Dvirka and Bartilucci
CONSULTING ENGINEERS

6800 Jericho Turnpike, Syosset, New York 11791
516-364-9892 • Fax: 516-364-9045

October 23, 1995

Mr. Robert Knizek, P.E.
Chief, Eastern Field Services Section
Division of Construction Management
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233

Re: Operation and Maintenance Manual
Cell No. 1 Cap
North Sea Landfill
Town of Southampton
D&B No. 1267-C

Dear Mr. Knizek:

On behalf of the Town of Southampton, enclosed are three (3) copies of the final Operation and Maintenance Manual dated September 1995 for the Post Closure Care of Cell No. 1 at the North Sea Landfill, Town of Southampton, New York.

This final manual supersedes the O&M Manual prepared by this office and submitted to NYSDEC and USEPA in November 1994 and May 1995.

This document reflects revisions made to the original O&M Manual in response to review comments received from both the NYSDEC and USEPA. Attached is a copy of a letter dated September 14, 1995 from the USEPA and a letter dated September 12, 1995 from the NYSDEC approving both the As-builts and the O&M Manual and requesting we finalize this document.

If you have any questions regarding this matter, please contact Mr. Robert Tschiember or me at your convenience.

Very truly yours,

Robert Tschiember FOR
C.J. Wachsmuth

CJW/ss
Enclosure
cc: John Grathwol, NYSDEC
Caroline Kwan, USEPA
Linda Riley, TOS
Thomas Talmage, TOS
Brian Gilbride, TOS
Bob Burns. D&B
R. Tschiember, D&B
♠1267/CJW09275.rk

Post-it® Fax Note 7671	Date 9/28/95	# of pages ▶ 1
To Bob Tschiember	From John Grathwol	
Co./Dept. D+B	Co.	
Phone #	Phone #	
Fax #	Fax #	

Conservation

EARTH DAY 25 1995 ENVIRONMENTAL PARTNERS

Michael Zagata
Commissioner

SEP 12 1995

Vincent Cannuscio

Mr. Richard J. Blowes
Deputy Supervisor
Town of Southampton
Town Hall
116 Hampton Road
Southampton, NY 11968

Dear Deputy Supervisor Blowes:

Re: Site Code 1-52-052
North Sea Landfill
Suffolk County

The Department has reviewed and approved the as-built drawings and Operation and Maintenance Manual for the site referenced above. The Town of Southampton may submit a payment voucher for the retainage on remedial action activities. Please do not include any additional costs on this voucher because retainage reimbursements are processed separately from other payments.

If you have any questions, please call me or John Grathwol at (518) 457-9285.

Sincerely,

Robert C. Knizek

Robert C. Knizek, P.E.
Chief, Eastern Field Services Section
Bureau of Construction Services
Division of Hazardous Waste Remediation

JG/lab
bcc: R. Knizek
J. Grathwol
Dayfile

SEP 1 4 1995

EXPRESS MAIL-
RETURN RECEIPT REQUESTED

Mr. Brian Gilbride, Sanitation Supervisor
Town of Southampton
Sanitation Department
116 Hampton Road
Southampton, New York 11968

Re: **Approval of the Operational & Maintenance (O&M) Manuals and As-Built Drawings**

Dear Mr. Gilbride:

The U.S. Environmental Protection and the New York State Department of Environmental Conservation have completed the review of the above referenced documents.

The O&M Manual received from your consultant, Dvirka Bartilucci, on June 15, 1995 should be made final. No additional corrections are needed. This report should be distributed to the appropriate personnel who will oversee the operational and maintenance of Cell #1. All monitoring data should be submitted to EPA for review and file. A benthic survey should be implemented this Fall. Please provide the name of your contractor and schedule of your monitoring program to EPA by September 29, 1995. EPA may want to take split samples in the future to confirm the monitoring data.

The revised As-Built drawings sent by your consultant on June 28, 1995 are approved. No additional change is necessary.

Please call me if you have any questions.

Thank you for your cooperation.

Sincerely yours,

Caroline Kwan
Project Manager
New York/Caribbean Superfund Branch II

cc: Robert Tschiember- D&B
Thomas Talmage- Town Engineer
John Grawoth-NYSDEC
James Delaney-B&R

OPERATION AND MAINTENANCE MANUAL

FOR THE POST-CLOSURE CARE

OF THE

NORTH SEA LANDFILL, CELL NO. 1 CAP

TOWN OF SOUTHAMPTON, NEW YORK

October 1994
Revised May 1995

Prepared for:

Dvirka and Bartilucci
6800 Jericho Turnpike
Syosset, New York 11791

On behalf of:

The Town of Southampton
116 Hampton Road
Southampton, New York 11968

For submission to:

USEPA Emergency & Remedial Response
26 Federal Plaza, Room 737
New York, New York 10278

Prepared by:

YEC, INC.
Clarkstown Executive Park
612 Corporate Way
Suite 4M
Valley Cottage, New York 10989

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Section 1

1 INTRODUCTION

1 INTRODUCTION

On February 21, 1991, the Town of Southampton entered into a Consent Decree with the United States Environmental Protection Agency (USEPA) for the closure of Cell No. 1 of the North Sea Landfill. As a part of the Consent Decree requirements, the Town was directed to prepare and submit for USEPA approval, an Operation and Maintenance Plan (O&M Plan) for the 30-year post-closure monitoring period following the closure of Cell No. 1 at the North Sea Landfill site.

1.1 SITE BACKGROUND

The North Sea Landfill is an active municipal landfill, publicly owned and operated since the 1960's by the Town of Southampton located in Suffolk County, New York. Figure 1-1 provides the regional setting of the landfill site. The site encompasses approximately 134 acres and is located southeast of the intersection of Majors Path and Great Hill Road in the Hamlet of North Sea in the Town of Southampton, Suffolk County, New York.

The landfill was initially constructed in 1963 for the disposal of municipal solid wastes and septic system wastes. The site includes two completed landfill cells (Cells No. 1 and 2), one active landfill cell (Cell No. 3), and an area of closed scavenger sludge lagoons, as shown in Figure 1-2.

Cell No. 1 is composed of two earlier landfill areas and totals approximately 14 acres. This cell, which was closed in 1985, received septic system sludges as well as municipal solid wastes beginning in the mid-1960's. The cell's upper plateau was capped with a 20-mil PVC geomembrane to minimize infiltration into the deposited waste. Two feet of sand were placed over the cap, and a stormwater collection system was installed to collect the runoff and direct it to a recharge basin at the western edge of the cell.

During New York State Department of Environmental Conservation (NYSDEC) inspection in March and May of 1984 and subsequent hydrogeologic investigations, leachate contamination of groundwater was discovered beneath this site. A Remedial Investigation/Feasibility Study (RI/FS) was completed (Holzmacher, McLendon and Merrill, 1989) and a Record of Decision (ROD) was signed (1989) for a 6 NYCRR Part 360 closure of Cell No. 1.

Closure of Cell No. 2 began in the spring of 1990, with substantial completion on October 31, 1991. It is approximately 14 acres in size. This cell was closed and capped in accordance with the requirements of the Consent Order between the Town and the NYSDEC dated February 23, 1989, and applicable 6 NYCRR Part 360 regulations.

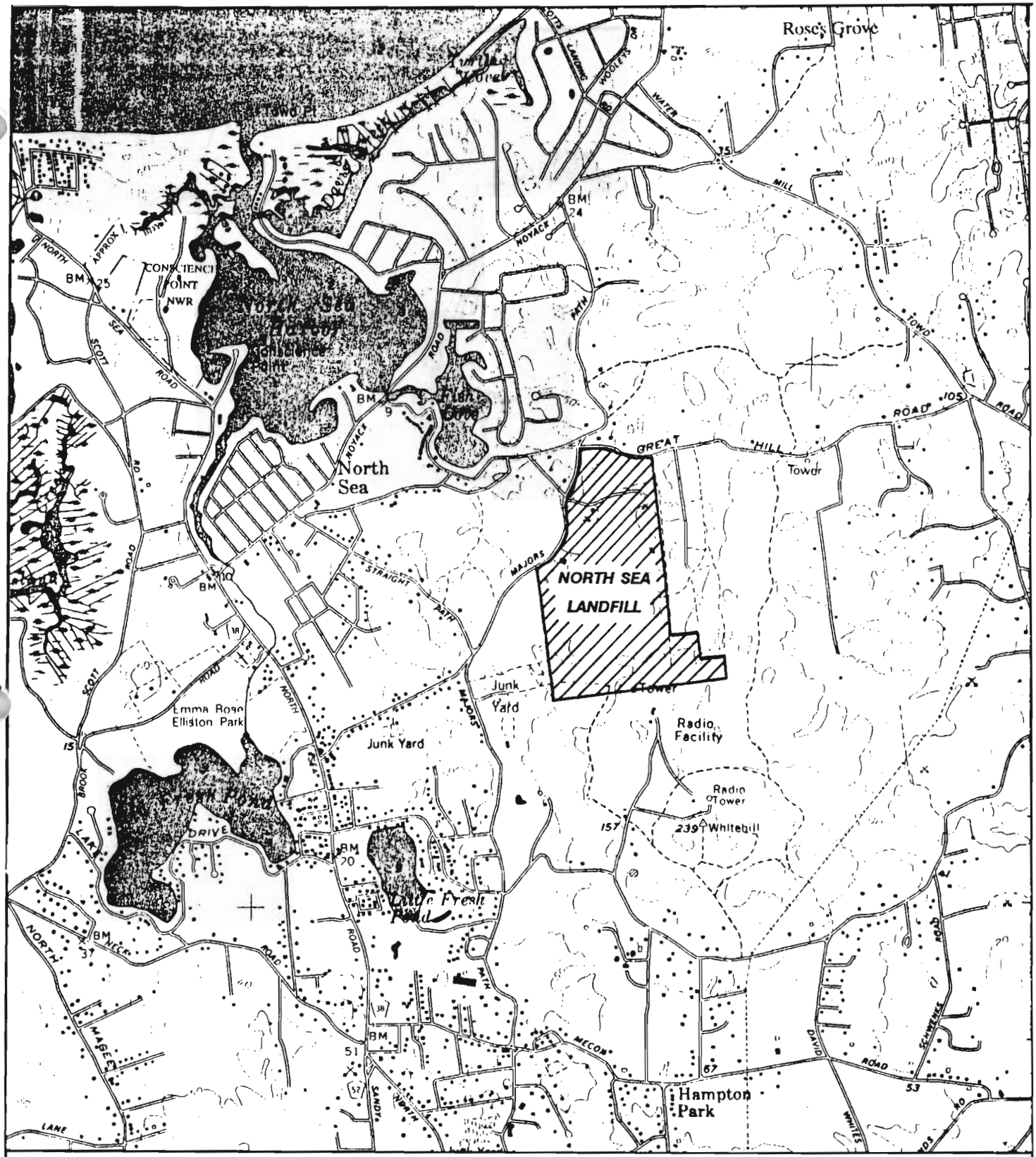


FIGURE 1-1
LOCATION MAP
NORTH SEA LANDFILL CELL NO. 1

BASE MAP SOURCE: USGS SOUTHAMPTON QUADRANGLE 1991

layer of 4.5 oz/yd^2 non-woven geotextile was placed beneath this soil layer to separate it from the subgrade. Passive gas vents were placed in the plateau of Cell No. 1 to vent this layer; and

- Prepared Subgrade: The Contractor used general fill as a subgrade to the final capping system. The Contractor regraded the site, as appropriate, to provide a minimum cover over the waste of six (6) inches of general fill and a maximum slope of 33 percent.

A section of the eastern sideslope of Cell No. 1 had existing slopes which were much steeper than 33 percent, and general fill could not be placed in this area because of the proximity of the property line. This area required that an alternate cover system be installed on top of the HDPE geocomposite material. Instead of cover soils, a revetment mat was utilized to avoid the disturbance of waste materials in this area. For this cover system, the soil layers above the geomembrane were not installed.

The revetment mat consists of a double-layer synthetic fabric form with reinforcing cables, its sections sewn together, and the cables staked above the top edge of the lined area. The fabric form is filled with a fine aggregate concrete (structural grout) producing a stable mat. Anchoring of the revetment mat employed the use of a passive restraining system.

The 60-mil HDPE cap material of Cell No. 1 was joined to the HDPE cap material of Cell No. 2 with a fusion or extrusion welded joint, and was connected to the existing 20-mil PVC-plateau cap on Cell No. 1 with a flexible two-part, "Lok-Strip".

For a visual presentation of the remedial work performed on the North Sea Landfill Cell No. 1, refer to Appendix Q of this Manual, Construction Record Drawings.

1.3 PURPOSE AND SCOPE

The purpose of the Cell No. 1 Post-Closure O&M Manual is to define, in general terms, the procedures for all personnel performing routine inspection, maintenance, or repair work on Cell No. 1 following its closure. This O&M Manual has been prepared in accordance with the "Superfund Remedial Design and Remedial Action Guidance" (OSWER 1986) and "Considerations for Preparation of Operations and Maintenance Manuals" (EPA 1972).

The guidelines and procedures presented in the Cell No. 1 Post-Closure O&M Manual are in general conformance with the 6 NYCRR Part 360 Requirements (effective October 1993) and are based on a review of site-specific information, including:

- Site visits
- Draft Operations and Maintenance Plan, North Sea Landfill Cell No. 1 (Malcolm Pirnie 1992)
- Cap Remedial Design Report, North Sea Landfill Cell No. 1 (Malcolm Pirnie 1992)
- Site Health and Safety Plan, North Sea Landfill Cell No. 1 Cap (Malcolm Pirnie 1991)
- East Slope Redesign, North Sea Landfill Cell No. 1 Cap (GeoSyntec 1993)
- Cap Evaluation of HDPE Geomembrane Substitution, North Sea Landfill Cell No. 1 (GeoSyntec 1993)
- Revision to the Construction Contract Pursuant to the "Modification Agreement," North Sea Landfill Cell No. 1 Cap (Dvirka & Bartilucci 1994)
- Construction QA Report, North Sea Landfill Cell No. 1 Cap (GeoSyntec 1994)
- Consent Decree, North Sea Landfill Cell No. 1 (1991)
- Record of Decision, North Sea Landfill Cell No. 1 (1989)

This Cell No. 1 Cap Operation and Maintenance Manual includes the following information:

- Site inspection guidelines;
- Maintenance and repair procedures;
- A groundwater monitoring plan;
- A gas monitoring plan;
- Personnel and equipment requirements;
- A contingency plan; and
- An annual cost estimate.

Section 2

2 SITE INSPECTION

2 SITE INSPECTION

Following the closure of Cell No. 1 of the North Sea Landfill, the site will be monitored in accordance with 6 NYCRR Part 360-2.15 criteria. The first step in the monitoring process requires the inspection of the site at least four times a year, by qualified, trained landfill personnel. The Standard Inspection Report Form is presented in Appendix A of this Manual. In addition, inspections will also be performed after a major rainfall event (5-year storm). The results of these inspections will be recorded on a standard inspection report form, and a copy of this form is provided in Appendix A. The location and extent of any damage discovered during an inspection will be noted on the standard inspection checklist form, along with any necessary additional information. Any irregularities found during these site inspections will be remediated according to the guidelines provided in Section 3 of this report. A copy of all the inspection reports will be submitted to the NYSDEC as soon after the inspection as possible and will also be included in the facility's annual report.

2.1 CAP INTEGRITY

During Cell No. 1 closure construction, a minimum of 30 inches of soil cover was placed over the geomembrane. A small area of the Cell No. 1 eastern sideslopes was covered with concrete revetment matting in lieu of the minimum 30-inch soil cover because of the existing steep slopes and the proximity of the property line. Both the traditional cap and the revetment mat cap must be inspected to assure their continued integrity.

2.1.1 Soil Cover

The soil cover will be visually inspected for signs of erosion damage, settlement, cracking, vectors, leachate or waste breakthrough, vandalism, litter, and unauthorized dumping. Erosion, settlement, or cracking of the cover soil will be considered damaging based upon whether the function of the final cover had been impaired in the affected area, e.g., ponded stormwater. However, the minimum final cover thickness must be maintained at 30 inches.

The Town Sanitation Supervisor will evaluate intermittent topographic surveys to determine if settlement has occurred. Where settlement has occurred, he will prepare and submit a work plan to the USEPA for approval to excavate test pits and evaluate the conditions of the landfill. The following will be noted on inspection logs:

- Visible debris, litter or waste;
- Signs of unauthorized dumping or vandalism such as vehicular tracks or disturbed cover soil; and
- Evidence of surface leachate (indication of damage to the cap).

2.1.2 Vegetation

The cover soil of the Cell No. 1 cap was vegetated during the cap construction according to the seeding schedule provided in the Remedial Design specifications and is included as Appendix L of this Manual. Future inspections of this vegetation will be performed to monitor the vegetative growth and identify problem areas which require reseeding. The vegetative cover will be inspected for bare spots, dead species, and undesirable species. Bare or dead areas of vegetation will be further examined for the possibility of landfill gas, leachate, erosion, or vector damage. The apparent cause of any damage will be noted in the inspection report.

2.1.3 Revetment Matting

Revetment matting was used in a small area of the cap system to replace the 30 inches of cover soil and allow placement of the geomembrane cap on a steep sideslope in the southeast corner of Cell No. 1. The mat consists of a geotextile fabric form filled with pumpable grout, supported by a concrete anchor at the top of the slope. The mat will be inspected for structural integrity and signs of vandalism or vector infestation. Cracked concrete anchors, damaged or missing concrete articulation blocks, damaged geomembrane instability of the structure, burrow holes or nests, and the apparent cause of any damage will be reported in the inspection logs.

2.1.4 Retaining Wall

The retaining wall on the east side of the landfill will be inspected at least once annually to determine if there is any movement of the landfill to the east. Movement will be determined by the use of a plumb line. However, because the retaining wall incorporates a flexible design, some vertical and/or horizontal movement is permissible and is expected to occur. Refer to Section 3.2.5 for recommended maintenance and repair procedures to the retaining wall.

2.1.5 Erosion Control Blanket

An erosion control blanket was placed on the seeded top soil layer to prevent washout and gulleying. During the inspection in July 1994, vegetative cover was generally complete with only small areas needing additional seeding. Gulleying was not present.

2.2 LEACHATE COLLECTION SYSTEM

The North Sea Landfill Cell No. 1 was constructed without a leachate collection system. In addition, no remedial system was installed to collect leachate. However, leachate will be monitored by identifying any surface outbreaks on the landfill (Section 3.1.1 - Leachate Control). The identification of any uncontrolled leachate must be documented

(Section 7 - Leachate Monitoring Plan). Surface leachate investigations must be performed when groundwater levels are at seasonal high levels.

2.3 STORMWATER COLLECTION SYSTEM

The stormwater collection system for the Cell No. 1 closure construction consists of diversion swales, perimeter swales, downchutes, energy dissipators, stilling basins, and culverts which will convey the collected stormwater runoff to the on-site groundwater recharge basin (Figure 2-1).

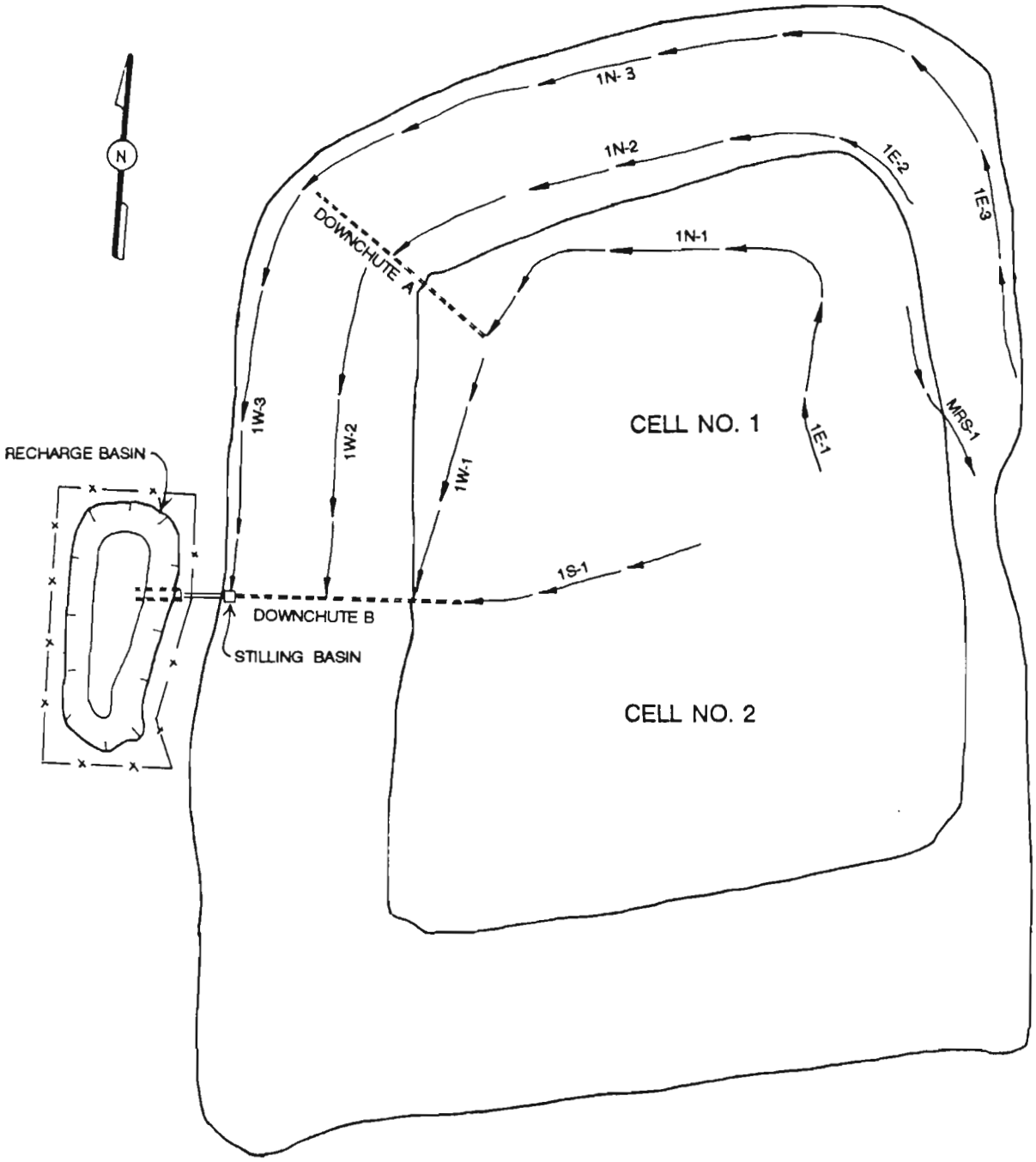
The two downchutes originally constructed for Cell No. 1 were redesigned and reconstructed because of failure during a winter storm. The summary of the downchutes' reconstruction is presented in Appendix B of this Manual. Each of these structures will be monitored for wear or damage and the results of these inspections will be reported in the inspection logs. The culvert discharge is at a fixed elevation and the discharge area will be monitored to determine if silting has occurred. Any necessary repairs will be performed according to the guidelines provided in Section 3 of this Manual.

All of the stormwater collection, conveyance, drainage, and control structures will be visually inspected for obstructions, siltation, ponded water, and erosion damage, such as wash-outs. The location of any obstruction or damage and its cause,if known, will be noted in the inspection logs. Diversion and perimeter swales will also be inspected for loss of vegetation or erosion control matting.

The downchutes and stormwater outlet have been constructed of gabion mattresses and the energy dissipation structure were constructed of cast-in-place concrete. These structures will be examined for damage or instability which could affect their performance. Erosion of soil beneath or around the structures, loose ties between the gabion baskets,or signs of slippage of the structures will be noted on the inspection logs.

