REVISED

ENGINEERING DESIGN REPORT

for the

TRIMMER ROAD LANDFILL SITE
TOWN OF PARMA
MONROE COUNTY, NEW YORK

Prepared for:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Prepared by:

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REVISED
ENGINEERING DESIGN LANDFILL REPORT
TRIMMER ROAD SITE

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1.0 INTRODUCTION

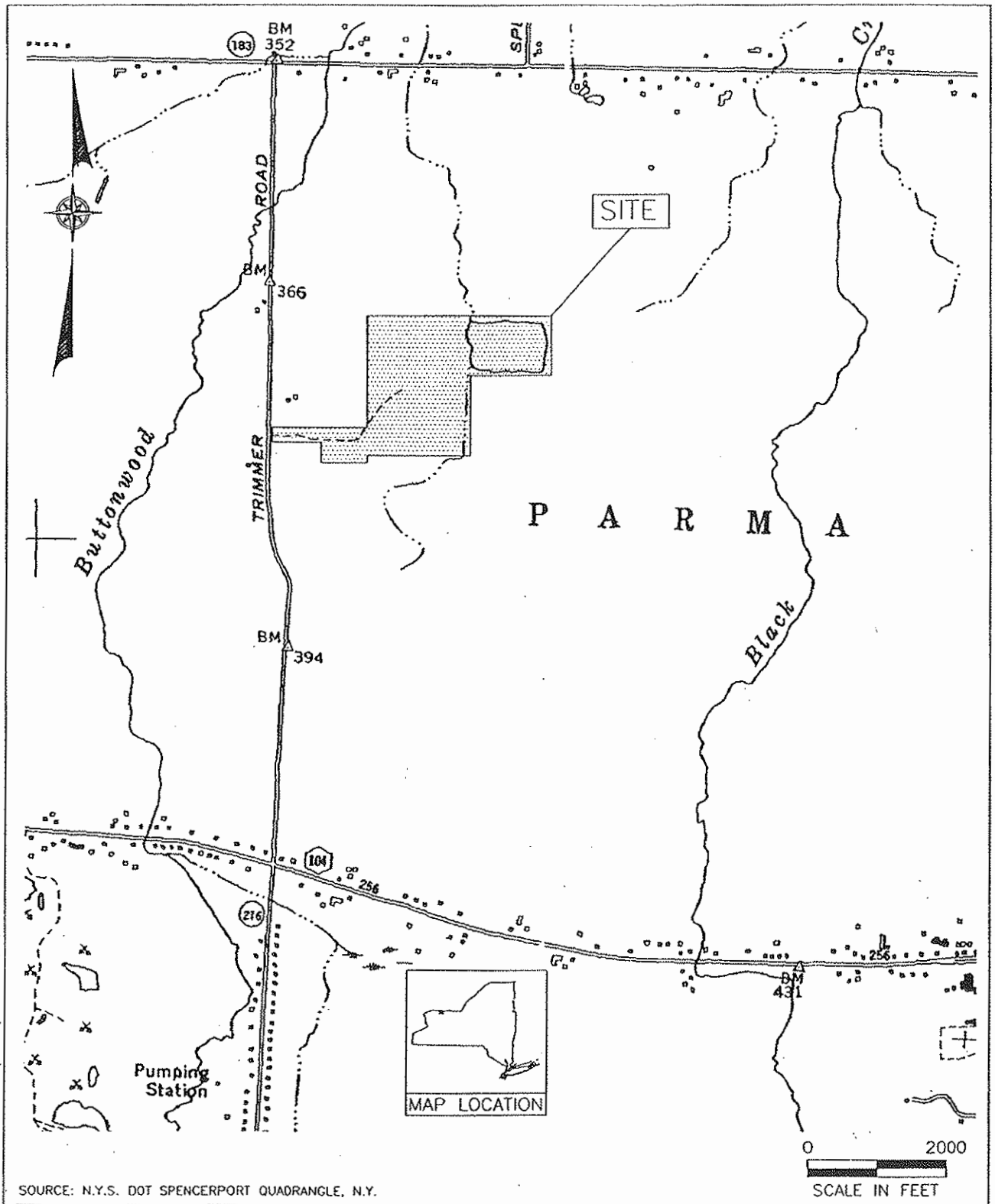
The Trimmer Road Landfill Site, located in the Town of Parma, Monroe County, New York (Figure 1-1), is a New York State Class 2 inactive hazardous waste disposal site, Registry No. 8-28-012. As part of New York State's program to investigate and remediate hazardous waste sites, the New York State Department of Environmental Conservation (NYSDEC) issued a Remedial Design (RD) Work Assignment to Dvirka and Bartilucci Consulting Engineers (D&B) to address the Trimmer Road Landfill Site. This Engineering Design Report is a deliverable under the work assignment.

1.1 Project Objective

The selected remedy for the Trimmer Road Landfill Site, as described in the March 2001 Record of Decision (ROD), is an evapotranspiration cap consisting of an enhanced soil cover, planted with selected vegetation designed to intercept infiltrating water and to promote enhanced evapotranspiration to the atmosphere. In addition, the remedy includes phytoremediation of contaminated groundwater northwest of the landfill; operation, monitoring and maintenance of the remedy; and implementation of site use restrictions. NYSDEC tasked D&B with providing design services for evapotranspiration cover test plots and phytoremediation buffer (vegetative buffer remediation) zones. A final remedial design package was submitted to the NYSDEC on April 4, 2006, which included the Engineering Design Report, dated February 2006.

1.2 Change in Scope

Bidding of the initial Contract Documents resulted in only two responsive bids and both greatly exceeded the cost estimate for the project. Therefore, the NYSDEC revised the scope of work for this design to initially focus on the implementation of the vegetative buffers. The NYSDEC has decided to evaluate the effectiveness of the native vegetative cover as the evapotranspiration cover for the Site. The purpose of this revised report is to present the conceptual design for full-scale implementation of the vegetative buffer remediation.



SOURCE: N.Y.S. DOT SPENCERPORT QUADRANGLE, N.Y.

TRIMMER ROAD LANDFILL
TOWN OF PARMA, NEW YORK

SITE LOCATION MAP

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A Division of William F. Cosulich Associates, P.C.

FIGURE 1-1

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1.3 Site Location, Ownership and Access

The Trimmer Road Landfill Site is located in a rural portion of the Town of Parma, Monroe County, New York, approximately 2 miles northwest of Parma Corners and approximately 10 miles west-northwest of the City of Rochester (Figure 1-1). The site is on the east side of Trimmer Road about 1 mile north of its intersection with Trimmer Road and New York State Route 104. The 60-acre site consists of an unlined landfill occupying 40 acres and includes a 10-acre pond. The site layout is shown on Figure 1-2.

