

DECISION DOCUMENT

Former Thypin Steel Plant
Voluntary Cleanup Program
Manorhaven, Nassau County
Site No. V00336
September 2015



Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - DECISION DOCUMENT

Former Thypin Steel Plant
Voluntary Cleanup Program
Manorhaven, Nassau County
Site No. V00336
September 2015

Statement of Purpose and Basis

This document presents the remedy for the Former Thypin Steel Plant site, a voluntary cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and applicable guidance.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Former Thypin Steel Plant site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

For OU: 01 & OU: 02

The elements of the remedy are as follows:

Based upon the results of the investigations at the site, the IRMs that have been performed, and the evaluation presented here, the Department has selected the following remedy for the site. This remedy includes continued operation of the implementation of ICs/ECs which include: green remediation principles and techniques, establishing and maintaining a site cover system, restriction of groundwater use, restricting the use of the property to restricted residential, commercial or industrial use property, and a site management plan for monitoring and future development. The Department believes that this remedy is protective of human health and the environment and satisfies the remediation objectives described in Section 6.5.

The elements of the selected remedy are as follows:

1. Engineering Control. A site cover will be required to allow for restricted residential, commercial or industrial use of the site. The cover will consist of either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of two feet of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for restricted residential use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified use as set forth in 6 NYCRR Part 375-6.7(d).

2. Institutional Control. Imposition of an institutional control in the form of an environmental easement for the controlled property that:

- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allows the use and development of the controlled property for restricted residential, commercial or industrial use as defined by Part 375-1.8(g), although the land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- requires compliance with the NYSDEC approved Site Management Plan.

3. A Site Management Plan for OU-1 and OU-2. A Site Management Plan is required which includes the following:

a) an Institutional Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

- Institutional Controls: An Environmental Easement will be imposed which will address the requirements and restrictions outlined in Paragraph 1 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site including provision for implementing actions recommended to address exposures related to soil vapor intrusion in any on-site or off-site buildings;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certifications of the institutional and engineering controls;

b) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of soil gas, indoor air and on-site and off-site groundwater to assess performance and effectiveness of the remedy;
- monitoring for vapor intrusion for any building occupied or developed on the site;
- If shallow groundwater off-site were ever found to be contaminated with VOCs, the Department would evaluate the need for additional soil vapor intrusion sampling in any off-site structures located within the proximity of a shallow groundwater plume;
- a provision for implementing actions recommended to address exposures related to soil vapor intrusion in any off-site buildings; and
- a schedule of monitoring and frequency of submittals to the Department.

Green Remediation

Green Remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of material which would otherwise be considered a waste.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

September 1, 2015

Date



James B. Harrington, P.E., Director
Remedial Bureau A

DECISION DOCUMENT

Former Thypin Steel Plant
Manorhaven, Nassau County
Site No. V00336
July 2015

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The Voluntary Cleanup Program (VCP) is a voluntary program. The goal of the VCP is to enhance private sector cleanup of brownfields by enabling parties to remediate sites using private rather than public funds and to reduce the development pressures on "greenfields." This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held on the Operable Unit-1 Remedial Action Work Plan (RAWP) in March 2006 and a public comment period was held on the Operable Unit-2 RAWP in August 2014, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

Port Washington Public Library
1 Library Drive
Port Washington, NY 11050
Phone: 516-883-4400

NYSDEC
Attn: Division of Environmental Remediation
50 Circle Road
SUNY @ Stony Brook, NY 11790
Phone: 631-444-0240

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at <http://www.dec.ny.gov/chemical/61092.html>

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The site is located at 5 Sagamore Hill Drive in the Village of Manorhaven, Town of North Hempstead, Nassau County and is approximately 11 acres in size.

Site Features: Since vacated by the Thylin Steel Company in 1988, there have been no occupants of the site. The existing buildings were demolished in 1990 and the site is currently overgrown with trees and brush.

Current Zoning/Use: The site is zoned for residential use, although it is currently vacant. There is a condominium complex and boat marina to the south, Manhasset Bay to the west, residential homes to the north and commercial/industrial facilities to the east of the site.

