and October 8, 2003) determined by particle tracking analysis supplied by the United States Geological Survey (USGS), that groundwater flows from the site in a generally west-northwest direction to tributaries of Buzzards Bay and the Cape Cod Canal, both salt or brackish waters. Water supply wells within the downgradient areas of the particle tracking plumes have the potential of pulling in brackish water, which could contaminate the wells. The results of the particle tracking analysis results are shown on the Application, Attachment 3, Figure 14 - *DEP Water Resources Map* and in the Application Attachment 6 – *Water Resources Correspondence*. As a result of these hydrogeologic studies the Bourne Water District has determined that the areas downgradient of the landfill are, for their purposes, "Non-Potential Drinking Water Source Areas" and that they will not seek to locate future drinking water sources in these areas. The Bourne Water District has stated this in a letter included in the Application, Attachment 6 – *Water Resources Correspondence* that it does not have, nor will it seek to locate future drinking water sources downgradient of the landfill. Additionally, as a result of the hydrogeologic studies the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in the Application, Attachment 6, 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.

Actions taken as a result of hydrogeologic studies have included the establishment of local by-laws and policies that prohibit and make illegal the construction of private or public water supply wells, which is characteristic of a Non-Potential Drinking Water Source Area. Therefore, despite the facility being on Cape Cod, within the mapped limits of a Potentially Productive Aquifer, the designation of the area as a Potentially Productive Aquifer is incorrect and the site is in fact a Non-Potentially Productive Aquifer. **The site meets this criterion.**

*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*

As described in part a., above, the facility is located on Cape Cod and therefore, the site is defined in the MCP as being located in a Potentially Productive Aquifer. As further defined in the MCP the facility is not located within a "Current Drinking Water Source Area", but the facility is by this definition located within a "Potential Drinking Water Source Area" due to the presence of the Potentially Productive Aquifer. Portions of the

aquifer downgradient from the site 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 MCP. Other contamination sources downgradient of the site, and in particular downgradient of proposed Phases 7 and 8, are two closed and unlined landfills (Brookside Landfill and Nightingale Stump Landfill). In addition, hydrogeologic studies conducted for the facility (Mahoney and Douglas, April 11, 2003 and October 8, 2003) determined by particle tracking analysis supplied by the USGS, that groundwater flows from the site in a generally west-northwest direction to tributaries of Buzzards Bay and the Cape Cod Canal, both salt or brackish waters. Water supply wells within the downgradient areas of the particle tracking plumes have the potential of pulling in brackish water, which could contaminate the wells. In addition to these downgradient contamination sources, hydrogeologic studies conducted on the JBCC site have determined that there is an existing plume of contamination that will eventually migrate through the landfill to downgradient sites, making groundwater in this area unusable as a drinking water source. See the Application, Attachment 3, Figure 11 - *USACE Groundwater Flow and Contamination Plume*. As a result of these hydrogeologic studies the Bourne Water District has determined that the areas downgradient of the landfill are, for their purposes, "Non-Potential Drinking Water Source Areas" and that they will not seek to locate future drinking water sources in these areas. The Bourne Water District has confirmed that it does not have, nor will it seek to locate future drinking water sources downgradient of the landfill. Additionally, as a result of the hydrogeologic studies the Bourne Board of Health has issued a regulation, as confirmed in a letter also included in the Application, Attachment 6, 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.

Based on hydrogeological studies, the aquifer downgradient of the facility cannot now, nor in the reasonably foreseeable future, be used as a public water supply due to existing contamination of the aquifer. **The site meets this criterion.**

- 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 the 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 MCP. In addition, there are two closed, unlined landfills and the potential for the presence or the promotion of brackish water that should characterize the area as a "Non-Potential Drinking Water Source Area". See the responses above. **The site meets this criterion.**

- II. Any area of waste deposition would be within 1,000 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 the Bourne Water District for drinking water. There are no known private drinking water supply wells within 1,000 feet of the landfill site. Additionally, there are no known potential private water supplies, as defined in 310 CMR 16.02, within 500 feet of the site. The Bourne Water District has stated in a letter included in the Application, Attachment 6 – *Water Resources Correspondence* 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, as confirmed in a letter also included in the Application, Attachment 6, 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. **The site meets this criterion.**

*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;*

Near the Bourne landfill, the groundwater flow direction is to the west-northwest toward Buzzards Bay, as shown on the Application, Attachment 3, Figure 10 - *Groundwater Contour Plan*, which represents measurements taken in 1998. This round of groundwater measurements, which used eleven monitoring wells, is the most conclusive map of groundwater flow at the site because there were a number of measuring points within the footprint of the landfill that were subsequently and properly abandoned and are now beneath the landfill. This round of water levels is not only the most precise measurements available for groundwater flow, but also represents the maximum groundwater levels recorded to date for the site. Groundwater elevations have been recorded for decades on the site, including a well that has been monitored by the USGS. 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 areas of the landfill will be that leachate from Phase 7 will drain to the currently active Phase 6 leachate sump, which was designed and approved to meet the minimum separation requirements, as part of the Phase 6 ATC approval process, and a separate leachate collection and sump system will be designed for Phase 8, which will also meet that criteria. **The site meets this criterion.**

*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. **The site meets this criterion.**

*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. **The site meets this criterion.**

*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. 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 "occupied residential dwellings." See the Application, Attachment 3, Figure 13 - *Land Use*. **The site meets this criterion.**

*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 MassDEP requirements for a groundwater protection system, as stipulated at 310 CMR 19.110. **The site meets this criterion.**

#### **SITE SUITABILITY CRITERIA FOR ALL SOLID WASTE FACILITIES (310 CMR 16.40(4))**

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 of that site assignment for a landfill should not affect the results of the previous evaluation of the General Site Suitability Criteria. MassDEP stated that the evaluation of only select criteria was required for the Phase 9 vertical expansion, namely: Traffic and Access to the Site (b), Potential Air Quality Impacts (f), Potential for the Creation of Nuisances (g), Size of Facility (h), Areas Previously Used for Solid Waste Disposal (i), and Consideration of Other Sources of Contamination or Pollution (k).<sup>2</sup> The following discussions address the *General Criteria* for Phases 7, 8 and 9.

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

310 CMR 16.40(4)(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*

The United States Department of Agriculture, Natural Resources Conservation Service (“USDA”) prepared a report titled *Custom Soil Resource Report for Barnstable County, Massachusetts, Town of Bourne, ISWM Department*, which is included in the Application as Attachment 7. The soil map included in that report identifies the 25-acre parcel, as well as the state-owned abutting land along the western boundary and the town-owned 12-acre parcel along the southern boundary, to contain 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 25-acre parcel 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 indicate this parcel was substantially disturbed prior to acquisition by the Town and may not have met the agricultural land classifications when ISWM acquired it. Included in the Application as Attachment 8 is a site specific soil survey report for the 25-acre parcel prepared by a Certified Professional Soil Scientist/Soil Classifier from LEC Environmental Consultants. This report documents and delineates the actual soil conditions of the parcel as it relates to this criterion and concluded

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<sup>2</sup> MassDEP listed an additional criterion, Promotion of Integrated Solid Waste Management, to be evaluated for the Phase 9 expansion. Section (a) of that criterion, set out at 310 CMR 16.40(5), lists factors for MassDEP to consider in determining whether a site is suitable for a landfill. A description of how the site meets each section of the criterion is included at the end of the suitability discussion.

that soils classified as supporting “Farmland of statewide importance” were not present. Therefore, the 25-acre parcel is not actually “Farmland of statewide importance.” The state-owned abutting land along the western boundary and the town-owned 12-acre parcel along the southern boundary of the 25-acre parcel are considered “Farmland of statewide importance,” however, and a buffer from those areas will be created to exclude landfilling there.

Figure 15 in the plans submitted with the Application (as Attachment 3), as revised on December 9, 2021 and attached hereto, 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 (17.34 acres) 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 landfill areas. Figure 15 also shows the 100-foot offset from the “Farmland of statewide importance.” The green area is that area where no site assignment modification is 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.

Because the “Farmland of statewide importance” will be outside the area site assigned for landfilling, **the site meets this criterion.**

*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*. **The site meets this criterion.**

*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 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. **The site meets this criterion.**

310 CMR 16.40(4)(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 Facility were thoroughly analyzed during the project review process conducted by EEA under MEPA and the CCC under DRI. All reviews, including those by the CCC, are complete and approved with the determination that no further



review is required. The proposed project does not request an increase in the permitted tonnage for the facility. In fact, the facility has been permitted since 1999 for 825 tons per day. The additional capacity provided by Phases 7, 8, and 9 will extend the life of the landfill, not allow more waste to come in daily or annually. Because the tonnage will remain the same, there is no change to the traffic volume that has been previously evaluated and approved, or change to the site access. There will be no change to the existing traffic impacts, which have already been well evaluated. Therefore, the facility's operation will not constitute a danger to the public health, safety, or the environment due to traffic.

Attachment 9 of the Application provides a Traffic Assessment and plan showing infrastructure improvements that were completed in 2012, which significantly improved traffic management at the site. This Traffic Assessment and plan were part of the above-referenced EEA-MEPA and CCC-DRI review. The traffic engineer notes in the Assessment that previous project files dating back to the original MEPA filing were reviewed again and that the conclusions remain valid: traffic safety and operations have been considered over many years; substantial improvements have enhanced traffic safety and operations; and crash history confirms that traffic operations will not constitute a danger to public safety.

The Traffic Assessment notes that the incoming waste stream at the landfill is primarily ash from SEMASS, which is delivered via 30-ton transfer trailers. This results in less truck traffic than if MSW was delivered in much smaller packer trucks. ISWM's preferred operating alternative is to continue to accept combustor ash from SEMASS, which will produce less traffic than the alternative of accepting only MSW. However, an evaluation of all MSW was considered in the traffic analysis, and the facility is capable of managing the difference in volume without creating new impacts. **The site meets this criterion.**

2. Pedestrian and Vehicular Safety- The project is all on previously site-assigned land that is currently part of the ISWM facility. The facility access is via a deceleration lane on Route 28 north bound. This is the only site access point and it has been thoroughly reviewed for safety concerns. Pedestrians are prohibited 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. **The site meets this criterion.**
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 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.

The existing main access road on the western perimeter will continue to be used as part of the Phase 7, 8 and 9 operations and for access to the residential recycling center area and the C&D Transfer Station. **The site meets this criterion.**

4. Alternate Routes- Access to the facility is limited to the Route 28, north bound lane as described above. **The site meets this criterion.**
5. Vehicle Emissions- As part of prior MassDEP permitting for the landfill ISWM submitted and received approval of a Cumulative Impact Assessment (CIA) (See the Application, Attachment 10), which included analysis of potential emissions from the facility. Since the total permitted tonnage of the facility will not change, emissions are not expected to change. ISWM has implemented a Best Management Practice program in order to reduce diesel emissions from its heavy equipment. ISWM's policy for purchasing all new equipment requires that it meet or exceed all current air emissions standards applicable to heavy equipment operations. **The site meets this criterion.**

310 CMR 16.40(4)(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 the 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, a Species of Special Concern. These areas are identified in the plans included in the Application as Attachment 3, Figures 4, 5, 6 and 7, along the eastern boundary abutting the Joint Base Cape Cod facility.

NHESP determined in a February 5, 2020 letter that the proposed landfill expansion will occur within areas already disturbed by existing solid waste operations and outside of the "Limit of Box Turtle Habitat" shown on the project plans. Therefore, Phases 7, 8, and 9 and surrounding areas outside of the delineated habitat line are exempt from further Massachusetts Endangered Species Act (MESA) review. This means that the permitting, construction and operation of Phases 7, 8 and 9 may proceed to completion without further NHESP action. See the NHESP comment letter, included in the Application, Attachment 11. **The site meets this criterion.**

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. **The site meets this criterion.**

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

A review of the Mass Wildlife Lands viewer confirms that the ISWM facility is not in a Wildlife Management Area. **The site meets this criterion.**

310 CMR 16.40(4)(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 or adjacent to 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 area that extends to the watershed boundary is not part of the ACEC. The ACEC is limited to identified wetlands resource areas and their 100 foot buffer zones, which are not impacted by the facility. **The site meets this criterion.**

310 CMR 16.40(4)(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 Joint Base Cape Cod (JBCC) adjacent to the ISWM parcels, 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 EEA, and therefore, this land could be considered open space as defined in items 2 and 4 listed above.

The Town wishes to support efforts to protect open space by eliminating any potential adverse impacts on the physical environment that the facility's 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 ISWM's 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 are and will continue to 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 apply water to open surfaces that may generate dust, with particular attention being paid to the landfill's access roads where heavy equipment operation is conducted. When a contractor is working on the site, they are contractually bound to control dust, principally by water application.

