

**FIFTH FIVE-YEAR REVIEW REPORT
OLD BETHPAGE LANDFILL SUPERFUND SITE
OLD BETHPAGE
NASSAU COUNTY, NEW YORK**



Prepared by

**U.S. Environmental Protection Agency
Region 2
New York, NY**

Approved by:

Date:



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Figure 1 - Site Location Map

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LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
EPA	United States Environmental Protection Agency
MCLs	Maximum Contaminant Levels
mg/kg	Milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OBSWDC	Old Bethpage Solid Waste Disposal Complex
O&M	Operation and Maintenance
PRPs	Potentially Responsible Parties
ROD	Record of Decision
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
ug/L	Micrograms per Liter
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Old Bethpage Landfill (OBL) Superfund site (Site) located in the Village of Old Bethpage, Nassau County, New York. The triggering action for this statutory FYR is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit, and addresses the identification and abatement of the source of Site contamination at the landfill property and the groundwater contamination at the Site. The remedy for the OBL Site has been completed and is in the operation and maintenance (O&M) phase and is the subject of this FYR.

The OBL Superfund Site FYR was led by Maria Jon, EPA Remedial Project Manager (RPM). Participants included Salvatore Badalamenti (EPA Eastern New York Remediation Section Chief), Robert Alvey (EPA Hydrogeologist), Charles Nace (EPA Risk Assessor), and Cecilia Echols (EPA Community Involvement Coordinator (CIC)). Benjamin Rung, representative for the New York State Department of Environmental Conservation (NYSDEC) also assisted in the preparation of this report. The Town of Oyster Bay (the Town) was notified of the initiation of the FYR. The review began on 10/06/2016.

Site Background

The Site is located in Old Bethpage, Town of Oyster Bay, Nassau County, New York. The 68-acre landfill is an inactive municipal landfill that is part of a larger sanitary landfill complex, namely, the Old Bethpage Solid Waste Disposal Complex (OBSWDC). The OBSWDC is owned and operated by the Town of Oyster Bay. The property on which the landfill is located is bounded primarily on the north by Bethpage Sweet Hollow Road, on the east by Winding Road and on the west by Claremont Road and Round Swamp Road. See Figure 1.

The OBSWDC consists of a total of 134 acres which contain the closed and capped landfill, inactive incinerators, a municipal solid waste transfer facility, a groundwater treatment facility, a leachate treatment facility, landfill gas control and recovery systems, a periodically operated NYSDEC approved clean fill disposal site, a recycling facility, scale house, recharge basins, stockpile areas and vehicle maintenance facilities.

The Town of Oyster Bay (Town) began landfilling operations in 1958, which consisted of processing and disposal of municipal waste at the OBSWDC. The municipal wastes were burned in two on-Site incinerators, and excess materials were compacted and baled for disposal in the adjacent landfill. The landfill also accepted incinerator ash and residue, as well as raw municipal solid waste which bypassed the incinerators during periods of maintenance downtime. In 1986, all landfilling and incineration activities ceased, and the Town began to ship off-site all waste collected and not recycled.

In 1979, local, state and federal investigations were initiated to evaluate the groundwater quality beneath and adjacent to the OBSWDC and the Site's potential impact to the public health and safety of area residents. The data obtained during these investigations indicated the presence of inorganic compounds and volatile organic compounds (VOCs) in the groundwater. VOCs detected in the groundwater were 1,2-dichloroethene, vinyl chloride, benzene, toluene, ethylbenzene and xylenes. In addition, methane gas was detected in the subsurface soil, both on- and off-Site. The Site was listed on the National Priorities List (NPL) on September 8, 1983.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Old Bethpage Solid Waste Disposal Complex		
EPA ID: NYD980531727		
Region: 2	State: NY	City/County: Old Bethpage/Nassau
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Maria Jon		
Author affiliation: EPA		
Review period 9/1/2012 thru 7/1/2017		
Date of site inspection: 5/25/2017		
Type of review: Statutory		
Review number: 5		
Triggering action date: 9/30/2012		
Due date (five years after triggering action date): 9/30/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

A Remedial Investigation and Feasibility Study (RI/FS) were completed for the Site in 1987. The RI included drilling and installing groundwater monitoring wells, collecting groundwater and soil samples for laboratory analyses, and a subsurface gas study. Based on the results of the RI, EPA performed a risk assessment for the Site.