2.3.1 Downchutes and Diversion Swales

Two downchutes were constructed to convey stormwater runoff from the landfill without destroying the integrity of the cap. Downchute A, on the northwestern corner of the landfill, receives stormwater runoff via diversion swales from the east and north portions of the landfill. Downchute B receives stormwater runoff via diversion swales from the west portion of the landfill. The discharge structure of Downchute A is connected to the discharge structure of Downchute B by Perimeter Swale 1W-3. The diversion swales, as well as the perimeter swale, will be examined on a regular basis for signs of erosion and/or sediment buildup, and noted in the inspection logs.



LEGEND

——→ DIVERSION SWALES

==== DOWNCHUTES

MRS MAINTENANCE ROAD SWALE

SCALE

0 200 FEET

BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 2-1
STORMWATER CONTROL SYSTEM
NORTH SEA LANDFILL CELL NO. 1

Eroded areas will be promptly filled with onsite soil fill, compacted, and seeded. Any sediment buildup will also be promptly removed with hand tools and will be spread over existing grassed sideslopes.

2.3.2 Recharge Basin

The groundwater recharge basin, located on the western side of the landfill, receives stormwater discharge from both Cell No. 1 and Cell No. 2. The retention time of the stormwater after significant rainfall events will be noted on the inspection logs. Periodic removal of silt and other fines may be necessary to maintain the proper functioning of the groundwater recharge basin.

The vegetated portion (above waterline) of the recharge basin sideslopes will be periodically inspected and monitored for signs of erosion. Inspection of the unvegetated (below waterline) portion of the recharge basin sideslopes will also be made subject to fluctuation in the water level of the recharge basin.

2.4 ACCESS ROAD

The access road to the top of Cell No. 1 is a continuation of the road installed during the closure of Cell No. 2 (Figure 2-2). The road was constructed of crushed stone having a minimum thickness of 12 inches. Visual inspections of the road will be conducted for potholes or burrow holes, erosion gullies, loss of stone cover, and obstructions. The results of these inspections will be noted on the inspection logs.

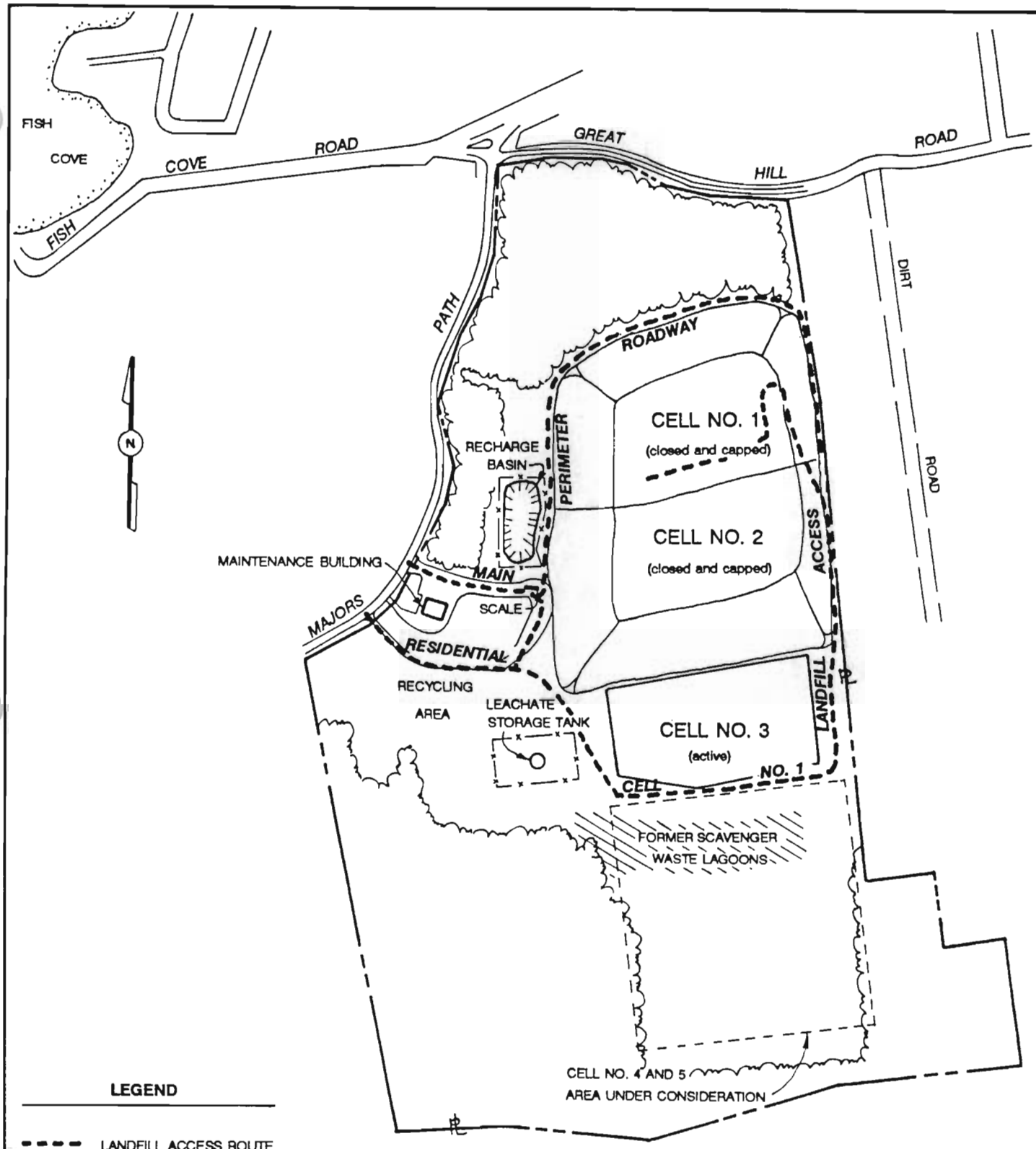
2.5 LANDFILL GAS MONITORING

2.5.1 Passive Venting System

A passive venting system consisting of 12 gas vents was installed on the plateau area of Cell No. 1 to allow venting of landfill gases through the geomembrane. During the post-closure monitoring period, these vents will be inspected for damage, such as excessive settlement which causes stress on the geomembrane, or signs of vandalism. The vents will also be inspected for signs of vector infestation. The inspection report will reflect any damage noticed during the inspection. The functioning of these vents will be monitored during air quality testing which will be performed at the site according to the guidelines provided in Section 5 of this Manual.

2.5.2 Perimeter Monitoring Wells

Perimeter gas monitoring wells are located at approximately 200-foot intervals along Majors Path, Great Hill Road, and the eastern property boundary. An explosive gas investigation is currently being performed at each vent location by the Southampton Fire



BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 2-2
SITE ACCESS
NORTH SEA LANDFILL CELL NO. 1

Marshall's Office and will continue during the post-closure period. The intent of the regular monitoring at these locations is to identify the presence and concentration of explosive gases and determine the extent of landfill gas migration.

Gas monitoring wells will be visually examined during each routine inspection and the functioning of each well will be checked during each monitoring event (the details of the gas monitoring program are presented in Section 5 of this Manual). If a monitoring well sustains damage, or cannot provide a representative gas reading, the well will be examined to determine whether the problem can be corrected. This determination will be facilitated by comparing data from previous monitoring activities to reveal the cause of the problem.

The inspection report will include the details of any gas monitoring well damage and the appropriate action that will be taken to correct the problem, as presented in Section 3 of this Manual.

2.6 GROUNDWATER MONITORING WELLS

Groundwater monitoring wells will be visually examined during each routine inspection and the functioning of each well will be checked during each quarterly sampling event. The details of the groundwater sampling program are presented in Section 4 of this Manual. If a monitoring well sustains damage, or cannot provide representative groundwater samples, the well will be examined to determine whether the problem can be corrected. This determination will be facilitated by comparing data from previous monitoring activities to reveal the cause of the problem. In particular, the following signs of damage or deterioration will be examined:

- Signs of encrustation and corrosion;
- An exceptional increase in solids content (e.g., from the breakdown of the screen); and,
- An appreciable decrease in groundwater elevation, perhaps the result of these problems.

The inspection report will include the details of any groundwater well damage and the appropriate action that will be taken to correct the problem, as presented in Section 3 of this Manual. Damaged wells that cannot be rehabilitated should be decommissioned by appropriate methods (i.e. overdrilling, pulling of casing, or grouting in place).

Section 3

3 MAINTENANCE AND REPAIR PROCEDURES

3 MAINTENANCE AND REPAIR PROCEDURES

The need for maintenance or repair work will be governed by the observations made during the regular site inspections previously described in Section 2, and records of this work will be maintained in the permanent landfill files at the Town Hall. This section describes the maintenance and repair procedures which will be followed during the post-closure monitoring period for Cell No. 1 at the North Sea Landfill. The personnel and equipment requirements for this 30-year period are presented in Section 6 of this Manual.

3.1 MAINTENANCE

Routine maintenance work will be performed, as necessary, during the 30-year post-closure monitoring period. Mowing, regrading of the cover soils and the access road, additional seeding, vector control, and the removal of undesirable vegetation species are considered normal (typical) maintenance tasks and will be discussed in this section. It is routine procedure for landfill personnel to keep records for maintenance activities at the landfill site.

3.1.1 Leachate Control

Because Cell No. 1 was constructed without a base liner and leachate collection system, the only leachate maintenance that will take place during the post-closure period will be associated with the monitoring of potential outbreaks on the landfill's sideslopes and around the perimeter of the landfill base. If leachate is observed and ultimately tracked to a failure of the cap system, the failed area of the cap membrane will be repaired as described in Section 3.2.4 of this Manual.

3.1.2 Landfill Gas Control

In addition to the landfill gas monitoring and sampling program that will occur at the perimeter monitoring wells, maintenance of the gas vents will also occur. For the early years after closure, while the landfill has the capacity to produce gas, the gas will be collected through a system of 12 vents located on the plateau area of Cell No. 1. During this period, the vents, pipes, and connections will be inspected and maintained on a regular basis.

3.1.3 Drainage and Erosion Control

Surface drainage (conveyance) features to control stormwater runoff have been designed for the 25-year, 24-hour, Type II storm, using U.S. Department of Agriculture Soil Conservation Service guidelines. The groundwater recharge basin has been

for the 100-year, 24-hour, Type II storm. The diversion swales and perimeter channels will be maintained with grassed channels. Complete vegetative coverage will be maintained and will be inspected at the same time the landfill cap is inspected. Areas of erosion will be noted and repaired as soon as possible to maintain the integrity of the cap. Downchutes and stilling basins will be inspected for foreign debris which may interfere with its proper functioning, and for areas of erosion which may degrade the integrity of the cap. The recharge basin will be kept free of litter, foreign objects, and vegetation that would otherwise inhibit groundwater recharge and degrade the integrity of the sideslopes and basin floor. In addition, the accumulation of fines on the basin floor, which inhibit recharge, will be kept to a minimum by periodic scouring.

3.1.4 Vegetative Cover

The vegetative (grass) cover of Cell No. 1 will be maintained at a minimum height of eighteen (18) inches, or mowed at least once each year during the first three years to control the growth of wild and deep-rooted species and minimize potential for introducing vector habitats. Following this initial period, the frequency of each mowing event will be determined by the site conditions. Undesirable species such as saplings or other vegetation with penetrating roots discovered during inspections will be removed if the Town supervisor determines that their presence poses a threat to the integrity of the final cover system. Application of herbicides and pesticides will not be used to control undesirable plant and/or animal species unless the non-chemical methods do not yield desired results. Areas of the cap with dead vegetation or lack of vegetation will be inspected by qualified landfill personnel for possible causes of defoliation and devegetation. The landfill personnel will provide a report of the inspection findings to the Sanitation Supervisor who will determine if further evaluation is necessary. If the Sanitation Supervisor deems it appropriate, the bare areas of the cap will be seeded according to the seeding schedule provided in Appendix L of this Manual.

3.1.5 Regrading

The effects of landfill subsidence, vandalism, or gulleying from minor precipitation events (i.e., not causing extensive damage to the site) may result in the need to regrade the cover soils of the cap system. The areas of erosion or landfill subsidence which affect the performance of the cap system will be brought back to original grade according to the procedures described for constructing final cover. Deterioration of the access road will be repaired by regrading where possible, or by the placement of additional gravel, if necessary, to provide access for routine inspections and maintenance activities. If vandalism is detected on the site, such as off-road vehicle tracks, the Southampton Town Police will be contacted and efforts will be made to further restrict access to the site.

3.1.6 Vector Control and Aesthetics

Vectors common to active landfill operations are not expected to be a problem at Cell No. 1. However, suspected rodent or insect infestation will be responded to by contacting qualified licensed exterminators. Prior to initiating an extermination program, the Town will advise the NYSDEC of the situation and, if necessary, develop and submit to NYSDEC an extermination work plan for review and approval. Details of the communication procedures for non-routine events are provided in Section 11 of this Manual.

3.1.7 Access

Access to, and onto, Cell No. 1 will be continually maintained. The perimeter roadway, as well as the roadway onto the landfill, will be monitored for signs of subsidence, erosion, and other forms of degradation. Vehicular access will be limited to authorized personnel and will only be accomplished through the main site entrance off Majors Path. The access roadways will be inspected for foreign objects and vegetative growth which could degrade their integrity and prohibit access.

3.2 REPAIRS

This subsection details the procedures which could be used to perform non-routine repairs of the Cell No. 1 cap system and, as such, are considered to be outside of the scope of the normal maintenance procedures for Cell No. 1. These activities may include, but not be limited to, repair of gas vents, piping and flares, groundwater monitoring wells, stormwater structures, the revetment matting, vegetative cover, and the geomembrane.

3.2.1 Stormwater Structures

On occasion, stormwater control structures can become damaged and diminished in function by intense rainfall events or by alternating freeze-thaw cycles. Gabions, used in the downchutes, are particularly susceptible to movement by erosion and undermining. Care should be taken to inspect gabions, as well as the diversion swales after intense rainfall events. If erosion or undermining is observed, the Town should notify the regulatory authorities, as well as their engineer immediately, and corrective action should be taken. Any obstructions found in and along the stormwater collection route will be promptly removed.

While some repairs have already taken place, additional repairs are anticipated over the 30-year post-closure period. With regular inspections and proper maintenance, the repairs can be kept to a minimum.

3.2.2 Gas Collection and Treatment System

Landfill gas vent damage will be most likely to occur during normal maintenance of the site, such as during mowing. Vandalism is more likely to occur at the perimeter gas monitoring wells located on Majors Path and Great Hill Road, where the monitoring wells are exposed and not shielded by trees and shrubs. If damage occurs to the exposed piping of a gas vent on the landfill, the piping will be replaced according to the approved construction documents. Severe breakage on landfill vents which can damage the membrane beneath the cover soils or the water-tight seal around the pipe penetration will be examined thoroughly. The cover soils will have to be removed, and the membrane and pipe penetration boot inspected for damage. If damage has not occurred, the soil layers around the vent will be replaced by hand and compacted to a minimum thickness of 30 inches. All repair will be such that replacement layers will match, and tie directly into the undisturbed portion of the cap. Damage to the membrane or the pipe penetration boot will be repaired according to the guidelines provided in Section 3.2.4 of this Manual.

3.2.3 Groundwater Monitoring Wells

The repairs required for groundwater monitoring wells may involve: 1) redevelopment of the well; 2) removal and replacement of the well screen; or 3) the installation of a new monitoring well. The repair technique used will be determined by the extent of the damage observed. However, any remedial actions will be discussed with the USEPA and the NYSDEC prior to their implementation.

Damaged monitoring wells that cannot be rehabilitated should be decommissioned in an manner appropriate for the existing geologic conditions at the site. This will prevent potential contaminant migration downward through the monitoring well.

The monitoring well decommissioning procedure should follow NYSDEC protocol and comprise the following:

- Overboring and removal of the casing, if present, to the greatest extent possible (minimum 5 feet);
- Perforation of any casing remaining in the borehole;
- Pressure grouting of the borehole from the base of the borehole with cement-bentonite grout to a depth of 5 feet below the ground surface using the tremie method;
- Backfilling the remaining 5 feet with native soil and compacting to avoid settlement;

- Grouted area will be periodically inspected for possible settlement; and

- If subsequent settlement occurs, native material will be placed into the depression and repacked to grade level. If severe settlement occurs, the settled portion will be regrouted and backfilled with native soil.

3.2.4 Cap Membrane and/or Revetment Matting

The east slope revetment is constructed with reinforcing cables which allow the mat to articulate and adapt to changing soil and water conditions. Therefore, it is anticipated that neither the mat nor the cap membrane will be adversely affected by settlement during the landfill post-closure monitoring period. Nevertheless, during the 30-year post-closure monitoring period for the site, there is the possibility that damage could occur to the cap membrane or the revetment matting. As such, the damaged sections would be removed and evaluated by a manufacturer's representative to determine the extent of the damage and the required repair techniques. The manufacturer's representative will approve the necessary repairs to these structures according to the Remedial Design Plans and Specifications. Specifications for the 20-mil PVC liner, 60-mil HDPE cap membrane, and revetment matting are presented in Appendices C, D, and E, respectively, in this Manual. In addition, each repair will be tested according to these documents.

3.2.5 Retaining Wall

Maintenance of the retaining wall will primarily consist of: 1) repairing soil erosion at both the base and top of the wall; 2) resetting and/or replacing missing or damaged cap blocks; and 3) replenishing eroded drainage stone.

If it is observed that the face of the wall has moved horizontally past vertical, the Town will secure the area immediately surrounding the wall as a safety precaution. It will then conduct an engineering inspection of the wall and develop a condition assessment report and prepare a plan of action. Upon approval from the NYSDEC, it will implement corrective measures as defined in that plan.

3.2.6 Flexible "Lok-Strip" Connection

Where the flexible membrane (PVC) liner from Cell No. 1 meets with the flexible membrane (HDPE) liner from the sideslope of Cell No. 1, they were joined using a flexible two-part "Lok-Strip" connection. Should it be determined that the "Lok-Strip" connection of the geomembranes requires repair, the Sanitation Supervisor will notify the USEPA, Town Board, and the NYSDEC and make appropriate arrangements to have these areas repaired.

Section 4

4 GROUNDWATER MONITORING PLAN

4 GROUNDWATER MONITORING PLAN

Groundwater monitoring at the North Sea Landfill site is currently performed in accordance with the NYSDEC-issued Permit to Operate Cell No. 3 (Appendix F). The locations of the existing groundwater monitoring wells on the site are shown on Figure 4-1.

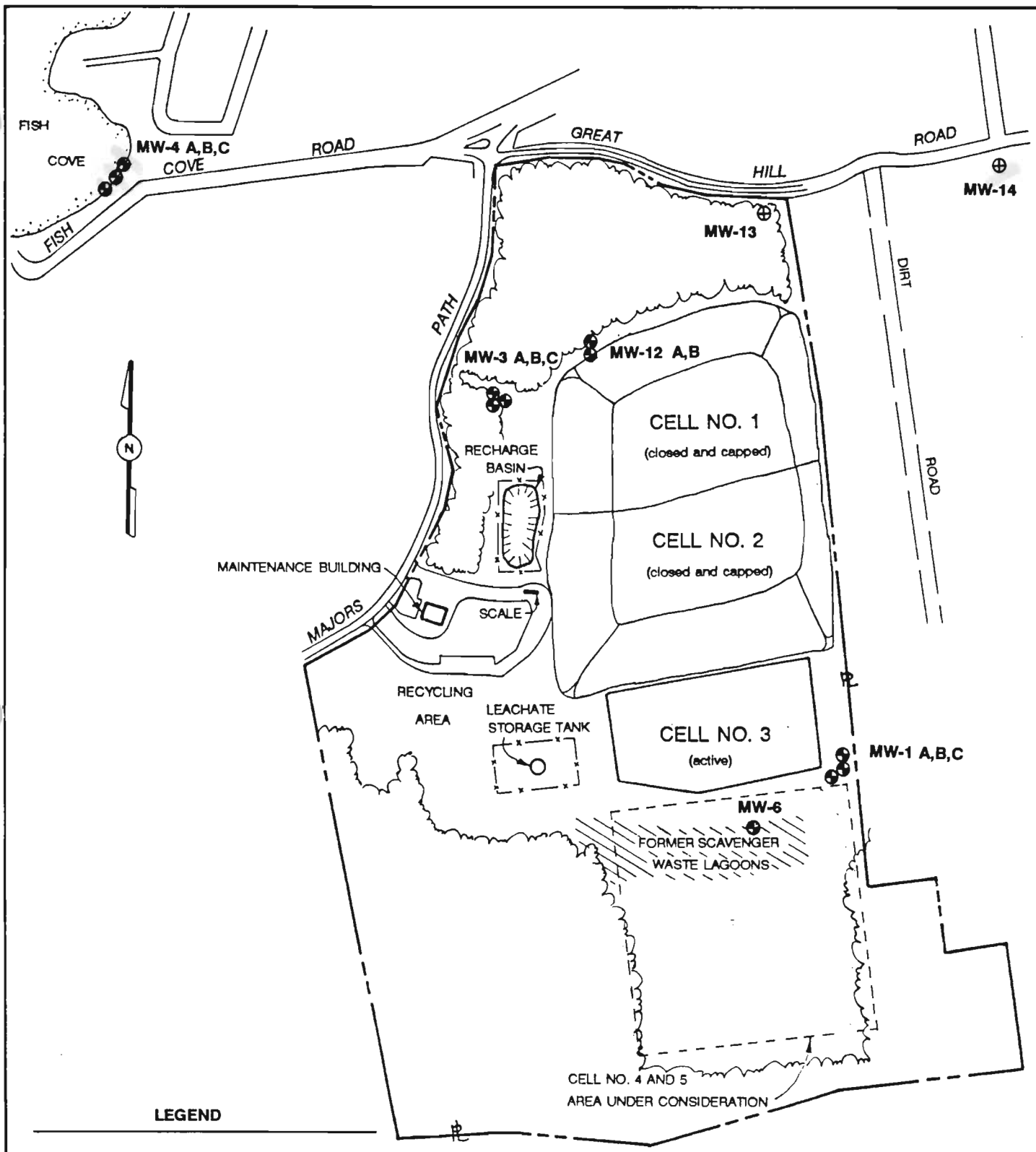
The current groundwater monitoring plan was developed during the RI/FS work performed for Cell No. 1 and incorporates wells which monitor upgradient and downgradient of Cell No. 1. However, according to the letter written by the NYSDEC to the USEPA dated July 16, 1992, addressing comments on the Draft Operations and Maintenance Plan prepared by Malcolm Pirnie (Appendix G), there appears to be a deficiency of coverage in the area northeast of Cell No. 1 on Great Hill Road and on the adjacent property to the east. These are areas which are cross-gradient of the general groundwater movement. Two additional groundwater monitoring wells (MW-13 and MW-14) have been recommended, in compliance with 6 NYCRR 360-2.11 (e) (1) (i). Based on what is currently known about the groundwater regime at the North Sea Landfill, these wells are anticipated to be developed to a depth of between 80 and 120 feet below ground surface and have a screened interval of 20 feet.

The groundwater monitoring plan currently being implemented by the Town of Southampton will continue during the post-closure period, unless conditions requiring contingent plans become necessary. Contingency (non-routine) plans are described in Section 9.

4.1 CURRENT MONITORING PLAN

The groundwater well network currently utilized for monitoring purposes at the North Sea Landfill consists of 22 groundwater monitoring wells that were installed as a part of the RI/FS, the Cell No. 3 landfill expansion hydrogeologic investigation, and earlier monitoring activities. Three wells (MW-3A, MW-3B, and MW-3C) are directly downgradient of Cell No. 1, and three wells represent an upgradient well cluster (MW-1A, MW-1B, and MW-1C).

Each groundwater monitoring well is currently sampled on a quarterly basis. Each unfiltered groundwater sample obtained during the four quarterly sampling events is analyzed for the routine constituents listed in Appendix H-1, as required by the Cell No. 3 Permit to Operate. In addition, one of the quarterly monitoring event sample sets is analyzed for baseline constituents listed in Appendix H-2.



BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 4-1
GROUNDWATER MONITORING LOCATIONS
NORTH SEA LANDFILL CELL NO. 1

4.2 FUTURE MONITORING PLAN

Currently, there are NYSDEC-approved closure plans in place for Cells No. 2 and 3. Both of these plans require the monitoring of upgradient and downgradient groundwater wells to assess the performance of these closures. The well cluster (MW-1A, MW-1B, and MW-1C) utilized to monitor the upgradient groundwater conditions for Cells No. 2 and 3 will also be used to monitor the upgradient groundwater conditions of Cell No. 1. In addition, upgradient monitoring well MW-6, located in the area of the former sludge lagoons, will also be monitored. Downgradient well clusters MW-3 (A, B, and C), MW-4 (A, B, and C) on the southeast shore of Fish Cove, and MW-12 (A and B) will continue to be monitored to assess the effectiveness of the closure of Cell No. 1. Two new cross-gradient monitoring wells are being recommended for installation northeast of Cell No. 1 along Great Hill Road (Figure 4-1). The depths and screen lengths of the wells to be utilized to monitor Cell No. 1 following the closure construction are listed in Table 4-1.

4.3 SAMPLING, ANALYSIS, AND REPORTING PROCEDURES

Currently, the procedures described below are followed during the sampling and analysis associated with the groundwater monitoring plan discussed in Section 4.1. These procedures are expected to continue to be followed in the future for all routine (scheduled) sampling and analysis of groundwater conducted at the North Sea Landfill site.

During each quarterly groundwater sampling event, each well will be purged a minimum of three well volumes prior to sample retrieval. This procedure will prevent the sampling of stagnant water and the possibility of collection a sample that is not representative, e.g., revealing a concentration higher than found in the surrounding groundwater regime. Either dedicated or disposable bailers will be used to collect samples after this purging procedure. Chain of custody documents for each sample retrieved will be maintained by both the company and the laboratory performing the quarterly sampling for the Town. Standard operations procedure for groundwater purging, and protocols for sample collection and analysis (6 NYCRR 360-2.11) are presented in Appendix M.

Field measurements will be obtained for the constituents listed in Appendix H-1 and H-2. Conductivity and pH will be measured in the field, and the static water level of each well will be determined prior to purging each groundwater monitoring well.

The samples will be collected and preserved as outlined in the USEPA document Manual of Methods for Chemical Analysis of Water and Wastes (EPA 600/47-9020) dated March of 1983. An excerpt from this document is presented in Appendix I.

Table 4-1

POST-CLOSURE MONITORING PROGRAM WELLS

Well No.	Depth of Well (ft)	Riser Length (ft)	Screen Length (ft)	Screened Interval (ft)	Date Completed
MW-1A	110	92	20	90-100	7/10/87
MW-1B	160	142	20	140-160	7/08/87
MW-C	195	177	20	175-195	9/24/87
MW-3A	60	42	20	40-60	8/27/87
MW-3B	110	92	20	90-110	8/28/87
MW-3C	179	161	20	159-179	8/26/87
MW-4A	30	12	20	10-30	8/25/87
MW-4B	78	60	20	58-78	9/09/87
MW-4C	150	132	20	130-150	9/03/87
MW-6	101	83	20	81-101	9/30/87
MW-12A	80	62	20	60-80	5/91
MW-12B	102	94	10	92-102	5/91
MW-13	80-120*	TBD	20*	TBD	TBD
MW-14	80-120*	TBD	20*	TBD	TBD

Notes

* Anticipated

TBD - To Be Determined

Depths and screen lengths reported by H2M Group of Melville, New York, in their annual ground water monitoring reports.

Depths and screen lengths for MW-12A and MW-12B are reported in the OU2 Remedial Investigation Report prepared by H2M Group.

Upgradient groundwater conditions will be monitored for Cell No. 1 utilizing the upgradient wells monitored for Cells No. 2 and 3.

Source

H2M (1987)

The results of groundwater monitoring plan testing have been submitted quarterly to the NYSDEC, prior to the closure of Cell No. 1. The results of all subsequent groundwater monitoring for Cell No. 1 will be submitted to the USEPA and the NYSDEC as required by the Consent Order.

The unfiltered groundwater samples obtained will be analyzed for the constituents listed in Appendix H-1 and H-2 in a USEPA Contract Laboratory Program (CLP) or a NYSDOH test method approved program.

A representative for the Town will compare results of each new lab analysis to the concentration of constituents from past analyses to determine if there are any significant changes.

In April 1993, the Town of Southampton signed a Consent Order (CO) with the NYSDEC to monitor or provide public water to homes northwest of the North Sea Landfill Cell No. 1 on Majors Path and Fish Cove Road. In July 1993, the Town, pursuant to the CO, submitted a plan for the public water hook-up of a number of homes located on the periphery of the leachate plume of Cell No. 1. The Town has responded to information requests by the NYSDEC, and has submitted cost estimates, and is currently awaiting approval. As a result of this activity, and the anticipated plan approval, monitoring of the water supplies of these residences is not included in post-closure care activities.

4.4 BENTHIC SURVEY

A bi-annual benthic survey will be performed in Fish Cove based on the protocol established for the benthic survey conducted in January 1992 (Appendix J). In addition, flux core measurements for ammonia will be taken from the predetermined locations in Fish Cove and conducted concurrently with the benthic survey. At the end of an eight-year period, no further benthic surveying or flux core sampling will be required pursuant to this plan; unless, based on the previous monitoring activities, it is determined that such additional monitoring should be performed. The USEPA, NYSDEC, and the Town will collectively make this determination.

Provided the results of these analysis demonstrate values which are consistent with previous results for the Operable Unit 2 Remedial Investigation, or the results are inconclusive, no further flux core analysis will be required under the O&M Plan.

5 GAS MONITORING PLAN

5 GAS MONITORING PLAN

Gas monitoring at the North Sea Landfill is currently performed to detect the migration of gases such as methane and hydrogen sulfide outside of the landfill boundaries. This monitoring is conducted in accordance with the Part 360 regulations and the NYSDEC Cell No. 3 Permit to Operate, Special Conditions. It is anticipated that this monitoring will continue during the post-closure monitoring period of Cell No. 1, and therefore, the details of the current gas monitoring plan are summarized in this section to demonstrate compliance with the regulations. A standard operating procedure similar to the one used by the Town of Southhampton Fire Marshall's office for methane gas monitoring is presented in Appendix N.

5.1 EXISTING GAS MONITORING LOCATIONS

A methane gas monitoring program is currently conducted by the Southampton Fire Marshall's Office at the North Sea Landfill at regular intervals. The methane monitoring program is performed utilizing the gas monitoring wells installed during the closure construction of Cell No. 2. The locations of these wells are shown in Figure 5-1.

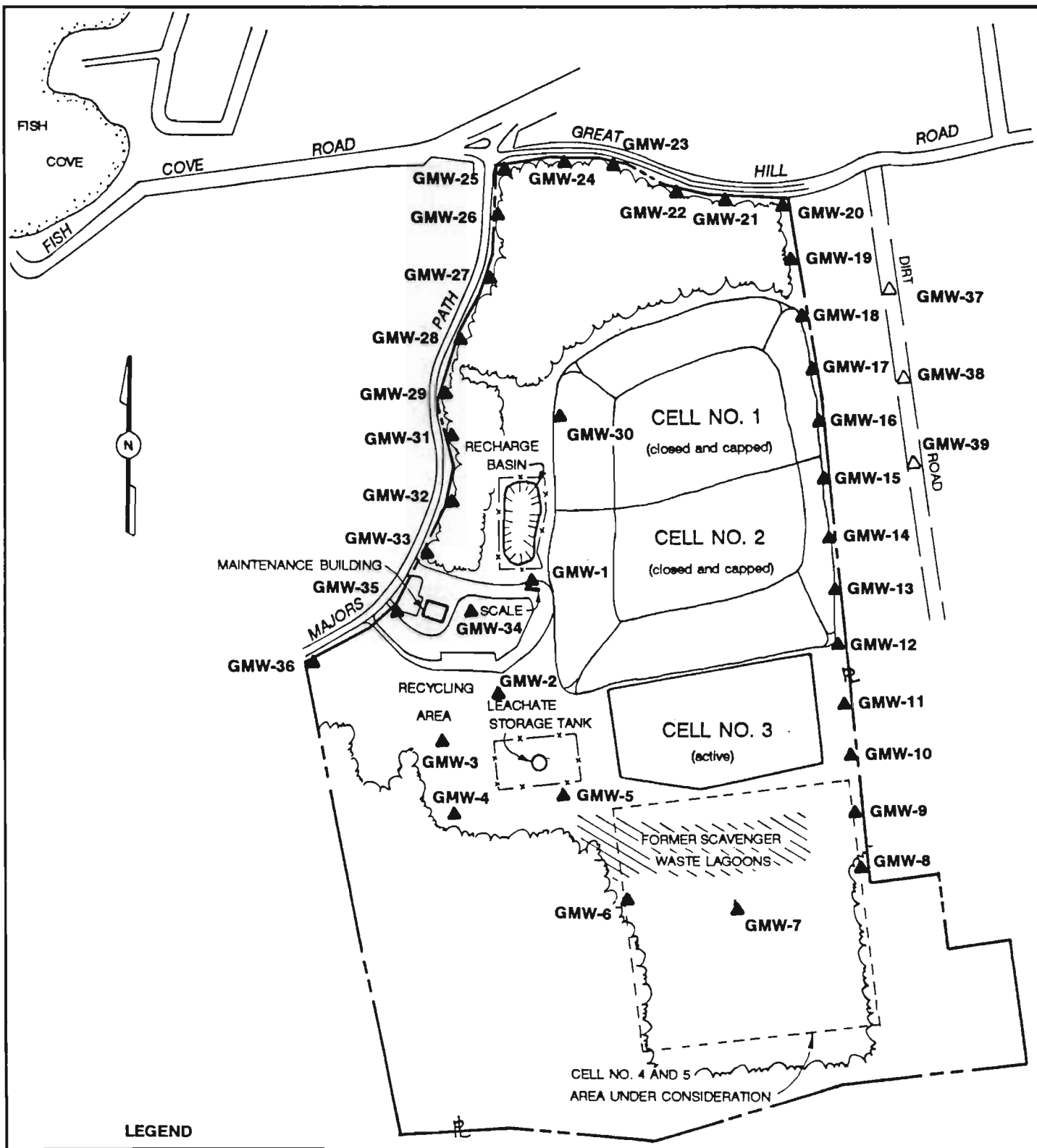
An odor monitoring program will also be initiated on site to detect the presence of odor-causing gases, such as hydrogen sulfide. The proposed sampling locations for this program are shown in Figure 5-2.

5.2 SAMPLING SCHEDULE

Each gas monitoring program has a required sampling schedule based upon the assumption that the gas migration characteristics at the site will not change over time. However, should the results obtained indicate a change in the gas characteristics, these monitoring programs will be modified accordingly.

The methane gas monitoring program requires a bi-weekly sampling of 66 wells at 36 locations. Each well location consists of either a single, shallow monitoring well, or a dual well system consisting of one shallow and one deep gas monitoring well. This monitoring schedule is expected to continue during the post-closure monitoring period for Cell No. 1.

The proposed odor monitoring program at the North Sea Landfill site will consist of air sampling at 20 fixed monitoring points (Figure 5-2) around the site property line and near specific structures on the site. Each of these points will be monitored a minimum of twice weekly, or more frequently if odors are detected between scheduled monitoring times.



LEGEND

▲ EXISTING GAS MONITORING WELLS

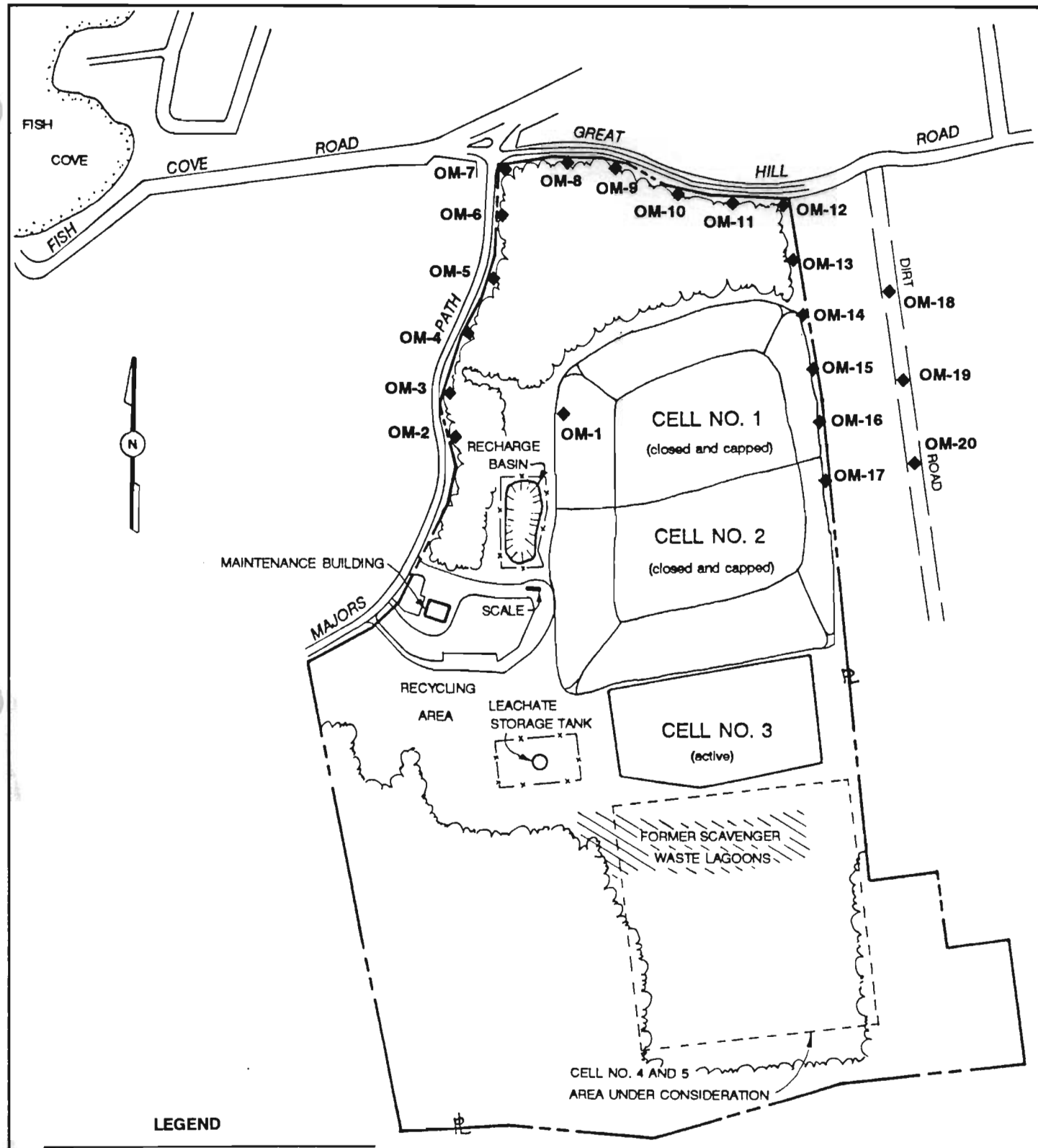
△ RECOMMENDED ADDITIONAL GAS MONITORING WELLS

SCALE

0 500 FEET

BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 5-1
GAS MONITORING LOCATIONS
NORTH SEA LANDFILL CELL NO. 1



BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 5-2
ODOR MONITORING LOCATIONS
NORTH SEA LANDFILL CELL NO. 1

5.3 SAMPLING PROCEDURES

Each sampling program has associated procedures which are required by the NYSDEC-approved sampling protocols. The operating procedure similar to the one used by the Town of Southampton Fire Marshall's Office for methane gas monitoring is presented in Appendix N of this Manual. The methane gas monitoring program was implemented in the fall of 1990, following the installation of the monitoring wells. Methane gas readings, by volume, are taken from each well, and the percentage of methane is determined. These readings are recorded for each well, along with the date, time, air temperature, barometric pressure, and general weather conditions. Each gas well has a locking cap and protective probe collar to prevent vandalism.

5.3.1 Methane Monitoring Program

The purpose of this monitoring program is to detect the possible migration of methane across the boundaries of the site to neighboring properties before the gas becomes a hazard to the public safety. Section 8.1.2 of this plan details the associated hazards of methane gas accumulation.

Each shallow and deep gas monitoring well is analyzed for the percent of methane accumulated in the well's atmosphere and the pressure generated within the well by the gases present. The results of the testing are summarized and submitted to the NYSDEC monthly. Any indication of dangerous levels of methane in the wells are reported to the appropriate authorities for immediate action. The lower explosive limit (LEL) of methane is 5 percent, by volume, in air. When levels of methane reach 25 percent of this amount, the Contingency Plan will be implemented. Section 9, Contingency Plan, identifies the appropriate authorities to contact should excessive levels of methane be detected.

5.3.2 Odor Monitoring Program

The purpose of this air monitoring program is to assess the potential impacts from odor-causing gases which may be emanating from the North Sea Landfill. Based upon previous monitoring activities at the site, hydrogen sulfide gas appears to be the principal contaminant causing odors near the site. Therefore, hydrogen sulfide was selected as the principal indicator compound for the air monitoring program, primarily because of its low odor threshold.

Hydrogen sulfide monitoring will be performed using a Jerome 631-x portable hydrogen sulfide gas analyzer with the capacity to detect hydrogen sulfide concentrations in the parts per billion (ppb). Aboveground samples will be taken at each monitoring point by the Town's personnel in the breathing zone (waist high) since the samples from this area are a good indication of the concentrations inhaled by the Town personnel.

Three consecutive readings will be taken at each monitoring point within a 10-minute period.

The data generated from the monitoring program will be summarized in the daily field book used for each sampling event and filed on site. Readings which indicate an imminent danger to the public will be first reported to the Southampton Police, Fire Department, and Town Board for immediate action. Next, the NYSDEC and USEPA will be notified. Off-site monitoring is being, and will continue to be, conducted by the Town of Southampton Fire Marshall's Office.

Section 6

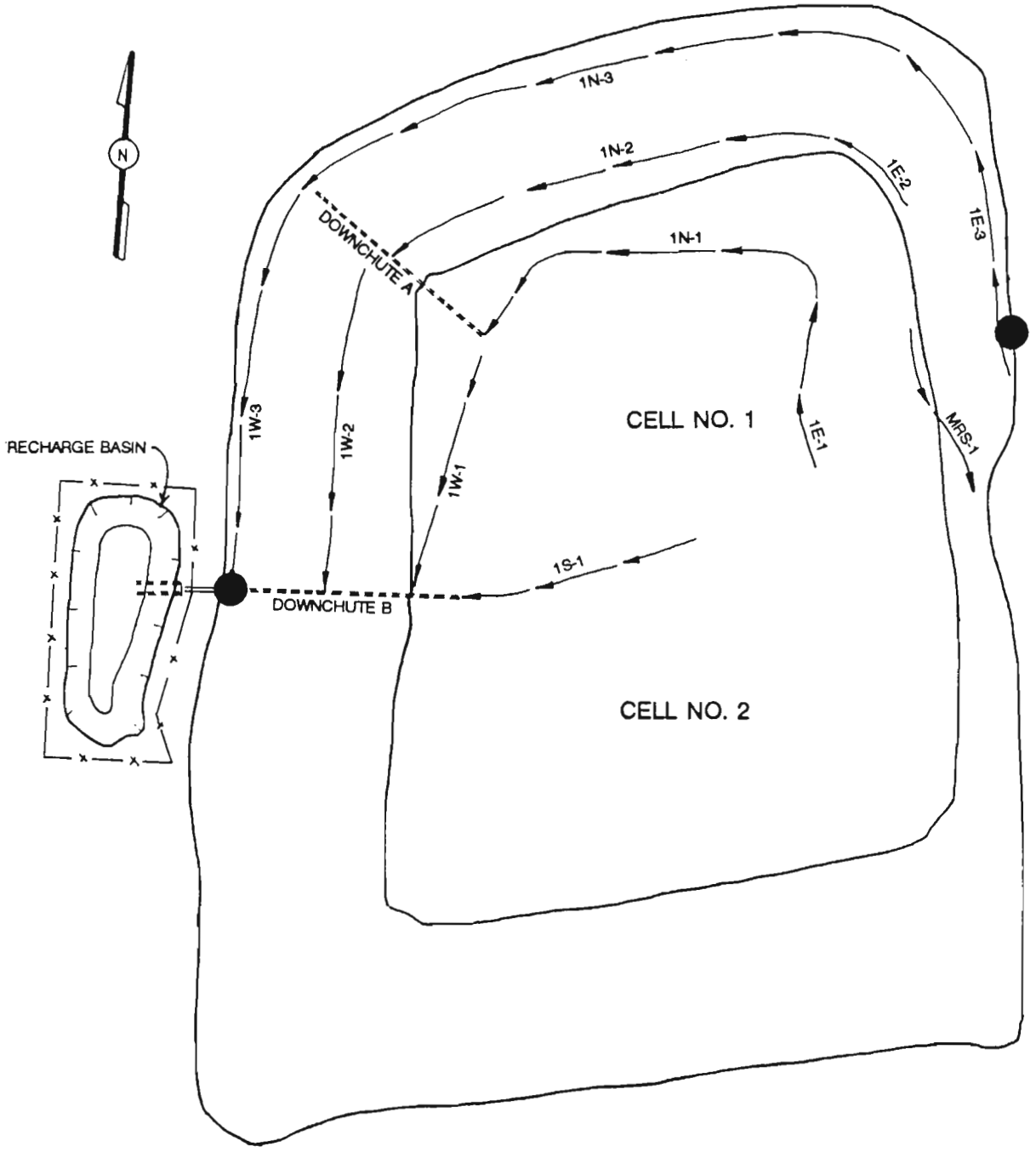
6 SURFACE/STORMWATER MONITORING PLAN

6 SURFACE/STORMWATER MONITORING PLAN

Stormwater monitoring will be conducted at two principal locations (Figure 6-1) on Cell No. 1: 1) at the stilling basin at the base of Downchute B on the west side of the landfill prior to discharge into the groundwater recharge basin; and 2) at the base of the revetment mat and rip-rapped toe-of-slope on the east side of the landfill prior to discharge off site. Samples will be collected only after major storms (i.e., precipitation events whose recurrence interval exceeds two years). The primary reason for stormwater sampling is to determine if any landfill leachate is present. As such, the collected stormwater will be analyzed for Routine Parameters, as specified in 6 NYCRR 360-2.11 (d) (6), Water Quality Analysis Tables, and are presented in Appendix H-1 of this Manual. Surface water sampling procedures should be consistent with 6 NYCRR 360-2.11 (d) (3) (vii), and are presented in Appendix O of this Manual.

Stormwater monitoring locations are critical because they represent discharge points to critical receptors; groundwater on the west side, and adjacent property on the east side. Contaminated stormwater runoff discharging to either of these locations would be a violation of the Environmental Conservation Law, as well as indicate a potential breach in the remedial landfill cap.

If leachate, or a parameter normally associated with landfill leachate, is detected at one of these two surface water sampling locations, the Town will notify the NYSDEC and the USEPA within 14 days, and indicate which parameters were detected. Upon notification, arrangements will be made to conduct a detailed visual inspection of all landfill surface water conveyances. If no visual evidence of a cap breach is found, additional surface water monitoring locations will be established on the landfill cap to isolate the source(s) of the potential leak. The additional monitoring locations will be agreed upon by the Town, its engineer, the NYSDEC, and the USEPA, and samples will be analyzed for Baseline Parameters (Appendix H-2) until the source has been found, or the results of the analysis indicate that leachate is no longer present.