Stormwater/Groundwater - The proposed site assignment modification will allow the conversion of solid waste handling operations to landfilling operations on the 25-acre parcel. The Phase 7 and Phase 8 landfill cells will be constructed in accordance with the current

MassDEP groundwater protection standards, as stipulated at 310 CMR 19.111 (in addition to the conditions imposed by MassDEP in the ATC). These standards require that at least a double composite liner with leak detection be installed. All liners at the landfill, 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 MassDEP 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 basin that is located at the northwest corner of the site and a new large infiltration/sedimentation basin that will be on the 12-acre parcel. The final design of the new sedimentation basin may vary but it will conform to the criteria of the Solid Waste Management Regulations and the Massachusetts Stormwater Management Standards.

Buffer - ISWM will maintain a natural buffer along the eastern boundary of the 25-acre parcel to protect the 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.

As a result of these activities **the site meets this criterion.**

310 CMR 16.40(4)(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 project – i.e., landfill expansion – will not constitute a danger to the public health, safety, or the environment from anticipated air emissions. The facility previously met this criterion when the 74-acre parcel was site assigned for landfilling and the 25-acre parcel was site assigned for a handling facility. As part of prior permitting 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*, which is included in the Application, Attachment 10. 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. The Phase 7, 8, and 9 landfill expansion conditions are consistent with those previously analyzed (although the tonnage is less).

After reviewing the report and supplemental information, MassDEP accepted the analysis (as part of the ATC application approval for the Phase 3, Stage 3 lined landfill expansion). ISWM has implemented a Best Management Practice program as described above, in order to reduce diesel emissions from its heavy equipment. **The site meets this criterion.**

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. **The site meets this criterion.**

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 (SO<sub>2</sub>), particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), ozone, lead, carbon monoxide and nitrogen dioxide (NO<sub>2</sub>). **The site meets this criterion.**

310 CMR 16.40(4)(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 closing 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. See the Application, Attachment 12 – *Sound Level Survey* for the 2001 study conducted by Cavanaugh Tocci Associates. The construction and operation of a landfill expansion in Phase 9 and on the 25-acre parcel will not result in any significant change of conditions from present and past noise impacts. **The site meets this criterion.**

2. *Litter* - Facility operations must be conducted to minimize blowing litter within the landfill. The level of effort needed to control windblown litter is dictated by waste

materials accepted, weather conditions, and wind conditions. Methods available to control windblown litter include the following:

Portable litter fence. The most suitable location for a 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 interfering with 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. Temporary fence is installed at strategic locations within the operating landfill to create additional interception and collection points for wind-blown litter.

Covering Vehicles. All vehicles entering or leaving the facility shall 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.

**The site meets this criterion.**

3. *Vermin* - Vermin (vector and rodent) control at the landfill 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.

**The site meets this criterion.**

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 within the landfill. **The site meets this criterion.**

5. *Bird Hazards* – The operation of the Phase 7, Phase 8 and Phase 9 landfill 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. **The site meets this criterion.**
6. *Other* - Due to the nature of landfilling 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 and will only be conducted if necessary.

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.

**The site meets this criterion.**

310 CMR 16.40(4)(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 parcel 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, including the Phase 9 expansion, and the subsequent Phase 7 and Phase 8 expansions will extend landfill operations to the southern boundary of the 25-acre parcel. The current access roads and paved open areas within the 25-acre and 74-acre parcels provide more than adequate room to maneuver and queue vehicles for all of the solid waste operations at the facility.

The Application requires the inclusion of a *Land Use Plan*, which is included in the Application, Attachment 3, Figure 13. This plan identifies the location of certain sensitive receptors, relative to specified offsets from property and waste handling area limits. As can be noted from this plan, the facility is of adequate size to provide sufficient space for unencumbered, proposed operations and there is adequate separation distance, or offset distance, from the identified, sensitive receptors.

**The site meets this criterion.**

310 CMR 16.40(4)(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 within Phase 9, which is within the area that is currently site assigned for landfilling, and on the 25-acre parcel that is currently site assigned for solid waste handling will provide beneficial, long term solid waste management capacity for Bourne and the greater Cape Cod region. The expansion of the proposed landfilling activities into Phase 9 and 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 expansion of landfill operations into Phase 7, Phase 8 and Phase 9 will provide 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 optimized use of the 74-acre parcel with Phase 9 and the development 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 the 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 a new site assignment that will allow solid waste handling operations to be permitted on portions of the 12-acre parcel, which will provide regional solid waste management services after the landfill has closed.

**The site meets this criterion.**

310 CMR 16.40(4)(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, Phase 8 and Phase 9 do not constitute a new facility, this criterion is not applicable.

310 CMR 16.40(4)(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 MassDEP guidance, as part of prior landfill permitting 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), which is included in the Application, Attachment 10. This analysis examined the potential impact of the theoretical build out of the facility, which is consistent with the Phases 7, 8 and 9 expansions, 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. **The site meets this criterion.**

310 CMR 16.40(4)(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 and recycle solid waste. The MassDEP'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. **The site meets this criterion.**

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. The eventual relocation of solid waste handling operations (after site assignment and permitting for the 12-acre parcel) will permit the continuation of the existing recycling, composting and other waste diversion activities. **The site meets this criterion.**

## PROMOTION OF INTEGRATED SOLID WASTE MANAGEMENT

310 CMR 16.40(5)(a) *In determining whether a site is suitable for a combustion facility or a landfill, the Department shall consider the following factors:*

*1. The potential yearly and lifetime capacity created by the proposed site use(s) in relation to the reasonably anticipated disposal capacity requirements and reduction/diversion goals of the Commonwealth and the geographic area(s) which the site will serve.*

Landfill capacity projections from MassDEP reveal a significant reduction in the number of operational landfills starting in 2021, which provide capacity for many types of municipal solid waste (MSW) including; household and commercial trash, processing residuals, storm/disaster debris, municipal waste combustor ash, contaminated soils, dredge spoils and special wastes. The best management option for much of this waste, which cannot be recycled, composted or combusted, is for it to be disposed in a landfill.

Bourne will continue to play a critical role in providing regional solid waste infrastructure going forward. Primarily, ISWM will provide much needed local municipal waste combustor ash disposal capacity. This is important because operators of combustors must show they have several years of capacity for their ash as part of their operating plan. The proposed buildout of the Bourne Landfill capacity is part of the plan for SEMASS, which has a contract with the Town running through the end of 2024, with options for extensions. This is especially important given that the CMW Landfill in Carver, where ash and bypass MSW from SEMASS also were deposited, closed December 2020.

The full buildout of the site for landfilling, as proposed, will add about 5,175,000 cubic yards of capacity, beyond the limits of the currently approved operations in Phase 6. If the current contract with SEMASS is continued indefinitely and the facility runs at its permitted capacity full time, the landfilling operations will extend to at least September 2041. If the current contract with SEMASS is discontinued and the facility switches to accepting only MSW and runs at its permitted capacity full time, the landfilling operations will extend to at least January 2036.

### **The site meets this criterion.**

*2. The extent to which the proposed site use(s), alone or in conjunction with other sites, provides or affords feasible means to maximize diversion or processing of each component of the anticipated waste stream in order to reduce potential adverse impacts from disposal and utilize reusable materials and only thereafter extract energy from the remaining solid waste prior to final disposal.*

The facility provides feasible means to maximize diversion or processing of each component of the anticipated waste stream. With the current and anticipated future use of the landfill being committed to 87% utilization for combustor ash disposal, a significant component of the diversion of unprocessed waste from landfills is provided. Other components of the site's

operations include the transfer of Single Stream Recyclables; a Residential Recycling Center that allows the source separation by residents and includes a Swap Shop; and processing and composting of brush and yard waste, and the processing of asphalt, brick and concrete (ABC) for reuse. **The site meets this criterion.**

*3. The extent to which the proposed use(s) of the site, alone or in conjunction with other sites, will contribute to the establishment and maintenance of a statewide integrated solid waste management system which will protect the public health and conserve the natural resources of the Commonwealth.*

From its very inception and its name as the Bourne Integrated Solid Waste Management facility, the site demonstrates the Town's commitment to providing facilities that are used to maximize the promotion of recycle/reuse and waste reduction. The facility is the predominant regional integrated solid waste management facility that can support other facilities in the region to protect the public health and conserve the natural resources of the Commonwealth. **The site meets this criterion.**

*310 CMR 16.40(5)(b) In determining whether a site is suitable for a combustion facility or a landfill, the Department and the board of health shall consider the extent to which the proposed use of the site directly incorporates recycling and composting techniques or is otherwise integrated into recycling and composting activities for the geographic area(s) which the site will serve.*

The proposed expansion of the facility will incorporate all of the existing solid waste management operations, which includes recycling and composting activities. These operations are available to the region. **The site meets this criterion.**

*310 CMR 16.40(5)(c) A site proposed for a combustion facility or a landfill shall be reviewed to determine if the site is also suitable for a recycling or composting facility either in conjunction with or instead of the proposed facility.*

The site is an existing recycling and composting facility and will continue to include these operations. **The site meets this criterion.**

*310 CMR 16.40(5)(d) Site assignment applications which incorporate significant recycling or composting uses, in accordance with the goals of the statewide plan, shall receive preferred consideration.*

The site has an existing site assignment, which is to be modified and will obtain a new site assignment to suit the proposed expansion of operations at the facility which incorporate significant recycling or composting uses, in accordance with the goals of the statewide plan. Consequently, the proposed site expansion should receive preferred consideration. **The site meets this criterion.**

Based upon the work that I have conducted and the work of others that I have reviewed, it is my professional opinion that the Bourne ISWM site at 201 MacArthur Boulevard is suitable for a vertical expansion of the existing landfill (Phase 9) and a horizontal landfill expansion into an area currently used for solid waste handling activities (Phases 7 and 8). The facility will not constitute a danger to the public health or safety or the environment.

Signed under the penalties of perjury this 25th day of January 2022.



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A. Raymond Quinn, PE

# **EXHIBIT 1**





769 Plain Street, Unit C  
Marshfield, MA 02050  
Tel. (781) 319-0100 Fax (781) 834-4783

**A. RAYMOND QUINN, P.E., LSP**  
**Senior Project Manager (Formerly Director of Engineering Services/President)**

**EXPERIENCE:**

Mr. Quinn is a Senior Project Manager for SITEC Environmental, Inc., having retired as its Director of Engineering Services and its President. Mr. Quinn's technical responsibilities focus on solid waste management, hazardous waste remediation, wastewater and water planning and design projects. He has overseen the design and construction administration of multi-million dollar wastewater treatment and collection and solid waste disposal and handling facilities. Mr. Quinn has also directed hazardous waste site assessments, prepared environmental impact reports and has provided operations assistance for solid waste management facilities and industrial pretreatment programs.

Mr. Quinn has overseen and provided quality assurance review on environmental assessment and design work in the disciplines of hazardous waste remediation, solid waste management facilities, sanitary landfills, other solid waste management facilities including materials recycling and processing facilities and groundwater remediation facilities.

Mr. Quinn's solid waste experience has included the preparation of an Environmental Impact Reports (EIR) for the permitting and expansion of both privately and publicly owned solid waste management facilities. Impacts that have been evaluated include groundwater quality, needs assessment, air quality, traffic and aesthetics. Facilities have included landfills, transfer stations, materials recycling facilities (MRF) and materials processing operations (MPO). Mr. Quinn has also prepared Site Assignment Applications for numerous facilities under current Massachusetts regulations, which resulted in positive site suitability reports by the Massachusetts DEP. He has provided primary technical expert testimony during the extensive site assignment hearings held by various local boards of health.

Mr. Quinn has been responsible for the design and construction administration of a lined mono-fill dedicated to the disposal of ash from a resource recovery facility, for the Massachusetts DEP. Mr. Quinn has managed a project for the Massachusetts DEP for the preparation of a Feasibility Study and Request For Proposals (RFP) for vendor response in providing a MRF in the DEP Central Region for a group of fifteen municipalities. Mr. Quinn has conducted a significant amount of permitting, design and operations support for landfill facilities, including: the preparation of several expansion designs and operations plans for existing landfills, that include liner and leachate collection facilities; the preparation of closure plans, including capping, storm water management, site assessment (investigation), post-closure monitoring and use components; the preparation of re-permitting applications, under Massachusetts solid waste regulations, which includes recycling and waste acceptance plans and financial assurance requirements; the design and applications for landfill gas collection and treatment (flare) facilities, which included BACT

(Best Available Control Technology) evaluations; and the oversight of environmental monitoring programs and preparation of interpretive reports on the programs.

Hazardous waste remediation work has included the design of groundwater recovery, treatment and recharge facilities; preparation of feasibility studies; preparation of closure plans and certification of closure for hazardous waste disposal facilities; total project responsibility for the design, construction administration, site assessment and remedial design for the removal and replacement of underground storage tanks at numerous commercial facilities; and short-term measure remedial design for a PCB/oil contaminated site. He has prepared Site Assessments, Feasibility Studies, interim action plans and preliminary design reports for remediation of PCB, petroleum product and solvent contaminated sites. Many of these projects have been conducted under the requirements of the Massachusetts Contingency Plan (MCP).

Water supply related projects have included the design of supply wells and pumping stations, distribution system design and treatment facilities for a contaminated public water supply source. He has overseen the design and construction management of a replacement well and treatment facility for the restoration of a 1.0 MGD public water supply source contaminated with VOCs, for a Massachusetts municipality.