The site is surrounded by undeveloped land on all sides, although there are a number of residential properties within a 1/2-mile radius. The on-site pond discharges to a tributary of Buttonwood Creek, which is a Class C stream that drains into Lake Ontario. There are drainage ditches along portions of the perimeter of the site. The ditches collect leachate seeps and surface runoff, and ultimately drain into the pond.

The current owner of the site is Mr. Patrick Fasciano, who purchased the property in 1980. The site is presently unused and is overgrown with emergent trees and scrub growth.

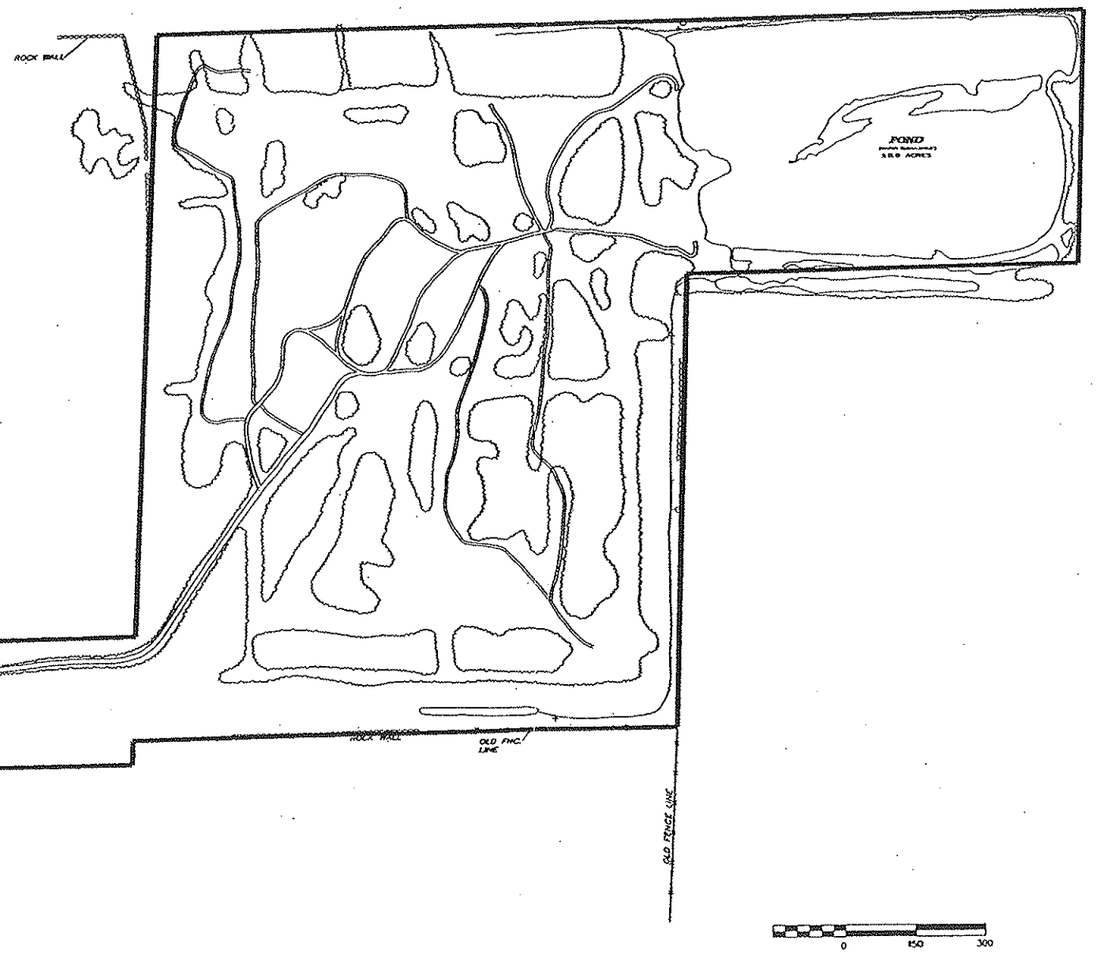
Access to the site is via a 1/4-mile long private road with a locked gate adjacent to Trimmer Road. Access can also be gained by walking through the surrounding forested land along recreational vehicle trails. The site is currently not fenced.

1.4 Site History

The Trimmer Road Landfill Site was a private disposal facility that accepted municipal waste from surrounding towns and industrial waste from local industries, including some that are known to have produced hazardous waste. There are also unconfirmed reports that drums were disposed at the site. While there is no direct evidence of hazardous waste disposal at the site, chemical analysis of groundwater samples indicates the presence of volatile organic compounds (VOCs) at concentrations exceeding groundwater standards. The land filling operations took place between 1952 and 1974.

NORTH

LEGEND
- ROCK WALL
- OLD WIRE FENCE LINE
- EDGE OF WATER



TRIMMER ROAD SITE
TOWN OF PARMA, NEW YORK

SITE MAP

FIGURE 1—2

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MAR 3, 2005 SEP C:\2273\Trimmer RD base.dwg

The Trimmer Road Landfill was in violation of NYSDEC regulations for sanitary landfills for much of the time it operated. Violations cited by Monroe County Health Department included refuse burned on-site; refuse not spread, compacted and covered; refuse protruding through cover; vermin and insect infestation; insufficient grading; uncontrolled release of leachate; and blowing paper.

1.5 Previous Investigations

A Phase I investigation conducted in 1983 identified sparse vegetation on the landfilled area, with debris exposed through the cover. At the time, numerous leachate seeps were noted discharging from the toe of the fill.

A Phase II investigation conducted in 1986 for the NYSDEC found that site groundwater was contaminated by organic compounds and metals, and established a preliminary groundwater flow direction in the overburden to the northwest. Leachate from landfill seeps was noted flowing into the on-site pond through the perimeter drainage ditches.

Three overburden (water table) monitoring wells were installed and sampled during the Phase II investigation. Groundwater sample results showed several VOCs at elevated concentrations, including vinyl chloride at 220 micrograms per liter (ug/l) and trans-1,2-dichloroethene up to 130 ug/l. Other VOCs and semi-volatile organic compounds (SVOCs) detected included benzene, toluene, ethylbenzene and xylene (BTEX), chlorobenzene, bis-(2-ethylhexyl) phthalate, diethylphthalate and butylbenzylphthalate. Metals detected in groundwater downgradient of the landfill, at concentrations exceeding NYSDEC Class GA groundwater standards included arsenic, barium, iron, magnesium and manganese.

The following summarizes the results from analysis of three surface water samples collected during the 1986 Phase II investigation (two from the perimeter ditches and one from the pond) and two surface water samples collected from upstream and downstream of the landfill in June 1994:

- Iron exceeded the NYSDEC Class C surface water standard by a factor of four in the downgradient sample and by a factor of nearly three in the pond water sample.
- Iron exceeded the NYSDEC Class C surface water standard by a factor of three in the upgradient sample.