Past Uses of the Site: Historic use of the site dates back to 1916 when the site was occupied by the First Yale Naval Aviation Unit for flight training of U.S. Navy personnel during World War I. Since that time, the site has been occupied by various entities associated with either flight training or the manufacturing of airplanes or airplane parts. The Thylin Steel Company occupied the site from 1958 until 1988. The company occupied the existing buildings for the storage and cutting of steel products. Historic manufacturing activities are viewed as the source of the metal plating waste discovered in on-site soil and volatile organic compounds in groundwater.

Site Geology/Hydrogeology: Groundwater occurs approximately eight to ten feet below land surface (bls) depending on seasonal fluctuation. Subsurface soil is composed of fill material and sand to a depth of approximately 20 feet bls. Below that exists the Upper Glacial aquifer which extends to approximately 75 feet bls and is composed of sand, silt and clay with a higher proportion of silt and clay with increasing depth. The groundwater flow direction is to the south/southwest.

Operable Units:

Operable Unit (OU) Numbers 01 and 02 are the subject of this document.

OU-1 consists of the on-site soil, soil vapor and groundwater.

OU-2 consists of the soil, soil vapor, groundwater and intertidal sediments off-site.

A site location map is attached as Figure 1.

Operable Unit (OU) Numbers 01 and 02 are the subject of this document.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, at a minimum, alternatives that restrict the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in DER-10, Technical Guidance for Site Investigation and Remediation were evaluated.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The voluntary cleanup agreement is with the responsible party and was executed by the Department on January 2, 2001. The agreement requires the party to address on-site and off-site contamination. Accordingly, no enforcement actions are necessary.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or wastes identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- air
- groundwater
- soil
- sediment
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. For a full listing of all SCGs see: <http://www.dec.ny.gov/regulations/61794.html>

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The contaminants of concern identified at this site are:

For OU: 01

1,1,1-TCA	nickel
tetrachloroethene (PCE)	benzo(a)anthracene
trichloroethene (TCE)	dibenz[a,h]anthracene
zinc	indeno(1,2,3-CD)pyrene
arsenic	chrysene
cadmium	benzo(a)pyrene
chromium	benzo(b)fluoranthene
copper	benzo[k]fluoranthene

For OU: 02

1,1,1-TCA	trichloroethene (TCE)
tetrachloroethene (PCE)	

The contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Decision Document.

The following IRMs have been completed at this site based on conditions observed during the RI.

IRM

In June 2001, under the Voluntary Cleanup Program, eleven 20 yard roll-off containers were filled with black stained wood debris. The contaminated wood was removed from an area which was subjected to test pitting in an area which was the location of a former metal plating shop. The roll-offs were transported to a permitted disposal facility. A total of 118 tons of wood debris was disposed of as non-hazardous waste.

Soil samples results collected in 2000 and 2001 were compared to Technical and Administrative Guidance Memorandum (TAGM) #4046 Recommended Soil Cleanup Objectives. An additional 52.5 tons of contaminated soil containing chromium and other metals as well as semi-volatile organic compounds was excavated and disposed of off-site as hazardous waste at a permitted disposal facility.

In July 2003, under an approved Interim Remedial Measures work plan, an air sparge/soil vapor extraction system was constructed to remediate volatile organic compounds (VOCs) in on-site groundwater. The system became operational in August 2003 and operated until August 2004 at which time it was shutdown for the purposes of sampling and assessing groundwater quality in the shallow aquifer.

While groundwater quality had improved in the area where the system was operating, elevated levels of VOCs were detected in groundwater outside the influence of the system. As a result, the system was expanded to the affected area and operated from December 2005 until October 2008 after which time, monitoring of shallow groundwater revealed total VOC concentrations had diminished from approximately 2,000 parts per billion (ppb) to less than 50 ppb. The IRM activities are memorialized in a Remedial Action Completion Report dated November 2009.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination: A Remedial Investigation was conducted to delineate the nature and extent of soil, soil gas and groundwater contamination on-site and off-site. The primary contaminants of concern in soil are metals (arsenic, cadmium, chromium, copper, nickel and zinc) and semi-volatile organic compounds (SVOCs) and the primary contaminants of concern in soil gas and groundwater are volatile organic compounds (VOCs) (1,1,1-trichlorethane, tetrachloroethylene and trichloroethene).