Wastewater projects include total project responsibility for the feasibility study, design and construction administration of several private and public wastewater treatment and disposal facilities and facility assessment for waste reduction, compliance and pretreatment design of industrial wastewater discharges. Mr. Quinn managed the preparation of Environmental Impact Reports, the design and construction administration and supervision of secondary and advanced wastewater and hazardous waste treatment plants, sludge handling and composting facilities, gravity and pressure sewer systems, sewer rehabilitation projects, drainage systems, water supply and storage facilities, roadway, site, and utilities for residential, industrial and planned unit developments; preparing 201 Facilities Plans, Industrial Pretreatment Program and state and federal permit applications; analysis of effects of septic system effluent on groundwater; conducting treatability studies of wastewater treatment plants, conducted feasibility study of sludge composting/land application alternatives and numerous Infiltration/Inflow Analyses and Sewer System Evaluation Surveys.

#### **EDUCATION:**

B.S., Civil Engineering, Northeastern University, 1971

#### **ACTIVE REGISTRATIONS:**

Professional Engineer in Massachusetts (#32861, 1986, Sanitary); New Hampshire (Retired); Maine (Retired); Rhode Island (#5195, 1988); Vermont (Retired); Pennsylvania (Retired).  
Licensed Site Professional in Massachusetts (Retired)

#### **AFFILIATIONS:**

American Society of Civil Engineers  
Water Environment Federation  
Licensed Site Professionals Association

# EXHIBIT 2

**ATTACHMENT 3**

**PLANS AND FIGURES**

**(REVISED APRIL 21, 2021 &**

**DECEMBER 9, 2021)**

## **LIST OF PLANS AND FIGURES**

Figure 1 - Locus Plan

Figure 2 - Property Line Plan

Figure 3 - Existing Conditions Site Plan

Figure 4 – Schematic Site Buildout Plan

Figure 5 - Initial Construction Phases Plan

Figure 6 - Intermediate Construction Phases Plan

Figure 7 - Conceptual Site Buildout Plan

Figure 8 - Site Buildout Profiles

Figure 9 - Existing Environmental Monitoring Systems

Figure 10 - Groundwater Contour Plan

Figure 11 - USACE Groundwater Flow and Contaminant Plume

Figure 12 - Water Resources Plan

Figure 13 - Land Use Plan

Figure 14 - MassDEP Water Resource Map

Figure 15 - Proposed Site Assignment Modifications

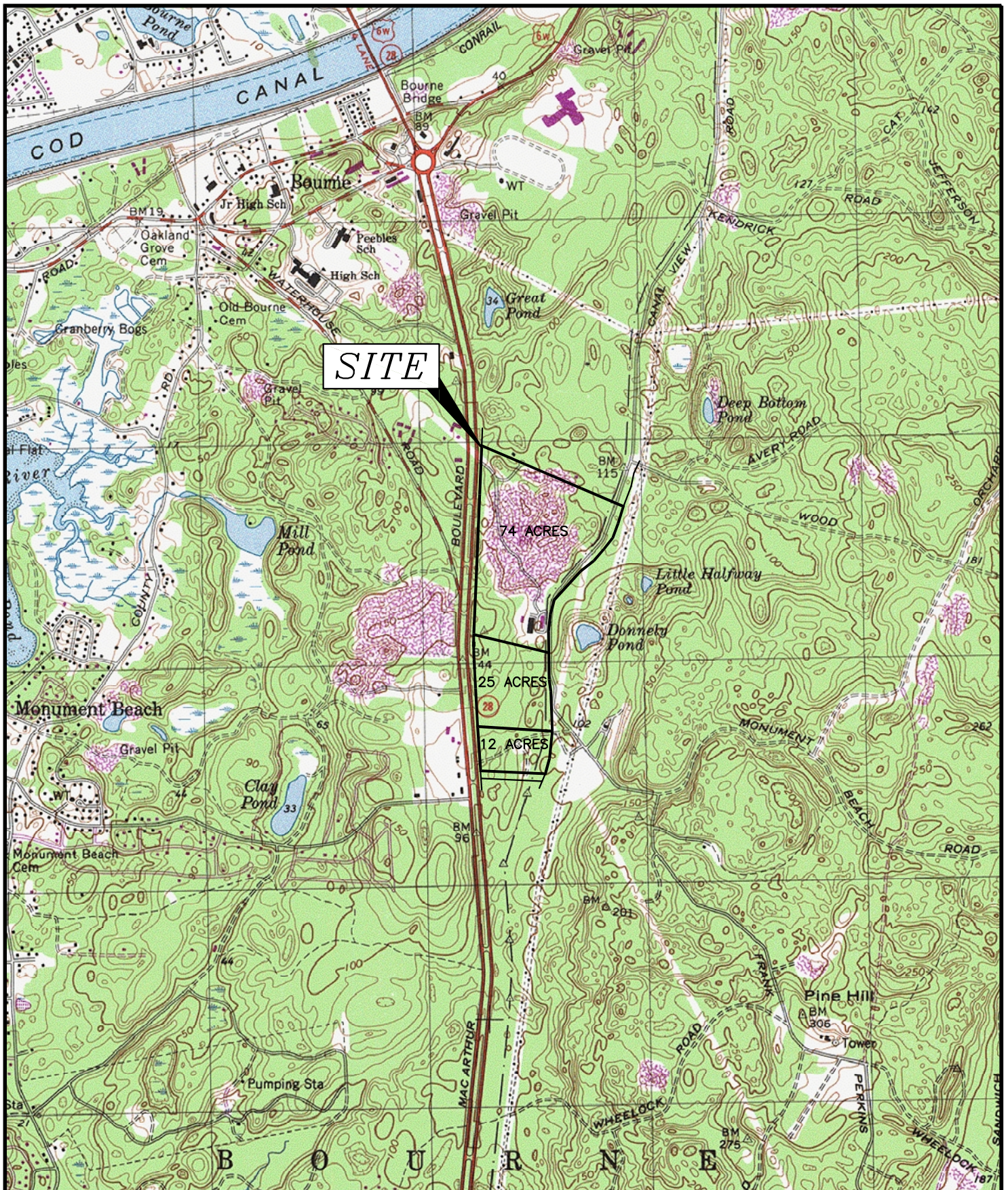
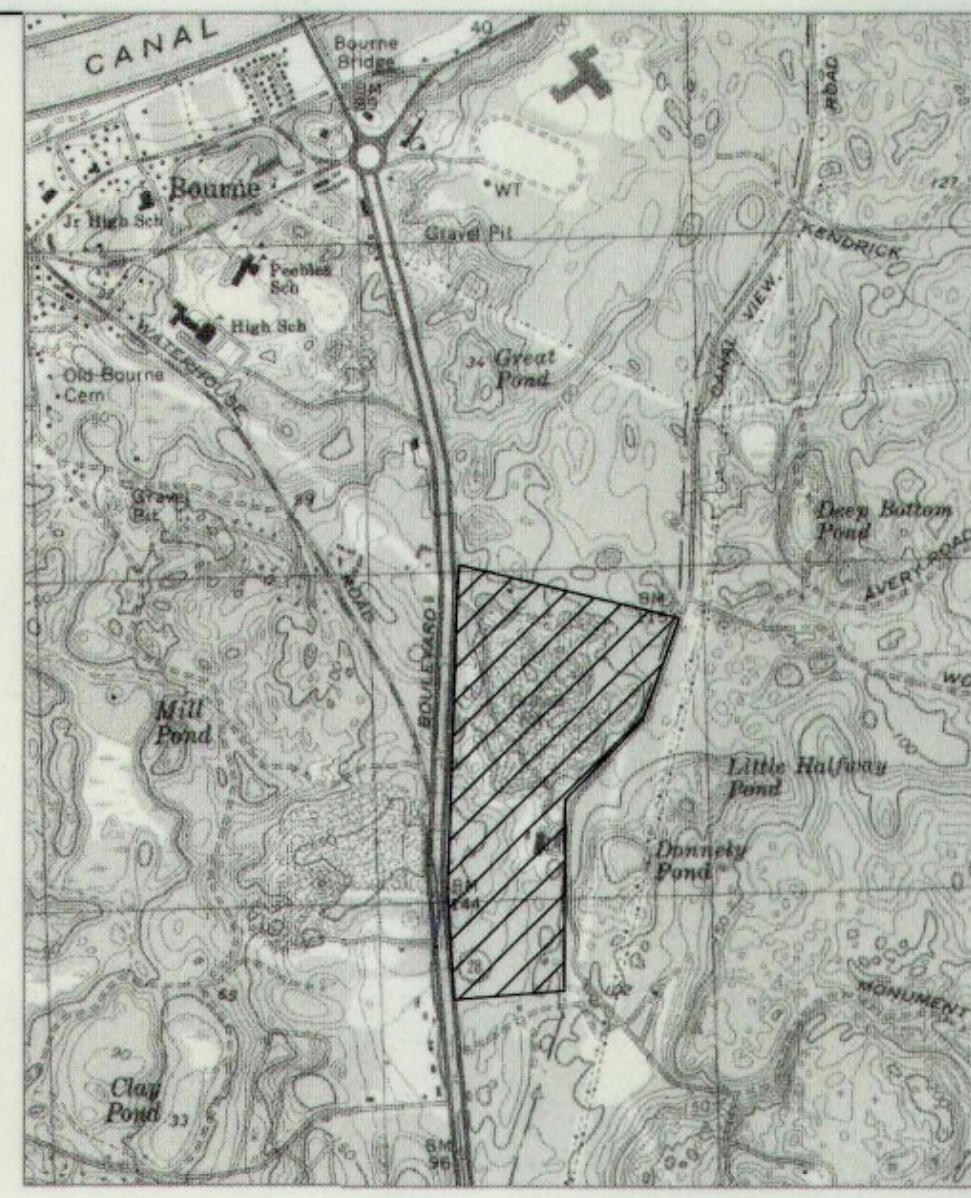
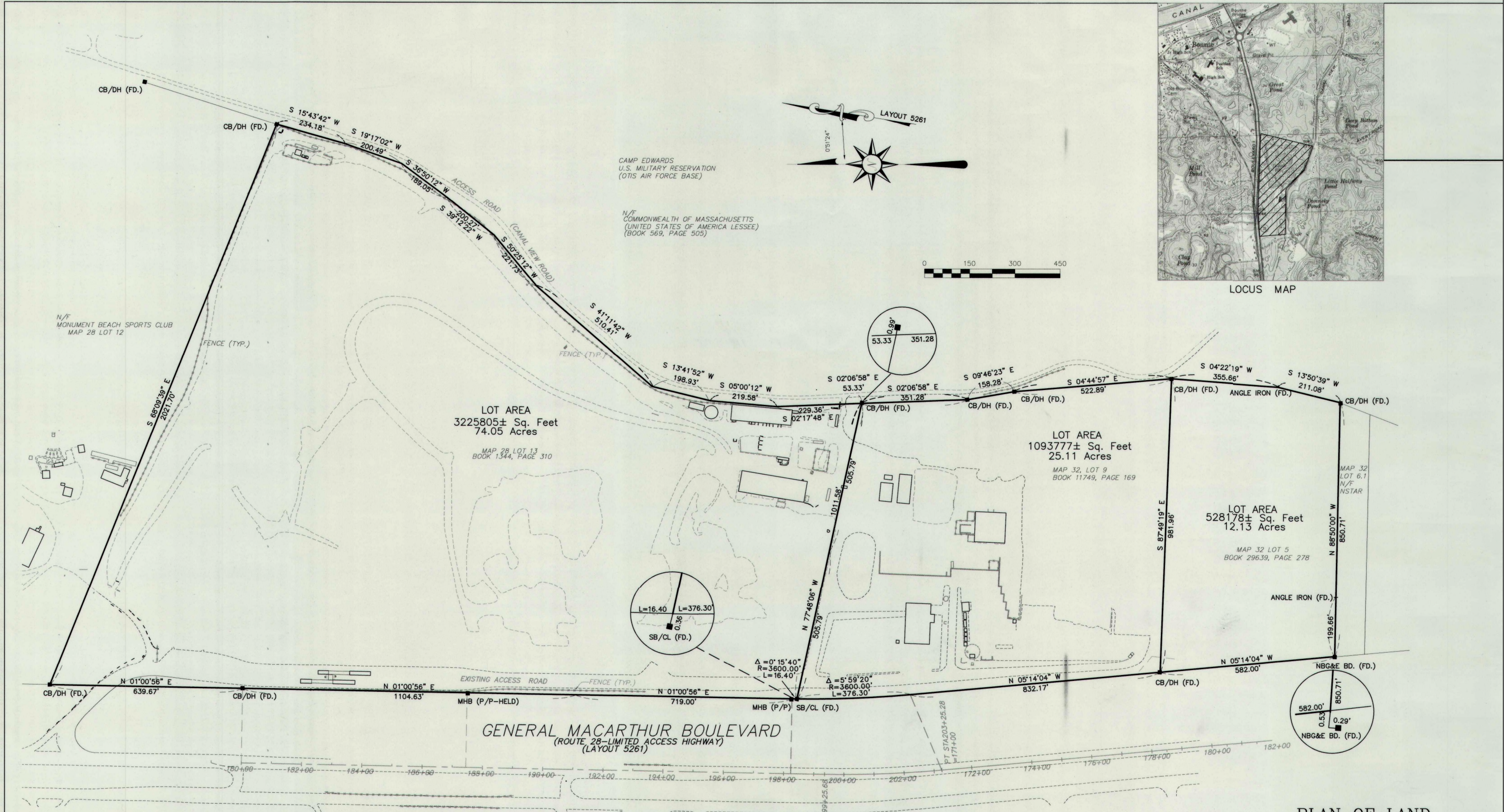