The following summarizes the results from analysis of two sediment samples collected from the drainage ditches during the Phase II investigation and eight sediment samples collected from the drainage ditches in June 1994:

- Metals did not exceed the range of levels reported for non-contaminated soils sampled at the site.
- VOCs and SVOCs, including acetone, chloroform, 2-butanone, di-n-butylphthalate and bis(2-ethylhexyl) phthalate, were detected at concentrations ranging from 19 micrograms per kilogram (ug/kg) to 117 ug/kg in the upgradient sample.
- VOCs and SVOCs, including acetone, chloroform, 2-butanone, di-n-butylphthalate and bis(2-ethylhexyl) phthalate, were found at levels ranging from 19 ug/kg to 1,000 ug/kg in the downgradient sample.

The site was delisted in 1992 due to the relatively low levels of contamination detected during the Phase II study. Additional investigations in 1996 revealed the presence of site contamination in groundwater at levels that raised public health concerns due to the existence of downgradient private water supplies. Therefore, the site was relisted as a Class 2 site in 1997.

A Remedial Investigation (RI) was conducted at the site by D&B between October 1999 and January 2001. The purpose of the RI was to define the nature and extent of contamination resulting from historic landfilling activities at the site. The RI included drilling of soil borings, installation of monitoring wells and analysis of soil and groundwater samples to determine the nature and extent of contaminants in the subsurface as well as determination of physical properties of soil and hydrogeologic conditions. Surface water, sediment and leachate samples were also collected to determine levels of contamination in the pond. A geophysical survey was conducted to evaluate whether off-site migration of leachate was occurring, and a landfill gas survey was completed to evaluate landfill gas generation and identify possible contaminant hot spots.

A description of observations and conclusions made during the RI are summarized below from information presented in the RI Report (D&B, 2001).

Geology/Hydrogeology

Based on observations recorded during the drilling of monitoring wells and the excavation of test pits at on-site and off-site locations, overburden on the site consists of up to 2 feet of red silt cover material over as much as 25 feet of waste over bedrock. Generally, the waste material is situated on top of the bedrock. Off-site overburden consists of reddish brown, poorly sorted silt and fine sand, ranging from 2 to 7 feet in thickness.

Bedrock beneath the landfill site has been mapped as the Queenston shale (Rickard, 1970). Bedrock is generally shallow (less than 7 feet below ground surface). Shallow bedrock is evident by the frequency of tabular cobbles and boulders found at or near ground surface. These tabular cobbles and boulders are relatively resistant fragments of sandstone and siltstone bedrock that have weathered from the underlying sequences of shale, siltstone and sandstone.

Based on water table elevation measurements recorded during the RI, groundwater beneath and adjacent to the landfill is found at an average depth of 3.5 feet below the ground surface in wells screened at the base of the overburden. Groundwater is found at an average depth of 5 feet below the ground surface in wells screened in the bedrock.

Groundwater flow at the site is relatively slow, as determined by slug test data, and groundwater flow is toward the northwest in both the overburden and bedrock aquifers. The vertical component of groundwater flow is small and generally downward, although a slightly upward gradient was observed in two well clusters during the RI.

Landfill Gas

Results of landfill gas monitoring indicate that VOCs were not detectable, less than 1 part per million (ppm) and methane occurs in low concentrations less than 5% methane across the site. As a result, landfill gas is not a concern at the site.

Leachate

The concentrations of contaminants in leachate are relatively low. The highest concentration of total VOCs detected was 123 ug/l. SVOC concentrations are very low, with the maximum detected concentration of total SVOC of 38 ug/l. A number of metals exceeded standards, criteria and guidelines (SCGs). In particular, iron, manganese and sodium were detected at concentrations significantly exceeding SCGs. No pesticides or polychlorinated biphenyls (PCBs) were detected in any leachate sample. Most leachate is flowing into the perimeter ditches along the east side of the landfill, resulting in contravention of surface water SCGs, and then into the pond east of the landfill. Based on these results, leachate is a concern.

Subsurface Soil

Based on screening of subsurface soils conducted during drilling of off-site monitoring wells, excavation of test pits and analysis of one subsurface soil sample collected from one test pit, no buried waste and no landfill-related contaminants were identified in off-site subsurface soil. Subsurface soil overlying or adjacent to waste did not appear to contain contaminants. As a result, subsurface soil contamination is not a concern.

Groundwater

Based on groundwater samples collected during the investigation activities, shallow groundwater in the overburden at the northwestern corner of the site is slightly contaminated with VOCs and metals. SVOCs (except for bis[2-ethylhexyl]phthalate) and cyanide were not detected at concentrations above SCGs. Maximum total VOCs detected in the three water table

monitoring wells during the remedial investigation activities along the northwestern boundary of the landfill range from 204 ug/l to 428 ug/l.

Bedrock groundwater is not contaminated with VOCs, SVOCs, pesticides or PCBs. Metals concentrations in bedrock groundwater exceed SCGs for some metals, but it is unclear whether the concentrations are background or landfill-related. There are no apparent concentration differences for metals between upgradient and downgradient monitoring wells. Although contaminant concentrations for VOCs are not high, the off-site migration of groundwater contaminated with VOCs and metals is a concern.

Surface Water

Surface water samples collected during the RI indicate that landfill-related VOCs are present in surface water at or near the site; however, the concentrations do not exceed SCGs. In the one sample analyzed for the full suite of contaminants, SVOCs, pesticides and PCBs were not detected. Aluminum, iron and selenium exceeded SCGs in surface water sampled near the site. The metals are apparently conveyed from the landfill to the surface water through leachate seeps. The elevated concentrations of metals in surface water were only detected adjacent to the site. Based on these results, metals contamination of surface water is a potential concern.

Surface Water Sediment

Surface water sediment samples contained no exceedances of SCGs for VOCs, pesticides, PCBs or cyanide. Phenols were the only SVOCs detected, at a concentration slightly above SCGs. Phenols were not detected in leachate or groundwater samples, and may be naturally occurring in the surface water. Several metals were detected in exceedance of SCGs and, at one location, occur in concentrations above the severe effects level for benthic communities. These metals include iron and manganese, as well as arsenic, cadmium, nickel, silver and zinc. As a result, surface water sediment contamination is a concern.

Private Water Supply

Based on the results of the RI, private water supply wells do not contain VOCs in exceedance of SCGs. Iron was detected above drinking water SCGs in some of the wells, but the concentrations are lower than groundwater sampled from monitoring wells near the site and are considered background. Since the private water supply wells are located downgradient of the site, the potential for migration of VOC-contaminated groundwater is a concern.