The assessment concluded that the main health risk associated with the Site is drinking contaminated groundwater, and since the Village of Farmingdale uses the public drinking water wells directly downstream of the landfill, these wells could be threatened by site related contaminants. The primary contaminants associated with the landfill, and detected in the groundwater, included benzene, toluene, ethylbenzene, xylenes, chlorobenzene. There were no completed pathways identified for ecological receptors.

Response Actions

Remedy Selection

From 1982 to 1984, prior to the NPL listing, the Town had already initiated various remediation activities. These remediation activities included the following:

- Installation of a gas control system to control subsurface gas migration.
- Installation of a landfill leachate collection and treatment system to control the accumulation and migration of landfill leachate off-Site.
- Placement of an impermeable clay cap on the eastern and northern slopes of the landfill (approximately 29 acres.)
- Installation of additional monitoring wells

EPA issued a Record of Decision (ROD) on March 17, 1988, and in June 1988, the Town entered into a Consent Decree with the State of New York. The remedial action objectives (RAOs) identified in the ROD were:

- to prevent, to the extent feasible, future contaminant migration from the landfill;
- to control the source of the contamination, i.e., the landfill;
- to prevent further expansion of the offsite groundwater plume of contamination; and
- to remediate the plume to ARARs, New York State Groundwater Standards and Drinking Water Guidelines.

The Consent Decree required the Town to undertake the design and construction of specific remedial actions, as set forth in the ROD:

- Design, construct and operate a groundwater collection and treatment facility to recover and remediate the contaminated groundwater plume associated with the landfill;
- Design and construct a cap for the remaining uncapped areas of the landfill, approximately 29 acres of the 68-acre landfill had been capped;
- Continue to operate the leachate treatment facility;
- Continue to operate the landfill gas migration control system; and
- Perform various monitoring to determine the effectiveness and performance of each of the remedial systems components described above.

Status of Implementation

Lockwood, Kessler & Bartlett, Inc., (LKB) was selected by the Town to prepare remedial design (RD) plans and specifications for all remedial components. These RDs were approved by the NYSDEC on various dates from 1989 through 1992. The following describes the remedial action (RA) efforts that were undertaken to implement each remedial component called for in the ROD and the Consent Decree:

Groundwater Collection and Treatment

The groundwater treatment system consists of five recovery wells, with an average depth of 280 feet delivering a combined maximum design flow of 1.5 million gallons per day (MGD); a treatment plant building, which houses the control room, laboratory, wet wells, pumps, acid rinse system and chemical holding tanks; an air stripper; a recharge basin with diffusion wells; and transmission piping.

A monitoring program to verify hydraulic capture and containment of the groundwater plume and to assess the progress of the remediation was designed and implemented when the groundwater treatment system began continuous operation on April 1, 1992.

Landfill Capping

As discussed previously, prior to the development of the final Consent Decree and the issuance of the ROD, 29 acres of the total 68 acres of the landfill had already been capped. The remaining portion, 39 acres, was capped under the provisions of the final Consent Decree and the ROD.

Landfill Leachate Collection and Treatment

A leachate collection and treatment system has been operating at the landfill since September 1983. The system is designed to collect, store, treat and dispose of leachate generated by the landfill. Collection wells and an under drain system have been installed over the 12-acre, lined portion of the landfill. The treated effluent is discharged into the Nassau County sewage treatment system, in accordance with the requirements of the State Pollution Discharge Elimination System (SPDES) and Nassau County ordinances.