FIGURE 1 - LOCUS PLAN  
 BOURNE LANDFILL  
 201 MACARTHUR BOULEVARD  
 BOURNE, MASSACHUSETTS

**SITEC**  
**ENVIRONMENTAL**

Civil and Environmental Engineering  
 Land Use Planning and Surveying  
 Hazardous and Solid Waste Consultants  
 700 Plain Street, Unit C  
 Marshfield, MA 02050  
 PHONE (781)-819-0100  
 FAX (781) 834-4765





LOCUS MAP

PLAN REFERENCES  
 PLAN BOOK 300, PAGE 98  
 PLAN BOOK 562, PAGE 14  
 PLAN BOOK 565, PAGE 63  
 LAYOUT # 5261(1962)  
 "RESERVATION MAP, CAMP EDWARDS"  
 DRAWING 911-803  
 DATED 5-15-41

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS, AND;  
 THAT THE LINES SHOWN HEREON ARE THE LINES DIVIDING EXISTING OWNERSHIPS AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS AND WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR THE DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

PLS *[Signature]* 4/12/2017  
 DATE



PLAN OF LAND  
 IN  
**BOURNE, MA**  
 PREPARED FOR  
 TOWN OF BOURNE

SCALE: 1"=150' APRIL 17, 2017

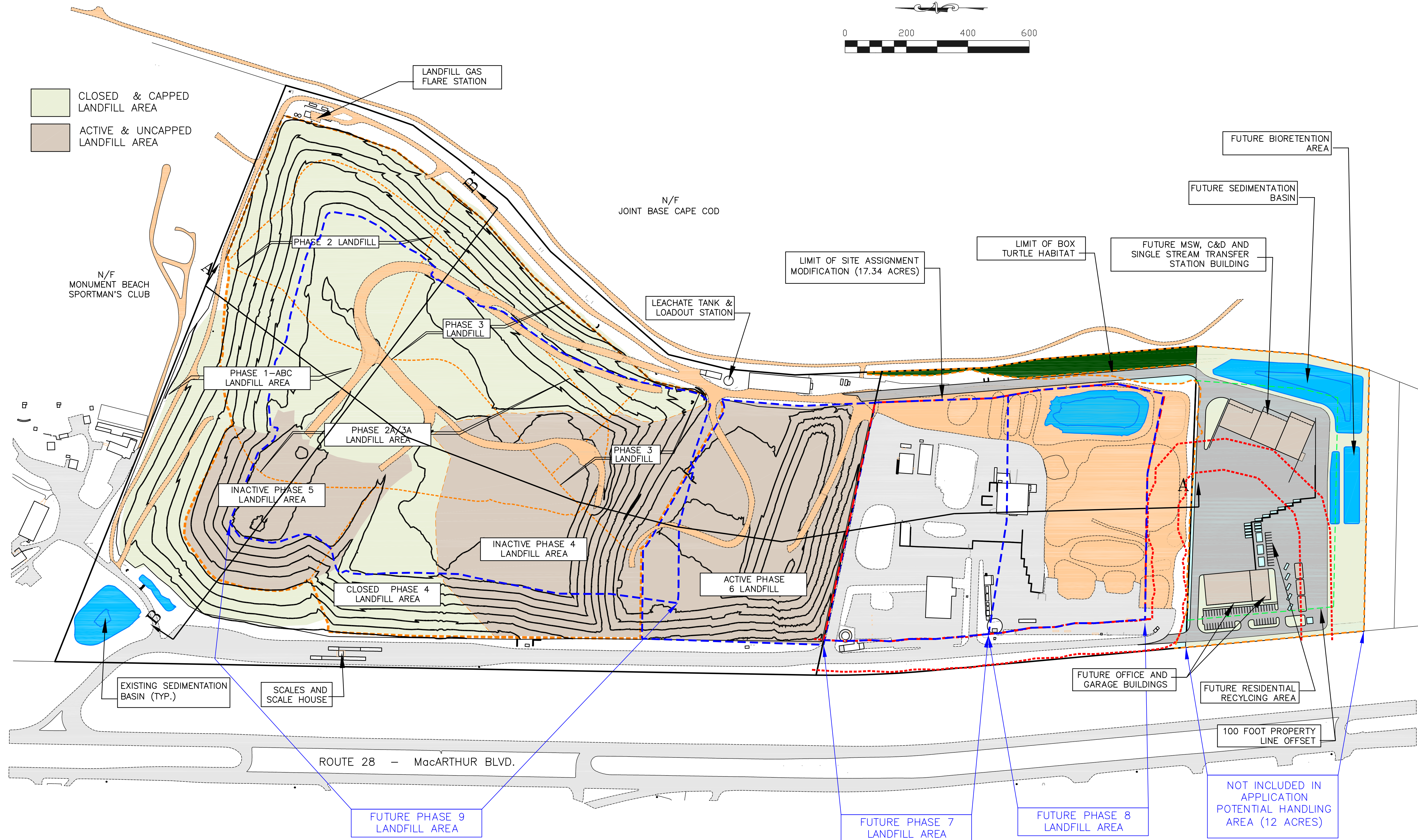
PREPARED BY

**SITEC**  
 Civil and Environmental Engineering  
 Land Use Planning  
 SITEC, Inc.  
 449 Founce Corner Road  
 Dartmouth, MA 02747  
 (508) 998-2125  
 FAX (508) 998-7554

FIGURE 2 - PROPERTY LINE PLAN







CLOSED & CAPPED LANDFILL AREA  
 ACTIVE & UNCAPPED LANDFILL AREA

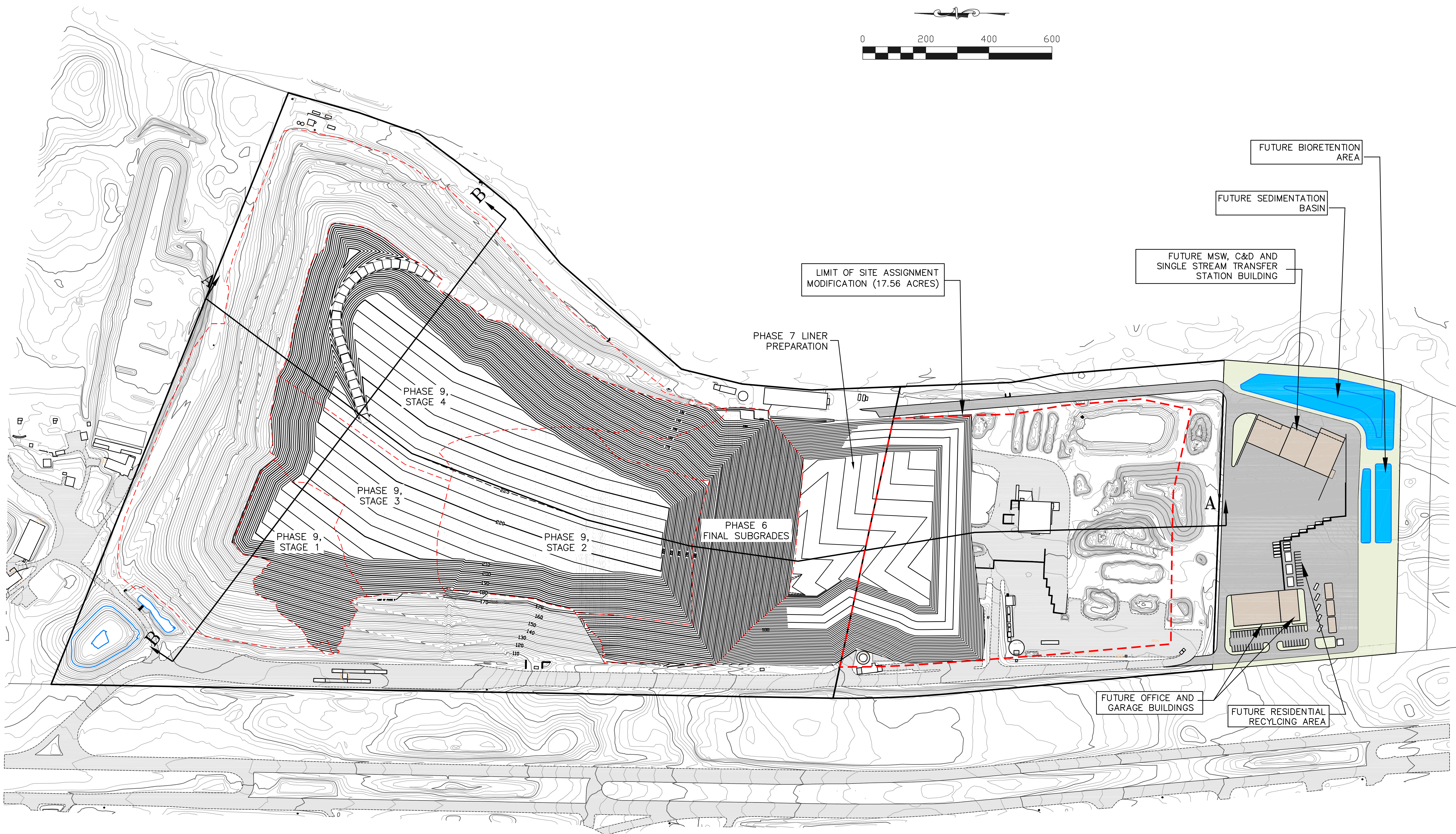
EXTENT OF BOX TURTLE HABITAT  
 ACERAGE OF DISTURBANCE - 539,135 sf  
 UNDISTURBED HABITAT - 46,463 sf

NOT INCLUDED IN APPLICATION POTENTIAL HANDLING AREA (12 ACRES)

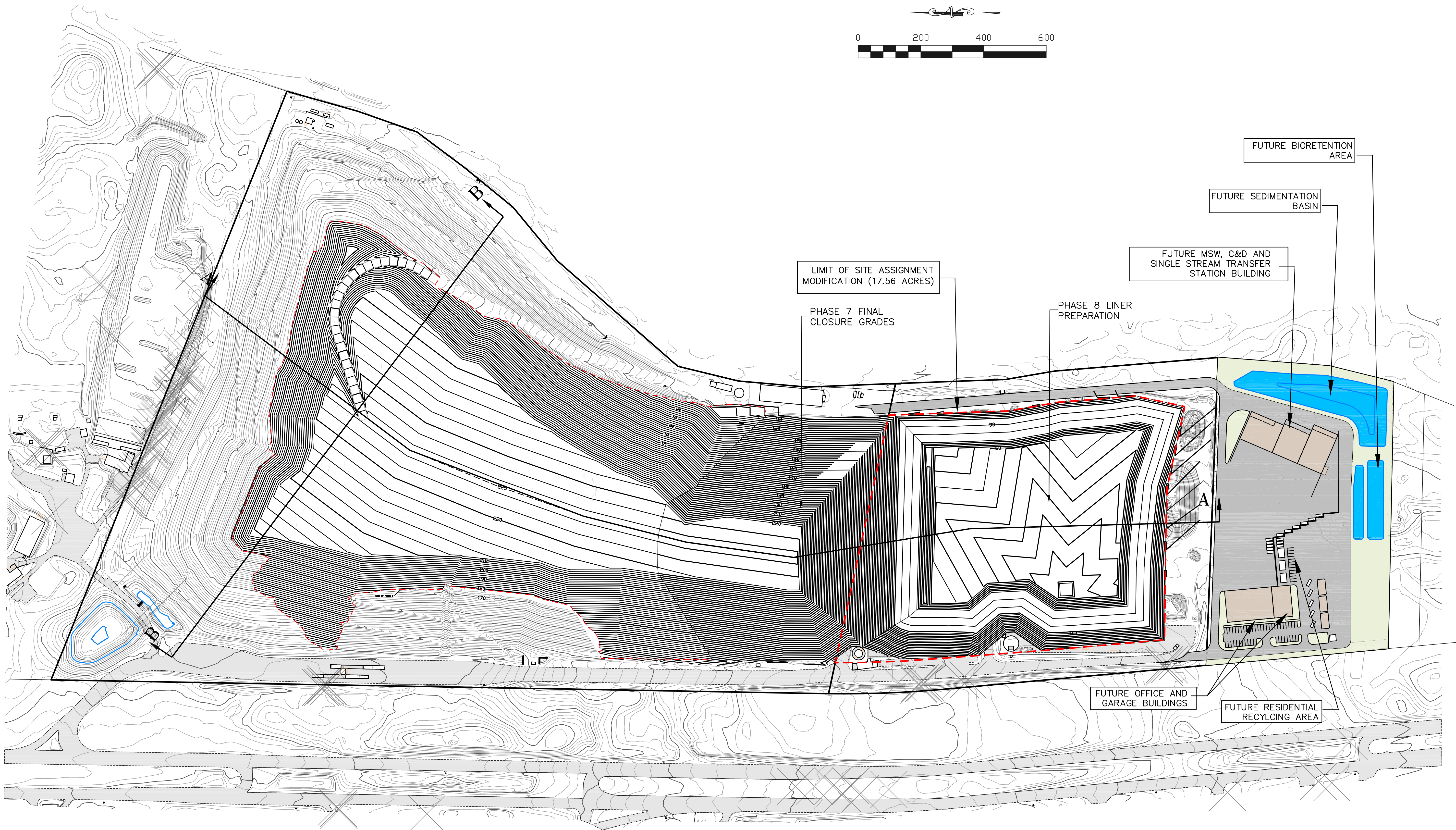
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**SITEC ENVIRONMENTAL**  
 Civil and Environmental Engineering  
 Land Use Planning and Surveying  
 Hazardous and Solid Waste Consultants  
 788 Pine Street, Suite 200  
 Marshfield, MA 02050  
 PHONE (781) 319-0100  
 FAX (781) 834-9783