2.0 PRE-DESIGN INVESTIGATION

A pre-design investigation was conducted by D&B in 2004 and 2005 as part of the remedial design work assignment issued by NYSDEC. The purpose of the pre-design investigation was to provide site-specific information to evaluate the extent of site groundwater contamination and to collect information required for the design of the selected remedial alternative. The pre-design investigation results were presented in the Pre-design Investigation Report (D&B, 2005).

Fieldwork was conducted in three phases. The first phase was performed in November 2004 and consisted of excavation of test pits. The second phase of the investigation was conducted in December 2004 and consisted of the installation of four additional groundwater monitoring wells. The third phase of the investigation was conducted in January 2005 and February 2005, and consisted of collection of groundwater samples from existing wells and the new wells installed at the site during the second phase of site activities. A summary of the pre-design investigation and results are presented below.

2.1 Test Pit Excavation

Eight test pits were excavated on and adjacent to the landfill as part of the pre-design investigation activities. The test pits were excavated to determine the thickness of soil cover and to identify the shallow soil stratigraphy in the area of the proposed evapotranspiration cover test plots.

The test pits were excavated using a rubber-tired backhoe. Topsoil was carefully removed and placed on one side of the pit to segregate it from subsequent waste material. Waste and fill were removed and placed on the opposite side of the excavation in such a way that minimized runoff of liquids from saturated waste and minimized contact with uncontaminated surface soils or excavated material. Generally, excavation did not proceed more than 1.5 feet into the waste. The pit was backfilled in the opposite order of material removal and compacted with the backhoe bucket.

Waste was encountered at all test pit locations, with the exception of PTP-8 (excavated at an off-site location adjacent the landfill). Waste was encountered at depths ranging from 1 foot below ground surface to 3 feet below ground surface.

2.2 Water Level Monitoring

Water level measurements were periodically obtained from on-site and off-site monitoring wells over the course of the pre-design field investigation. Prior to installation of the new monitoring wells (MW-11, MW-12, MW-13 and MW-14), a round of water level measurements was obtained from the existing well network on December 16, 2004. A second round of water level measurements was obtained from the four new monitoring wells and the 20 existing wells on March 10, 2005. Water level measurements were also obtained from selected monitoring wells at the site prior to collecting groundwater samples. Specifically, water levels were measured in monitoring wells MW-5S, MW-6S, MW-8S, MW-9S, MW-11, MW-12, MW-13 and MW-14 on January 20, 2005 and monitoring wells MW-4S and MW-7S on February 5, 2005.

Water level rounds were completed within as short a period as possible in order to provide a synoptic view of groundwater conditions. Measurements of depth to water and topographic survey data were used to calculate groundwater elevations and to prepare water table elevation contour maps.

Based on depth to water measurements recorded during RI and pre-design investigation, groundwater around the landfill is found at an average depth of 3.5-feet below grade surface in wells screened in overburden. Groundwater is found at an average depth of 5 feet below ground surface in wells screened in the bedrock.

Groundwater flow at the site is generally slow and toward the northwest in both the overburden and bedrock zones. The vertical component of groundwater flow is small and generally downward; however, an upward gradient was observed in two well clusters during

previous investigations. This upward flow appears to be associated with seasonal fluctuations in groundwater elevations. Therefore, the horizontal groundwater migration at the site is more significant than the vertical migration.

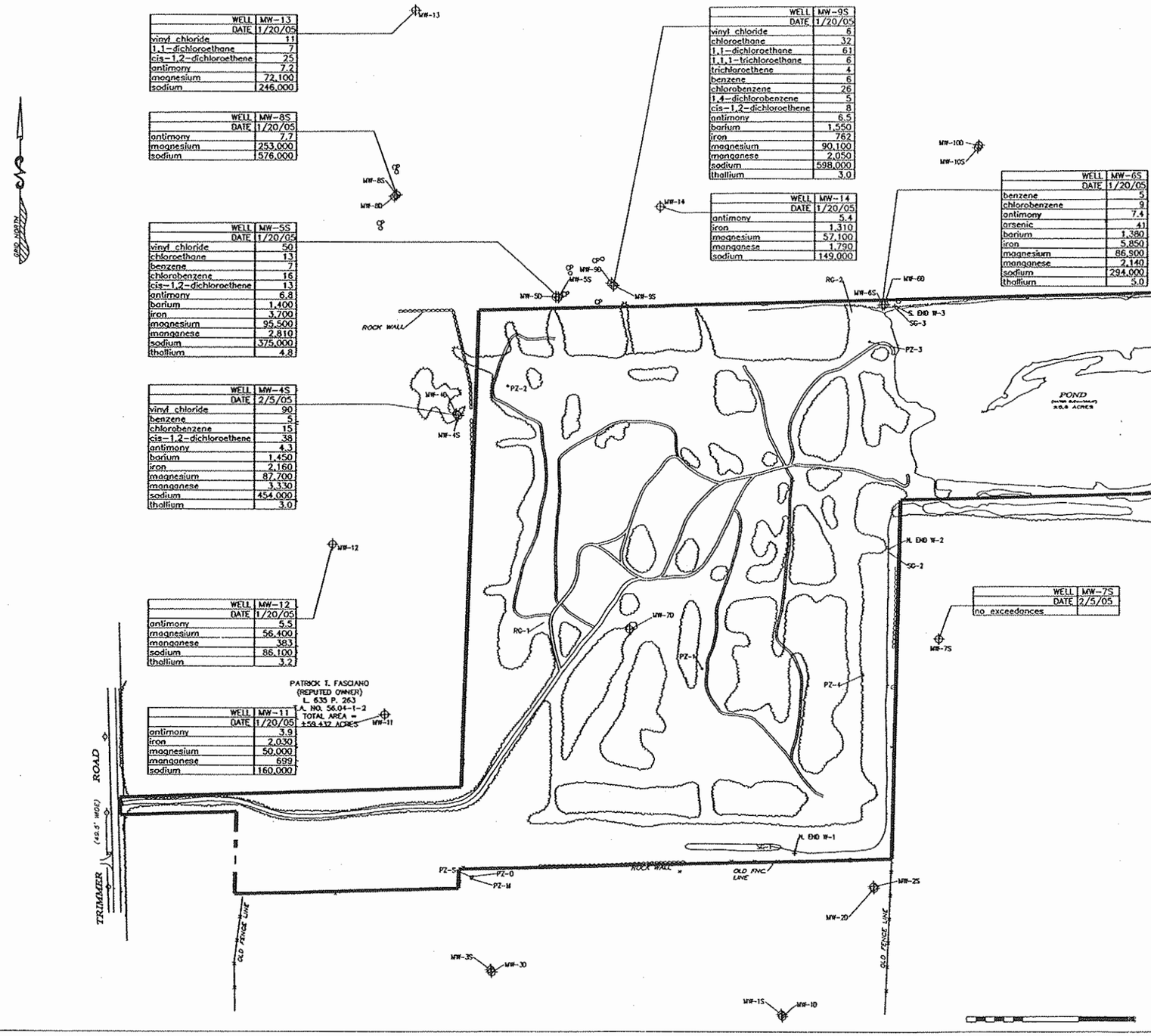
2.3 Groundwater Quality

One round of groundwater samples was collected during the pre-design investigation. Groundwater samples were collected from ten monitoring wells, including four new monitoring wells and six existing monitoring wells to further define the extent of groundwater contamination. Specifically, samples were collected from existing monitoring wells MW-4S, MW-5S, MW-6S, MW-7S, MW-8S and MW-9S and newly installed monitoring wells MW-11, MW-12, MW-13 and MW-14 (see Figure 2-1). All groundwater samples were analyzed for TCL VOCs, TAL inorganics and cyanide.