LEGEND

- DIVERSION SWALES
- DOWNCHUTES
- STORMWATER MONITORING LOCATIONS
- MRS — MAINTENANCE ROAD SWALE

SCALE

0 — 200 FEET

BASE MAP SOURCE: MALCOLM PIRNIE 1992

FIGURE 6-1
STORMWATER MONITORING LOCATIONS
NORTH SEA LANDFILL CELL NO. 1

7 LEACHATE MONITORING PLAN

7 LEACHATE MONITORING PLAN

Because Cell No. 1 contains no base liner, no leachate collection system was installed. The form of leachate monitoring during the post-closure period will consist principally of: 1) visual inspection of the landfill sideslopes for leachate outbreaks and seeps; 2) monitoring stormwater discharge from the surface of the landfill for constituents normally found in leachate; and 3) visual inspection of the area outside the perimeter road for wet spots and seeps. Suspect wet areas will be noted; and if they persist, they will be sampled for routine parameters, as specified in 6 NYCRR 360-2.11 (d) (6), and presented in Appendix H-1 of this Manual. If the samples are determined to contain leachate, the NYSDEC and USEPA will be notified; and a plan will be developed to determine the cause of the leak.

Section 8

8 PERSONNEL AND EQUIPMENT PROCEDURES

8 PERSONNEL AND EQUIPMENT REQUIREMENTS

The post-closure monitoring of Cell No. 1 will be a continuation of the existing North Sea Landfill operations. Therefore, the experienced personnel currently operating the North Sea Landfill will continue to be responsible for the entire site's routine operation and maintenance. In the event that a component of Cell No. 1 becomes damaged, inoperative, or requires non-routine repair, the procedures outlined in Sections 9 and 11 will be followed. Currently, Cell No. 2 is closed and Cell No. 3 is operational. The personnel and equipment requirements described below represent an estimate of the time which will be required to maintain and repair Cell No. 1. This estimate assumes that major storm events (i.e., those causing extensive damage to the landfill site) will not occur during the post-closure period, and that other contingencies will not occur, as discussed in Sections 9 and 11 of this plan.

8.1 STAFFING PLAN

The personnel required to conduct quarterly inspections and perform routine maintenance and repairs will consist of a Site Manager or Supervisor, one heavy equipment operator, and two laborers. Because the North Sea Landfill site is currently operating as a solid waste management facility (Cell No. 3), the current operations personnel will be performing the required monitoring and maintenance during the post-closure period according to the guidelines described in Section 3 of this plan. As a result, the training requirements, safety plan, and equipment currently in use for this site will continue for the Cell No. 1 post-closure monitoring period. For events occurring outside the scope of the routine maintenance and repair program, specific assistance will be required as described in Sections 9 and 11. Sections 8.1.1 and 8.1.2 provide a summary of the required training for the landfill staff. Records are routinely kept for the landfill personnel and are described in Section 12.

8.1.1 Staff Training

Current landfill personnel have been trained in general landfill operations and specific duties at the site. They also have been given additional training in the recognition of, and response techniques to, hazardous and otherwise unacceptable waste materials, first aid, and basic firefighting. These training programs are updated annually and as newly developed techniques are implemented. These training programs appear to be adequate for the monitoring of Cell No. 1. The Sanitation Supervisor's training includes conducting comparative data (laboratory and field) analyses and identifying when significant changes occur in data from period to period, as well as identifying unusual occurrences. If unusual circumstances or conditions occur, the Sanitation Supervisor will then notify the Town Board, USEPA, and NYSDEC, and arrangements will then be made to acquire professional assistance.

Evaluations of alternatives, and implementation of solutions, will be directed by a Town representative.

8.1.2 Safety Plan

Based upon available information, it appears that Cell No. 1 of the North Sea Landfill contains the following potential chemical and physical hazards, which should be taken into consideration during the post-closure monitoring period:

- Methane gas;
- Revetment matting on steep sideslopes;
- Limited ingress/egress;
- Open drainage swales;
- Exposure to the (weather) elements; and
- Deer ticks.

The landfill personnel will be informed of these potential hazards, given special instructions as needed, and issued safety equipment (as necessary) in conformance with the OSHA requirements.

Methane Gas

Based on readings taken by the Town of Southampton Fire Marshall's Office, methane gas venting from Cell No. 2 ranges from zero to the explosive range. Readings are taken from each of the gas vents every two weeks using a Gas Tech NP-85 explosive gas/oxygen analyzer meter. Methane monitoring is currently being conducted for Cell No. 1 according to the plan described in Section 5 of this report. Personnel performing monitoring or maintenance work on Cell No. 1 have the potential of being exposed to methane gas being vented from both Cell No. 2 and Cell No. 1.

Methane (CH_4), an odorless, colorless, and tasteless gas, is a simple asphyxiant, under high concentrations. There are no systemic effects, either at 5 percent concentration or for long-term exposure. Neither are there any Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL), National Institute of Occupational Safety and Health (NIOSH) recommended exposure limit, or American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values. The prime concern associated with methane is the hazard of fire and explosion. The Lower

Explosive Limit (LEL) for methane is 5 percent of air volume and the Upper Explosive Limit (UEL) is 15 percent of air by volume.

The post-closure monitoring personnel will be briefed on: 1) the presence of methane gas on site; 2) the potential hazards associated with methane gas; and 3) the procedures to be followed to detect methane. Personnel will be directed to avoid generating arcs, sparks, or flames, in areas where methane gas is detected at levels of 10 percent of the LEL, or greater, and will be prohibited from smoking on site. An explosive gas/oxygen analyzer will be used to detect the presence of methane gas and determine its concentration.

Revetment Matting and Steep Slopes

Steep slopes are a physical hazard due to the potential risk of personnel falling or equipment and material sliding. The capped slopes of Cell No. 1 are 3:1 or less in all areas except where the revetment matting has been placed on the east side of the landfill. The slopes in this area are much steeper, and the footing for personnel will be awkward due to the concrete articulating blocks of this structure. Personnel will be advised of the existence of this hazard and be cautioned to maintain proper footing when working in this area. Equipment used on the sideslopes during the monitoring period will be placed, anchored, and operated appropriately to minimize the physical hazards associated with steep sideslopes.

Limited Ingress/Egress

All vehicles will enter the North Sea Landfill site from Majors Path through the main gate located on the western side of the site. In addition, there is a smaller entrance south of the main entrance which is used by residents exiting from the residential drop off area to eliminate cross traffic between the residential vehicles and commercial trucks entering the site through the main gate.

Access to the top of Cell No. 1 is limited to a roadway which travels between Cell No. 3 and the borrow area, and to a roadway between the closed Cell No. 2 and the operating Cell No. 3 (Figure 2-2). These two roadways merge on the eastern side of Cell No. 2 and continue to ascend the landfill between Cells No. 1 and No. 2. While another (perimeter) roadway traverses the western and northern sides of Cell No. 1, it comes to a dead end on the eastern face of Cell No. 1 and does not allow complete access to Cell No. 1 or to the other roadway.

Because the North Sea Landfill is an active solid waste management facility, the roadways on site are frequently used by Town personnel, haulers, and residents. The roadway between Cell No. 3 and the borrow area is utilized by Town personnel to relocate cover material and by haulers to deliver municipal solid waste (MSW) to Cell

No. 3. The roadway between Cell No. 2 and Cell No. 3 is also utilized to some extent by these same vehicles. Other vehicles may be on site for inspections, delivery of supplies and materials, and for site visits by contractors or engineers. It should be noted that the roadways on the eastern portion of the site are narrow and are primarily constructed of stabilized, sandy material. Such conditions, in addition to the traffic, may impede access to Cell No. 1.

Incomplete and impeded access to the plateau area on Cell No. 1 could present a potential hazard, in that personnel and equipment may not be easily evacuated from the area should it become necessary, and emergency vehicles may not easily access the area. Site personnel will be advised of access conditions and of any precautions and procedures necessary to conduct inspection, maintenance, and repair work on Cell No. 1.

Open Drainage/Diversion Swales

In addition to the limited roadway access discussed above, the access road which travels between Cell No. 2 and Cell No. 3 is bordered on the north side by a drainage swale, approximately 2.5 to 3.0 feet deep. Consistent with typical industry practice, the swales are not fenced and, therefore, could be a potential physical hazard to personnel travelling to and from the site. Personnel performing inspection, maintenance, or repair work on Cell No. 1 will be informed of this potential hazard and the necessary precautions needed to be taken to avoid it becoming a hazard.

Severe Weather

Cell No. 1 of the North Sea Landfill rises to an elevation in excess of 150 feet above mean sea level (msl). The top of the landfill cell is exposed to both the sun and the wind, which can aggravate extremes of temperature. In the winter, there is little protection from the wind; and in summer, there is no screening of the sun. This can potentially contribute to physical hazards such as hypothermia, dehydration, and frostbite in the cold weather, and heat rash, heat cramps, heat exhaustion, and heat stroke in hot weather. Personnel performing inspections, maintenance, and repair work on Cell No. 1 will be advised of the severe weather hazards and necessary precautions as part of the safety orientation program. A description of these is presented in Appendix J of this Manual.

Deer Ticks

Based on information from the Suffolk County Department of Health, personnel working at the North Sea Landfill should take the precautions described below against possible deer tick bites. Deer ticks are carriers of the spirochete (*borrelia bergdorfi*) which causes Lyme Disease, which can be transmitted to humans when bitten.

Signs and symptoms of Lyme Disease may include the following:

- The most well-known warning sign is a rash, classically described as a small red area that starts at the site of a tick bite and gradually enlarges over several days. The rash, which does not appear until three to 30 days after the tick bite, may grow to several inches in diameter and is circular with a central clearing. It may be obvious or very faint. Multiple, usually smaller, rashes without central clearing may develop in some individuals.

- Flu-like symptoms may precede or accompany the onset of the rash. Symptoms may include chills and fever, headache, malaise and fatigue, stiff neck and, in some cases, pain in the joints.

- If Lyme Disease is diagnosed and treated early, the prognosis is excellent. If the initial stage is not discovered and treated promptly, later stages may develop. Chronic arthritis, and in some cases heart and nervous system disorders, may develop weeks to months after the tick bites.

Some infected individuals may not develop either rash or symptoms. Thus, anyone bitten or thought to be bitten by a deer tick, or developing signs or symptoms of Lyme Disease is advised to see a physician promptly for an examination and possibly a blood test. Prophylaxis or treatment with antibiotics (tetracycline) may be a recommended course of action.

To prevent tick bites, personnel should wear long pants, made of light colored, tightly woven cloth; tuck pants legs inside of socks; use an insect repellant; check themselves frequently and wash themselves thoroughly at the end of each day. The site safety officer will advise personnel of the risk of deer tick bites, the initial symptoms, and the precautions to be taken.

8.2 EQUIPMENT

The equipment utilized for the post-closure monitoring of Cell No. 1 will consist of standard construction equipment from the Town's inventory. In addition, highway maintenance equipment, such as mowers and trimmers, will be used to maintain the site following its closure.

8.2.1 Minimum Requirements

The principal operations to be performed on a regular basis during the post-closure period will be mowing of the vegetation and the repair of cover soil erosion. The mowing operations will require the use of a heavy equipment mower which can be

operated safely on steep sideslopes. The soils repair will be accomplished with a front-end loader, a vibratory drum roller, and a grader, as necessary, depending upon the size and depth of the area which has been eroded. This equipment is currently available in the Town's inventory and is expected to be available for use at the site during the post-closure monitoring period for Cell No. 1. The equipment will be outfitted with rollover protection cabs and backup alarms meeting the OSHA requirements for this type of machinery. The equipment will be maintained according to the Town's current maintenance schedule, and reserve equipment for emergencies will always be available from the Town's inventory. Because the landfill is an operating solid waste management facility, resources will not be designated solely for landfill post-closure activities. In general, the landfill resources are used wherever necessary on site and is based on availability.

8.2.2 Firefighting Equipment

Fire extinguishers will be carried on all equipment used on the site for maintenance or repair work. In addition, during active operations at the site, fire extinguishing equipment will be available in the scalehouse, manager's office, and maintenance buildings. The North Sea Fire Department will provide assistance and/or equipment, as needed, to control any fires which may occur at the site.

Section 9

9 CONTINGENCY PLAN

9 CONTINGENCY PLAN

The objective of the contingency plan is to address the events which may occur outside of the scope of the routine maintenance program. The contingency plan will be implemented following the discovery of a condition at the landfill which cannot be covered by routine maintenance. Natural occurrences, such as storms, drought, and landfill settlement, are considered "expected occurrences" and have been addressed in the previous sections of this report. Other situations, such as war, an earthquake, or other catastrophic events cannot be reasonably expected to occur and, therefore, are not specifically addressed in this report.

The contingency plan which follows addresses new or continuing degradation of the groundwater quality, the migration of methane gas, and the possibility of a fire on the landfill. Contingencies for Severe Weather are presented in Appendix K of this Manual. The guidelines which follow will be used to determine when the contingency plan should be implemented and which corrective measures should be enacted. The appropriate regulatory agencies and other public officials will be notified for any emergency which is governed by this contingency plan.

9.1 GROUNDWATER CONTAMINATION

Groundwater will be monitored quarterly during the post-closure period according to the provisions of Section 4 of this plan. In the event that a statistically significant increase in the level of contamination emanating from the landfill via the groundwater pathway arises, the Town, NYSDEC, and USEPA will be notified. As a result, the next round of sampling will include testing of the Expanded List of Parameters to determine specific constituents. These parameters are presented in Appendix H-3 of this Manual. At this point, should the elevated levels continue or if new contaminants are discovered, the Town, NYSDEC, or USEPA may request that a work plan be developed that investigates the nature, extent, and cause of the contamination. Upon acceptance of the plan and completion of the work involved, a report will be prepared. The report will describe the findings of the investigation and make recommendations for corrective measures, if necessary. The Town, NYSDEC, or USEPA will determine the specific corrective measure to be taken and make the necessary appropriations for implementation. At a minimum, any corrective action will be accomplished in accordance with 6 NYCRR 360-2.20 (reference Appendix P).

9.2 SURFACE WATER CONTAMINATION

Surface water will be collected and tested after major rainfall events, as described in Section 2.3. In the event that laboratory analysis indicates elevated levels of constituents indicative of leachate, the next round of sampling (after a major rainfall event) will include testing for Baseline Parameters. These parameters are presented in Appendix H-2 of this

Manual. At this point, should levels of constituents indicative of leachate continue to be present, the Town, NYSDEC, or USEPA may request that a work plan be developed that investigates the nature, extent, and cause of the suspected contamination. Upon acceptance of the plan and completion of the work involved, a report will be prepared. The report will present the findings of the investigation and recommend corrective actions. The Town, NYSDEC, or USEPA will select the preferred corrective action and appropriate implementation. At a minimum, any corrective action will be accomplished in accordance with 6 NYCRR 360-2.20 (reference Appendix P).

9.3 LANDFILL GAS MIGRATION

Methane gas that is flared or vented to the atmosphere does not present a risk to human health. However, a build-up of gas within a confined space at the landfill may create an explosion hazard. If it is suspected that methane gas generation poses a human health hazard, the NYSDEC will be notified, and an investigation undertaken to determine whether the flare or vent system is functioning properly. The possible responses to a gas venting emergency include replacing portions of the venting system, adding new vents, or installing an active gas withdrawal system.

Currently, a gas monitoring system exists around the perimeter of the landfill. The landfill gas monitoring wells are designed to detect the presence of methane. A description of the routine gas monitoring plan is provided in Section 5 of this plan.

In the event that methane gas is detected at a level equal to, or greater than, 25 percent of the LEL (5 percent, by volume) during the routine, bi-weekly monitoring schedule, the Landfill Supervisor and officials identified in Section 9.5 of this Manual will be notified and will immediately undertake all steps necessary to ensure safety and protection of human health and notify NYSDEC officials. If deemed necessary, the following will be implemented:

- Within seven days of detection, the Town will submit to the NYSDEC and USEPA a report of the methane gas levels detected and provide a description of the steps that will be taken to protect human health; and

- Within 45 days of detection, submit a plan to implement a remediation plan for the methane gas releases and a schedule for implementation of the plan within 60 days after date of detection. The plan must assess the nature and extent of the gas release problem and describe the proposed remedy.

9.4 FIRE AND EXPLOSION

Cell No. 1 has been inactive since 1985. As a result, the likelihood of an underground fire in the waste is relatively low. However, an aboveground (vegetation) fire is a possibility and will be reported to the local fire department immediately if it occurs. The appropriate response measure, including the safety of the personnel on the site, will be the responsibility of the fire department (Section 9.5). Any damage to the Cell No. 1 closure structures will be repaired according to the guidelines in Section 3, after extinguishing the fire.

9.5 EMERGENCY RESPONSE

Emergencies are events which fall outside of the reasonable range of occurrence and have not been included in the Post-Closure Contingency Plan. Such events may include, but not be limited to, a catastrophic failure of one of the stormwater control features, a catastrophic failure of the landfill cap, or a fire caused by the release of high concentration of methane at the perimeter gas monitoring wells.

9.5.1 Notification Procedure

For emergencies that present an immediate danger or threat to human health and welfare, the Southampton Sanitation, Police, and Fire Departments will be notified; the affected area(s) secured; and local residents warned or evacuated. For emergencies that do not present an immediate threat or danger to human health and welfare, the Southampton Sanitation and Suffolk County Health Departments will be notified, as well as the NYSDEC and USEPA.

9.5.2 Telephone Numbers

Telephone numbers for emergency response personnel are presented on the following page.

Emergency Response Telephone Numbers

North Sea Fire Department Dover Avenue and Noyack Road Southampton, NY	(516) 283-4739
Town of Southampton Police Department 110 Old Riverhead Road Hampton Bays, NY	(516) 728-3400
Town of Southhampton Department of Fire Prevention Building 76 Southhampton Airport Westhampton Beach, NY	(516) 288-0201
Southampton Town Board 116 Hampton Road Southampton, NY	(516) 283-6000
North Sea Landfill Site Majors Path Southampton, NY	(516) 283-2600
Suffolk County Health Services Dept. Div. of Environmental Health Services 225 Rabro Drive East Hauppauge, NY	(516) 853-3081
NYSDEC Region I Building 40 - SUNY Stony Brook, NY	(516) 444-0375
NYSDEC Div. of Hazardous Waste Remediation 50 Wolf Road Albany, NY	(518) 457-3976
USEPA Region II Superfund Branch 26 Federal Plaza - Room 737 New York, NY	(212) 264-2657

10 POST-CLOSURE COST ESTIMATE

10 POST-CLOSURE COST ESTIMATE

This section of the report presents an estimate of the costs expected to be incurred during the inspection, maintenance and monitoring of the Cell No. 1 capping system. This annual cost estimate is based on 1994 dollars. The projected cost of the three basic components (inspections, maintenance, and monitoring) are presented below. The total projected annual cost during the 30-year post-closure period of Cell No. 1 is $83,380 (Table 10-1). However, certain variables may affect these estimated costs:

- The extent or severity of storms which exceed the design standards and result in severe erosion or other natural calamities;
- Weather extremes, such as drought or extensive frozen ground;
- A change in groundwater quality or water table elevation, which could require the installation of additional wells or more frequent testing of the existing wells; and
- Increase in fees, special levies, changes in insurance rates, or other unexpected administrative costs.

10.1 INSPECTION COSTS

It is expected that the quarterly inspections of the Cell No. 1 cap system will be performed by Town of Southampton personnel. Assuming that it will take two staff members to perform the inspection, a combined hourly rate was estimated to be $56 per hour. Assuming that the inspection will be performed during a normal 8-hour work day, this would amount to $448 per inspection. Cell No. 1 will be inspected a minimum of four times per year; therefore, the annual estimated cost of performing the site inspections is estimated to be $1,792 per year.

10.2 MAINTENANCE COSTS

Routine maintenance of the Cell No. 1 cap is anticipated to include three activities: 1) repairing erosion damage to landfill cap and perimeter features; 2) mowing landfill grass and maintaining general landscaping; and 3) removing silt and debris from drainage structures. Estimating this work requires assumptions based on previous post-closure monitoring experience, as well as a knowledge of the site weather history. Repair costs will generally involve a minimum of three workers and appropriate equipment. Routine repairs are anticipated to involve one 8-hour day per specific component (e.g., diversion swale, recharge basin, access road). However, routine repair to the landfill cover system is anticipated to take two days for each occurrence.

Table 10-1

POST-CLOSURE COST ESTIMATE - ANNUAL SUMMARY

Inspections	1,792
Routine Maintenance and Repair	22,420
Contingency Repair (15%)	3,370
Gas Monitoring [1]	8,320
Odor Monitoring [1]	16,640
Stormwater Monitoring	
Sample Collection	400
Laboratory Analysis	2,150
Groundwater Monitoring [1]	
Sample Collection	7,680
Laboratory Analysis	15,610
Benthic Survey (first 8 years only)	5,000
Total	$83,380

[1] A portion of these costs are already included in the annual O&M budget for the entire North Sea Landfill Facility, but are not readily discernible by Cell No. As a result, a lower annual operating budget may be realized by Cell No. 1

The North Sea Landfill site is located on Long Island's south fork. Because of its proximity to the Atlantic Ocean, sea breezes persist. Wind erodes the soil and can exacerbate the effects of storms. In addition, because of the elevation and exposure of the site, the effects of weather are further aggravated.

On average, it is expected that the swales and stilling basins will require silt removal twice per year and that scouring of the groundwater recharge basin will be conducted three times per year. Routine erosion repair to conveyance features will probably occur twice per year, while recharge basin repair will occur four times per year. The cost of these maintenance services is anticipated to average approximately $22,000 annually (Table 10-2). The cost of this maintenance work will be greater during the first two to three years of the post-closure period as the vegetative cover develops, perhaps as much as $30,000 per year, but is expected to decrease to a somewhat lower value for the remainder of the 30-year post-closure period.

Other costs which may be incurred during this maintenance period include groundwater and gas monitoring well repair or replacement, gas vent repair or replacement, access road maintenance and repair, reconstruction of drainage structures, or repairs to the geomembrane or the revetment matting. These costs are contingent upon need and, therefore, are unable to be estimated at this time. However, an amount equal to 15 percent of the routine inspection and maintenance costs ($22,420 per year) was added to the total annual cost for contingencies. This amount for these non-routine (contingent) repairs is estimated to be $3,370 per year. This amount should be budgeted for each of the 30 post-closure monitoring years. While it is not expected to be used each year, it is anticipated that over the post-closure life of the facility, non-routine repairs will occur that will necessitate the use of contingent monies. Therefore, it is important that this contingency budget be carried over, and accrued, from year to year.

10.3 MONITORING COSTS

10.3.1 Gas Monitoring

Gas monitoring is currently performed at the North Sea Landfill on a routine (bi-weekly) basis. This involves the effort of one individual, a representative from the Town Fire Marshal's office, for a full (8-hour) day for each sampling event. This results in a labor expense of $8,320 on an annual basis.

10.3.2 Odor Monitoring

Odor monitoring is being proposed for the Cell No. 1 post-closure period. It is anticipated that one person will perform the survey, that it will take 0.2 hours (12 min) for each location, and that it will take 4 hours to conduct each sampling event. With

Table 10-2

ROUTINE MAINTENANCE AND REPAIR SCHEDULE
ANNUAL POST-CLOSURE BUDGET

Activity	No. of Personal	Labor Combined Rates $/hr	$/day	Days/yr	Total Labor ($)	Equipment $/day	Equipment ($)	Total ($)
Landscaping								
• Mowing	2	56	448	4	1,792	60	240	2,032
• Miscellaneous	2	56	448	1	448	60	60	508
Stormwater Control Features								
• Swales	2	56	448	2	896	100	200	1,096
• Stilling/ Recharge Basins	3	84	672	2	1,344	200	400	1,744
• Culverts	2	56	448	2	896	100	200	1,096
Environmental Monitoring								
• Gas Wells	2	80	640	1	640	60	60	700
• Groundwater Wells	2	80	640	1	640	60	60	700
Cell Cap								
• Soil/Veg. Cover	2	56	448	4	1,792	200	800	2,592
• Revetment Mat	2	56	448	1	448	60	60	508
Access Road	2	56	448	2	896	100	200	1,096
General Site Maintenance	2	56	448	4	1,792	60	240	2,032
Recordkeeping	1	40	320	26	8,320	-	-	8,320
Total					19,904	-	2,520	22,424

sampling conducted semi-weekly, a total of 104 sampling events will take place each year. This will result in a labor expense of $16,640, annually.