Acad No. SSEIR SITE PLAN-SOLAR ARRAY.dwg  
 SE01-456-12



<b>SITEC ENVIRONMENTAL</b> Environmental Engineering Land Use Planning and Hazardous and Solid Waste Consultants 769 Plain Street, Unit C BOSTON, MA 02118 PHONE (781) 319-0100 FAX (781) 834-7783		project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT drawing title: INITIAL CONSTRUCTION PHASE PLAN	scale: AS SHOWN date: FEB. 26, 2021 drawn: ARQ checked: ARQ approved: ARQ drawing number:	No. 1 Date 04/20/2021 Revision Description: ADD SITE ASSIGNMENT MOD LIMITS & PE STAMP	Chkd. by: Apprd. by:
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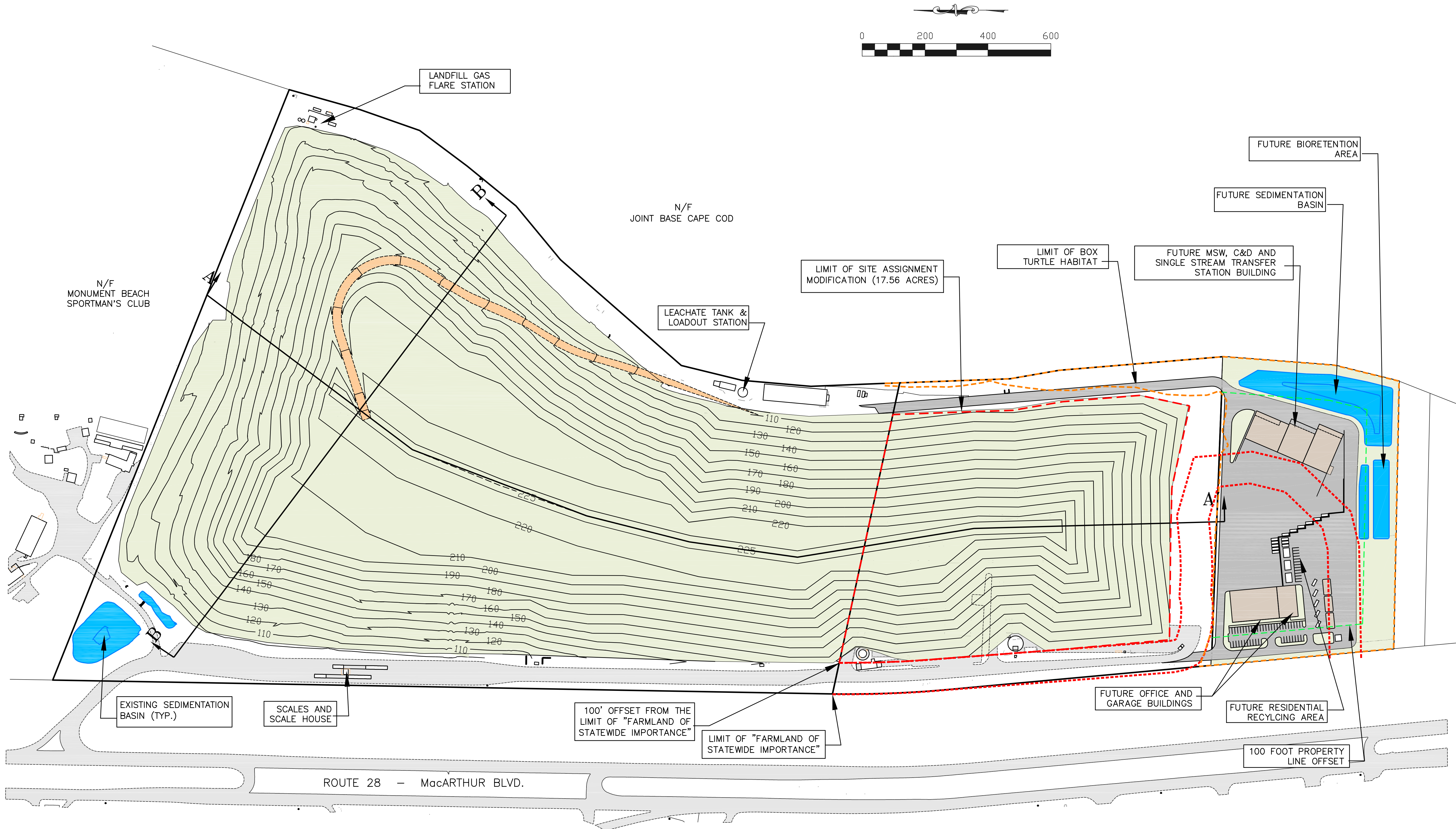


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1. ADD SITE ASSIGNMENT MOD LIMITS & PE STAMP	04/20/2021	1	ARC	ARC	FEB. 26, 2021	ARC	ARC	ARC	

Project: BOURNE LANDFILL  
 Client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT  
 Drawing Title: INTERMEDIATE CONSTRUCTION PHASE PLAN

Scale: AS SHOWN  
 Date: FEB. 26, 2021  
 Drawn: ARC  
 Checked: ARC  
 Approved: ARC  
 Drawing Number:

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 and Planning  
 Hazardous and Solid Waste Consultants  
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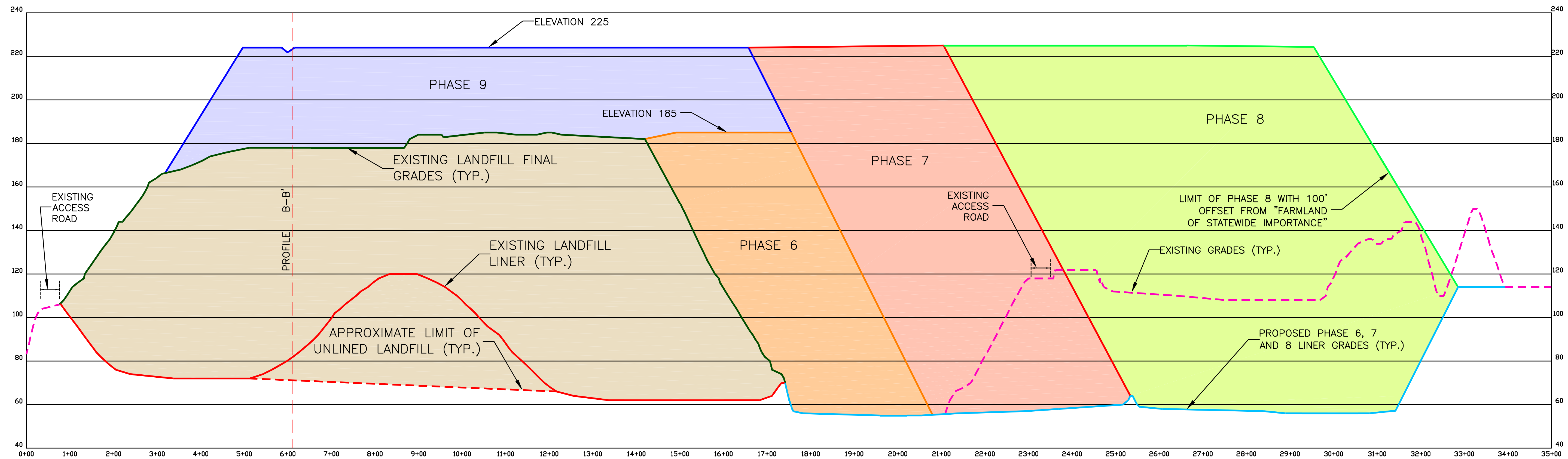
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ADD SITE ASSIGNMENT MOD LIMITS & PE STAMP	04/20/2021	1	ARQ	AS SHOWN	FEB. 26, 2021	ARQ	ARQ	

Project: BOURNE LANDFILL  
 Client: SITE ASSIGNMENT MODIFICATION OF BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT  
 Drawing #/Rev: FIGURE 7 CONCEPTUAL SITE BUILDOUT PLAN

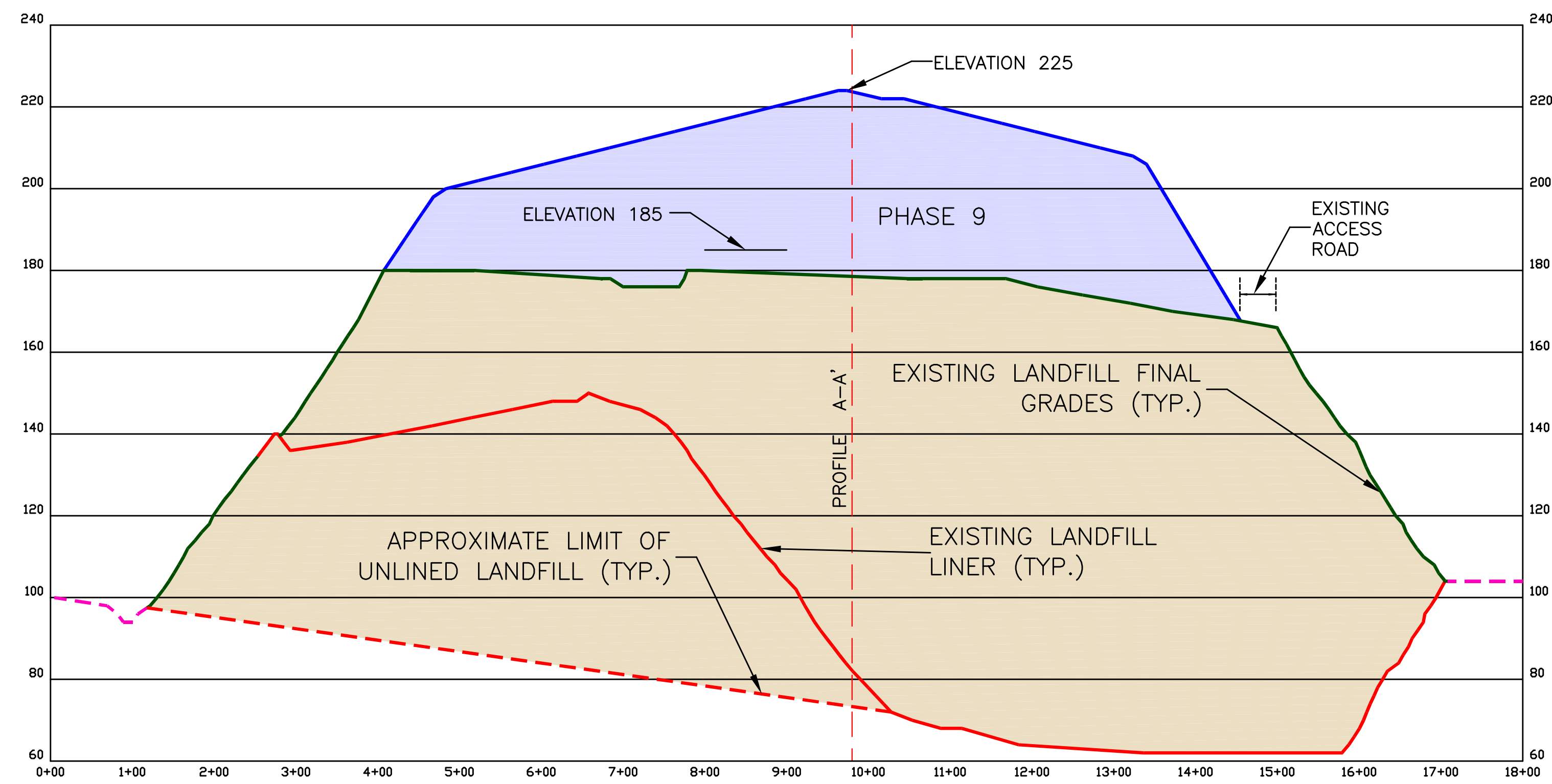
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 Checked: ARQ  
 Approved: ARQ  
 Drawing #/Rev: ARQ