SCGs were exceeded for VOCs in groundwater samples collected from four of the existing monitoring wells, which are located outside the estimated extent of waste material. The following VOCs were detected at concentrations above SCGs in at least one groundwater sample collected from monitoring wells MW-4S, MW-5S, MW-6S and MW-9S: benzene, chlorobenzene, chloroethane, 1,4-dichlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethene, 1,1,1-trichloroethane and vinyl chloride.

SCGs were also exceeded for VOCs in the sample collected from MW-13, one of the four newly-installed shallow monitoring wells, which were located to further delineate the nature and extent of groundwater contamination at the site. MW-13, located to the north of MW-8S and MW-8D contained elevated concentrations of 1,1-dichloroethane, cis-1,2-dichloroethene and vinyl chloride. No VOCs were detected at concentrations exceeding SCGs in any of the other new wells (MW-11, MW-12 and MW-14).

The groundwater VOC contaminants identified during the pre-design investigation as exceeding SCGs are consistent with the site contaminants of concern listed in the Record of Decision (ROD). Consistent with the results of the RI, the area of highest VOC groundwater



WELL	MW-13
DATE	1/20/05
vinyl chloride	11
1,1-dichloroethane	7
cis-1,2-dichloroethene	25
antimony	7.2
magnesium	72,100
sodium	246,000

WELL	MW-8S
DATE	1/20/05
antimony	7.7
magnesium	253,000
sodium	576,000

WELL	MW-5S
DATE	1/20/05
vinyl chloride	50
chloroethane	13
benzene	7
chlorobenzene	16
cis-1,2-dichloroethene	13
antimony	6.8
barium	1,400
iron	3,700
magnesium	95,500
manganese	2,810
sodium	375,000
thallium	4.8

WELL	MW-4S
DATE	2/5/05
vinyl chloride	90
benzene	5
chlorobenzene	15
cis-1,2-dichloroethene	38
antimony	4.3
barium	1,450
iron	2,160
magnesium	87,700
manganese	3,330
sodium	454,000
thallium	3.0

WELL	MW-12
DATE	1/20/05
antimony	5.5
magnesium	56,400
manganese	363
sodium	86,100
thallium	3.2

WELL	MW-11
DATE	1/20/05
antimony	3.9
iron	2,030
magnesium	50,000
manganese	699
sodium	160,000

WELL	MW-9S
DATE	1/20/05
vinyl chloride	6
chloroethane	32
1,1-dichloroethane	61
1,1,1-trichloroethane	6
trichloroethene	4
benzene	6
chlorobenzene	26
1,4-dichlorobenzene	5
cis-1,2-dichloroethene	8
antimony	6.5
barium	1,550
iron	762
magnesium	90,100
manganese	2,050
sodium	598,000
thallium	3.0

WELL	MW-14
DATE	1/20/05
antimony	5.4
iron	1,310
magnesium	57,100
manganese	1,790
sodium	149,000

WELL	MW-6S
DATE	1/20/05
benzene	5
chlorobenzene	9
antimony	7.4
arsenic	41
barium	1,380
iron	5,850
magnesium	86,900
manganese	2,140
sodium	294,000
thallium	5.0

WELL	MW-7S
DATE	2/5/05
no exceedances	

LEGEND
- MW- MONITORING WELL
- ROCK WALL
- OLD WIRE FENCE LINE
- EDGE OF WATER

NYS CLASS GA GROUNDWATER SATNDARD	
vinyl chloride	2
chloroethane	5
1,1-dichloroethane	5
1,1,1-trichloroethane	5
trichloroethene	5
benzene	1
chlorobenzene	5
1,4-dichlorobenzene	3
cis-1,2-dichloroethene	5
antimony	3
arsenic	25
barium	1,000
iron	300
magnesium	35,000
manganese	300
sodium	20,000
thallium	0.5

concentrations reported in micrograms per liter

TRIMMER ROAD SITE
TOWN OF PARMA, NEW YORK

SCG EXCEEDANCES IN GROUNDWATER

FIGURE 2-1

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APRIL 19, 2005 SEP C:\2273\Trimmer RD base.dwg

contamination is located beneath the northwestern corner of the landfill and off-site to the northwest. Monitoring wells MW-4S, MW-5S and MW-9S exhibited the greatest total VOC concentrations during the pre-design investigation. These wells are located downgradient of the northwestern portion of the landfill.

Elevated levels of dissolved metals were detected in nine of the ten monitoring wells sampled during the pre-design investigations activities. No metals exceedances were detected in MW-7S. In the other wells, SCGs for dissolved antimony, barium, iron, magnesium, manganese, sodium and thallium were exceeded in at least one sample.

Groundwater inorganic contaminants identified during the pre-design investigation are generally consistent with the site contaminants of concern listed in the ROD. Consistent with the results of the RI, the area of highest metals groundwater contamination is located beneath the northwestern corner of the landfill and off-site to the northwest. In general, dissolved metal concentrations were found to be lower during the pre-design investigation than were detected during the RI (D&B, 2001).

3.0 BASIS OF DESIGN

3.1 Introduction

The initial design package for the Trimmer Road Landfill Site included all of elements of the Record of Decision (ROD) for the site, dated March 2001. Bidding of the initial Contract Documents resulted in only two responsive bids and both greatly exceeded the cost estimate for the project. Therefore, the NYSDEC revised the scope of work for this design to initially focus on the implementation of the vegetative buffers. The NYSDEC has decided to evaluate the effectiveness of the native vegetative cover as the evapotranspiration cover for the Site.

The main objective of the ROD is phytoremediation of contaminated groundwater northwest of the landfill. Therefore, the remedial design program will include the design of three vegetative buffers north and west of the landfill to address groundwater contamination downgradient of the landfill. Presented below is the basis for design. Permits, required approvals and potential site constraints are also addressed in this section.