10.3.3 Stormwater Monitoring

Stormwater monitoring is being proposed for the Cell No. 1 post-closure period. Stormwater will only be sampled after large rainfall events. It is anticipated that five (5) such events will occur each year. Assuming that it will take two hours to collect two stormwater samples and prepare them for laboratory analysis, the annual field labor budget is estimated to be $400. The stormwater samples will be analyzed for Routine Parameters. The estimated cost for laboratory analyses is $215 per sample. Therefore, the estimated budget for stormwater monitoring is $2,550 per year.

10.3.4 Groundwater Monitoring

Fourteen specific wells will be utilized to monitor groundwater for the Cell No. 1 post-closure period. It is anticipated that well sampling will be conducted by two field personnel, and that three days will be required for collection of a complete round (14) of samples. With four rounds of monitoring required each year, a field labor budget of $7,680 is anticipated.

Collected groundwater samples will be analyzed quarterly for Routine Parameters and annually for Baseline Parameters. Routine Parameters are estimated to cost $215 per sample, while Baseline Parameters are $470 per sample. The annual budget for laboratory analyses of groundwater samples is estimated to be $15,610, resulting in a total groundwater monitoring budget of $23,290 per annum.

10.3.5 Specialty Studies

Fish Cove will be monitored for the first eight (8) years of post-closure. A benthic survey will be conducted on a bi-annual basis. A total of five (5) surveys will be conducted, including one at the beginning of the official post-closure period. It has been estimated that each survey will cost approximately $8,000, resulting in an average annual cost of $5,000 for the first eight years.

11 COMMUNICATION PROCEDURES

11 COMMUNICATION PROCEDURES

During the 30-year post-closure period at Cell No. 1 of the North Sea Landfill, routine inspections will be performed quarterly as described in Section 2 of this plan. In addition to these scheduled inspections, non-routine inspections may be necessary as a result of extraordinary incidences which may occur at the site such as fires, natural disasters, or significant vandalism. Section 2 and 3 of this plan identify the procedures to be followed for routine site inspections and scheduled for maintenance and repair. The procedures outlined in Sections 2 and 3 will also be followed in the event that a non-routine inspection is required. This section of the plan outlines the recommended communication procedures to be followed in the event that a component of the landfill site becomes damaged, inoperative, or requires non-routine repairs.

Section 9.5.2 lists the addresses and telephone numbers of the appropriate authorities to contact in case of emergencies.

11.1 VANDALISM

Routine inspection of the soil cover will reveal if any unauthorized dumping or vandalism has occurred on site, as described in Section 2. Should this occur, inspection personnel will record evidence of such activity (e.g., vehicle tracks) or attempt to identify the source of the illegally placed waste, and immediately notify the Sanitation Supervisor. The Sanitation Supervisor will notify the Town Board and the Southampton Police of the incident.

When vandalism, trespassing, or unauthorized dumping has occurred, the Landfill Supervisor will evaluate site security procedures to identify the probable access route and will augment the security procedures to prevent such access, as needed. If the site cannot be secured through the use of existing resources and the Landfill Supervisor determines that additional labor or materials are needed to protect the site, the Landfill Supervisor will notify the Town Board to obtain an appropriate commitment of specialty resources.

In addition, to determine if any of the landfill components have been damaged as the result of significant vandalism, an emergency site inspection will take place. The Sanitation Supervisor will coordinate and direct all emergency repairs and notify Town officials of any adverse conditions at the site.

11.2 FIRES

All on-site equipment used for maintenance and/or repair work will be equipped with fire extinguishers, as described in Section 6. However, should a fire occur which cannot be contained by on-site personnel or equipment, the North Sea Fire Department will be

contacted. In addition, the Landfill Supervisor will be notified immediately so that he can coordinate the other on-site activities.

After a fire, the Landfill Supervisor will determine if any of the landfill components were damaged. A site investigation will be undertaken according to the procedures outlined in Section 2 of this plan. The Sanitation Supervisor will coordinate and direct all emergency repairs and notify the Town Board of any adverse conditions at the site.

11.3 NATURAL DISASTERS

Some natural disasters that might occur at the site may include, but not be limited to, hurricanes, heavy rains, ice storms, lightening strikes, and/or floods. Other natural phenomena, such as tornadoes and seismic events, are unlikely to occur at the site due to its geographic location. Should one or more of these events take place at the site, site personnel will follow emergency procedures to ensure protection and prevent personal injury during the event and will notify the Sanitation Supervisor of any evident damage or threatening conditions that have been created as a result of the event. Damage that might occur as a result of such events include erosion of the final cover system and clogging of stormwater conveyance features. Lightening strikes to trees could result in trees falling across site roadways and fire.

If a severe storm event or other natural phenomena has caused significant damage to the landfill, or if the site has sustained significant damage, an emergency site inspection will be undertaken to determine the extent of such damage. When the Sanitation Supervisor determines that conditions are safe to inspect the site, he will dispatch a team of qualified personnel to inspect the site as described in Section 2 of this Manual. The Sanitation Supervisor will coordinate and direct all emergency repairs and notify the Town Board of adverse conditions at the site.

11.4 VECTORS

During routine and incidental site inspections, vector infestation may be evidenced by the presence of burrow holes or nests. Should infestation be discovered to pose a potential threat to the integrity of the landfill cover system or other site components, the landfill Sanitation Supervisor will be notified of these conditions. The landfill Site Supervisor will contact an appropriate extermination service to eliminate rodents or insects, as needed.

11.5 METHANE

The site is monitored bi-weekly for methane at 36 locations. Sixty-six wells, both shallow and deep, are monitored to determine the percent of methane accumulated within the well's atmosphere and the pressure generated within the well by the gases

present. These results are reported to the NYSDEC on a monthly basis. It is expected that these procedures will be followed throughout the 30-year post-closure period. In the event that the recorded methane levels exceed 25 percent of the lower explosive limit (LEL) contingency planning will be implemented. Cell No. 1 currently has a gravity gas collection system consisting of twelve (12) vents located on the plateau area of the landfill and connected to two "stick" flares. Each flare is connected to a system of gas vents.

11.6 ODORS

The Town will develop a monitoring plan to assess the potential impacts from odor-causing gases which may be emanating from the landfill. Hydrogen sulfide will be used as the primary indicator for the air monitoring program because of its low odor threshold. Readings of hydrogen sulfide levels will be recorded twice weekly at each of 20 monitoring points around the landfill property line and off site (Figure 5-2). Should readings indicate an imminent danger to the public, they will be reported first to the Landfill Supervisor, Southampton Fire and Police Departments, and Town Board. Upon notification of these entities, the NYSDEC and USEPA will be notified.

11.7 DUST

Prolonged dry periods are not expected to present the same problems at a closed landfill as at an operating landfill because of the presence of vegetative cover. To prevent blowing dust, the landfill cap must maintain complete vegetative cover. This will prevent the cap from desiccation under prolonged dry conditions. However, during such periods, areas that are not vegetated (e.g., access roads and recharge basins) will be watered, utilizing an on-site water truck, and use of the roads will be minimized.

11.8 STORMWATER CONTROL SYSTEM

The stormwater control system will be inspected to determine if siltation has occurred which would impede the flow of stormwater through the system or recharge into the groundwater. In the event that siltation has occurred, it will be noted on the inspection form, and the Landfill Supervisor will be notified so that the appropriate action can be taken to clean the conveyance system or regrade the recharge basin.

Diversion swales and downchutes of the conveyance system will be noted for excessive build-up of silt; energy dissipators and stilling basins will be cleared of silt and other debris; and the recharge basin will be scoured to remove silt and other fine particles that would prevent or impede groundwater recharge.

11.9 EXCESSIVE LANDFILL SETTLEMENT

Intermittent topographic surveys for cap integrity and differential settlement will be arranged by the Sanitation Supervisor to determine if a change has occurred which could indicate potential malfunction of one of the landfill components. If it is determined through the evaluation that certain areas have settled to the point where the integrity of the cap system may be jeopardized, the Landfill Supervisor will notify the Town Board, NYSDEC, and USEPA. Upon a physical examination of the site by the Town, its engineer, and representatives from the NYSDEC and USEPA, a work plan will be prepared to remediate any damage that may have been caused to the landfill cover system.

11.10 GROUNDWATER CONTAMINATION

Should there be a statistically significant increase in the level of contamination emanating from the site via the groundwater pathway, the USEPA and the Town Board will be notified; and the Town's laboratory will monitor the expanded list of parameters (Appendix C-3) during the next round of sampling. Should the elevated levels continue, or if new contaminants are discovered, the Town (or a representative of the Town, such as the Town Engineer) will prepare a work plan to investigate the nature, extent, and cause of the contamination. The work plan will be submitted to the NYSDEC and the USEPA for approval. Following implementation of this work plan, the results will be evaluated and recommendations for corrective measures to the USEPA and the Town Board will be made.

Section 12

12 RECORDKEEPING AND REPORTING

12 RECORDKEEPING AND REPORTING

12.1.1 Recordkeeping

The landfill will maintain records of inspections, maintenance (routine and non-routine), and environmental monitoring of the landfill. Table 12-1 presents a schedule summary of the overall inspection, recordkeeping, and maintenance schedules for operations to be conducted at the landfill. This information will be recorded and maintained in the Town files. Some of the information will be reported to NYSDEC as presented in Section 12.2. The remaining information will be available in the files maintained at the site. Records also will be maintained regarding the results of the environmental monitoring plan as presented in Sections 4 and 5 of this Manual. In addition, records will also be maintained for landfill personnel. Such record information would include, but not be limited to: 1) personal information (name, address, date of birth, etc.); 2) length of employment, including start date; 3) landfill/site duties; and 4) history of health examinations.

12.2 REPORTING

The Town of Southampton will prepare and submit reports on surface water, groundwater, and landfill gas quality, and an annual report to summarize the operation, maintenance, and monitoring of the landfill described below.

12.2.1 Water Quality Reports

Water Quality Monitoring reports (for surface water and groundwater) will be prepared and submitted to the Regional Office of the NYSDEC as a component of the Annual Report and in special Water Quality Assessments as directed by the NYSDEC. These reports will contain the following information:

- Results of groundwater and surface water sampling events to be conducted quarterly, or after a major precipitation event; and
- An analytical review of the data to determine exceedences of applicable State water quality criteria, as well as discernable trends in data.

12.2.2 Landfill Gas Reports

A Landfill Gas (Methane) Monitoring report will be prepared and submitted to the NYSDEC as a component of the Annual Report and will contain the following:

- A compilation of the bi-weekly methane monitoring reporting results;

TABLE 12-1

INSPECTION, RECORDKEEPING, AND MAINTENANCE SCHEDULES LANDFILL OPERATIONS

Item	Activity Frequency
Police entire cell area, including buffer, for litter	D
Record running hours for equipment	D
Equipment Maintenance and Repairs Performed	D
Total Fuel Usage	D
Inspect portable fire extinguishers	Q
Clean landfill access road	As Necessary
Maintain access road	As Necessary
Clean recharge basin to maintain design capacity	As Necessary
Maintain and resurvey vertical and horizontal control monuments	B
Perform topographic survey of landfill	A
Inspect other emergency equipment (first aid kits, personnel protective equipment, water truck, two-way radios, etc.)	A
Update Emergency Contingency Plan	A

Notes:

D = Daily A = Annual Q = Quarterly B = Biennially

All site facilities, environmental controls, and monitoring systems to be checked for damage at least weekly, inspected prior to forecasted major storms, and after severe inclement weather.

- An analysis of trends observed; and
- An analysis of exceedances and a description of any special steps taken to respond to, or remediate, the exceedances.

12.2.3 Annual Report

An annual report for Cell No. 1 will be submitted to the NYSDEC no later than 60 days after the first day of January of each year. This report will include:

- A summary of all routine operations and maintenance activities;
- A summary of all routine inspections of components of the landfill;
- A summary of all non-routine inspections of components of the landfill;
- A compilation and summary of all emergency activities;
- A compilation and summary of all water quality (surface water and groundwater) data collected throughout the year;
- A compilation and summary of all landfill gas data collected during the year;
- A summary of all expenses incurred throughout the year, both routine and contingent; and
- Any changes from the approved reports, plans, and specifications will be listed, with justification for each change given.

Section 13

13 FINANCIAL ASSURANCE

13 FINANCIAL ASSURANCE

The Town of Southampton will utilize Town personnel who are familiar with the landfill site, its equipment, and existing procedures to conduct routine and normal post-closure maintenance activities at Cell No. 1. Post-closure cost estimates have been prepared and are presented in Section 10 of this Manual. The post-closure cost estimate has included both annual and periodic costs, as described in the Landfill's Closure Plan. The Town will provide continuous financial coverage for post-closure care until released from financial assurance requirements by the NYSDEC.

13.1 ADJUSTMENTS TO COST ESTIMATES

The post-closure care cost estimate will be adjusted annually for inflation and a copy submitted to the NYSDEC. The NYSDEC will be notified, and the financial assurance documentation revised and resubmitted if changes occur to the post-closure care activities. A justification will also be submitted, which could include adjustments for: 1) inflation; 2) routine maintenance; 3) landfill personnel; and 4) landfill conditions. Justification will also include a description of any corrective measures that may have been implemented.

13.2 INCREASE IN COSTS

The Town will notify the NYSDEC and increase the post-closure care cost estimate and the amount of financial assurance, if increases in inflation, significant changes in landfill conditions, and additions to the post-closure plan occur during the post-closure care period. The Town will, in the case where corrective measures have been implemented, annually adjust cost estimates and financial assurance. As with routine post-closure care, the Town will also provide continuous coverage for corrective measures, until released from financial assurance requirements by the NYSDEC.

Section 14

14 REFERENCES

14 REFERENCES

Consent Decree between the Town of Southampton and the United States Environmental Protection Agency, U.S. District Court, Eastern District of New York, February 20, 1991.

Construction QA Report (Draft) - North Sea Landfill Cell No. 1 Cap, prepared by GeoSyntec Consultants, March 9, 1994.

Draft Operation and Maintenance Plan - North Sea Landfill Cell No. 1, prepared by Malcolm Pirnie, Inc., Revised August 21, 1992.

East Slope Redesign - North Sea Landfill Cell No. 1 Cap, prepared by GeoSyntec Consultants, October 1993.

Evaluation of HDPE Geomembrane Substitution - North Sea Landfill Cell No. 1 Cap, prepared by GeoSyntec Consultants, October 1993.

Fish Cove Study - North Sea Landfill, prepared by H2M Group, March 1992.

Green, R.L., Page, Jr., G.L., Johnson, W.M., Considerations for Preparation of Operation and Maintenance Manuals, EPA-430/9-74-001, January 1974.

Record of Decision - North Sea Landfill Cell No. 1, U.S. Environmental Protection Agency, Region II, September 29, 1989.

Remedial Action Work Plan - North Sea Landfill Cell No. 1 Cap, prepared by Malcolm Pirnie, Inc., Revised December 30, 1992.

Remedial Design Report - North Sea Landfill Cell No. 1 Cap, prepared by Malcolm Pirnie, Inc., Revised August 24, 1992.

Revision to the Construction Contract for the North Sea Landfill Cell No. 1 Cap Pursuant to the "Modification Agreement" dated January 11, 1994, Change Order No. 2, prepared by Dvirka & Bartilucci, May 1994.

Site Health and Safety Plan - North Sea Landfill Cell No. 1 Cap, prepared by Malcolm Pirnie, Inc., August 19, 1991.

Solid Waste Management Facilities, 6 NYCRR Part 360, New York State Department of Environmental Protection, Division of Solid Waste, October 9, 1993.

Superfund Remedial Design and Remedial Action Guidance, U.S. Environmental Protection Agency, OSWER Directive 9355.0-4A, June 1986.

APPENDICES

Appendix A

APPENDIX A

STANDARD INSPECTION REPORT FORM

Site Inspection Checklist

Date: _____
Inspected By: _____

Site Name: _____
Cell No.: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
1) Vegetative Cover:						
a) Landfill Site:						
bare spots						
dead areas						
undesirable growth						
b) Drainage Structures:						
bare spots						
dead areas						
undesirable growth						
2) Revetment Matting:						
a) Sideslopes:						
cracking						
vandalism						
vector infestation						
holes						
missing concrete articulating blocks						
exposed geomembrane						
b) Anchor Trenches:						
cracking						
holes						
3) Ground Water Monitoring Wells:						
damage/vandalism						
settlement						
vector infestation						

ADDITIONAL COMMENTS:

Site Inspection Checklist (Cont.)

Date: _____ Site Name: _____
Inspected By: _____ Cell No.: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
4) Soil Cover:						
slope movement and condition						
erosion damage						
settlement						
holes						
vector infestation						
waste breakthrough						
leachate breakthrough						
vandalism						
unauthorized dumping						
litter						
5) Access Roads:						
potholes/burrow holes						
erosion gullies						
loss of stone cover						
obstructions						
6) Gas Venting System:						
odor						
damage/vandalism						
settlement						
vector infestation						
passive gas venting system efficiency						

ADDITIONAL COMMENTS:

Date: _____ Site Name: _____
Inspected By: _____ Cell No.: _____

7) Storm Water Collection						
a) Diversion Swales:						
silt accumulation						
ponded water						
wash outs						
vegetative cover						
b) Perimeter Swales:						
silt accumulation						
ponded water						
vegetative cover						
erosion control matting						
c) Energy Dissipators:						
damage/instability						
soil erosion around						
d) Downchutes:						
damage/instability						
soil erosion beneath						
loose ties						
slippage of gabion						
e) Culvert Outlets:						
damage/instability						
soil erosion beneath						
loose ties						
slippage of gabion						

ADDITIONAL COMMENTS:

_____
_____
_____
_____
_____

Appendix B

APPENDIX B

RECONSTRUCTION OF GABION DOWNCHUTES "A" AND "B" (SCOPE OF WORK)

SCOPE OF WORK

RECONSTRUCTION OF GABION DOWNCHUTES "A" AND "B"

The work to be performed by Contractor under this Contract Modification for the reconstruction of failed downchutes "A" and "B" includes, but is not limited to, the following:

1. **Preliminary Work**
   A. Removal of existing riprap filled gabion basket sluiceway at each location between plateau level and concrete structures at the toe of slope as shown on the modification drawings.
   B. Removal of existing cap veneer above existing 60 mil HDPE membrane as ordered by Engineer in eroded/damaged areas where the sand drainage layer has been depleted and survey of the existing membrane to verify if damage has been sustained.
   C. Repair existing 60 mil HDPE membrane as necessary and/or ordered by Engineer.

2. **Reconstruction of Cap Veneer**
   A. Reconstruction of a sand drainage layer, filter fabric separator layer and general fill layer in damaged areas.
   B. Reconstruction of cap relief drain system in damaged areas.

3. **Construction of New Downchutes**
   A. Construction of General Fill layers to top of proposed gabion channel and approach apron section.
   B. Excavation of gabion channel section.
   C. Construction of new gabion downchutes including, but not limited to:
      • fine grading
      • mechanical compaction
      • 60 mil HDPE membrane

- geonet/geotextile composite
- 9" rock filled gabion mattress
- Installation of nominal 3/8" well graded clean crushed rock to interstices of lower third of riprap used in construction of gabion basket downchutes

D. Construction of earth berms and/or additional fill to finished grade adjacent to new downchutes.

E. Installation of erosion control materials as shown.

F. Construction of gabion mattress approach aprons at intermediate swales and plateau inlets as shown.

G. Grouting of loose riprap and gabion mattresses as shown.

4. **Modifications to Existing Concrete Drainage Structures**

A. Install relief ports through wall sections as shown.

B. Mechanically fasten 60 mil HDPE membrane to concrete dissipation structure and to drainage discharge structure as shown.

5. **Restoration**

A. Cleanout and restoration of existing drainage swales IW-3 and IN-3.

B. Cleanout of existing swale at dissipation structure, drainage discharge structure and twin 36" C.M.P. outlet pipes.

C. Restoration of existing cap veneer.

D. Reconstruction of all breaches in perimeter swale and perimeter roadway between and in the vicinity of downchutes "A" and "B".

E. Reconstruction of intermediate swales 1W-2 and 1N-2.

F. Installation of erosion control fabric and blanket.

6. **Quality Control**

   A. Performance of field quality control to assure work meets minimum construction criteria.

7. **Survey Work**

   A. Perform all survey work required to construct the new downchutes including work required to develop record drawings of the completed work.

8. **Record Drawings**

   A. Record drawings shall be prepared for this work by the Contractor in accordance with the Original Contract Documents.

SPECIAL CONDITIONS

1. **Use and Disposal of Existing Material**

   Contractor shall utilize riprap salvaged from the existing gabion downchutes for construction of riprap paving, riprap structures and gabions. Excess salvaged riprap shall be loaded, hauled and stockpiled by Contractor at a location southwest of the site/leachate storage tank and shall become the property of the Town.

   All other construction debris generated by this work may be disposed of in the landfill's active Cell No. 3.

   Coordinate these activities with landfill operator.

2. **Inspection of Existing Membrane**

   As part of this work, the Contractor shall expose the existing 60 mil textured HDPE liner as directed by Engineer in disturbed areas where the sand drainage layer has been depleted for inspection by the original installer, Gundle Lining Construction Corp. Upon inspection, the installer shall repair, test and log all deficiencies observed. Upon completion of inspection and/or repair, the liner manufacturer and installer shall submit a report detailing all repairs made and shall certify to Owner that the inspected membrane is in full conformance with the requirements of Specification Section 02771 <u>High Density Polyethylene (HDPE) Geomembrane</u> of GeoSyntec Consultants' October 1993 report, entitled <u>Evaluation of HDPE Geomembrane Substitution, North Sea Landfill, Cell No. 1 Cap</u>.

3. **Earthwork**

Prior to installation of HDPE membrane, geonet composite and gabion sections, the Contractor shall place and compact fill to a height equal to the top of the proposed channel or approach apron section. Upon completion of fill operation, Contractor shall excavate to the proposed gabion section subgrade, fine grade, compact and test the prepared subgrade, including side slopes.

4. **Quality Control Criteria and Procedures**

A. Soils

- All soils placed shall be placed in accordance with the Original Contract Specifications as relates to 1) maximum thickness of loose lifts and 2) the minimum compacted density required for the different veneer components.
- Contractor shall engage an approved laboratory to perform compaction tests.
- Minimum quantity of compaction tests to be performed by Contractor is five (5) per 12 inch lift per downchute as directed by Engineer. Contractor shall submit original reports to Engineer.

5. **Work Required at Recharge Basin**

All work remaining to be performed at the recharge basin including, but not limited to items listed below are not part of this additional work. This work will be paid for either through Original Contract Bid Items and/or through the "Modification Agreement" Change Order:

- dewatering of basin
- removal of silt
- regrading
- grouting of gabion spillway
- landscaping
- placement of erosion control fabrics

- fence
- additional stone headwall
- reconstruction of Cell No. 2 stormwater outfall

SUPPLEMENTAL SPECIFICATIONS

All specifications of the Original Contract Documents shall apply unless further modified below or as modified in the special conditions:

Division 2 - Sitework

° Section 2D - Excavation and Backfill (Revise)

- Fill used in construction of the drainage layer shall be obtained from the Cell No. 5 borrow site. Only virgin material from Cell 5 shall be used in the performance of this work. After construction is completed, Cell 5 shall be restored to existing grades and contours with material from Cell No. 4 or 5, as necessary.
- Drainage sand shall meet the existing specification for drainage and venting sand except for percent passing the 3/8" sieve.
- Fill used in construction of new berms, swales, general fill layer, etc. shall be obtained from the Cell No. 4 borrow site. Only virgin material from Cell No. 4 shall be used in performance of this work.
- Fill used to construct the sand drainage layer shall be compacted to a minimum of 90% of the modified proctor maximum density.
- Fill used to construct berms, swales, general fill layer, etc. shall be compacted to a mimimum of 90% of the modified proctor maximum density.