Landfill Gas Collection and Treatment

Since 1982, the Town has implemented programs to prevent off-Site migration of landfill gas at the Site. A perimeter landfill gas-collection system has been installed and consists of 33 gas-recovery wells, 6,500 feet of collection header, and three condensate collection wells. Under the terms of the ROD and the Consent Decree, the Town is required to operate and maintain the gas control system in compliance with the requirements of 6 NYCRR Part 360 at the OBSWDC property boundary.

Institutional Controls Implementation

Table 4: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Landfill	Yes	No*	OBL	Establishing institutional controls in the form of deed restrictions on future uses of the landfill.	Environmental Easement/Restrictive Covenants were placed on the real property on June 30, 2017.
Groundwater	No	No		Restrict future groundwater use at the Site.	ICs in the form of existing state and local regulations restrict future groundwater use at the Site. Specifically, the NYSDOH State Sanitary Code regulates and prevent the installation of wells at a hazardous waste site in the state.

*The ROD did not require ICs, however, ICs are required under 6NYCRR Part 360 and were filed at the Office of the County Clerk on June 30, 2017.

Systems Operations/Operation & Maintenance

The groundwater remediation system began operating on April 1, 1992. A system of five recovery wells, designated RW-1 through RW-5, was installed at the leading edge of the VOC plume associated with the landfill. In 2016, the RW-1 and RW-2 were shut down since landfill related COCs were no longer detected in the influent. RW-3 – RW-5 continue to be operated by the NYSDEC for the purposes of addressing groundwater contamination associated with another NPL and NYSDEC site. As of this shut down date, the groundwater system is no longer being monitored or evaluated in conjunction with the OBL site.

In 2016, based on the decision to shut down the OBL groundwater recovery wells and continue operation under another site, the O&M plan was revised to begin attainment monitoring. The NYSDEC has modified the Consent Decree post-termination monitoring requirements, which include two sampling rounds to be performed annually, consisting of groundwater monitoring at the following wells: LF1, LF2, MW-5B, MW-6A, MW-6B, MW-6C, MW-6E, MW-6F, MW-8A, MW-8B, MW-9B, MW-9C, OBS-1. This new sampling program shall be in effect for a minimum of two years and will be used to confirm attainment of groundwater restoration, remedial action objectives and associated cleanup levels.

Soil gas quality and ambient air-quality monitoring are being conducted in the vicinity of the landfill on a quarterly basis to measure compliance with established ambient air-quality guidelines. Additionally, the Town submits an annual engineering report prepared by a licensed professional engineering firm for the purpose of summarizing the status of all landfill gas monitoring programs. The reports document the effectiveness of the methane gas-collection system for controlling gas migration beyond the boundary of the landfill. The frequency of monitoring perimeter gas wells, and on-Site buildings and structures, for methane was reduced from quarterly to annually, effective the second quarter of 2016.

In addition, landfill leachate is monitored semiannually for metals, sulfites, and total suspended solids. In 2016, the Town has received Nassau County approval to discharge leachate directly to the sewer system without treatment.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last five-year review and the current status of those recommendations.

Table 5: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
OBL	Protective	The implemented remedy for the Old Bethpage Landfill Superfund Site protects human health and the environment. The groundwater contamination and the potential for gas migration at the Old Bethpage Landfill are under control and there is no exposure to human receptors from site-related contaminants. There are no exposure pathways that could result in unacceptable risks and none expected as long as the Site use and groundwater use do not change and the engineered and access controls selected in the decision documents continue to be properly operated, monitored and maintained.

No issues or recommendations were identified in the FYR.

Since the last FYR, the deed restriction for the OBL, an institutional control required under 6NYCRR Part 360, was filed at the Office of the County Clerk on June 30, 2017.

In addition, an analysis of recovery well data indicated that the extraction system and monitoring wells are impacted by sources upgradient of the OBL and that the OBL groundwater remedy had effectively addressed and treated the OBL groundwater plume. Specifically, review of recovery well sampling data indicated no landfill COCs in Recovery Wells RW-1 and RW-2 and that the primary constituents detected in RW-3, RW-4, and RW-5 are attributable to non-landfill sources.