3.2 Vegetative Buffers

Vegetative buffers will be constructed north and west of the landfill in an attempt to treat a portion of the shallow off-site contaminated groundwater plume. The planting of trees (poplar and willow) in these areas will address groundwater contamination by a combination of plant uptake and enhanced biodegradation by root-associated microorganisms. The trees have a high water uptake, are fast growing and deep-rooted.

3.2.1 Buffer Locations

The buffers to be installed in the vicinity of the Trimmer Road Landfill have been located to address the off-site groundwater contamination. Three vegetative buffers will be installed to the north and west of the landfill.

Vegetative Buffer No. 1 will be placed to intercept shallow groundwater contamination identified in monitoring wells MW-5 and MW-9 (see Figure 2-1). Vegetative Buffer No. 2 will be placed in the vicinity of monitoring well MW-4 to address shallow groundwater contamination detected in this area. Vegetative Buffer No. 3 will be placed in the vicinity of MW-8. Although low to non-detectable levels of volatile organic compounds (VOCs) have historically been detected in MW-8, MW-8 is located downgradient of MW-4 and elevated VOC levels have been detected in MW-4.

The locations for the buffers were selected during a site visit in November 2004. The locations identified in the field were selected based on observations that these areas contained fewer trees and were in greater decline than other more densely vegetated areas. It is planned to leave the more densely vegetated areas undisturbed.

3.2.2 Buffer Conceptual Design

Vegetative Buffer No. 1

The depth to groundwater in the vicinity of MW-5S (in the western portion of Vegetative Buffer No. 1) ranges between 1.7 feet and 3.6 feet below ground surface, with typical levels approximately 2.5 feet below ground surface. Depth to groundwater in the vicinity of MW-9S ranges between 1.3 feet and 5.6 feet below ground surface, with typical levels approximately 2 feet below ground surface. For poplar trees, a minimum unsaturated (vadose) zone of approximately 2 feet is typically required to ensure adequate root growth. For willow trees, the typical minimum vadose zone required is approximately 1.5 feet. Based on these values, it is not recommended to place additional borrow soil in this area to enhance the vadose zone. However, due to the shallower depth to water in the eastern portion of the area around MW-9S, the eastern end of Vegetative Buffer No. 1 will be planted with 2/3 willow trees and 1/3 poplar trees. The central portion of the buffer and the western end of the buffer will be planted with 2/3 poplar trees and 1/3 willow trees.

Vegetative Buffer No. 2

The depth to groundwater in the vicinity of MW-4S ranges from ground surface to approximately 1 foot below ground surface. Therefore, in order to provide the necessary vadose zone in this area, it is recommended that additional soil be placed to increase the vadose zone in Vegetative Buffer No. 2 to at least 2 feet. This area will be planted with 1/2 willow trees and 1/2 poplar trees.

Vegetative Buffer No. 3

The depth to groundwater in the vicinity of MW-8S ranges from just below ground surface to approximately 1.5 feet below ground surface. Therefore, similar to Vegetative Buffer No. 2, it is recommended that additional soil be placed in this area to create a sufficient vadose zone thickness for the preservation of the trees. Similar to Vegetative Buffer No. 2, this area will be planted with 1/2 willow trees and 1/2 poplar trees.

3.3 Permits and Approvals

Each of the three vegetative buffer areas will be installed at off-site locations and, as a result, temporary easements with the affected property owner(s) will be required. Listed below are the residential parcels that are anticipated to be affected, based on the conceptual design layout and available information:

1. Parcel Number 56.02-1-3.2 (899 Peck Road)
2. Parcel Number 56.02-1-27 (949 Peck Road)
3. Parcel Number 56.04-1-1 (140 Trimmer Road)

3.4 Site Constraints

The intent of this section is to provide a description of potential site constraints, including access issues and subsurface utilities that may impact the construction of the vegetative buffers.

With the exception of obtaining temporary easements with the impacted property owners for the purposes of installing the vegetative buffers, there are no additional site constraints currently identified for this project.

4.0 VEGETATIVE BUFFER DESIGN

4.1 Site Preparation

The areas designated on the Contract Drawings as Vegetative Buffer (Phytoremediation Buffer) No. 1, Vegetative Buffer No. 2 and Vegetative Buffer No. 3 will be cleared. Trees, branches and any woody vegetation will be reduced to wood chips. The wood chips will be placed within the landfill property. No material will be transported off-site.

4.2 Bed Preparation

For Vegetative Buffer No. 1, the overlying vegetation will be cleared. No topsoil will be added to this area.

As discussed in Section 3.0, depth to groundwater at Vegetative Buffer No. 2 and Vegetative Buffer No. 3 is less than the minimum of 1.5 to 2 feet required for adequate root growth of the trees. Therefore, topsoil will be placed in each of these buffer areas to ensure healthy growth of the trees. Topsoil material to be used in these areas will consist of fertile, friable natural top soil of loamy character without admixtures of subsoil and uniform in quality. Sufficient quantities of such topsoil material is readily available in the site vicinity.

4.3 Tree Planting

As shown on the Contract Drawings, poplar and willow trees will be planted in the vegetative buffer areas. The trees will be planted with 7-foot spacing (on center) with 10 feet between each row. This larger spacing is necessary due to the wider spread of the willow trees than the poplar trees. Topsoil material will be trenched approximately 10 inches wide and 6 inches into groundwater (approximately 2 to 5 feet below ground surface) for the entire length of each row. The trench will be filled with compost, granular fertilizer and the excavated topsoil to create a fairly uniform mixture throughout the length of the trench. The trees will be oriented in an east-west direction to maximize the number of trees planted in each area.

5.0 MAINTENANCE AND MONITORING

The Contractor will be responsible for maintaining and monitoring the vegetative buffers for 1 year. The following sections describe the maintenance and monitoring activities that the contractor will be required to perform.

The Contractor will be responsible for utilizing experienced tree and grass care personnel to perform the maintenance and monitoring of the vegetative buffers. Maintenance activities include mowing, weed control, pruning, animal and insect control, and replanting. Monitoring activities include monthly inspections that will include noting the need for maintenance activities, as well as observing for indications of plant disease, and abiotic and nutrient stress.

5.1 Maintenance Activities

5.1.1 Mowing

Mowing of the vegetation between the tree rows will be completed by the Contractor to reduce weed pressure, encourage nutrient cycling and discourage habitat for potentially tree-damaging animals. Vegetation will be mowed to a 3-inch height when the grass or weed height exceeds 6 inches.

5.1.2 Weed Control

Uncontrolled weed growth can inhibit tree growth, promote insect infestation and increase opportunities for fungal diseases. Weed control can be accomplished through mowing, hand pulling or herbicide use. The Contractor will be required to obtain NYSDEC approval prior to use of herbicide on the site.