° Section 2D4 - Riprap (Revise)

- The d_{50} size of loose/grouted riprap shall be six (6) inches.
- 3/8" gravel used to fill the interstices of lower third of riprap used in construction of gabion baskets shall be clean crushed rock meeting the following nominal gradation:

% passing 1/2" sieve	100
% passing 3/8" sieve	90
% passing 1/4" sieve	17
% passing #4 sieve	5
% passing 1/8" sieve	2

Appendix C

APPENDIX C

PVC LINER REPAIR PROCEDURE

WRIGHT LINING & CONSTRUCTION CO., INC.

PVC REPAIR PROCEDURE

Any necessary repairs to the PVC shall be made with the lining material itself and cold applied vinyl to vinyl splicing adhesives. Patches should be cut so as to cover the area to be repaired by a minimum of 4" in all directions. Patches should be cut with rounded corners. The splicing adhesive shall be applied to the contact surface between the patch and the lining, and the two surfaces pressed together immediately. Any wrinkles should be smoothed out as well as possible. When repairing liner that has been in service for some period of time, it may be necessary to clean the existing PVC with a solution such as soap and water, or a carefully applied chemical like MEK. The sevices of a qualified liner superintendent should be used when bonding new material to old.

APPROVED	☒
APPROVED AS NOTED	☐
REVISE AND RESUBMIT	☐
FINAL APPROVAL	☐

THIS MATERIAL HAS BEEN CHECKED FOR GENERAL ARRANGEMENT AND COMPLIANCE WITH SPECIFICATIONS AND CONTRACT DRAWINGS. APPROVAL OF THIS MATERIAL SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR DIMENSIONAL OR OTHER ERRORS AND OMMISSIONS, OR OF GUARANTIES REQUIRED BY THE CONTRACT DOCUMENTS.

DVIRKA AND BARTILUCCI
Consulting Engineers

BY (CWL) DATE 9/1/93

HÜLS AMERICA INC.

Oak Hill Road
Crestwood Industrial
Mountaintop
PA 18707
Tel: (717) 474-5741
FAX: (717) 474-0988

CUSTOMER: Watersaver Co.
HULS ORDER: 128599-001

THICKNESS: 42 MIL PVC
ROLLS TESTED: See attached sheet.

PRODUCT NO: 0853
COLOR NO: 60568 BLACK

FINISH: M0700 MATTE
PRODUCED WEEK OF: 06/23/93

TEST REPORT DATE: 07/19/93

PROPERTY	SPECIFICATION	TEST VALUE	ASTM TEST METHOD
Thickness, mils, Nominal, +/-5%	40.0	41.6	D- 751
Specific Gravity, Nominal, min.	1.23	1.27	D- 792
Tensile Strength, psi, Nominal, min. (breaking factor lbs./in. width, Nominal, min.)	2300 (92.0)	MD 2740 (110.4) TD 2518 (100.7)	D- 882
Elongation at Break, %, Nominal, min.	400	MD 537 TD 530	D- 882
Modulus @100% Elongation, psi, Nominal, min. (force @100% elongation, lbs./in. width, Nominal, min.)	1000 (40.0)	MD 1153 (46.1) TD 1080 (43.2)	D- 882
Tear Resistance, lbs./in. Nominal, min. (tear force @ gauge lbs., Nominal, min.)	250 (10.0)	MD 295 (11.8) TD 320 (12.8)	D-1004
Low Temperature, Deg. F Pass	-25	Pass	D-1790
Dimensional Stability, % Change, max.	3.5	1.3	D-1204
Water Extraction, % loss, max.	0.35	0.16	D-3083
Volatility, % loss, max.	0.50	0.46	D-1203

Order #125599-001

PROPERTY	SPECIFICATION	TEST VALUE	ASTM TEST METHOD
Resistance to soil burial, % Change, max.			D-3083
Breaking Factor	-5	Pass	
Elongation @ Break	-20	Pass	
Modulus @ 100% Elongation	+20	Pass	
Hydrostatic Resistance, psi, Nominal, min.	110	Pass	D-751

WALTER F. YEAGER, QUALITY CONTROL MANAGER

CC: W. YEAGER, P. SAWHNEY, A. ARENA, L. KARPOWICZ, LAB (2), R. DICKINSON, CUSTOMER SERVICE, PROJECT NO. 93-116.

NOTE: INDIVIDUAL ROLL DATA ON PAGE 3.

Appendix D

APPENDIX D

HDPE GEOMEMBRANE SPECIFICATIONS

Gundle®

GUNDLINE INSTALLATIONS

FOR COMPLETE INSTALLATIONS LIST,
CALL GUNDLE LINING SYSTEMS, INC., HOUSTON, TX.
(713-443-8564 OR 1-800-435-2008)

CONTACT: ANNA SPENCER

Gundle Lining Systems Inc

Gundle®

Textured Gundline® HDT Maximizes Slope Stability

Gundle Lining Systems has developed a method for adding a rough texture to the surface of our durable High Density Polyethylene (HDPE) liners. The result is a high performance product called Gundline HDT which increases slope stability in engineered landfills and other lining applications.

Gundline HDT's special textured surface dramatically improves slope stability by increasing friction between the synthetic liner and soils, geotextiles, and other geosynthetics. Cover soils are held on the liner with the greatly increased friction, and safety-conscious engineers can improve factors of safety on slopes of varying steepness. Table 1 lists the improvements in friction angle for Gundline HDT, determined by direct shear box testing.

The innovative friction surface of Gundline HDT is manufactured simultaneously with extrusion of the solid barrier portion of the liner as opposed to being added after extrusion. It's a rough surface, fully integrated with the sheet during the molten phase of manufacture. As a result, it has excellent abrasion resistance and remains intact regardless of chemicals contacting the sheet surface.

TABLE 1: DIRECT SHEAR BOX FRICTION ANGLES*

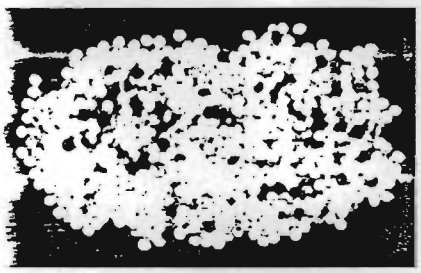
SLIDING SURFACE	FRICTION ANGLE (DEGREES) POLYETHYLENE	TEXTURED
Gundline/H.R. Clay	16	24
Gundline/Ottawa Sand	17	26
Gundline/Geotextile (Nonwoven)	11	29

*Note: Friction angles for the products listed are typical only and may vary with local soil conditions. Accordingly, engineers must test friction angles for the product using site specific soil composition for all designs incorporating the product.

Gundline HDT Retains The Important Advantages Of Gundline® HD.

Manufactured in 22.5 foot wide seamless rolls and in thicknesses ranging from 40-100 mils of barrier wall, Gundline HDT features the same important qualities that have made Gundline HD the world's leading lining system. Tensile strength before yielding, biaxial elongation, tear resistance, puncture resistance, ultraviolet light resistance, chemical resistance, dimensional stability, heat resistance, and stress crack resistance are all excellent. So is resistance to microorganisms and rodent damage.

As with Gundline HD, Gundle manufactures Gundline HDT with only the top performing pipe grade HDPE resin. The superior high grade resin creates an ideal structure to the finished sheet.



HDPE resin and carbon black used in manufacturing.

Gundline® VLT

Gundline VLT combines the exceptional elongation and elastic properties of Gundline® VL (Very Low Density Polyethylene Liner) with the outstanding friction characteristics and slope stabilizing qualities of Gundline® HDT! The combination makes the liner ideal for landfill closures and other applications where elongation, flexibility, and slope stability are important. The excellent multi-axial elongation of Gundline VLT accommodates differential settlement while the textured surface provides long term slope stability.

Gundline HDT Provides Solutions To Difficult Applications.

A recent problem at Islip, New York illustrates the effectiveness of Gundline HDT. It began when the city's municipal landfill neared capacity. The problem was then compounded by the lack of available land for expansion. But Gundle provided the solution. After considering all available options, it was decided to expand vertically—a process dubbed "piggybacking." A new cell would be created to sit atop the existing closed and capped landfill. However, it was critical to establish slope stability for the new, steep slopes of this 80-foot high addition. So Gundle manufactured and installed 1.2 million square feet of Gundline HDT and successfully increased the friction angle between the liner and the sand over sixty percent.

Today, not only does Islip have 1.8 million cubic yards of new refuse disposal capacity, but they also have peace of mind knowing it's lined with the industry's most stable and durable liner.

GUNDLINE® HDT/VLT SPECIFICATIONS

TYPICAL PROPERTIES	TEST METHOD	GUNDLINE® HDT GAUGE (NOMINAL)					GUNDLINE® VLT GAUGE (NOMINAL)			
		30 mil	40 mil	60 mil	80 mil	100 mil	30 mil	40 mil	60 mil	80 mil
Density (g/cc)	ASTM D1505	.94 Min	.94 Min	.94 Min	.94 Min	.94 Min	.910 -.925	.910 -.925	.910 -.925	.910 -.925
Melt Flow Index (Max.) (190 C, 2.16 kg, g/10 minutes)	ASTM D1238 Condition E	.3	.3	.3	.3	.3	.6	.6	.6	.6
Carbon Black (%)	ASTM D1603	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3
Tensile Properties	ASTM D638 Modified Type IV Dumb bell @ 2 ipm									
Strength at Yield (PPI)		70	95	140	190	240	NA	NA	NA	NA
Strength at Break (PPI)		30	50	75	100	125	56	84	112	169
Elongation at Yield (%)		13	13	13	13	13	NA	NA	NA	NA
Elongation at Break (%)		150	150	150	150	150	400	400	400	400
Multi Axial Elongation at Break (%, Min.)	GRI-GM4	15	15	15	15	15	75	75	75	75
Tear Resistance (Pounds)	ASTM D1004 Die C	22	30	45	60	75	12	18	27	36
Puncture Resistance (Pounds)	FTMS 101 Method 2065	30	52	80	105	130	51	64	75	85
Environmental Stress Crack (Hours, Min.)	ASTM D1693 10% Igepal, 50°C	1500	1500	1500	1500	1500	1500	1500	1500	1500
Dimensional Stability (% Change)	ASTM D1204	+/-2	+/-2	+/-2	+/-2	+/-2	+/-2	+/-2	+/-2	+/-2
Thermal Stability OIT (Minutes)	ASTM D3895 130°C, 800 PSI 0_2	2000	2000	2000	2000	2000	2000	2000	2000	2000
Low Temperature Brittleness (°F)	ASTM D746 Procedure B	-112	-112	-112	-112	-112	-112	-112	-112	-112
Coefficient of Linear Thermal Expansion (x 10 $^{-4}$/cm/cm°C)	ASTM D696	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Water Vapor Transmission (g/m²/day Max.)	ASTM E96	.1	.1	.1	.1	.1	.1	.1	.1	.1

Note: All values, except when specified as minimum or maximum, are typical test results.

SUPPLY SPECIFICATIONS

The following describes typical roll dimensions for Gundline HDT and VLT.

NOMINAL THICKNESS		WIDTH		LENGTH		AREA	
mil	mm	ft.	m	ft.	m	ft. 2	m2
30	0.75	22.5	6.86	625	190	14,063	1306
40	1.0	22.5	6.86	600	183	13,500	1254
60	1.5	22.5	6.86	420	128	9,450	878
80	2.0	22.5	6.86	320	97	7,200	669
100*	2.5	22.5	6.86	250	76	5,625	522

* 100 mil is only available in HDT

GUNDLINE HDT and GUNDLINE VLT are rolled on 6" I.D. hollow cores. Each roll is provided with 2 slings to aid handling on site. Dimensions and weights are approximate. Custom lengths available upon request.

Gundle Lining Systems Inc

Gundle®

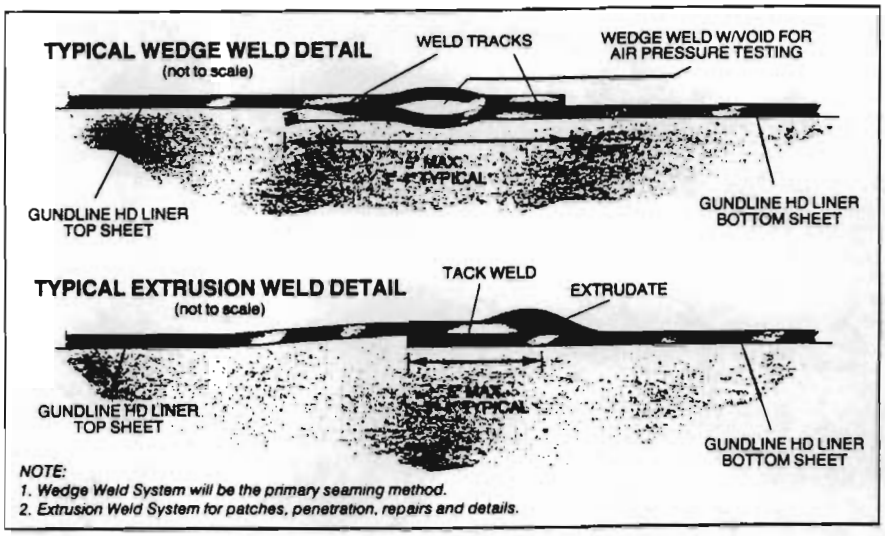
"If it needs lining, it needs Gundle."
19103 Gundle Road
Houston, Texas 77073 U.S.A.
Phone: (713) 443-8564
Toll Free: (800) 435-2008
Telex: 166657 GundleHou
Fax: (713) 875-6010

The Gundle Hot Wedge Weld: Effective And Efficient

Gundle's new generation hot wedge welders add versatility, speed and performance to Gundle's seaming capabilities. Together with the patented "mixing tip" fillet extrusion welders, Gundle offers the most advanced systems available today.

The Gundle hot wedge welder offers a number of important advantages over traditional seaming methods. As the welder propels itself along the sheets it draws a hot wedge between them. The heated sheets are then fed between a set of pressure rollers, creating a dual track seam. The Gundle hot wedge welder automatically adjusts the roller gap and wedge position to accommodate different sheet thicknesses. An air blower, mounted on the welder, directs a stream of air ahead of the path of the wedge to blow away dust particles. This air can be heated to dry or preheat the sheet during extreme cold. The Gundle welder also positions the wedge accurately at the edge of the top sheet for ease of non-destructive seam testing.

These features enable the Gundle hot wedge to weld sheets from 20 mil to 140 mil at speeds of up to 15 feet per minute. The welder has enough power to weld vertical seams, and yet, with its modern materials and innovative design, is 40% lighter than other welders, reducing operator fatigue and errors. Using appropriate temperature and speed settings, the hot wedge welded seams provide excellent results in peel and shear destructive tests.



NOTE:
1. Wedge Weld System will be the primary seaming method.
2. Extrusion Weld System for patches, penetration, repairs and details.

The Gundle hot wedge welder is a precision-machined assembly in which all drive components are totally enclosed and sealed from site dirt. This compact machine hardly lifts the upper sheet, which minimizes the formation of "fish mouths." Fish mouths are often caused by bulkier welding machines which stretch the top sheet. These features, together with automatically controlled temperature and speed, result in extremely consistent welds while reducing operator adjustments to an absolute minimum.

Since fillet extrusion welding is always necessary at penetrations and when patching, Gundle's hot wedge welder used alongside Gundle's patented extrusion welder with mixing action provides Gundle customers with the finest combination of welding technology available.

The Gundle Extrusion Weld: Improved Heat Transfer For Top Quality Extrusion Welding

Gundle Lining Systems' patented extrusion weld provides the combination of heating, extrudate deposition, and mixing action that results in a truly homogeneous bond between liner sheets.

Gundle's special extrusion welding gun stirs the molten extrudate against and into the liner. This mixing action greatly improves heat transfer and blends the extrudate bead into both sheets, creating a homogeneous weld. The result is a fully integrated connection through the seam. Since there is a continuous connection through the seam, and because the extruded bead is as thick as the liner sheet, the resulting seam is as strong as the sheet itself. Due to the extremely efficient heat transfer of Gundle's

patented mixing action, installations welded at 15°F have provided the same high quality test results as installations welded at 70°F.

The Gundle extrusion welder extrudes the identical polymer mix from which Gundline® HD sheet is made. The high quality pipe grade HDPE extruded to form the seam, therefore, has the same excellent resistance to a wide range of waste solutions. These include metal hydroxides, salts, acids, alkalis, oils, and hydrocarbon solvents including most chlorinated hydrocarbons (along with many other chemicals). The extrusion weld system must be used for patches, penetrations, repairs, and detail work.

Both the Gundline extrusion weld and the Gundle hot wedge weld result in a truly homogeneous bond between the liner sheets. Therefore, there is no interface between the sheets which could be disrupted by absorbed solvents. Both Gundle seams offer the same chemical resistance as Gundle sheets and both can be used with Gundline HD, Gundline® HDT, Gundline VL, and Spectraline.

Destructive Testing At The Lab And On-Site

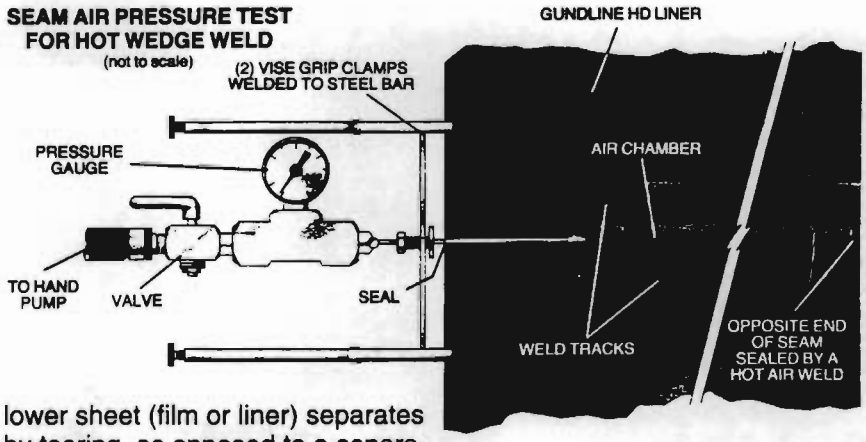
All Gundle seams are subjected to destructive testing. Samples cut from site welds are tested in the laboratory according to ASTM D638 (shear test) and ASTM D413 (peel test). These tests prove the quality of the Gundle welds.

Shear testing applies a tensile stress from the top sheet through the weld and into the bottom sheet. Peel testing peels the overlapped edge of the bottom sheet away from the top sheet in order to observe if separation occurs. The peel test indicates whether or not the sheets are continuously and homogeneously welded at the seam.

The important criterion in the peel test is that the test sample demonstrates what is called a Film Tear Bond (FTB). This means that as the weld is tested, the upper or lower sheet (film or liner) separates by tearing, as opposed to a separation between the top surface and bottom surface of the seam itself. A Film Tear Bond test result means the seam is good; a fully integrated weld.

Weld samples are sent by Express Mail to Gundle's laboratory in Houston from project sites. The Gundle Lab provides 24-hour turnaround for results on destructive test samples.

Gundle regularly conducts destructive seam tests at the jobsite too. This is to properly set welding conditions prior to start-up each morning and after work each work break, as well as to augment the official Gundle Lab testing of destructive seam samples.



Non Destructive Air Pressure Testing

The standard procedure for Gundle installations is to test 100% of the seam footage for leaks. With the Gundle hot wedge welder, non-destructive testing is made more efficient by air pressure testing of the gap between the "dual" wedge weld tracks on all welds 30 mils and greater. A single weld track is used on 20 mil, and an air lance or probe is used for non-destructive testing. The gap is pressurized by air injected through a needle inserted into the gap between weld tracks. Possible leaks are indicated by a loss of pressure over 5 minutes after the gap has been pressurized by a hand pump, and sealed by a valve. Very long sections of seam (up to 500 ft.) can be quickly tested for leaks, resulting in very efficient installation QC. Note that after a seam has passed a pressure test, pressure is released at the seam end opposite the pump/gauge assembly. This ensures that the seam is continuous and has been 100% tested.

Non Destructive Vacuum-Box Testing

Where air pressure testing is not applicable, Gundle technicians use a vacuum chamber to test 100% of the seamed footage. This test also confirms that no leaks are present in the seams. To perform a vacuum test, a soap solution is sprayed on top of the seam. Then a rectangular plexiglass-faced vacuum box is placed on the seam and a 5 psi vacuum is pulled in the box.

Visual inspection of Gundle extrusion welds, which are on top of the sheet, is also an important part of quality control on all Gundle installations.

Gundle Lining Systems Inc

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Houston, Texas 77073 U.S.A.
Phone: (713) 443-8564
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Appendix E

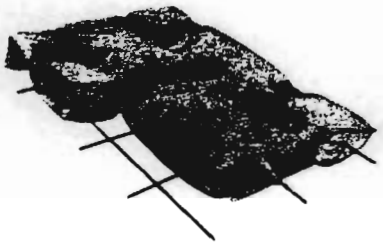
APPENDIX E

ARTICULATING BLOCK (REVETMENT) MAT SPECIFICATIONS

ARMORFORM® ARTICULATING BLOCK MAT (ABM)

TYPICAL DIMENSIONS, WEIGHTS AND VOLUMES

(Values shown are typical only, and will vary with field conditions.)



Articulating Block Size	Nominal Block Dimensions	Weight/ Block	Weight/ Sq. Ft.	Coverage/ Cu. Yd. Concrete	Availability
4" ABM	24" x 12" x 4"	93 lbs.	41 lbs.	82 ft.²	Inventory
6" ABM	24" x 18" x 6"	210 lbs.	64 lbs.	53 ft.²	Inventory
8" ABM	24" x 24" x 8"	373 lbs.	86 lbs.	40 ft.²	Special Order

PRODUCT DESCRIPTION

Articulating Block Mat (ABM) was developed by Nicolon Engineers to meet the requirements for a cast-in-place, flexible and cable reinforced concrete erosion control revetment. Specially designed concrete filled fabric forms, revetment cables and filter fabric combine to provide a stable, articulating and permeable erosion protection, which maintains its integrity in the event of subgrade deformation or severe dynamic loading.

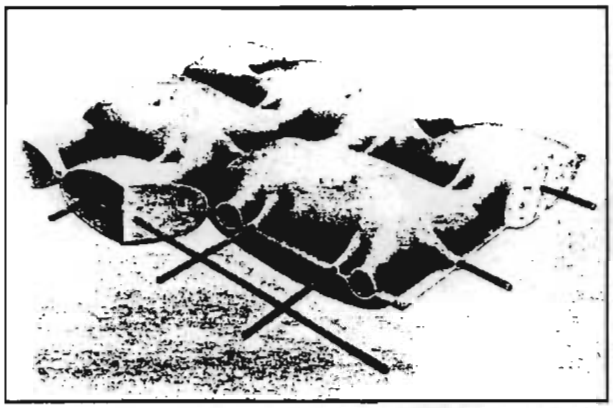
Articulating Block Mat (ABM) is formed with a double-layer woven fabric, joined together into a matrix of rectangular compartments each separated by a narrow perimeter of interwoven fabric and containing interconnecting high strength revetment cables. The fabric forms are positioned on the area to be protected, where they are filled with a pumpable fine aggregate concrete (structural grout) to form a mattress of individual blocks in a bonded block pattern. The high strength revetment cables become embedded in the blocks to tie the blocks together and enable the revetment to resist tension in all directions.