As a result, pumping from Recovery Wells RW-1 and RW-2 was ended on October 7, 2016 with approval of the NYSDEC. The OBL is currently in the Attainment Monitoring phase. Recovery pumping from RW-3, RW-4 and RW-5 continues and will continue for the specific purpose of capturing impacted groundwater associated with the Claremont Polychemical NPL site and the Former American Louvre NYSDEC Superfund site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Old Bethpage Landfill Superfund Site. The announcement can be found at the following web address:

https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf

In addition to this notification, EPA published a public notice of the performance of the fifth five-year review for the OBL Superfund Site on EPA's OBL Site webpage as well as on the Town of Oyster Bay Town Hall's website. The purpose of the public notice was to inform the community that the EPA would be conducting the fifth five-year review to ensure that the remedy implemented at the Site remains protective of public health and is functioning as designed. The notice included the RPM and the CIC address and telephone numbers for questions related to the FYR process or the Site. Once the FYR is completed, the results will be made available on EPA's Old Bethpage Landfill Site webpage and at the local Site repository located at the Plainview-Old Bethpage Public Library, 999 Old County Road, Plainview, New York. In addition, efforts will be made to reach out to stakeholders and local public officials to inform them of the results.

No interviews were conducted as part of this FYR.

Data Review

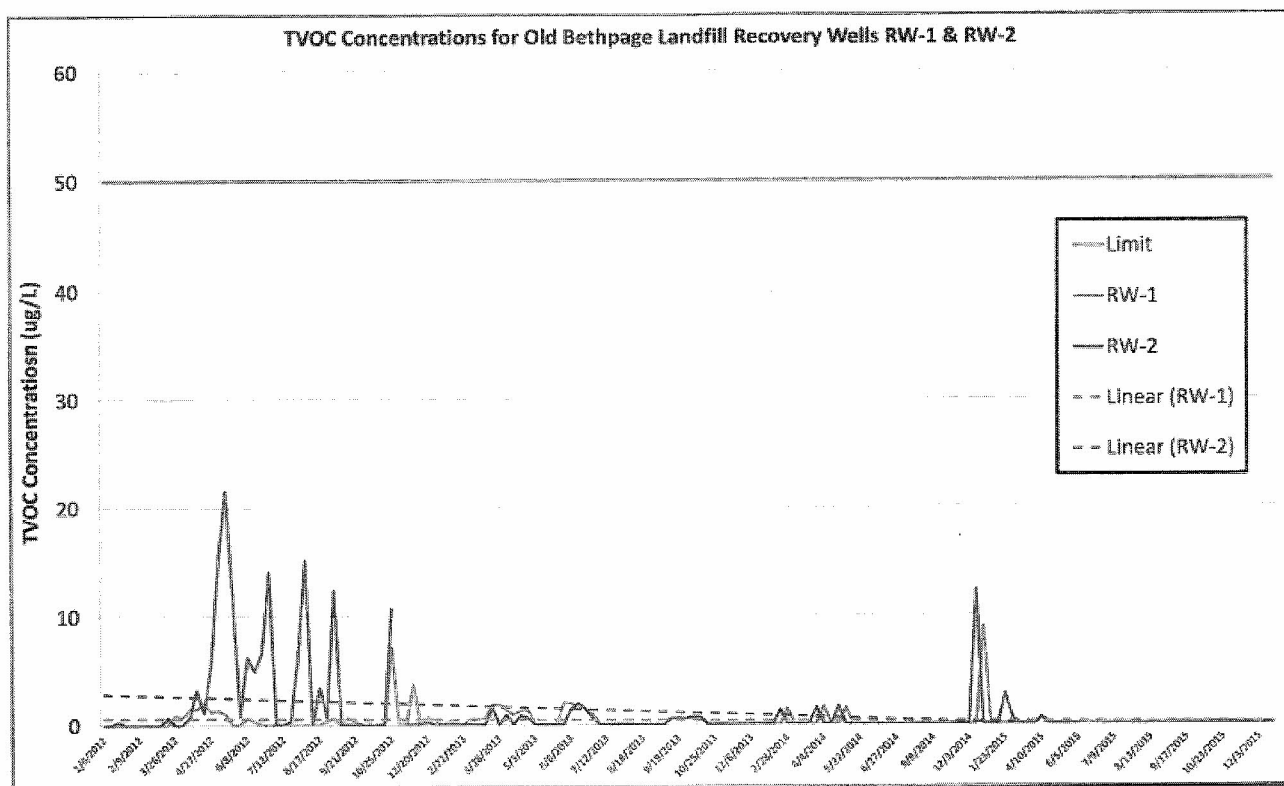
The landfill cap is well-maintained and fully operating as designed. The volume of leachate has steadily declined as the waste materials under the cap drained. Due to improved leachate quality, the Town received permission in 2016 to discharge the untreated leachate directly to the Nassau County sewer system. Monitoring is conducted by the Township twice per year. No issues have arisen that would impact the current discharge agreement.