Prior to Remediation:

Soil: Based on soil samples collected from soil borings and test pits in 2000 and 2001, soil cleanup objectives were exceeded for the metals identified in Section 6.1.2, in on-site soil. Arsenic was detected in the range of 1.9 parts per million (ppm) to 36.4 ppm. Cadmium was detected in the range of 0.06 ppm to 192 ppm. Chromium was detected in the range of 0.5 ppm to 33,900 ppm. Copper was detected in the range of 1.0 ppm to 1,620 ppm. Nickel was detected in the range of 1.0 ppm to 223 ppm, and zinc was detected in the range of 2.0 to 81,300 ppm. There were no elevated levels of site related metals, VOCs or SVOCs in off-site soils.

Groundwater: The groundwater monitoring well network revealed the presence of volatile organic compounds, identified in Section 6.1.2, in on-site groundwater which exceeded the NYS Groundwater Standards for Class GA Groundwaters. VOC concentrations in on-site groundwater were as high as 8,900 ppb. Temporary groundwater monitoring wells constructed off-site downgradient revealed sporadic levels exceeding the groundwater standards in deeper groundwater, however, VOC concentrations in shallow groundwater (10 feet to 20 feet bls) were below standards

Soil Gas: TCE was detected in on-site soil gas at levels from non-detect to 4,200 ug/m³. Additional VOCs (PCE and TCA) were detected in on-site soil gas at far lesser concentrations than TCE. VOC concentrations were not found to be elevated in any of the six off-site soil gas samples except for one sample which detected PCE at 41 ug/m³.

A vapor intrusion study was conducted at an off-site condominium complex located south (downgradient) of the site. A sub-slab soil gas and an indoor air sample was collected from the basement of each of the eight condominium buildings in the complex. One ambient air sample was also collected for comparative purposes, PCE ranged from ND to 18 ug/m³ in sub-slab soil gas and 0.81 ug/m³ to 16 ug/m³ in indoor air. TCE ranged from ND to 18 ug/m³ in sub-slab soil gas and ND to 0.97 ug/m³ in indoor air. TCA was ND in sub-slab soil gas in all buildings and ND to 1.3 ug/m³ in indoor air. All three compounds were ND in the ambient air sample.

Intertidal sediment sampling was conducted along Manhasset Bay. Sediments were analyzed for the Target Analyte List/Target Compound List. No compounds were detected at levels exceeding the Department's Class A saltwater sediment guidance values.

Post Interim Remedial Measure:

Soil: With the promulgation of 6NYCRR Part 375 on December 14, 2006, the soil quality data is being compared to the restricted residential use soil cleanup objectives (RRSCOs). Twelve surface soil samples (0-2 inches bls) were collected on-site and analyzed for metals. There was only one detection of arsenic at 22.6 ppm and copper at 343 ppm which were found to exceed the RRSCO of 16 ppm and 270 ppm, respectively. Elevated levels of the following SVOCs exists in on-site shallow soils (0-2 feet bls); Benzo(a)anthracene was detected in the range of non-detect (ND) to 7 ppm, the RRSCO is 1 ppm. Benzo(a)pyrene was detected in the range of ND to 5.8 ppm, the RRSCO is 1 ppm. Benzo(b)fluoranthene was detected in the range of ND to 4.7 ppm, the RRSCO is 1 ppm. Benzo(k)fluoranthene was ND to 4.9 ppm, the RRSCO is 3.9 ppm. Chrysene was ND to 7.6 ppm, the RRSCO is 3.9 ppm. Indeno(1,2,3-cd)pyrene was ND to 4.1 ppm, the RRSCO is 0.5 ppm and Dibenz(a,h)anthracene was ND to 2.1 ppm, the RRSCO is 0.33 ppm.

Groundwater: The groundwater monitoring well network revealed the presence of volatile organic compounds, identified in Section 6.1.2, in on-site groundwater which exceeded the NYS Groundwater Standards for Class GA Groundwaters. VOC concentrations in on-site groundwater are currently as high as 2,900 ppb. However, that is representative of groundwater quality in a discrete silt/clay zone approximately 35' bls where contaminants are sorbed onto organic particles. In November 2005, temporary groundwater monitoring wells constructed off-site downgradient revealed levels sporadically exceeding the groundwater standards in deeper groundwater (35' bls) with concentrations as high as 5,500 ppb. This again was indicative of a discrete zone where contaminants are sorbed onto silts and clays. VOC concentrations in shallow groundwater off-site (10 feet to 20 feet bls) were found to be below the groundwater standards. Access issues have restricted re-sampling off-site.