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Acad No. SSEIR SITE PLAN-SOLAR ARRAY.dwg  
 SE01-456-12



PROFILE A-A'  
 HORIZONTAL SCALE: 1" = 120'  
 VERTICAL SCALE: 1" = 24'



PROFILE B-B'  
 HORIZONTAL SCALE: 1" = 120'  
 VERTICAL SCALE: 1" = 24'



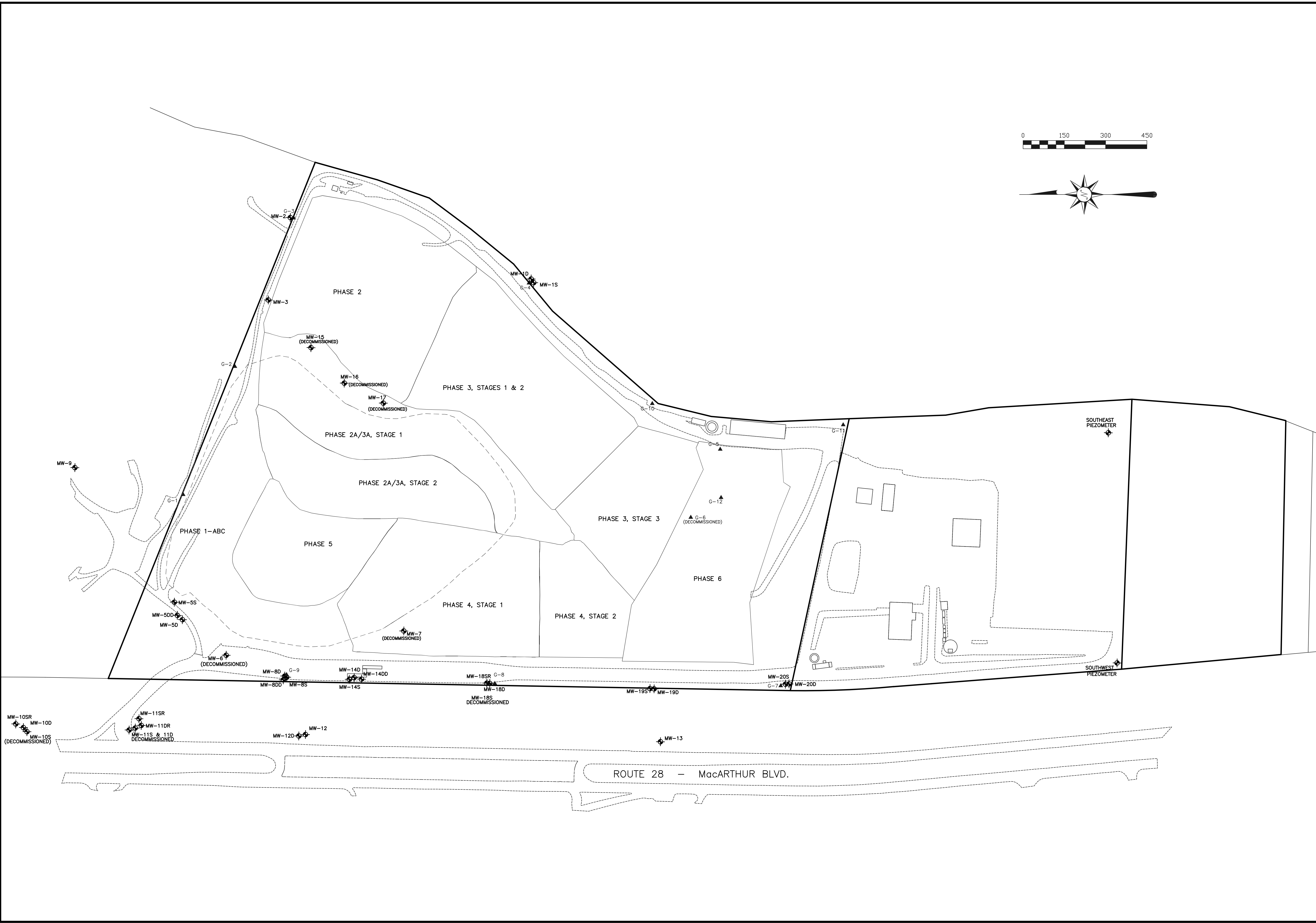
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date:	FEB. 26, 2021
drawn:	ARQ
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approved:	ARQ
drawing number:	
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	04/20/2021
	ADD PE STAMP

project: BOURNE LANDFILL  
 SITE ASSIGNMENT MODIFICATION  
 client: BOURNE DEPARTMENT OF  
 INTEGRATED SOLID WASTE MANAGEMENT  
 drawing title: FIGURE 8  
 SITE BUILDOUT PROFILES

SITEC Environmental, Inc.  
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**SITEC ENVIRONMENTAL**  
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 Land Use Planning and Surveying  
 Hazardous and Solid Waste Consultants

Acad No. SE01-456-12  
 SSSR SITE PLAN-SOLAR ARRAY.dwg



Project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT drawing title: FIGURE 9 EXISTING ENVIRONMENTAL MONITORING SYSTEMS		scale: AS SHOWN date: FEB. 26, 2021 drawn: ARQ checked: ARQ approved: ARQ drawing number:		No. 1 Date 04/20/2021 Revision Description: ADD PE STAMP		Chkd. by: Appr. by: ARQ	
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SITEC Environmental, Inc.  
 789 Plain Street, Unit C  
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 PHONE (781) 319-0100  
 FAX (781) 834-2783

**SITEC**  
 ENVIRONMENTAL  
 Civil and Environmental Engineering  
 Land Use Planning and Surveying  
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Acad No. ENV MONITOR SYS-07-22-2020.dwg  
 SE01-456-12

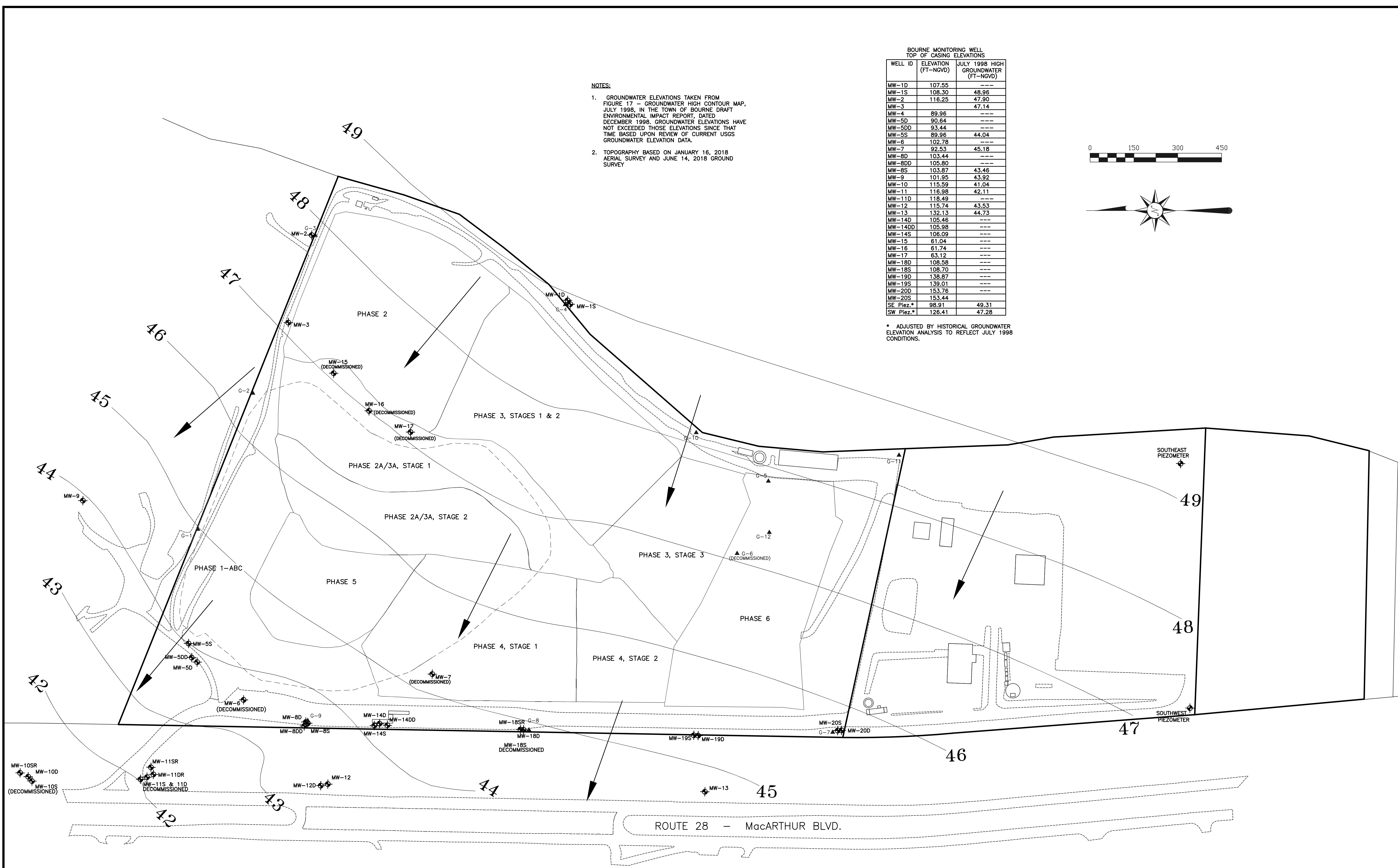
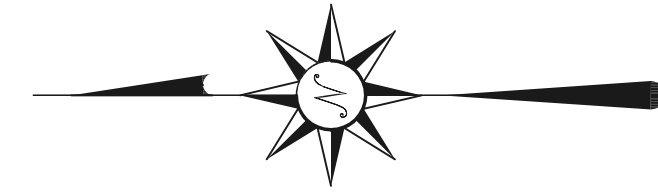


**NOTES:**

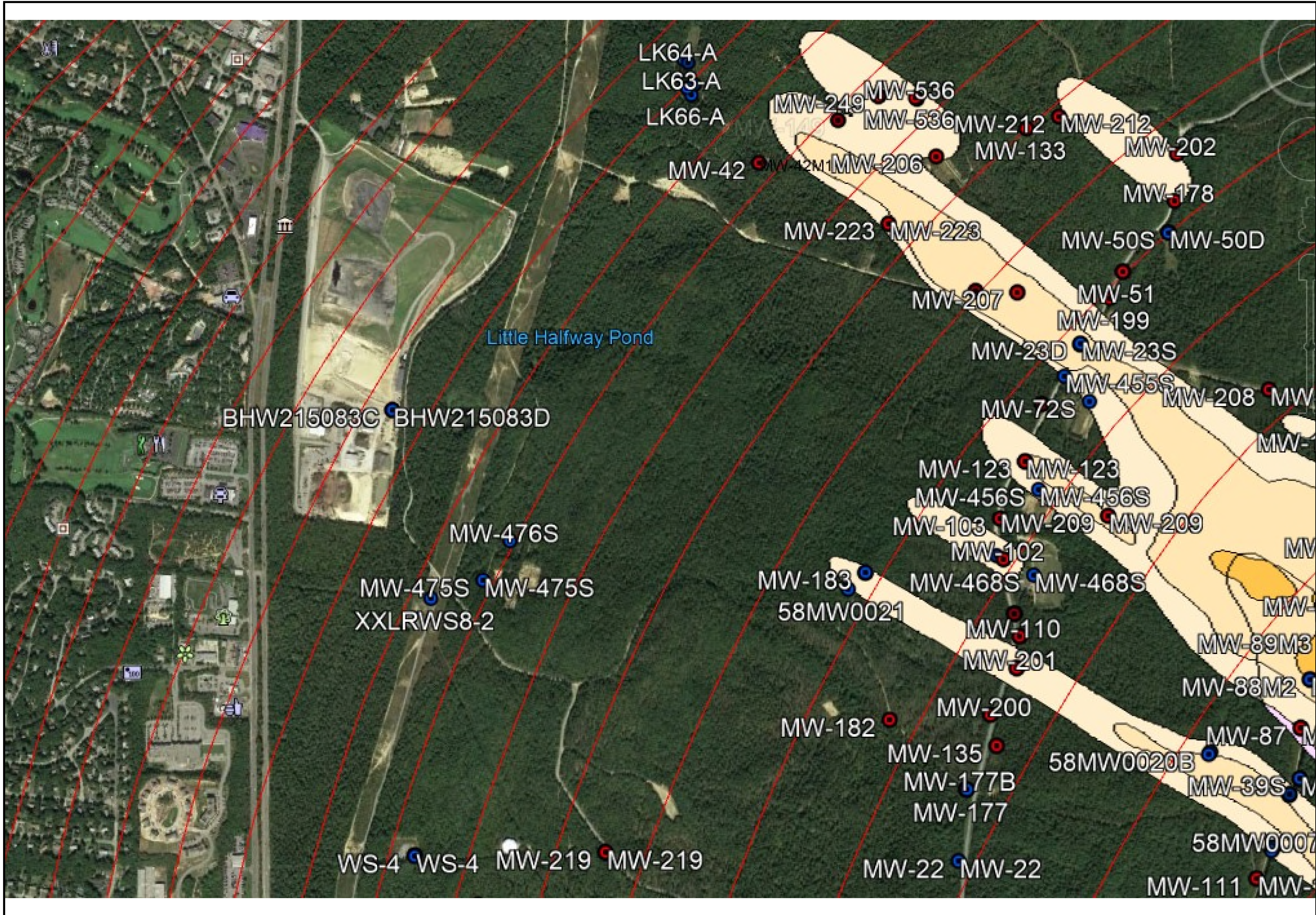
- GROUNDWATER ELEVATIONS TAKEN FROM FIGURE 17 - GROUNDWATER HIGH CONTOUR MAP, JULY 1998, IN THE TOWN OF BOURNE DRAFT ENVIRONMENTAL IMPACT REPORT, DATED DECEMBER 1998. GROUNDWATER ELEVATIONS HAVE NOT EXCEEDED THOSE ELEVATIONS SINCE THAT TIME BASED UPON REVIEW OF CURRENT USGS GROUNDWATER ELEVATION DATA.
- TOPOGRAPHY BASED ON JANUARY 16, 2018 AERIAL SURVEY AND JUNE 14, 2018 GROUND SURVEY