The Town operates the perimeter landfill gas (LFG) collection system and maintains a zero percent LFG migration line at the OBL boundary, as documented by the October 2016 zero-percent LFG migration survey. The Town has monitored the perimeter LFG collection system exhaust quarterly for methane, and the results continue to indicate that minor emissions are not a concern.

Groundwater monitoring was performed during this review period and entailed collecting samples from each of the 16 wells required to be monitored. The samples were analyzed for VOCs and the required New York State Part 360 leachate indicator and inorganic parameters.

Review of the VOCs concentrations in the groundwater detected non-detectable levels or very low concentrations, below their respective groundwater standard or guidance values. Also, review of the leachate indicator and inorganic parameter results for this review period indicates that most of these parameters were not detected, or only detected sporadically at low concentrations, below their respective groundwater standard or guidance value.

In 2016, based on an analysis of contaminant concentrations in recovery wells RW-1 and RW-2, it was determined that no landfill COCs were detected in these wells. As a result, these wells were shut down in October 2016. A graph of the total volatile organic compounds (TVOC) sample results and trend lines since 2012 for RW-1 and RW-2 is provided below:



As stated in the O&M section, in 2016, based on the decision to terminate the groundwater extraction and treatment at the OBL Site, NYSDEC modified the Consent Decree post-termination monitoring requirements, which include two sampling rounds to be performed annually, consisting of: groundwater monitoring at the following wells: LF1, LF2, MW-5B, MW-6A, MW-6B, MW-6C, MW-6E, MW-6F, MW-8A, MW-8B, MW-9B, MW-9C, OBS-1.

Site Inspection

A Site inspection was conducted on May 25, 2017. The following parties were in attendance:

Maria Jon, EPA RPM
 Robert Alvey, EPA Hydrologist
 Chuck Nace, EPA Risk Assessor
 Matthew Russo, Town of Oyster Bay
 Sunita Chakraborti, Town of Oyster Bay
 Gary Terrell, Town of Oyster Bay
 John Gerlach, LKB, Inc.

Since the completion of the remedial action, the Site conditions have remained relatively stable. The OBSWDC is surrounded by a fence with a gated entrance to control access. There has been

no evidence of trespassing. The fence and the gate are inspected on a regular basis. The entrance is manned by Town personnel during operating hours, and visitors must sign in. At all times the entrance gate is closed and locked. Besides daily on-Site activity, fencing and the posting of signs have effectively controlled access to the Site. The monitoring wells installed within and around the Site are functional; and the landfill leachate collection system is operational.

TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The remedy identified in the 1988 ROD consisted of the design, construction and operation of a groundwater collection and treatment facility to recover and remediate the contaminated groundwater plume associated with the OBL; the design and construction of a cap for the remaining uncapped areas of the OBL; the continuation of operation of the leachate treatment facility and the OBL gas migration control system operation; and various monitoring activities to determine the effectiveness and performance of each of the remedial systems components described above.