5.1.3 Pruning

Pruning will be performed when branches are small in diameter. Pruning of the trees will be limited to the following:

- Removal of double leaders during the first growing season;
- Removal of any dead, diseased, or insect-infested portions of a tree; and
- Removal of branches close to the ground that may interfere with equipment access.

Light pruning will take place at any time of year, and pruning of dead, disease, or insect-infested branches will be performed as soon as these conditions are observed. Heavier pruning will be performed in late winter while the trees are dormant. To minimize the potential for disease transfer, the pruners will be sanitized between every 5 to 10 trees.

5.1.4 Animal and Insect Control

The vegetative buffers will be surrounded by fencing which will limit animal damage to the trees. Controlling grass/weed height around trees can reduce damage from small mammals.

Trees will be inspected at least monthly throughout the growing season for signs of insect damage. Such signs include defoliation, partially eaten leaves, discolored leaves, stunted growth, visible insects or eggs, insect habitats such as silk tents, or oozing sap/wood frass from borer holes. The Contractor will be required to address insect damage if more than 5 percent of the trees have significant damage.

If insect or animal damage is noted and action is required, the Contractor will be required to develop an insect/animal control plan for review and approval by the NYSDEC within 2 weeks of noting damage. Insect control often involves spraying the trees with chemical insecticides. The Contractor will be required to hire a licensed practitioner to apply insecticides in accordance with all local, state and federal regulations.

5.1.5 Replanting

Upon observation of dead trees during the contract period, the Contractor will notify the NYSDEC and replace the tree in the next growing season at no additional cost to the NYSDEC. If a dead tree is bordered by healthy trees which have created too much shade for a replant tree to grow, then this location may be left unplanted at the discretion of the NYSDEC.

5.2 Monitoring Activities

5.2.1 Monthly Inspections

The Contractor will be required to perform monthly inspections of the trees. During the inspection the Contractor will be required to note the following site conditions:

- Surface disturbances, such as rutting, erosion channels, tire tracks, settlement, etc.;
- Indications of vandalism or trespassing;
- Areas of settling;
- Areas of ponded water;
- Areas of significant erosion;
- Number of live/dead trees;
- Leaf condition, such as eaten leaves, discolored leaves, wilted or curled leaves;
- Bark condition, such as outer bark been damaged by animals, equipment or insects, including holes in the bark, oozing sap, wood shavings, etc.;
- Branch condition;
- Indications of animal burrows next to trees;
- Insects on the trees, including the bark and leaves;
- Grass condition;
- Leaf status, such as new leaf growth, trees losing their leaves, etc.; and

- Grass height.

The Contractor will be required to perform an annual population census to serve as an indicator of overall site health. The Contractor will be required to perform the census near the end of the year's growing season. To complete the census, the Contractor will be required to provide information about the condition of each tree.

The Contractor will note the average tree height and caliper in each planted zone, the total number of trees per row, the number of dead or dying trees, and the location(s) of stressed trees. Information about the cause of the tree stress (insect, mower, deer, drought damage, etc.) should be included in the census data, if known. The location and distribution of stressed trees is important to provide useful information for determining the cause of the stress and developing possible cures.

In addition to the above, the Contractor will be required to inspect the trees for the disease and abiotic stress. The following sections identify the disease and abiotic stress.

5.2.2 Plant Disease Damage

During the monthly inspections, the Contractor will be required to identify infectious diseases caused by fungi, viruses and/or nematodes. Such diseases can show up as blights, spots, rusts, cankers, galls or other deformities. The Contractor shall determine root diseases by digging up an affected tree and looking for signs of rot and/or root system deformities. If, during routine inspections, the Contractor notes excessive indications of infectious diseases (typically greater than 10 percent of the leaves), the Contractor will be required to immediately take samples of diseased tissue for identification by a NYSDEC-approved laboratory. Once identified, the Contractor will be required to provide a plant disease control plan to the NYSDEC for review and approval within 2 weeks of sample collection. In some instances, control of infectious disease will be implemented through removal of diseased branches or trees. In rare cases, application of fungicides or other chemical amendments by licensed professionals may be necessary.

5.2.3 Abiotic Stress

Abiotic stresses include drought stress, flood stress, herbicide stress and heat stress. The Contractor will be required to note signs of abiotic stress during the routine inspections. Symptoms of drought stress include curled, bent, scorched, or chlorotic leaves, early senescence (leaf drop), and dieback of twigs and branches in the crown. If signs of drought stress are noted, the Contractor will be required to notify the NYSDEC and provide recommendations for irrigation.

5.2.4 Groundwater Monitoring

As part of the remedial design, five new monitoring wells, MW-15, MW-16, MW-17, MW-18 and MW-19, will be installed by the Contractor. Groundwater samples will be collected from existing monitoring wells MW-4S, MW-5S, MW-8S, MW-9S and MW-14 and the five new monitoring wells. The NYSDEC will be responsible for the collection of groundwater samples from these monitoring wells once a year with the first sampling event coinciding with the installation of the vegetative buffers. Each sample will be analyzed Target Compound List VOCs in accordance with NYSDEC Analytical Services Protocol Method OLM04.2. The results will be tabulated and provided to the NYSDEC. Full Category B data packages will be provided with the summary tables.

5.3 Reporting

The Contractor will be required to provide site inspection status reports to the NYSDEC. The reports will present the results of the inspections as described in Section 5.2.1 and identify any maintenance activities performed during the month. In addition, if during the site inspection, damage to the trees is noted the Contractor will provide a recommended corrective action for the NYSDEC review and comment/approval.

6.0 EFFECTIVENESS MONITORING

Vegetative buffers will be monitored for their effectiveness of uptake of groundwater contamination. The effectiveness of the vegetative buffers will be evaluated through the results of the groundwater sampling discussed in Section 5.0. The results of the analysis of groundwater samples collected from monitoring wells MW-5S, MW-9S, MW-14, MW-15, MW-16, MW-17, MW-18 and MW-19 will be utilized to assess the effectiveness of Vegetative Buffer No. 1. The results of the analysis of groundwater samples collected from monitoring wells MW-4S, MW-8S and MW-15 will be used to assess the effectiveness of Vegetative Buffer Nos. 2 and 3.

7.0 COST EVALUATION

7.1 Purpose

The purpose of this cost estimate is to provide a budgetary value for funding the proposed remedial construction at the Trimmer Road Landfill Site.

7.2 Cost Estimate

This cost estimate presents capital costs based on the conceptual design developed and presented in this report. The unit costs are based on values contained in RS Means, quotes received from contractors and suppliers, as well as data from recently completed projects. Table 7-1 summarizes the costs of the proposed remedial construction at the Trimmer Road Landfill Site. As can be seen in Table 7-1, the estimated cost of the proposed remedial construction is approximately $230,490. The detailed costs are provided on Table 7-2.