BOURNE MONITORING WELL TOP OF CASING ELEVATIONS		
WELL ID	ELEVATION (FT-NGVD)	JULY 1998 HIGH GROUNDWATER (FT-NGVD)
MW-1D	107.55	---
MW-1S	108.30	48.96
MW-2	116.25	47.90
MW-3	---	47.14
MW-4	89.96	---
MW-5D	90.64	---
MW-5DS	93.44	---
MW-6	89.96	44.04
MW-6	102.78	---
MW-7	92.53	45.18
MW-8D	103.44	---
MW-8DD	105.80	---
MW-8S	103.87	43.46
MW-9	101.95	43.92
MW-10	115.59	41.04
MW-11	116.98	42.11
MW-11D	118.49	---
MW-12	115.74	43.53
MW-13	132.13	44.73
MW-14D	105.46	---
MW-14DD	105.98	---
MW-14S	106.09	---
MW-15	61.04	---
MW-16	61.74	---
MW-17	63.12	---
MW-18D	108.58	---
MW-18S	108.70	---
MW-19D	138.87	---
MW-19S	139.01	---
MW-20D	153.76	---
MW-20S	153.44	---
SE Piez.*	98.91	49.31
SW Piez.*	126.41	47.28

\* ADJUSTED BY HISTORICAL GROUNDWATER ELEVATION ANALYSIS TO REFLECT JULY 1998 CONDITIONS.

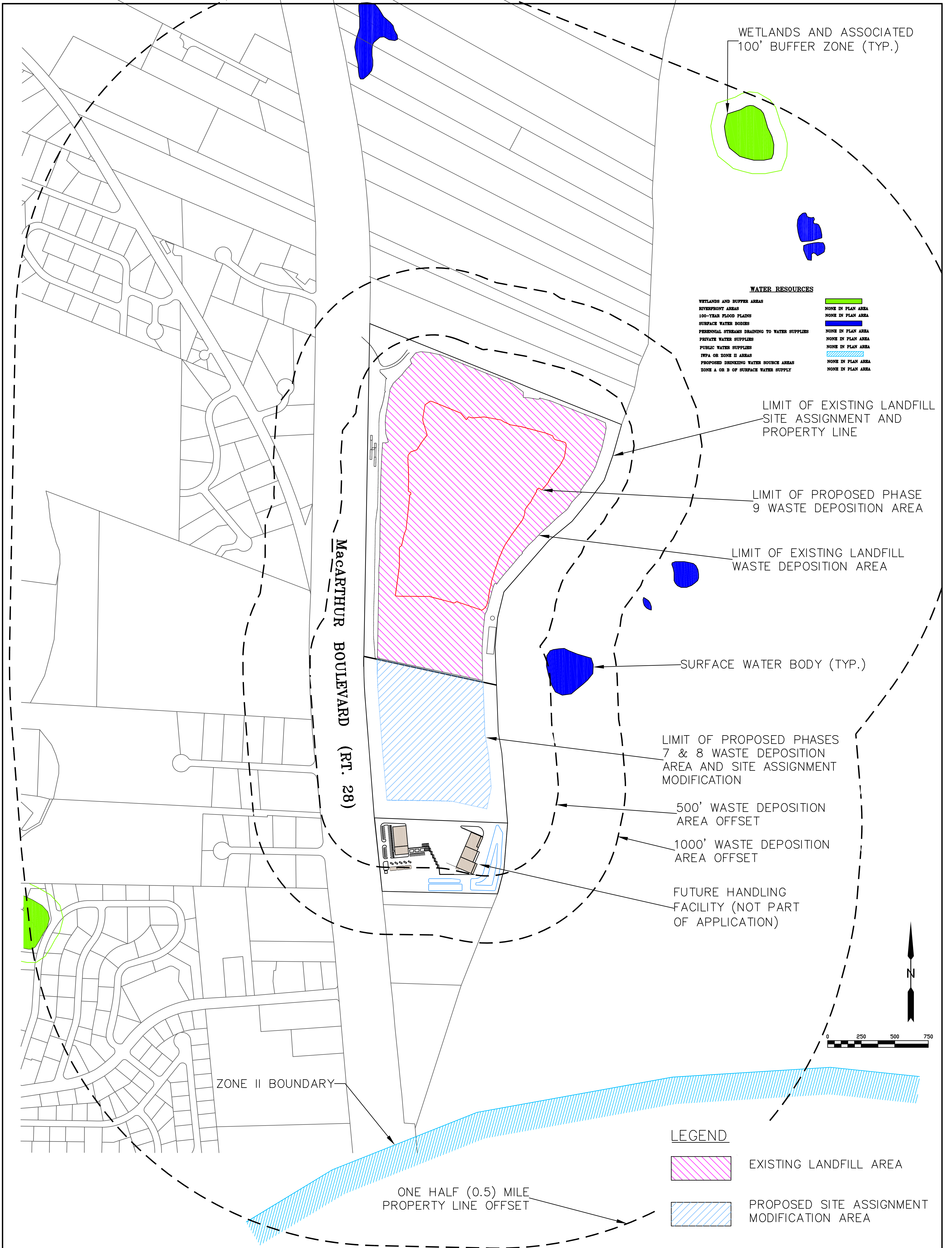


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Revision Description		
Date		
No.	1	04/20/2021 ADD PE STAMP
AS SHOWN	scale: AS SHOWN	date: FEB. 26, 2021
drawn: ARQ	checked: ARQ	approved: ARQ
drawing number:		
project:	BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION	
client:	BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT	
drawing title:	FIGURE 10 GROUNDWATER CONTOUR PLAN	
SITEC Environmental, Inc. 789 Plain Street, Unit C PHONE (781) 315-0100 FAX (781) 834-4783		
<b>SITEC ENVIRONMENTAL</b> Civil, Environmental, Engineering Land Use, Remediation, Site Hazardous and Solid Waste Consultants		
Acad No. ENV MONITOR SYS-07-22-2020.dwg		
SE01-456-12		



SITEC Environmental, Inc. 789 Plain Street, Unit C PHONE (781) 318-0100 FAX (781) 834-4783	project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT drawing title: USACE GROUNDWATER FLOW AND CONTAMINANT PLUME drawing number: FIGURE 11
scale: NO SCALE date: FEB. 26, 2021 drawn: ARQ checked: ARQ approved: ARQ	No. 1 Date 04/20/2021 Revision Description 1 ADD PE STAMP
Checked by: _____ Approved by: _____	ARQ
Acad. No. SE01-456-12 SSEIR SITE PLAN-EXIST COND.dwg	





WETLANDS AND ASSOCIATED 100' BUFFER ZONE (TYP.)

**WATER RESOURCES**

- |  |                   |
|--|-------------------|
| WETLANDS AND BUFFER AREAS                    | NONE IN PLAN AREA |
| RIVERFRONT AREAS                             | NONE IN PLAN AREA |
| 100-YEAR FLOOD PLAINS                        | NONE IN PLAN AREA |
| SURFACE WATER BODIES                         | NONE IN PLAN AREA |
| PERENNIAL STREAMS DRAINING TO WATER SUPPLIES | NONE IN PLAN AREA |
| PRIVATE WATER SUPPLIES                       | NONE IN PLAN AREA |
| PUBLIC WATER SUPPLIES                        | NONE IN PLAN AREA |
| TWPA OR ZONE II AREAS                        | NONE IN PLAN AREA |
| PROPOSED DRINKING WATER SOURCE AREAS         | NONE IN PLAN AREA |
| ZONE A OR B OF SURFACE WATER SUPPLY          | NONE IN PLAN AREA |

LIMIT OF EXISTING LANDFILL SITE ASSIGNMENT AND PROPERTY LINE

LIMIT OF PROPOSED PHASE 9 WASTE DEPOSITION AREA

LIMIT OF EXISTING LANDFILL WASTE DEPOSITION AREA

SURFACE WATER BODY (TYP.)

LIMIT OF PROPOSED PHASES 7 & 8 WASTE DEPOSITION AREA AND SITE ASSIGNMENT MODIFICATION

500' WASTE DEPOSITION AREA OFFSET

1000' WASTE DEPOSITION AREA OFFSET

FUTURE HANDLING FACILITY (NOT PART OF APPLICATION)

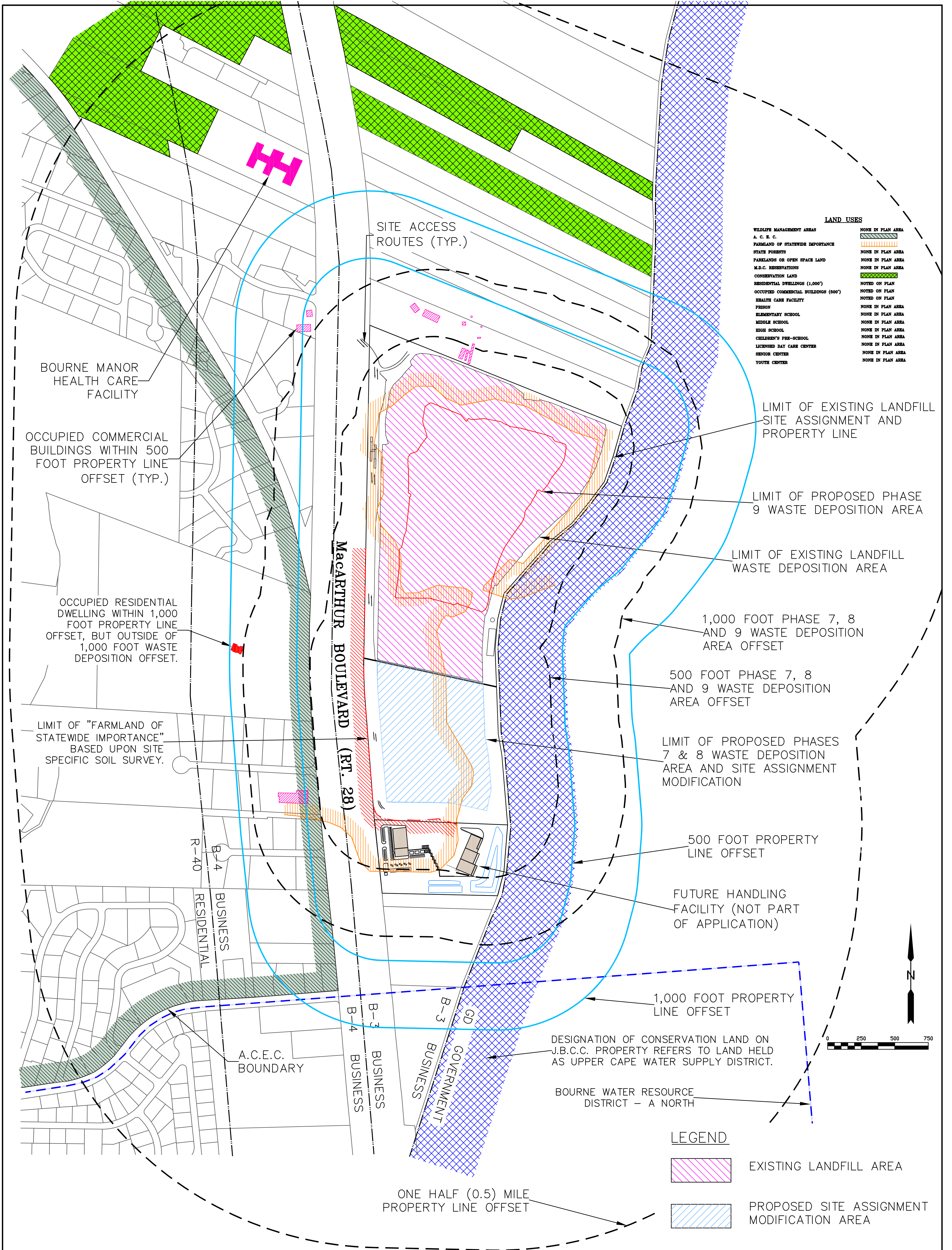
ZONE II BOUNDARY

ONE HALF (0.5) MILE PROPERTY LINE OFFSET

**LEGEND**

- |  |  |
|--|--|
|  | EXISTING LANDFILL AREA                     |
|  | PROPOSED SITE ASSIGNMENT MODIFICATION AREA |

File No. SEC1-456-12 <b>SITEC ENVIRONMENTAL</b> <small>Responsible and Solid Waste Consultants</small> <b>SITEC Environmental, Inc.</b> <small>768 Pksh Street, Unit C          Norwalk, MA 02050          (781) 319-0100          Fax (781) 334-4783</small>	<b>project:</b> BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION	<b>scale:</b> AS SHOWN <b>date:</b> FEB. 26, 2021	<table border="1"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Revision Description</th> <th>Chkd. by</th> <th>Appvd. by</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>04/20/2021</td> <td>ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS &amp; PE STAMP</td> <td></td> <td>ARQ</td> </tr> </tbody> </table>	No.	Date	Revision Description	Chkd. by	Appvd. by	1	04/20/2021	ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS & PE STAMP		ARQ
	No.	Date	Revision Description	Chkd. by	Appvd. by								
1	04/20/2021	ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS & PE STAMP		ARQ									
<b>client:</b> BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT	<b>checked:</b> ARQ <b>approved:</b> ARQ	<b>sheet</b> ___ <b>of</b> ___ <b>drawing number:</b>											