The OBL landfill cap is well-maintained and fully operating as designed. The volume of leachate has steadily declined as the waste materials under the cap drained. Due to improved leachate quality, the Town received permission in 2016 to discharge the untreated leachate directly to the Nassau County sewer system. Monitoring is conducted by the Township twice per year. No issues have arisen that would impact the current discharge agreement.

The Town operates the perimeter LFG collection system and maintains a zero percent LFG migration line at the OBL boundary, as documented by the October 2016 zero-percent LFG migration survey. The Town monitors the perimeter LFG collection system exhaust weekly for methane, and the results continue to indicate that minor emissions are not a concern.

The Groundwater Collection and Treatment Facility has served its purpose for recovering and treating impacted groundwater from the OBL. Review of sampling data through 2015 confirmed that Recovery Wells RW-1 and RW-2 were no longer necessary as inlet sampling consistently detected no OBL related constituents of concern. In October 2016, NYSDEC assumed operational control of the groundwater treatment system and recovery wells for purposes of addressing groundwater plumes from other sites. To begin the attainment monitoring phase and evaluate post remediation conditions, NYSDEC modified the consent decree to require groundwater monitoring and analysis semi-annually for at least two years.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Human Health – As identified in previous five-year reviews, two complete exposure pathways were identified in the ROD; ambient air exposure and groundwater exposure. The remedial actions that have taken place at the Site have prevented the surrounding populations from potential exposure to contaminants found in the landfill. The cleanup levels that were identified in the ROD were based upon the existing standards in place at the time, and they are still valid.

However, some of the standards have been revised to be more stringent. Although not required by the ROD, the Town has been applying the new, more stringent, standards for compliance. Therefore, based on a review of the existing data it is concluded that the exposure assumptions, toxicity data, cleanup levels, and the remedial action objectives used at the time of the remedy are still valid.

Although vapor intrusion was not evaluated in the original ROD, vapor intrusion was evaluated as part of the 2002 Five-year Review. The conclusions from that evaluation indicated that since there were no residences within 100 feet of the groundwater plume, that the vapor intrusion pathway was not complete. Based upon observations during the Site visit and groundwater quality data over the last five years, the conclusion regarding vapor intrusion reached in the 2002 Five-year Review is still valid.

Ecological –There were no completed pathways identified for ecological receptors. Based upon review of the past and current data, combined with the Site visit, the previous conclusion that there are no completed exposure pathways for ecological receptors is still valid.

The remedial actions objectives used at the time of the remedy selection are still valid and protective of the environment.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the Five-Year Review:	
None	

OTHER FINDINGS

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The implemented remedy for the Old Bethpage Landfill Superfund Site protects human health and the environment.		