Table 7-1

TRIMMER ROAD LANDFILL
CONSTRUCTION COST ESTIMATE

Payment Item No.	Description	Unit	Estimated Quantity	Unit or Lump Sum Price		Total Amount
				Words	Figures	
1	Submittals, Mobilization, Site Preparation, Temporary Facilities and Utilities, Restoration and Demobilization	L.S.	1	Nineteen thousand dollars	$19,000.00	$19,000.00
2	Health and Safety	Days	30	Three hundred and forty dollars	$340.00	$10,200.00
3	Clearing and Grubbing	Acre	4.0	Five thousand dollars	$5,000.00	$20,000.00
4	Access Road	S.Y	3,500	Ten dollars	$10.00	$35,000.00
5	Fencing	Feet	1,900	Twenty-four dollars	$24.00	$45,600.00
6	Vegetative Buffers	L.S.	1	Seventy-nine thousand dollars	$79,000.00	$79,000.00
7	New Groundwater Monitoring Wells	Linear Feet	66	Sixty-five dollars	$65.00	$4,290.00
8	Operations and Maintenance	L.S.	1	Seventeen thousand four hundred dollars	$17,400.00	$17,400.00
GRAND TOTAL IN WORDS: Two hundred and thirty thousand four hundred and ninety dollars						
GRAND TOTAL IN FIGURES: $230,490						

Bids will be compared on the basis of the TOTAL AMOUNT BID FOR ITEMS 1 THROUGH 8.

TABLE 7-2
TRIMMER ROAD LANDFILL SITE
PARMA, NEW YORK
COST ESTIMATE

Item No.	Unit of Measure	Estimated Quantity	Description	Engineer's Estimate	
				Unit Price	Total Price
1	**L.S.**	**1**	**Submittals, Mobilization, Site Preparation, Temporary Facilities and Utilities, Restoration and Demobilization**		**$19,000.00**
	6% of total		*Mobilization, demobilization, plans, submittals, schedules, meetings and incidentals*		*$13,056.90*
	Month	*3*	*Construction trailer, field office expenses, temporary sanitary facilities and disposal of solid waste*	*$1,000.00*	*$3,000.00*
	LF	*850*	*Erosion and Sedimentation Control*	*$2.50*	*$2,125.00*
	L.S.	*1*	*Project Sign*		*$1,000.00*
2	**30**	**Days**	**Health and Safety**		**$10,200.00**
	Week	*4*	*Health and safety officer*	*$1,500.00*	*$6,000.00*
	Week	*4*	*Air monitoring equipment - PID, landfill gas monitor, particulate meter*	*$700.00*	*$2,800.00*
	Week	*4*	*Decon station*	*$250.00*	*$1,000.00*
	L.S.	*1*	*Sampling, handling and disposal of PPE*	*$400.00*	*$400.00*
3	**Acre**	**4.0**	**Clearing and Grubbing**	**$5,000.00**	**$20,000**
	Acre	2.4	*Access Road to Contract Limit*	*$5,000.00*	*$12,000*
	Acre	0.3	*Area Surrounding MWs*	*$5,000.00*	*$1,500*
	Acre	*0.6*	*Phytoremediation Buffer No. 1*	*$5,000.00*	*$3,000*
	Acre	*0.2*	*Phytoremediation Buffer No. 2*	*$5,000.00*	*$1,000*
	Acre	*0.4*	*Phytoremediation Buffer No. 3*	*$5,000.00*	*$2,000*
4	**S.Y.**	**3,500**	**Access Road**	**$10.00**	**$35,000**
5	**L.F.**	**1,900**	**6-Foot High Fencing**	**$24.00**	**$45,600**

TABLE 7-2
TRIMMER ROAD LANDFILL SITE
PARMA, NEW YORK
COST ESTIMATE

Item No.	Unit of Measure	Estimated Quantity	Description	Engineer's Estimate	
				Unit Price	Total Price
6	**L.S.**	**1**	**Vegetative Buffers**		**$79,000**
	C.Y.	*1,200*	*Topsoil*	*$28.22*	*$33,864*
	C.Y.	*110*	*Compost*	*$5.00*	*$550*
	L.F.	*3,000*	*Trenching and planting*	*$9.00*	*$27,000*
	Each	*221*	*Poplar Trees*	*$26.00*	*$5,746*
	Each	*258*	*Willow Trees*	*$26.00*	*$6,708*
	S.Y.	*4,300*	*Grass Seeding*	*$1.25*	*$5,375*
7	**L.F.**	**66**	**New Groundwater Monitoring Wells**	**$65.00**	**$4,290**
	L.S.	*1*	*Mobilization*	*$600.00*	*$600*
	Each	*5*	*Well/Boring Setup*	*$200.00*	*$1,000*
	L.F.	*66*	*4.25 HSA*	*$13.00*	*$858*
	L.F.	*50*	*2-inch PVC well screen*	*$8.00*	*$400*
	L.F.	*16*	*2-inch PVC well riser*	*$4.00*	*$64*
	Each	*15*	*Well screen sandpack material*	*$15.00*	*$225*
	Each	*5*	*Bentonite*	*$20.00*	*$100*
	Each	*5*	*Protective Casing*	*$200.00*	*$1,000*
	Each	*5*	*Keyed Alike Locks*	*$10.00*	*$50*
8	**L.S.**	**1**	**Operations and Maintenance**		**$17,400**
	Each	*12*	*Monthly Inspections*	*$400.00*	*$4,800*
	Each	*4*	*Mowing, Pruning*	*$600.00*	*$2,400*
	Tree	*24*	*Replacement of dead trees*	*$26.00*	*$624*
	Days	*12*	*Monthly Status Report*	*$800.00*	*$9,600*
Grand Total					**$230,490**

8.0 REFERENCES

Dvirka and Bartilucci Consulting Engineers. *Feasibility Study Report* -- Trimmer Road Landfill Site, Town of Parma, Monroe County, New York. Site Registry No. 8-28-012. February, 2001.

Dvirka and Bartilucci Consulting Engineers. *Pre-Design Investigation Report* -- Trimmer Road Landfill Site, Operable Unit 01, Town of Parma, Monroe County, New York. Site Registry No. 8-28-012. March, 2005.

Dvirka and Bartilucci Consulting Engineers. *Remedial Investigation Report* -- Trimmer Road Landfill Site, Town of Parma, Monroe County, New York. Site Registry No. 8-28-012. February, 2001.

New York State Department of Environmental Conservation. *Record of Decision* -- Trimmer Road Landfill Site, Town of Parma, Monroe County, New York. Site Registry No. 8-28-012. March, 2001.