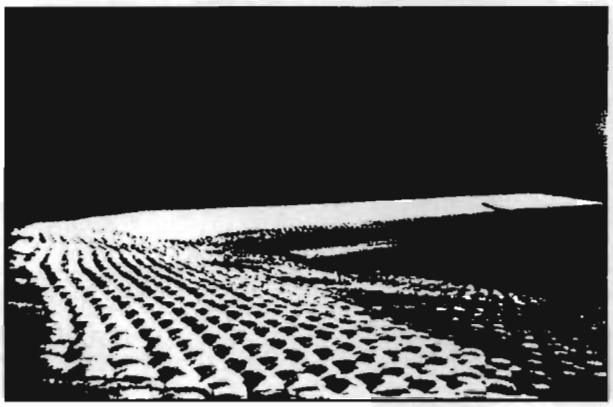
Articulating Block Mat fabric is woven from multifilament and textured polyester yarns, and designed with the required strength, stability, and filtration characteristics of a superior fabric form. The fabric forms are constructed with four grout ducts per compartment, for directing the flow of structural grout, and six cable ducts per compartment, for securely centering the revetment cables. Block dimensions are controlled by the compartment size and spacer cords located at approximately the center of each compartment. The size of the grout ducts is designed to optimize the flow of structural grout and to provide shear points at controlled locations along the revetment. The shear points perfect the separation of the blocks and enable the revetment cables to act as "hinges" for the articulating revetment.

Relief of hydrostatic uplift pressure, caused by entrapped and ground water, may be provided by cutting slits in the narrow perimeter fabric which separates each block, after the structural grout has hardened and/or by inserting plastic weep tubes through the mat at specified centers. Articulating Block Mat (ABM) should be placed over filter fabric.

Articulating Block Mat (ABM) provides a durable erosion control system designed for rapid construction of revetments, capable of withstanding attack by waves and rapidly flowing water. Installations do not require dewatering. Fabric form panels can be positioned and filled from the surface in shallow water or by divers in deep water. Piles, dolphins, and other obstructions can be accommodated by using panels fabricated to meet field measurements.

At Nicolon's fabrication facilities, Articulating Block Mat fabric in mill width rolls and revetment cables are factory fabricated into multiple mill with panels, designed to fit site dimension and topography. Panels are delivered to the job site where the installer assembles the panels into a continuous concrete forming system. Fabric forms contract as they are pumped with a structural grout. Allowance must be made for this contraction in estimating the quantity of fabric form required. Nicolon should be contacted to determine the appropriate contraction factors for your site conditions.

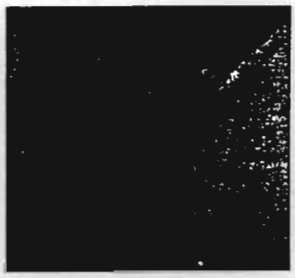




DESIGN CONSIDERATIONS

- Articulating Block Mat (ABM) is used where velocities are moderate to high, bedload and ice formations are light to heavy, and roughness coefficient, n = 0.045 to 0.050, is required.
- Articulating Block Mat (ABM) is used where wave action and ice formations are light to heavy.
- Articulating Block Mat (ABM) is ideal for underwater placement.
- Articulating Block Mat (ABM) is available with standard polyester revetment cables or optional galvanized aircraft cables.
- Articulating Block Mat (ABM) is available in custom block sizes and weights, other than those designated in this literature, to meet your project requirements.

The information presented herein will not apply to every installation. Dimensions and quantities shown are approximate only and will vary as a result of site conditions and installation procedures. No warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control.



Adjacent fabric form panels are joined together and longitudinal revetment cables are connected to a screw type helix anchor assembly prior to injection of fine aggregate concrete.

FINE AGGREGATE CONCRETE MIX DESIGN

1. A pumpable fine aggregate concrete (structural grout) is used in the construction of all Articulating Block Mat (ABM) revetments. As an aid to pumpability, a pozzolan grade fly ash may be substituted for up to 35% of the cement. Mixes designed with 5% to 8% air content will have improved pumpability and resistance to freeze-thaw. A retarding admixture may be used in hot weather.
2. Excess mixing water expelled through the permeable ARMORFORM fabric will reduce the volume of fluid structural grout from 27 cu. ft. to approximately 25 cu. ft. of hardened grout.

Typical Range of Mix Proportions

Material	Mix Proportions lbs./cu. yd.	After Placement lbs./cu. yd.
Cement	750-850	815-920
Sand	2120-2030	2275-2195
Water	540-555	460-470
Air	As Required	

3. Fine aggregate concrete (structural grout) consistency should be in the 9-11 second range when passed through the ¾" orifice of the standard flow cone described in ASTM C-939-80. Tests utilizing a concrete slump cone are not appropriate.

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ARMORFORM® INSTALLATION

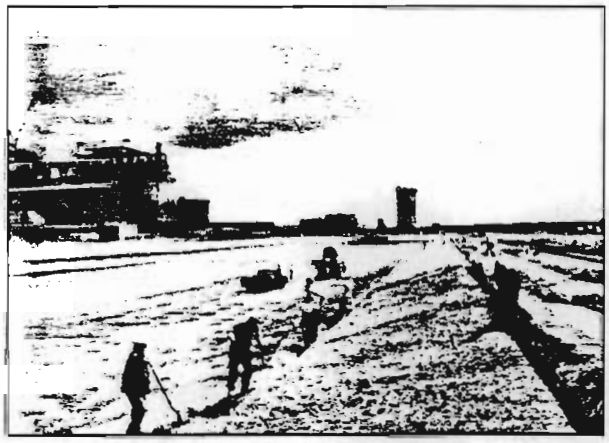
The successful ARMORFORM installation begins with thorough planning and culminates in well engineered materials properly installed. After the yarns are produced, woven into mill width rolls, and factory fabricated into panels, the installation is the final step. The importance of sound installation techniques in any erosion control project cannot be over emphasized. Regardless of the type of erosion control method used, the success or failure of any job will depend to a very large extent on the proper execution of the installation.

Once an installer has been chosen there are four basic steps to be taken in any ARMORFORM erosion control installation:

1. Site Preparation
2. Panel Placement and Field Assembly
3. Structural Grout Pumping
4. Inspection

SITE PREPARATION

Slope grading equipment, such as backhoes or drag lines, is used to excavate to required depths, contour the slopes to the specified slope ratio, and form the anchor, toe, and terminal trenches around the periphery of the installation. The area to be protected must be free of rock, brush, roots, or large soil clods.



The fabric forms are usually anchored into a trench approximately two feet deep, by one foot wide, at the top of the slope. The trench should be located one to three feet from the top edge of the slope. The exposed soil beyond the anchor trench should be sloped away from the trench, or a drainage ditch should be excavated so surface water will run off and not saturate the slope.

The graded slope should be jointly inspected by the installer, owner's representative, and excavation contractor. If slope conditions are unacceptable for the fabric forms, corrective measures should be taken.

PANEL PLACEMENT AND FIELD ASSEMBLY

Once the slope and other related excavation conforms to finished grade and elevation specifications, installation of filter fabric, if required, and the ARMORFORM fabric forms may begin. First, the ARMORFORM panels are removed from their packages and placed in position for installation. The panels can be quite large to minimize joining on the site, sometimes weighing as much as 500 pounds per panel.

Next, a panel is rolled down the slope and positioned for unfolding. The panels are positioned according to a carefully prepared drawing where each panel is identified for placement. The panel is then unfolded by a work crew and pulled into position. The ARMORFORM panels should be positioned loosely along the slope.

Once positioned, the upper edge of the ARMORFORM panel is folded into the anchor trench atop the slope. The extra fabric provided for contraction during pumping should be accumulated and held at the top of the slope and gradually released as the form is filled.

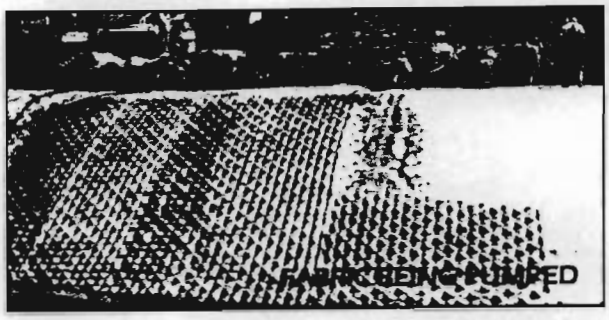
ARMORFORM® INSTALLATION (Cont'd)

Adjacent panels are joined by field sewing or zippering the double-layer fabric forms, bottom edge to bottom edge, and top edge to top edge. When installing Articulated Block Mat (ABM), optional transverse high strength cables should be spliced prior to joining of the top layers of fabric.

As the first two panels are being joined, the third is positioned so that the seaming crew can start on it, upon completion of the first seam. This procedure is continued until all field seams are made. No more material than can be pumped in one day should be unrolled and positioned.

STRUCTURAL GROUT PUMPING

The upper edge of the ARMORFORM panel which has been placed into the anchor trench should be pumped first, thus forming an anchor to prevent the remainder of the form from sliding down the slope as it is pumped with structural grout. The pumping crew should then inject grout into the lower mat area, proceeding gradually up the slope until the fabric form has been filled.



Structural grout is injected into the ARMORFORM fabric form by inserting a 2" diameter grout injection pipe through a small slit cut in the upper layer of fabric. A grout tight seal is formed by wrapping the injection pipe with burlap, which is held in place by a laborer as grout is being injected. When the pipe is withdrawn, the burlap is stuffed in the hole where it remains until the grout stiffens to a point that it is no longer fluid. The burlap is then removed and the concrete surface at the hole smoothed by hand.

INSPECTION

When inspecting the panels prior to pumping, wrinkles and loose fabric should be expected as they are necessary to compensate for form contraction. (As much as 10% contraction in each direction may be expected.) Nicolon should be contacted to determine the appropriate contraction factor for your site conditions.

All field sewn seams, zipper connections, and lap joints must be carefully inspected. Colored thread is advised for all field sewn seams to facilitate inspection.

For detailed installation guidelines contact Nicolon Corporation.

The information presented herein will not apply to every installation. Dimensions and quantities shown are approximate only and will vary as a result of site conditions and installation procedures. No warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control.

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ARMORFORM® GUIDE SPECIFICATION FOR ARTICULATING BLOCK MAT (ABM)

1.0 GENERAL

1.1 SCOPE OF WORK
The Contractor shall furnish all labor, materials, equipment, and incidentals required to perform all operations in connection with the installation of the proposed Articulating Block Mat (ABM) revetment in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

1.2 DESCRIPTION
The work shall consist of installing an articulating, cable reinforced, concrete mat revetment, by positioning a specially woven double-layer synthetic fabric form on the surface to be protected and filling it up with a pumpable fine aggregate concrete (structural grout) in such a way as to form a stable mat of required thickness, weight and configuration.

2.0 MATERIALS

2.1 FINE AGGREGATE CONCRETE
Fine aggregate concrete shall consist of a mixture of portland cement, fine aggregate (sand), and water so proportioned and mixed as to provide a pumpable grout. Pozzolan and grout fluidifier conforming to these Specifications may be used at the option of the Contractor. The mix shall exhibit a compressive strength of 2000 psi at 28 days when made and tested in accordance with ASTM C-31 and C-39.

Note: The average compression strength of ARMORFORM cast fine aggregate concrete shall be at least 20% higher at 7 days than that of the companion test cylinders made in accordance with ASTM C-31, and not less than 2500 psi at 28 days.

2.1.1 Portland cement shall conform to ASTM C-150, Type I or Type II.

2.1.2 Fine aggregate shall conform to ASTM C-33, except as to grading. Aggregate grading shall be reasonably consistent and shall be well graded from the maximum size which can be conveniently handled with available pumping equipment.

2.1.3 Water for mixing shall be clean and free from injurious amounts of oil, acid, salt, alkali, organic matter or other deleterious substances.

2.1.4 Pozzolan, if used, shall conform to ASTM C-350.

2.2 FABRIC FORM
The fabric forms shall be, as specified, ARMORFORM *note a* Articulating Block Mat as manufactured by Nicolon Corporation, or approved equal. Each layer of fabric shall meet or exceed the statistical mean (average) results as shown below.

Property	Test Method	Unit	Values ABM
Physical:			
Composition			Poly[1]
Weight (double-layer)	ASTM D-3776-79	oz/yd	15
Thickness	ASTM D-1777-75	mils	23
Mill Width		in	82
Mechanical:			
Grab Tensile Strength	ASTM D-1682-75	lbs	
Warp			320
Fill			300
Grab Tensile Elongation	ASTM D-1682-75	%	
Warp			18
Fill			22
Diaphragm Burst Strength	ASTM D-3786-80 a	psi	625
Trapezoid Tear Strength	ASTM D-1117-80	lbs	
Warp			130
Fill			130
Puncture Strength	ASTM D-3787-80	lbs	80
Hydraulic:			
Water Flow Rate	ASTM D-4491	gal/min/sf	105
Coefficient of Permeability (k)	ASTM D-4491	cm/sec	0.09
Permittivity (k/l)	ASTM D-4491	1/sec	1.5
Porosity	ASTM D-737-75	cf/min/sf	300
Spacer Cord:			
Break Strength	ASTM D-2256	lbs/cord	150 (8)

[1] Poly-Polyester

The Contractor shall furnish the Engineer, in duplicate, manufacturer's certified test results showing actual test values obtained when the above physical properties were tested for compliance with the Specifications.

Note a: The Engineer shall indicate the Articulating Block Mat size required. Example: 4" ABM.

2.2.1 Fabric form material shall consist of double-layer woven fabric joined together into a matrix of rectangular compartments each separated by a narrow perimeter of interwoven fabric, to produce a mat with finished nominal block dimensions of ____ inches x ____ inches x ____ inches in thickness (see note b), and a nominal weight of *note b* lbs./ft.[2] Spacer cords shall connect the two layers of fabric at approximately the center of each compartment. Fabric form compartments shall be offset one half a block length, in the mill width direction, to provide a bonded block pattern.

Fabric form compartments shall each have four grout ducts, two at the top and two at the bottom of each compartment, to allow passage of the fine aggregate concrete between adjacent compartments. No more than four grout ducts per compartment shall be permitted and the filled cross sectional area of each grout duct shall be no more than 10% of the maximum cross sectional area of the block transverse to the duct.

Fabric form compartments shall each have six cable ducts, two at the top, two at the bottom and one on each side of each compartment, to allow for insertion of revetment cables between compartments. The diameter of each cable duct shall be no larger than 1.0 inch.

Note b: The Engineer shall indicate the nominal block dimensions and weight/sq. ft. for the Articulating Block Mat required.

2.2.2. Revetment cables shall be installed between the two layers of fabric and through the compartments in a manner which provides for longitudinal and lateral binding of the finished block revetment. The longitudinal revetment cables (slope cables) shall be on approximately 12 inch centers, when measured along the finished revetment, and shall be securely centered by means of the cable ducts. All cables, within each block, shall be completely embedded in the fine aggregate concrete. Revetment cables installed through the large diameter grout ducts shall not be permitted.

Note: Optional transverse cables may be installed parallel to the block length on centers approximately equal to the finished block width of the Articulating Block Mat Size required.

Revetment cable shall be constructed of high tenacity, low elongation, continuous filament polyester fibers. Cable shall have a core construction comprised of parallel fibers contained within an outer jacket or cover. The weight of the parallel core shall be between 65% to 75% of the total weight of the cable. Cable shall be note c inch in diameter and its break strength shall be not less than note c lbs.

Revetment cable fittings shall be selected so that the resultant cable splice shall provide a minimum of 80% of the rated cable break strength. All cable splices shall have a minimum cable overlap of 6 inches and be made with aluminum compression fittings.

Note c: The Engineer shall indicate the cable diameter and minimum break strength for the Articulating Block Mat size, slope length, and side slope required.

2.2.3 Anchors shall be ____ inch x ____ inch x ____ inch (see note d), screw type helix anchors and shall conform to ASTM A-36. The anchors and ¾ inch diameter connection rods shall be galvanized in accordance to ASTM A-123. Anchor helix shall be pitch controlled to insure maximum holding capacity.

Note d: The Engineer shall indicate the screw type helix anchor required.

2.2.4 Individual mill width rolls of fabric form shall be a minimum width of 82 inches. Mill width rolls shall be cut to the length required, and the two layers of fabric separately joined bottom edge to bottom edge and top edge to top edge by means of sewing thread, to form multiple mill width panels. All factory sewn seams shall be downward facing as shown on the Contract Drawing. The grab tensile strength of all sewn seams shall be not less than 100 lbs./in. when tested in accordance with ASTM D-1682-75.

2.2.5 Grout stops shall be installed at predetermined, mill width, intervals to regulate the flow of fine aggregate concrete.

2.2.6 Immediately following receipt of fabric forms to the job site, forms should be inspected and stored in a clean dry area where they will not be subject to mechanical damage, exposure to moisture or direct sunlight.

3.0 INSTALLATION

3.1 SITE PREPARATION

3.1.1 Areas on which fabric forms are to be placed shall be constructed to the lines and grades shown on the Contract Drawings. Where such areas are below the allowable grades they shall be brought to grade by placing compacted layers of selected materials. The depth of layers and amount of compaction shall be as specified by the Engineer. All obstructions, such as roots and projecting stones shall be removed.

3.1.2 Excavation and preparation of anchor trenches, terminal trenches, and toe trenches or aprons shall be done in accordance with the lines, grades and dimensions shown on the Contract Drawings.

3.1.3 Immediately prior to placing the fabric forms, the prepared area shall be inspected by the Engineer and no forms shall be placed thereon, until the area has been approved.

3.2 FABRIC FORM PLACEMENT

3.2.1 Fabric form panels, as specified in Section 2.2 of this Specification shall be placed within the limits shown on the Contract Drawings.

3.2.2 Fabric forms shall be placed over filter fabric as specified elsewhere in these Specifications.

3.2.3 Adjacent fabric form panels shall be joined before fine aggregate concrete injection, by field sewing or zippering the two bottom layers of fabric together and the two top layers of fabric together. All sewn seams shall be downward facing as shown on the Contract Drawings except with the approval of the Engineer.

Note: Optional transverse cables should be spliced prior to joining of the top layers of fabric.

3.2.4 When conventional joining of panels is impractical, or where called for on Contract Drawings, adjacent panels may be overlapped a minimum of two feet pending approval by the Engineer. In no case shall simple butt joints between panels be permitted.

3.2.5 Lap joints and expansion joints shall be provided as shown on the Contract Drawings, or as specified by the Engineer.

3.2.6 Longitudinal revetment cables shall be connected to a screw type helix anchor assembly as shown on the Contract Drawings.

3.2.7 Immediately prior to injection of fine aggregate concrete, the assembled fabric form panels shall be inspected by the Engineer and no fine aggregate concrete shall be pumped therein until the fabric seams, panel connections, and anchor assembly have been approved.

3.3 FINE AGGREGATE CONCRETE PLACEMENT

3.3.1 Following panel placement, small slits shall be cut in the top layer of the fabric form to allow for the insertion of the injection pipe. Fine aggregate concrete shall be injected between the top and bottom layers of fabric, filling the panel to the recommended thickness and configuration.

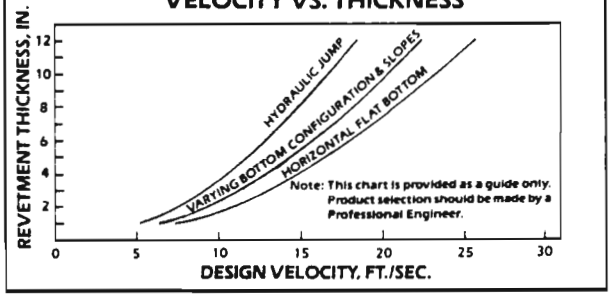
3.3.2 Fine aggregate concrete shall be injected in such a way that excessive pressure on the fabric form and cold joints are avoided.

3.3.3 Holes in the fabric left by the removal of the injection pipe shall be temporarily closed by inserting a piece of burlap or similar material. The burlap shall be removed when the concrete is no longer fluid and the concrete surface at the hole smoothed by hand. Foot traffic on the filled mat shall be restricted to an absolute minimum for one hour after pumping.

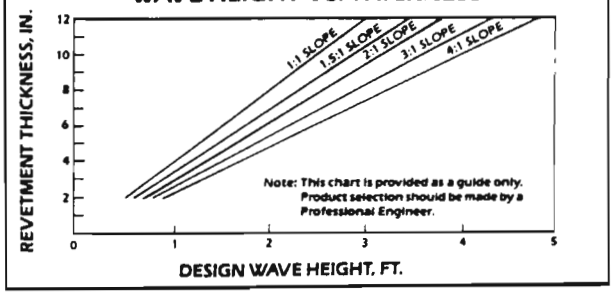
3.3.4 Upon completion of the fine aggregate concrete placement, all the anchor trenches, terminal trenches and toe trenches shall be back-filled and compacted, as specified by the Engineer.

3.3.5 After fine aggregate concrete has hardened, slits shall be cut in the narrow perimeter fabric which separates the blocks, to provide relief of hydrostatic uplift pressure. Slits shall each be approximately 4 inches long and shall be cut between cable ducts at locations shown on the Contract Drawings. Special care shall be taken not to cut the revetment cable or the filter fabric that has been placed under the fabric form.

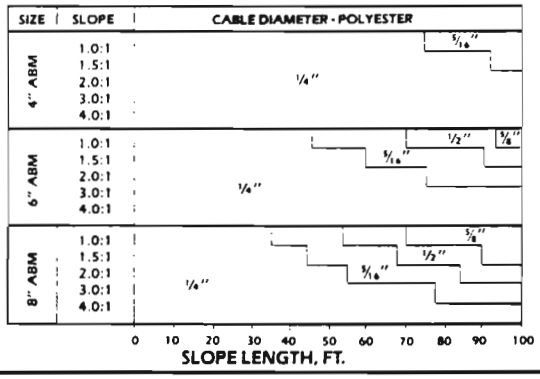
VELOCITY VS. THICKNESS



WAVE HEIGHT VS. THICKNESS



CABLE SELECTION CHART

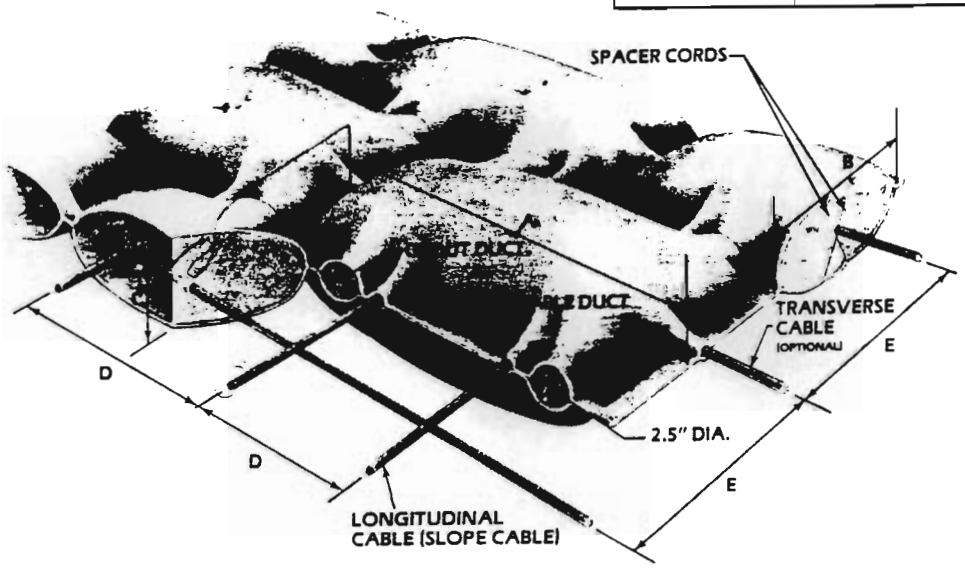


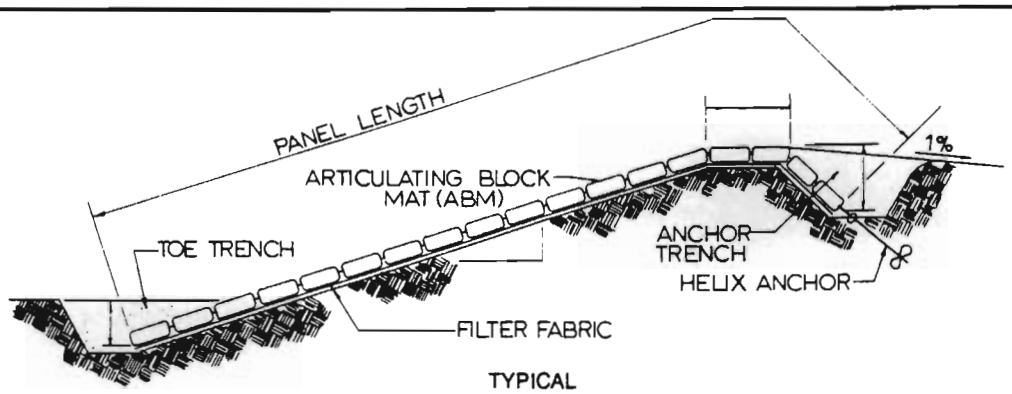
1/4" - 3700 LBS.	5/16" - 7000 LBS.
1/2" - 15000 LBS.	5/8" - 23000 LBS.