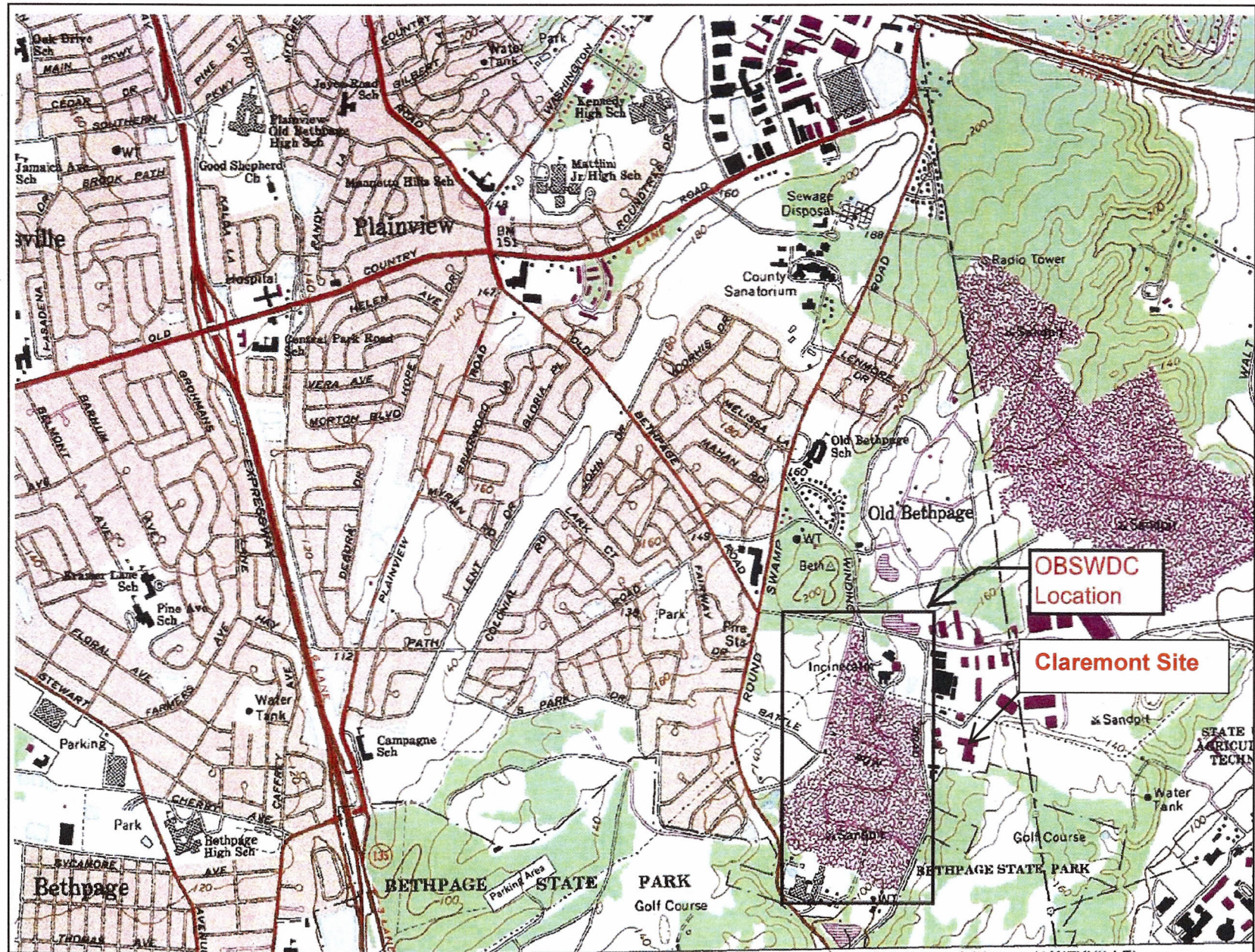
VIII. NEXT REVIEW

The next five-year review report for the OBL Superfund Site is required five years from the completion date of this review.