Under the Department approved Interim Remedial Measure, VOCs in shallow groundwater were remediated using air sparge/soil vapor extraction technology. Total VOC levels in shallow groundwater were reduced from approximately 2,000 ppb to less than 50 ppb.

Under the Department approved OU-1 Remedial Action Work Plan, deeper groundwater was remediated utilizing in-situ chemical oxidation (ISCO) injections. Four rounds of ISCO injections were performed into on-site groundwater (Figure 2). Post remedial monitoring revealed VOCs in groundwater have been significantly reduced and in most cases approach SCGs. Sporadic detections of residual VOCs have been discovered bound in the tight silt and clay layers beneath the site. In general, there has been a 90% reduction of VOCs in on-site groundwater.

Soil Gas: As a result of the remediation of on-site groundwater, VOCs levels in on-site soil gas have diminished by an order of magnitude or more.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure*.

People are not drinking contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. People will not come into contact with the contaminated soil unless they perform ground-intrusive work at the site. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The potential for soil vapor intrusion must be evaluated for any buildings developed on the Site and any actions recommended to address exposures related to soil vapor intrusion will be taken as necessary. Environmental sampling indicates soil vapor intrusion is not a current concern for off-site buildings.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

For OU 01:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

For OU 02:

Groundwater

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings off-site.

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation.

For OU 01: On-site, the selected remedy is referred to as the remedy.

The elements of the selected remedy, as shown in Figure 2, for OU: 01 are as follows:

Based upon the results of the investigations at the site, the IRMs that have been performed, and the evaluation presented here, the Department has selected the following remedy for the site. This remedy includes continued operation of the implementation of ICs/ECs which include: green remediation principles and techniques, establishing and maintaining a site cover system, restriction of groundwater use, restricting the use of the property to restricted residential, commercial or industrial use property, and a site management plan for monitoring and future development. The Department believes that this remedy is protective of human health and the environment and satisfies the remediation objectives described in Section 6.5.

The elements of the selected remedy are as follows:

1. **Site Cover.** A site cover will be required to allow for restricted residential, commercial or industrial use of the site. The cover will consist of either of the structures such as buildings, pavement, or sidewalks comprising the site development or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of two feet of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for restricted residential use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified use as set forth in 6 NYCRR Part 375-6.7(d).

2. Institutional Control. Imposition of an institutional control in the form of an environmental easement for the controlled property that:

- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allows the use and development of the controlled property for restricted residential, commercial or industrial use as defined by Part 375-1.8(g), although the land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- requires compliance with the NYSDEC approved Site Management Plan.

3. A Site Management Plan for OU-1 and OU-2. A Site Management Plan is required which includes the following:

a) an Institutional Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

- Institutional Controls: An Environmental Easement will be imposed which will address the requirements and restrictions outlined in Paragraph 1 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site including provision for implementing actions recommended to address exposures related to soil vapor intrusion in any on-site or off-site buildings;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certifications of the institutional and engineering controls;

b) ora Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of soil gas, indoor air and on-site and off-site groundwater to assess performance and effectiveness of the remedy;
- monitoring for vapor intrusion for any building occupied or developed on the site;
- If shallow groundwater off-site were ever found to be contaminated with VOCs, the Department would evaluate the need for additional soil vapor intrusion sampling in any off-site structures located within the proximity of a shallow groundwater plume;
- a provision for implementing actions recommended to address exposures related to soil vapor intrusion in any off-site buildings; and
- a schedule of monitoring and frequency of submittals to the Department.

4. Green Remediation

Green Remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of material which would otherwise be considered a waste.

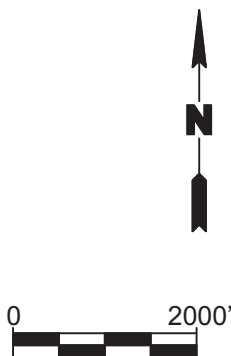


**FORMER THYPIN
STEEL FACILITY
(SITE)**

QUADRANGLE LOCATION



SOURCE:
USGS; 1979. Hicksville, New York
7.5 Minute Topographic Quadrangle



Title:

SITE LOCATION MAP

FORMER THYPIN STEEL FACILITY
MANORHAVEN, NEW YORK

Prepared for:

MBA-MANORHAVEN, LLC
PRINCETON, NEW JERSEY



ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: J.W.