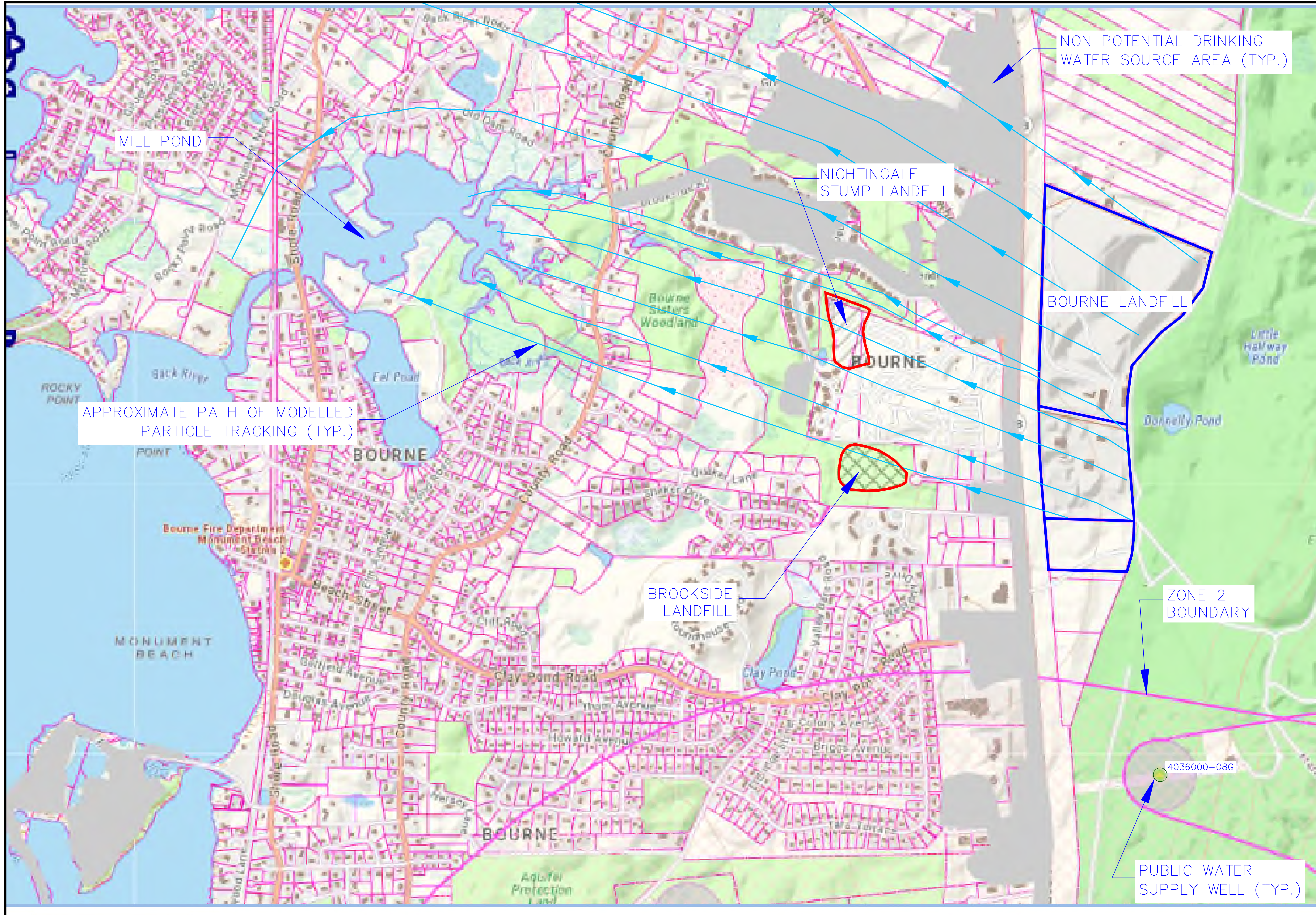
**LAND USES**

WILDLIFE MANAGEMENT AREAS	NONE IN PLAN AREA
A. C. E. C.	NONE IN PLAN AREA
FARMLAND OF STATEWIDE IMPORTANCE	NONE IN PLAN AREA
STATE FORESTS	NONE IN PLAN AREA
PARKLANDS OR OPEN SPACE LAND	NONE IN PLAN AREA
M.D.C. RESERVATIONS	NONE IN PLAN AREA
CONSERVATION LAND	NOTED ON PLAN
RESIDENTIAL DWELLINGS (1,000')	NOTED ON PLAN
OCCUPIED COMMERCIAL BUILDINGS (500')	NOTED ON PLAN
HEALTH CARE FACILITY	NONE IN PLAN AREA
PRISON	NONE IN PLAN AREA
ELEMENTARY SCHOOL	NONE IN PLAN AREA
MIDDLE SCHOOL	NONE IN PLAN AREA
HIGH SCHOOL	NONE IN PLAN AREA
CHILDREN'S PRE-SCHOOL	NONE IN PLAN AREA
LICENSED DAY CARE CENTER	NONE IN PLAN AREA
SENIOR CENTER	NONE IN PLAN AREA
YOUTH CENTER	NONE IN PLAN AREA

**LEGEND**

	EXISTING LANDFILL AREA
	PROPOSED SITE ASSIGNMENT MODIFICATION AREA

File No. SEC1-456-12 <b>SITEC ENVIRONMENTAL</b> Hazardous and Solid Waste Consultants SITEC Environmental, Inc. 789 Plain Street, Unit C Norwell, MA 02061 (781) 319-0100 Fax: (781) 334-4783	project: BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION client: BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT drawing title: FIGURE 13 LAND USE PLAN	scale: AS SHOWN date: FEB. 26, 2021 drawn: checked: ARQ approved: ARQ sheet ___ of ___ drawing number:	<table border="1"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Revision Description</th> <th>Chkd. by</th> <th>Appvd. by</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>04/21/2021</td> <td>ADD ADJUSTED FARMLAND LINE FROM SITE SPECIFIC SOIL SURV.</td> <td></td> <td>ARQ</td> </tr> <tr> <td>1</td> <td>04/20/2021</td> <td>ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS &amp; PE STAMP</td> <td></td> <td>ARQ</td> </tr> </tbody> </table>	No.	Date	Revision Description	Chkd. by	Appvd. by	2	04/21/2021	ADD ADJUSTED FARMLAND LINE FROM SITE SPECIFIC SOIL SURV.		ARQ	1	04/20/2021	ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS & PE STAMP		ARQ	
	No.	Date	Revision Description	Chkd. by	Appvd. by														
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1	04/20/2021	ADD SITE ASSIGNMENT MOD LIMITS, REV OFFSETS & PE STAMP		ARQ															



MILL POND

APPROXIMATE PATH OF MODELLED PARTICLE TRACKING (TYP.)

NIGHTINGALE STUMP LANDFILL

NON POTENTIAL DRINKING WATER SOURCE AREA (TYP.)


BOURNE LANDFILL

BROOKSIDE LANDFILL

ZONE 2 BOUNDARY

PUBLIC WATER SUPPLY WELL (TYP.)

4036000-08G



Project:	BOURNE LANDFILL SITE ASSIGNMENT MODIFICATION OF BOURNE DEPARTMENT OF INTEGRATED SOLID WASTE MANAGEMENT		
Scale:	NO SCALE	Date:	FEB. 26, 2021
Drawn:	ARQ	Checked:	ARQ
Approved:	ARQ	Revision Description:	
Drawing Number:		No.:	1
		Date:	04/20/2021
		Check by:	ARQ
		Appvd. by:	ARQ

FIGURE 14  
MassDEP WATER RESOURCES MAP

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

759 Plain Street, Unit C  
Marblehead, MA 02050  
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FAX (781) 834-4783

Acad No. SSEIR SITE PLAN-EXIST COND.dwg  
SE01-456-12

25-ACRE PARCEL

12-ACRE PARCEL

NOT INCLUDED IN APPLICATION  
12-ACRE PARCEL  
NEW SITE ASSIGNMENT  
TO ALLOW SOLID WASTE HANDLING

PORTION OF 25-ACRE PARCEL  
SITE ASSIGNMENT MODIFICATION  
TO ALLOW LANDFILLING  
(17.34 ACRES)

74-ACRE PARCEL  
EXISTING LANDFILL

BALER DRIVE

TRANSFER LANE

RECYCLE PLACE

WEST SIDE DRIVE

"FARMLAND OF STATEWIDE  
IMPORTANCE"

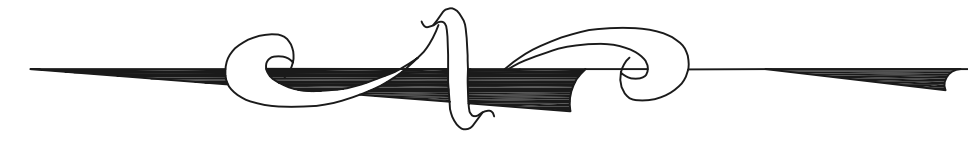
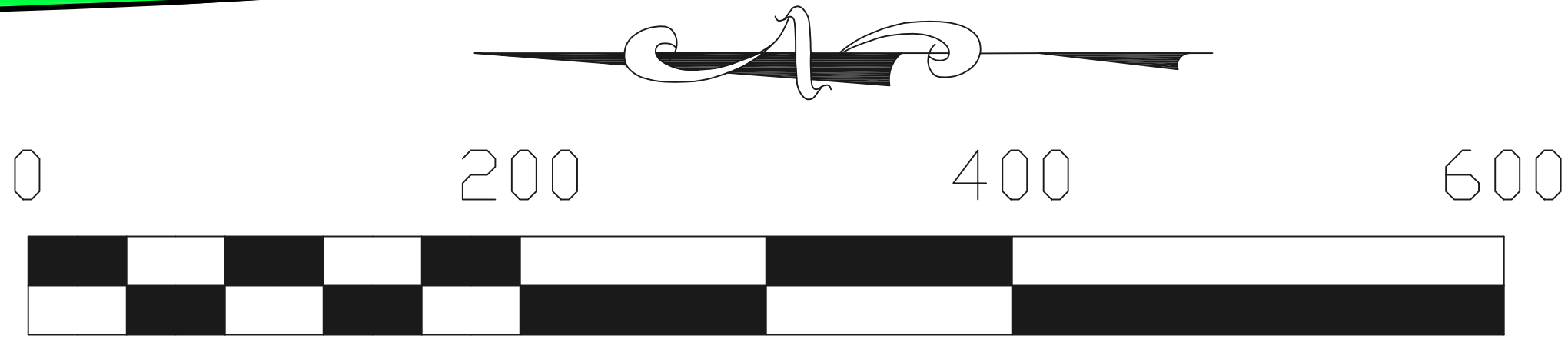
100' OFFSET FROM THE  
LIMIT OF "FARMLAND OF  
STATEWIDE IMPORTANCE"

LEGEND

MODIFY FOR LANDFILL

NOT INCLUDED IN APPLICATION  
NEW SITE ASSIGNMENT FOR  
SOLID WASTE HANDLING

NO PROPOSED CHANGES



Revision No.	Date	Revision Description
1	04/20/2021	REVISED "FARMLAND OF STATEWIDE IMPORTANCE" SITE ASSIGNMENT & LINER LIMITS CLARIFYING LABEL
2	12/9/2021	

scale:	AS SHOWN
date:	FEB. 26, 2021
drawn:	KWR
checked:	KWR
approved:	
drawing number:	

**SITEC ENVIRONMENTAL**  
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Acad No.  
 SITE SCHEMATIC OCT 19-R1.dwg  
 SE01-456-04