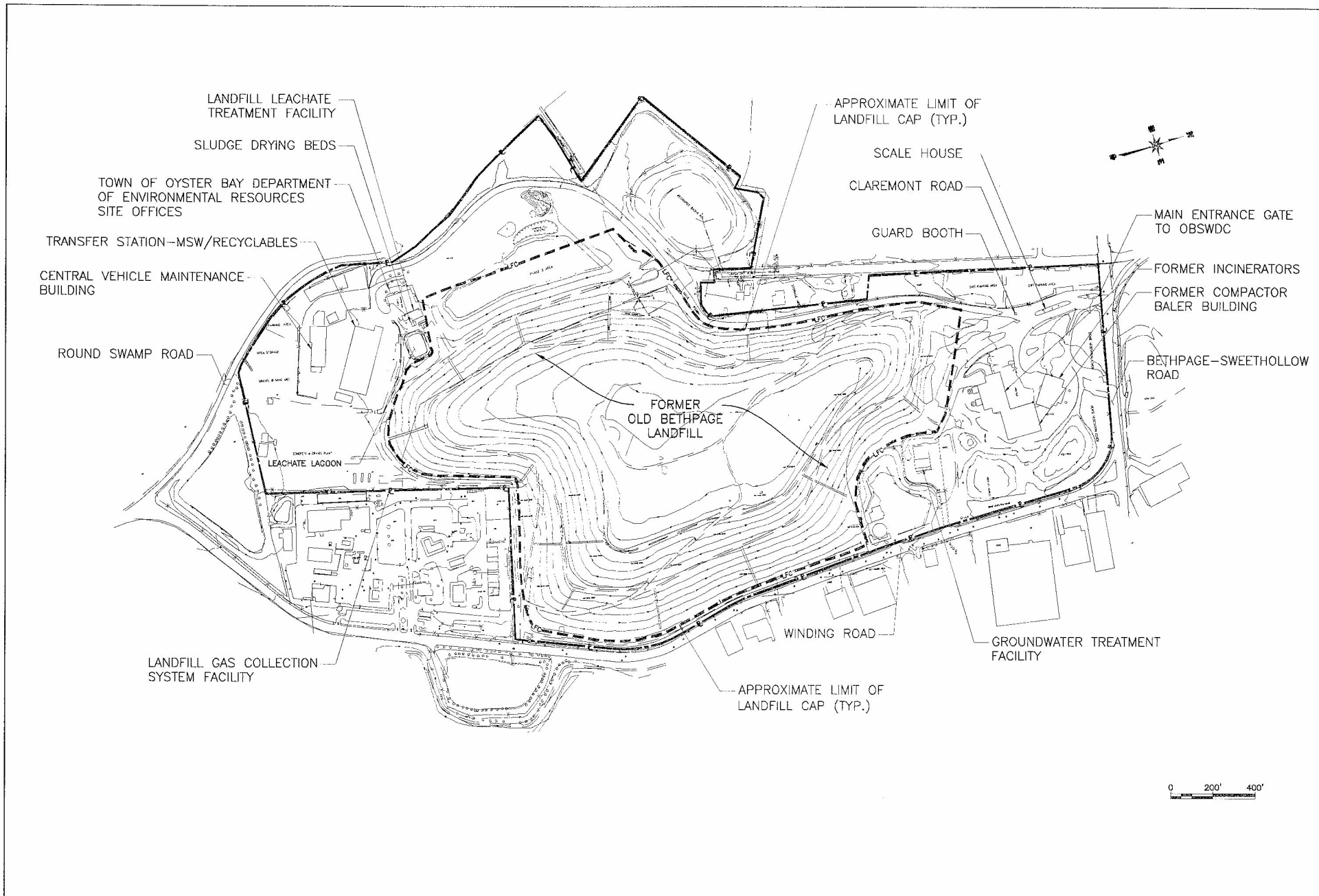
APPENDIX A – REFERENCE LIST

Document Title, Author and Date
Record of Decision, Old Bethpage Landfill, March 1988
New York State Department of Law Consent Decree, July 1988
EPA Guidance for conducting Five-Year Reviews, June 2001
2012 4th Quarter Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood, Kessler and Bartlett, April, 2013
2013 4 th Quarter and Annual Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, June 2014
2014 4 th Quarter and Annual Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, March 2015
2015 4 th Quarter and Annual Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, January 2016
1 st Quarter 2016 RAP Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, June 2016
2 nd Quarter 2016 RAP Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, September 2016
4th Periodic Review Report for Old Bethpage Landfill, Mar 31,2015-May 31, 2016, LKB, June 2016
3 rd Quarter 2016 RAP Report, Old Bethpage Solid Waste Disposal Complex Groundwater Treatment Facility, Lockwood Kessler and Bartlett, December 2016
Letter from Ben Rung, NYSDEC to Richard Betz, Town of Oyster Bay, “Operational Termination of Recovery Wells 1 & 2, Old Bethpage Landfill Groundwater Treatment Facility” Oct. 7, 2016

FIGURE 1 – SITE LOCATION ON USGS QUAD MAP



Source: Huntington, NY 7.5-Minute Quad



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