Date: 17AUG11

Prepared by: C.P.

Scale: 1:25000

Project Mgr.: C.P.

Office: NY

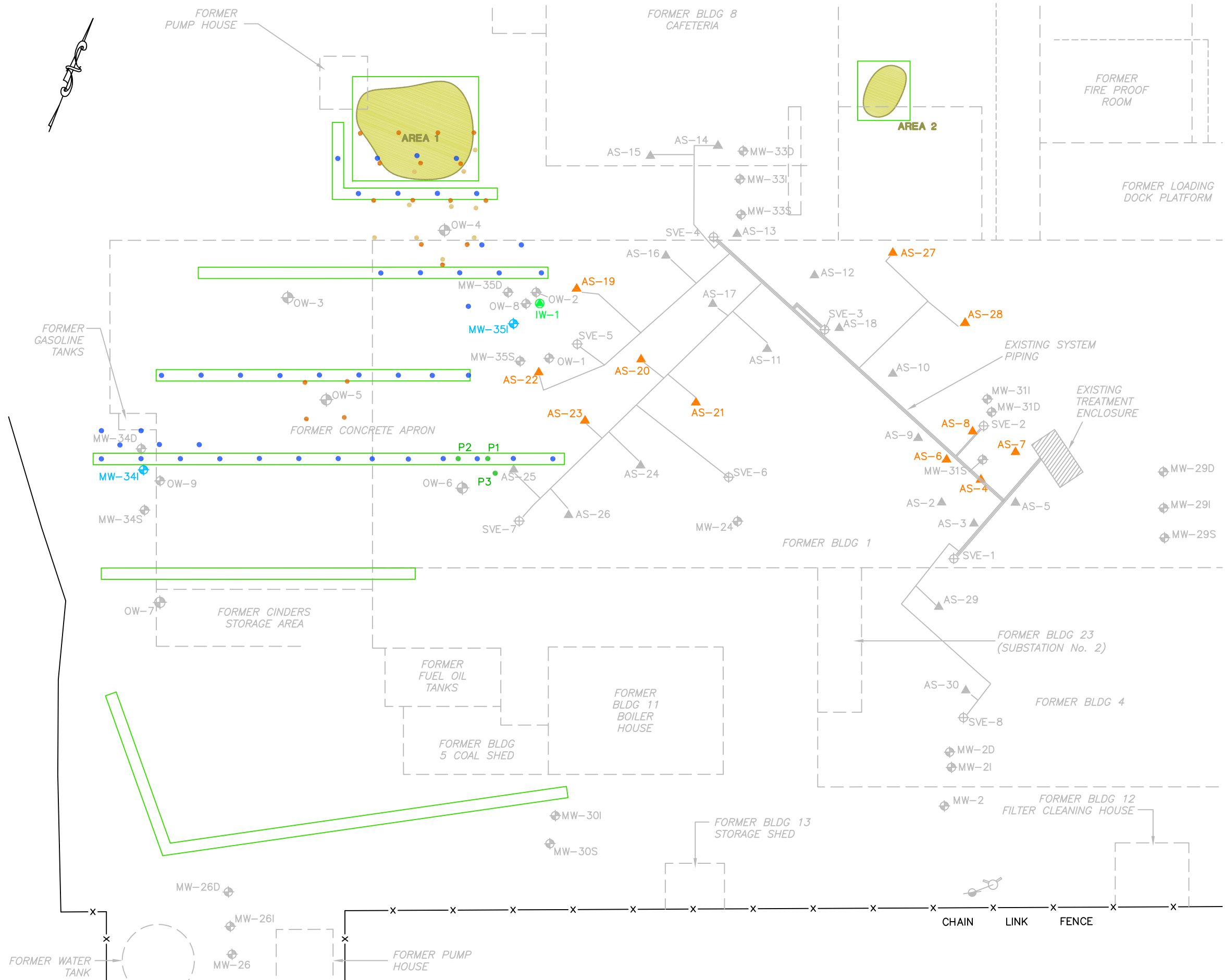
File No.: MBA0129404.CDR

Project No.: 77101Y

FIGURE

1

V:\CAD\PROJECTS\0771Y\0001Y\327\0771.0001Y327.01.DWG



DRAFT

LEGEND

- MW-35I LOCATION AND DESIGNATION OF EXISTING WELL SAMPLED
- WELL DEPTH DESIGNATIONS:
 - D - DEEP
 - I - INTERMEDIATE
 - S - SHALLOW
- MW-23 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- AS-12 LOCATION AND DESIGNATION OF AIR SPARGE WELL
- AS-21 LOCATION AND DESIGNATION OF AIR SPARGE WELL USED FOR FIRST PHASE OF INJECTIONS
- SVE-1 LOCATION AND DESIGNATION OF SOIL VAPOR EXTRACTION WELL
- IW-1 LOCATION AND DESIGNATION OF EXISTING INJECTION WELL
- LOCATION OF INJECTION POINT SECOND PHASE OF INJECTIONS
- LOCATION OF INJECTION POINT ISCO PILOT STUDY
- LOCATION OF INJECTION POINT THIRD PHASE OF INJECTIONS
- LOCATION OF INJECTION POINT FOURTH PHASE OF INJECTIONS
- AREAS OF IMPACT BASED ON MIP RESULTS
- LOCATION OF INJECTION POINTS FIRST ROUND OF INJECTIONS

SOURCE

BUILDING FOOTPRINT OBTAINED FROM LOCKWOOD GREENE ENGINEERS, INC. PLANCOR 999 PLOT PLAN AND THYPIN STEEL CO., INC. ADVERTISING BROCHURE.



Title:

INJECTION POINT LOCATIONS

FORMER THYPIN STEEL FACILITY
MANORHAVEN, NEW YORK

Prepared For:

MBA-MANORHAVEN, LLC
PRINCETON, NEW JERSEY


ROUX ASSOCIATES, INC.
*Environmental Consulting
& Management*

Compiled by: J.W.

Date: 17JAN13

Prepared by: J.A.D.

Scale: AS SHOWN

Project Mgr: C.P.

Project: 0771.0001Y000

File: 0771.0001Y327.01.DWG

FIGURE

2



**FORMER THYPIN
STEEL FACILITY
(SITE)**

QUADRANGLE LOCATION



0 2000'

SOURCE:
USGS; 1979. Hicksville, New York
7.5 Minute Topographic Quadrangle

Title:

SITE LOCATION MAP

FORMER THYPIN STEEL FACILITY
MANORHAVEN, NEW YORK

Prepared for:

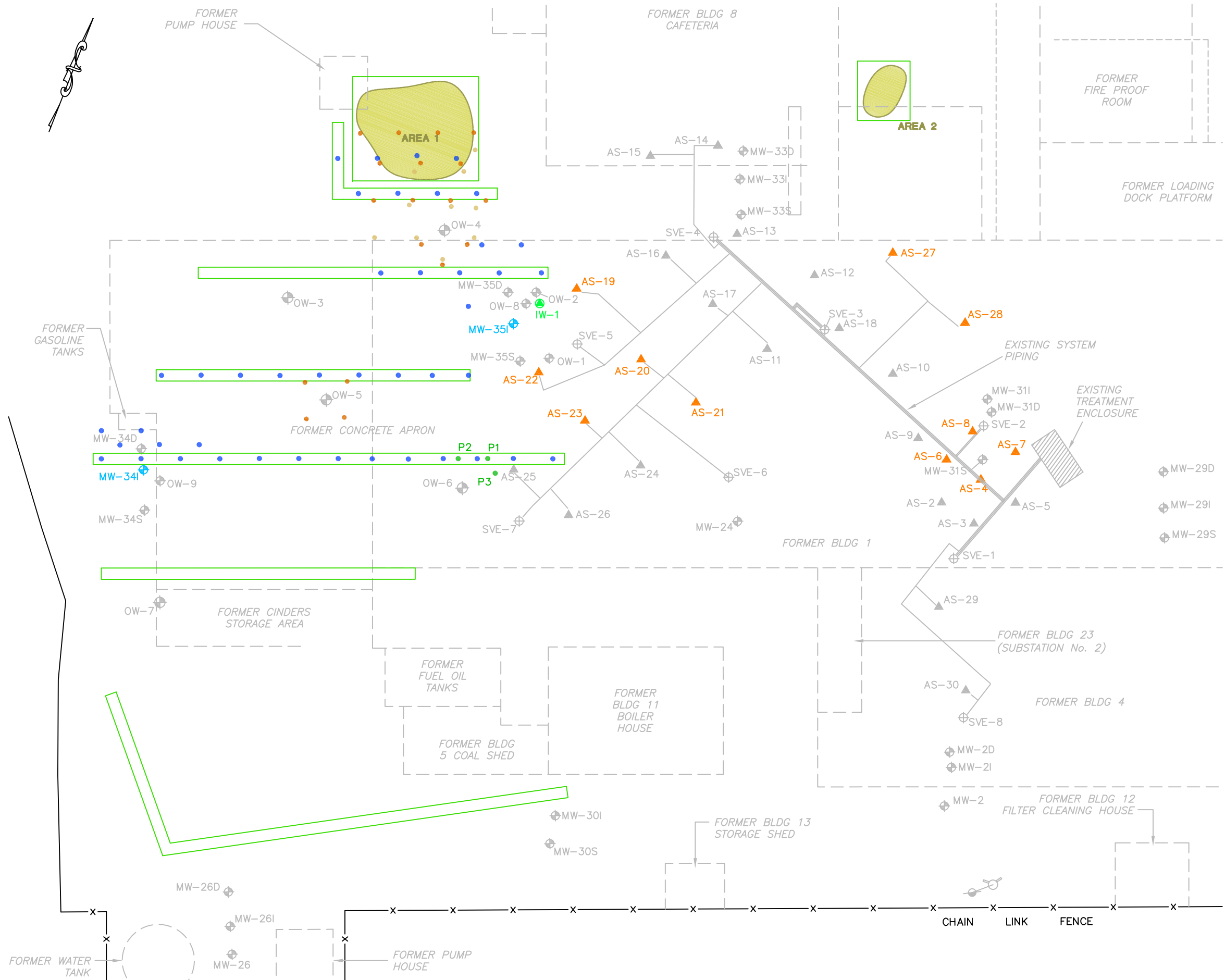
MBA-MANORHAVEN, LLC
PRINCETON, NEW JERSEY



ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: J.W.	Date: 17AUG11	FIGURE 1
Prepared by: C.P.	Scale: 1:25000	
Project Mgr.: C.P.	Office: NY	
File No.: MBA0129404.CDR	Project No.: 77101Y	

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DRAFT

LEGEND

- MW-35I LOCATION AND DESIGNATION OF EXISTING WELL SAMPLED
- WELL DEPTH DESIGNATIONS:
 - D - DEEP
 - I - INTERMEDIATE
 - S - SHALLOW
- MW-23 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- AS-12 LOCATION AND DESIGNATION OF AIR SPARGE WELL
- AS-21 LOCATION AND DESIGNATION OF AIR SPARGE WELL USED FOR FIRST PHASE OF INJECTIONS
- SVE-1 LOCATION AND DESIGNATION OF SOIL VAPOR EXTRACTION WELL
- IW-1 LOCATION AND DESIGNATION OF EXISTING INJECTION WELL
- LOCATION OF INJECTION POINT SECOND PHASE OF INJECTIONS
- LOCATION OF INJECTION POINT ISCO PILOT STUDY
- LOCATION OF INJECTION POINT THIRD PHASE OF INJECTIONS
- LOCATION OF INJECTION POINT FOURTH PHASE OF INJECTIONS
- AREAS OF IMPACT BASED ON MIP RESULTS
- LOCATION OF INJECTION POINTS FIRST ROUND OF INJECTIONS

SOURCE

BUILDING FOOTPRINT OBTAINED FROM LOCKWOOD GREENE ENGINEERS, INC. PLANCOR 999 PLOT PLAN AND THYPIN STEEL CO., INC. ADVERTISING BROCHURE.



Title:

INJECTION POINT LOCATIONS

FORMER THYPIN STEEL FACILITY
MANORHAVEN, NEW YORK

Prepared For:

MBA-MANORHAVEN, LLC
PRINCETON, NEW JERSEY


ROUX ASSOCIATES, INC.
*Environmental Consulting
& Management*

Compiled by: J.W.

Date: 17JAN13

Prepared by: J.A.D.

Scale: AS SHOWN

Project Mgr: C.P.

Project: 0771.0001Y000

File: 0771.0001Y327.01.DWG

FIGURE

2