SCREW TYPE HELIX ANCHOR SELECTION SOIL HOLDING STRENGTH DATA

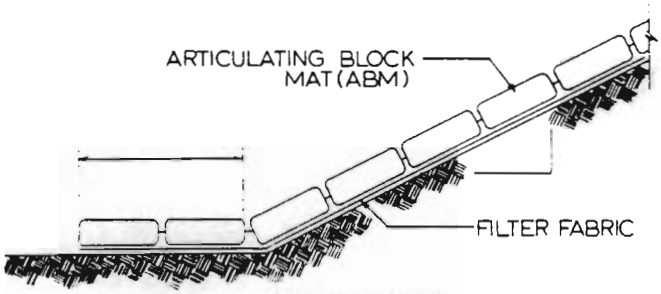
HELIX DIA.	DESCRIPTION	AREA SQ. IN.	APPROX. SOIL HOLDING STRENGTH IN LBS. CLASS 5	CLASS 6	CLASS 7
4"	4" Helix, 3/4" x 54" rod	12.5	4500	3000	1500
6"	6" Helix, 3/4" x 66" rod	28	6500	5000	2500
8"	8" Helix, 1" x 66" rod	50	9500	7500	5000
10"	10" Helix, 1 1/4" x 66" rod	78	13000	11000	8000
11.3"	11.3" Helix, 1 1/4" x 96" rod	100	15000	13000	10000
13.5"	13.5" Helix, 1 1/4" x 96" rod	143	18000	16000	13000
15"	15" Helix, 1 1/4" x 96" rod	176	20000	18000	15000

ARTICULATING BLOCK SIZE	NOMINAL DIMENSIONS A	B	C	D	E
4" ABM	24"	12"	4"	12"	12"
6" ABM	24"	18"	6"	12"	18"
8" ABM	24"	24"	8"	12"	24"

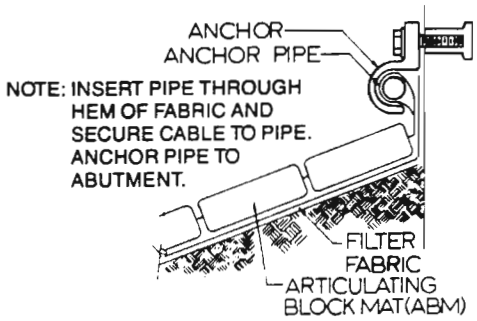




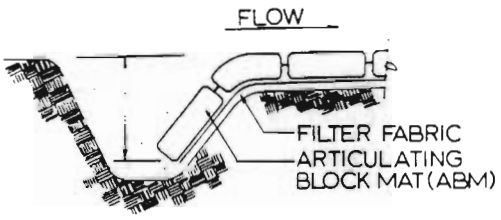
TYPICAL
ARTICULATING BLOCK MAT SECTION
(N.T.S.)



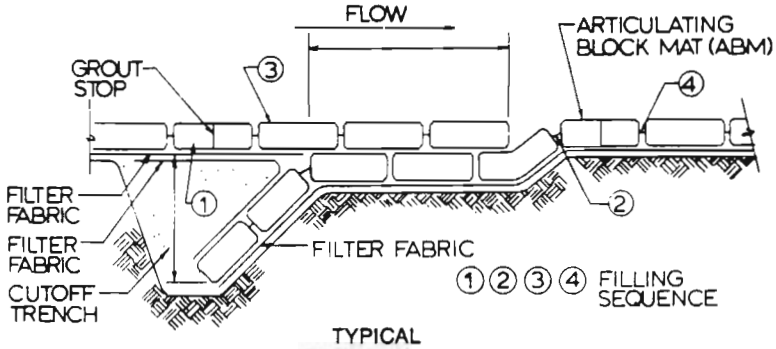
TYPICAL APRON
(N.T.S.)



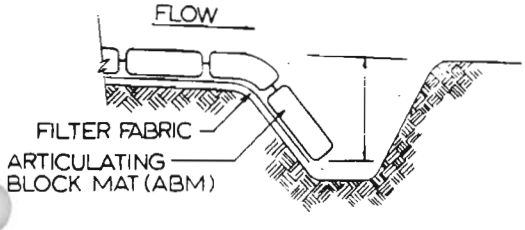
TYPICAL
ABUTMENT CONNECTION
(N.T.S.)



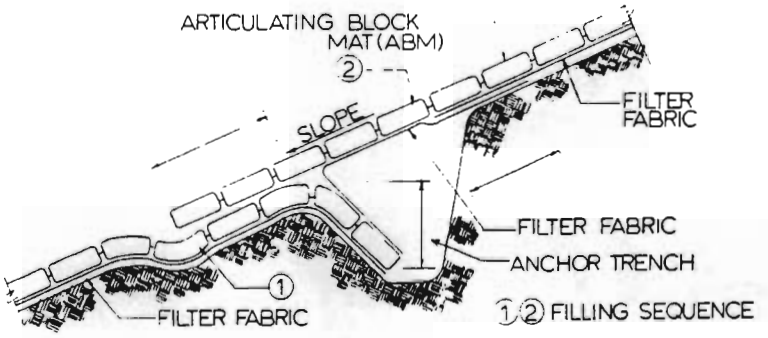
TYPICAL
UPSTREAM TERMINAL
(N.T.S.)



TYPICAL
LAP OR EXPANSION JOINT
WITH CUTOFF TRENCH
(N.T.S.)



TYPICAL
DOWNSTREAM TERMINAL
(N.T.S.)



TYPICAL
SIDE SLOPE LAP OR EXPANSION JOINT
WITH ANCHOR TRENCH
(N.T.S.)

NICOLON
CORPORATION

July 14, 1993

Ms. Joanne Broman
Tully Construction
127-50 Northern Blvd.
Flushing, NY 11368

Re: North Sea Landfill Specifications

Dear Ms. Broman:

Please be advised that Nicolon Armorform® 4" ABM is manufactured according to the enclosed specifications. The style of 4" ABM that is specified for use on the North Sea Landfill project is no longer produced and is not available.

The current design has been utilized on many projects during the past two years (including the Blydenburgh Landfill) without failure. Furthermore, we have had numerous compliments from customers stating that the current design is superior to the old one.

I certainly hope that we will be in agreement that the current product will perform adequately for the North Sea Landfill project. Please feel free to call if I can be of further assistance.

Sincerely,
NICOLON CORPORATION

Mark A. Torre
Sales Representative - Armorform®

MAT/ph

Enclosure

APPROVED	☒
APPROVED AS NOTED	☐
REVISE AND RESUBMIT	☐
FINAL APPROVAL	☐

THIS MATERIAL HAS BEEN CHECKED FOR GENERAL ARRANGEMENT AND COMPLIANCE WITH SPECIFICATIONS AND CONTRACT DRAWINGS. APPROVAL OF THIS MATERIAL SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR DIMENSIONAL OR OTHER ERRORS AND OMMISSIONS, OR OF GUARANTIES REQUIRED BY THE CONTRACT DOCUMENTS.

DVIRKA AND BARTILUCCI
Consulting Engineers
BY MH/KC DATE 10/11/93

Construction Products Division, 3500 Parkway Lane, Suite 500, Norcross, Georgia 30092 (404) 447-6272 FAX: (404) 662-5819

NICOLON
CORPORATION

July 14, 1993

Ms. Joanne Broman
Tully Construction
127-50 Northern Blvd.
Flushing, NY 11368

Re: **Certification**

Dear Ms. Broman:

We hereby certify that Armorform® 4" ABM Style 76600/87, to be supplied to your firm for the North Sea Landfill project meets or exceeds the specifications provided below:

		76600 - 4" ABM	TEST METHOD
SAMPLE WIDTH	-	94.25 inches	
CONSTRUCTION	-	33.6 X 33.2	
WEIGHT	-	13.4 oz/sq yd (double layer)	ASTM D3776
GRAB TENSILE			ASTM D4632
MD	-	249 lbs	
XMD	-	405 lbs	
GRAB ELONGATION			ASTM D4632
MD	-	18%	
XMD	-	19%	
MULLEN BURST	-	726 PSI	ASTM D3786
PUNCTURE	-	186 lbs	ASTM D4833
TRAPEZOID TEAR			ASTM D4533
MD	-	134 lbs	
XMD	-	220 lbs	
WATER FLOW RATE	-	209.3 + gpm/sq ft	ASTM D4991
PERMITTIVITY	-	2.724 + sec^-1	ASTM D4991
PERMEABILITY	-	0.208 + cm/sec	ASTM D4991
THICKNESS	-	30 mils	
SPACER CORD			
GRAB TENSILE	-	147 lbs	

Sincerely,
NICOLON CORPORATION

Mark A. Torre
Sales Representative - Armorform®

Subscribed and sworn to me this 14th of July, 1993.

Peggy R. Hill
My Commission expires November 28, 1994.

Appendix F

APPENDIX F

NORTH SEA LANDFILL
CELL NO. 3 SOLID WASTE PERMIT

Solid Waste

New York State Department of Environmental Conservation
Building 40—SUNY, Stony Brook, New York 11790-2356

(516) 444-0365
FAX (516) 444-0373

Thomas C. Jorling
Commissioner

November 1, 1993

Mr. Fred W. Thiele, Jr.
Town of Southampton
116 Hampton Road
Southampton, NY 11968

AMENDMENT TO PERMIT

Former Permit # (if any):

Owner:

RE: Permit No. & Location:

1-4736-00324/00002-0
North Sea Landfill Cell No. 3
Majors Path & Great Hill Road
Town of Southampton

Dear Supervisor:

_____ Your recent request to extend the above permit has been reviewed pursuant to 6NYCRR, Part 621. The expiration date is extended to _____.

__XX__ Your recent request to modify the above permit has been reviewed pursuant to 6NYCRR, Part 621. It has been determined that the proposed modifications will not substantially change the scope of the permitted actions or the existing permit conditions.

Therefore, the permit is amended to authorize (Modified Special Condition #15 is to read):

On or before April 15, 1994, the Permittee shall submit to the Department a copy of the signed vendor contract with specifications and an implementation schedule for their resource recovery system. The Permittee shall make a good faith effort to adhere to that implementation schedule and advise the Department of the status of such implementation or before August 15, 1994. Failure to comply with this condition may result in the revocation of the authorization granted in Permit Condition #14 to accept raw municipal solid waste for disposal at Cell #3.

This letter is an amendment to the original permit and as such, shall be posted at the job site.

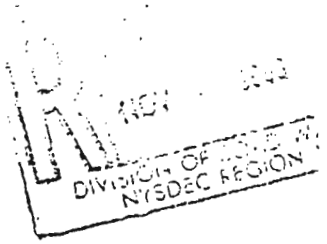
All other terms and conditions remain as written in the original permit.

Very truly yours,

George W. Hammarth

George W. Hammarth
Deputy Regional Permit Administrator

CWH/nw
cc:



New York State Department of Environmental Conservation
Building 40—SUNY, Stony Brook, New York 11790-2356

(516) 751-1389
FAX (516) 751-3839

Thomas C. Jorling
Commissioner

AMENDMENT TO PERMIT

December 31, 1992

Mr. Fred W. Thiele, Jr., Supervisor
Town of Southampton
Town Hall
116 Hampton Road
Southampton, NY 11968

RE: Letter to the Commissioner Requesting
A Permit Modification For North Sea Landfill Cell No. 3
UPA No. 1-4736-00324/00002-0

Dear Supervisor Thiele:

Commissioner Jorling has reviewed your correspondence dated December 14, 1992, requesting a modification of the above referenced permit to allow for landfilling of unprocessed municipal solid waste in cell #3 beyond the December 31, 1992 deadline.

On December 30, 1992, the Commissioner found that your request may be granted pursuant to Special Condition #14 of the existing permit. A copy of the Commissioner's letter is attached.

Special Conditions 14, 15, and 31 have been revised as follows, new Special Condition 32 is added, and Special Condition 33 is deleted:

Special Condition #14

Authorization to landfill wastes after December 18, 1990. other than the "products of resource recovery, incineration, or composting and downtime waste and untreatable wastes," in accordance with ECL 27-0704(g), second paragraph, is limited to the disposal of such waste only in Cell #3 of the Town's North Sea Landfill. Such approval is extended until May 31, 1995 or until the capacity is reached, whichever is sooner. For the remaining life of the cell, if any, ash residue, non-combustible residue from a resource recovery facility, non-compostable residue from a composting facility, compost, downtime waste, untreatable waste and cleanfill shall be accepted for disposal.

Special Condition #15

AMENDED

On or before October 1, 1993, the Permittee shall submit to the Department a copy of the signed vendor contract with specifications and an implementation schedule for their resource recovery system. The permittee shall make good faith efforts to adhere to that implementation schedule and advise the Department of the status of such implementation on or about January 1, 1994. Failure to comply with this condition may result in the revocation of the authorization granted in Permit Condition #14 to accept raw municipal solid waste for disposal at the Cell #3.

Special Condition #31

Following cessation of landfilling operations in Cell #3 in compliance with Department approved permit time frames and any extensions granted thereto, closure operations shall commence in accordance with the approved Cell #3 closure plan and implementation schedule, pursuant to NYCRR Part 360-2.17(e).

Special Condition #32

The Permittee shall adopt and implement a Department approved local Solid Waste Management plan which includes a local law or ordinance which complies with the requirements of section 120-aa of the General Municipal Law by February 26, 1993, and shall provide the Department with a draft of such local law or ordinance for its review and comment by January 15, 1993. Failure to comply with this condition may result in the revocation of the authorization granted in Permit Condition #14 to accept raw municipal solid waste for disposal at the Cell #3.

Sincerely,

Robert A. Greene
Regional Permit Administrator
Region One

RAG/JAW/nw

cc: R. Cowen
B. Mitrey
P. Daniel
J. Wieland
L. Riley

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 2

To	From
Pappachan Daniel	Alan Woodard
Co. Region 1	Co. Central Office
Dept. DEC	Phone #
Fax #	Fax #

STATE
DEP/
ENVIRONMEN
ALBANY, NE

THOMAS C. JORLING
COMMISSIONER

DEC 30 1992

Dear Supervisor Thiele:

This letter responds to your December 14, 1992 request for an extension of the permit to operate the North Sea Landfill Cell #3. Special Condition 14 of the March 8, 1991 permit to operate provides that:

> Authorization to landfill wastes after December 18, 1990, other than the "products of resource recovery, incineration or composting . . . downtime wastes and untreatable wastes," in accordance with ECL 27-0704.4(g), second paragraph, is limited to disposal of such waste only in Cell #3 of the Town's North Sea Landfill. Such approval shall expire on January 1, 1993. However, if the Town displays to the satisfaction of the Commissioner that such deadline is inappropriate for good cause, the Commissioner may extend this deadline as he deems appropriate.

Special condition 15 of that permit provides:

> After January 1, 1993, the Landfill may only accept for disposal ash residue, non-combustible residue from a materials resource recovery facility, non-combustible residue from a composting facility, compost, downtime waste, untreatable wastes and clean fill.

Your letter indicates that the Town of Southampton ("the Town") is continuing to implement its resource recovery system, detailed in the Town's September, 1992 revisions to its draft Solid Waste Management Plan/Generic Environmental Impact Statement ("draft plan"). The cornerstone of that Plan is a proposed waste recycling and composting facility.

Your letter states that the Town is reluctant to begin preparing a draft Request for Proposals for this facility until this Department has approved the Town's draft plan, and that as soon as such approval occurs the Town will commence the process which will result in the Town entering into a vendor contract for the construction of this facility within a six month timeframe.

The Department is unable to approve the draft plan as proposed because the Town has not complied with the requirement of GML §120-aa that municipalities adopt a local law or ordinance by September 1, 1992 which requires source separation of those components of the waste stream for which economic markets exist. The Town's local law or ordinance does not require such source separation, but rather prohibits the disposal of certain listed recyclables at the Town's solid waste management facilities if still commingled with the raw municipal solid waste stream. It is my understanding that in practice the Town has already instituted a source separation program which appears to comply with the requirements of GML §120-aa, so it should not be a controversial matter for the Town to make the appropriate amendments to its local law or ordinance. However, the Town cannot do so without following certain procedural requirements which will delay such adoption beyond January 1, 1993.

For these reasons, the Division of Solid Waste will, in the near future, be sending you a letter which details the steps which the Town must take to receive the Department's approval of the plan. The only substantive matter which this letter will require the Town to undertake is compliance with GML §120-aa. The letter will also discuss the procedural and administrative requirements which the Town must undertake for plan approval. This should provide the Town with reasonable assurance that the Department's approval of the draft plan is contingent only upon conditions which the Town may easily satisfy. I trust that the Town will, upon receipt of this letter, be comfortable in immediately commencing the RFP process so that the facility will be operational by May 1995.

I agree that the existing January 1, 1993 deadline for landfilling "other wastes" is inappropriate and that good cause has been shown for extending the time frame until May of 1995--the date when the Town's facility should be operational. Our Region 1 office is now working to issue a permit modification, authorizing the landfill to receive "other wastes" until May 1995. That permit modification will include permit conditions with milestone dates to ensure that the Town: (1) proceeds expeditiously with the RFP and with construction of the facility; and (2) complies expeditiously with the requirements of GML §120-aa.

Sincerely,

Thomas C. Jorling

Mr. Fred Thiele, Jr.
Supervisor
Town of Southampton
116 Hampton Road
Southampton, New York 11968

[illegible]

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT

Under the Environmental Conservation Law

DEC PERMIT NUMBER	1-4736-00324/00002-0
FACILITY/PROGRAM NUMBER(S)	52-S-13
EFFECTIVE DATE	12/18/90
EXPIRATION DATE(S)	12/18/95

___	Article 15, Title 3; 6NYCRR 327, 328, 329: Aquatic Pesticides
___	Article 15, Title 5: Protection of Water
___	Article 15, Title 15: Water Supply
___	Article 15, Title 15: Water Transport
___	Article 15, Title 15: Long Island Wells
___	Article 15, Title 27: Wild, Scenic and Recreational Rivers
___	6NYCRR 608: Water Quality Certification
___	Article 17, Titles 7, 8: SPDES
___	Article 19: Air Pollution Control*
___	Article 23, Title 27: Mined Land Reclamation
___	Article 24: Freshwater Wetlands
___	Article 25: Tidal Wetlands
R-O	Article 27, Title 7; 6NYCRR 360: Solid Waste Management*
___	Article 27, Title 9; 6NYCRR 373: Hazardous Waste Management
___	Article 34: Coastal Erosion Management
___	Article 36: Floodplain Management
___	Articles 1, 3, 17, 19, 27, 37; 6NYCRR 380: Radiation Control

N—New, R—Renewal, M—Modification, C—Construct (*only), O—Operate (*only)

PERMIT ISSUED TO
Town of Southampton

ADDRESS OF PERMITTEE
116 Hampton Rd., Southampton, NY 11968

AGENT FOR PERMITTEE/CONTACT PERSON
George Stavropoulos, Supervisor

TELEPHONE NUMBER

NAME AND ADDRESS OF PROJECT/FACILITY (If different from Permittee)
North Sea Limited Landfill Expansion (Cell No. 3) Majors Path & Great Hill Rd.

LOCATION OF PROJECT/FACILITY	COUNTY	TOWN	UTM COORDINATES
North Sea	Suffolk	Southampton	

DESCRIPTION OF AUTHORIZED ACTIVITY
Operation of a 6 acre landfill cell (Cell No. 3) on the 131 acre Town of Southampton operated municipal solid waste landfill site.

GENERAL CONDITIONS

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations and the conditions specified herein or attached hereto.

1. The permittee shall file in the office of the appropriate regional permit administrator, or other office designated in the special conditions, a notice of intention to commence work at least 48 hours in advance of the time of commencement and shall also notify him/her promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation which may order the work suspended if the public interest so requires pursuant to ECL §71-0301 and SAPA §401(3).
3. The permittee has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. The Department reserves the right to modify, suspend or revoke this permit at any time after due notice, and, if requested, hold a hearing when:
   a. the scope of the project is exceeded or a violation of any condition of the permit or provisions of the ECL and pertinent regulations are found; or
   b. the permit was obtained by misrepresentation or failure to disclose relevant facts; or
   c. newly discovered information or significant physical changes are discovered since the permit was issued.
5. To maintain a valid permit, the permittee must submit a renewal application, including any forms, fees or supplemental information which may be required by the Department, at least 30 days prior to the expiration date of the existing permit (180 days prior for State pollution discharge elimination system permits (SPDES), solid waste management facilities permits (SWMF), or hazardous waste management facilities permits (HWMF)).
6. This permit shall not be construed as conveying to the applicant any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work or as authorizing the impairment of any rights, title or interest in real or personal property held or vested in a person not a party to the permit.
7. The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way which may be required for this project.
8. Issuance of this permit by the Department does not, unless expressly provided for, modify, supersede or rescind an order on consent or determination by the Commissioner issued heretofore by the Department or any of the terms, conditions, or requirements contained in such order or determination.
9. Any modification of this permit granted by the Department must be in writing and attached hereto.

PERMIT ISSUANCE DATE	PERMIT ADMINISTRATOR	ADDRESS
December 18, 1990	David DeRidder	[illegible] NEW YORK [illegible]

AUTHORIZED SIGNATURE [illegible]

95-20-6f (7/87)—25c NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPECIAL CONDITIONS

For Article 27 ; Title 7; 6NYCRR 360 ;

PERMIT TO OPERATE

TOWN OF SOUTHAMPTON

North Sea Limited Landfill Expansion-Cell No. 3

SEE ATTACHED CONDITIONS 1 THRU 33

DEC PERMIT NUMBER
1-4736-00324/00002-0

FACILITY ID NUMBER | PROGRAM NUMBER

DEC 18 '90 [illegible]

SPECIAL PERMIT CONDITIONS
PERMIT TO OPERATE
TOWN OF SOUTHAMPTON
North Sea Limited Landfill Expansion
Cell No. 3
DEC PERMIT NO. 1-4736-00324/00002-0

1) This landfill shall be operated in strict conformance with 6 NYCRR Part 360 regulations in effect at the issuance date of this permit and the Special Conditions listed herein.

2) For the purpose of this permit, terms used herein shall have the same meaning as those set forth in ECL Article 27, 6 NYCRR Part 201, 219, 360 and 621, unless this permit specifically states otherwise. Where terms are not otherwise defined, the meaning associated with such terms are not otherwise defined, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

3) This operation permit shall expire on December 18, 1995, or when the facility reaches capacity, whichever is sooner. If the permittee wishes to continue an activity by this permit after the expiration date of this permit, the permittee shall submit a complete application for a renewal of this permit at least 180 days before this permit expires, as called for under 6 NYCRR 621-13(a) which addresses to the Department's satisfaction the requirements of ECL 27-0704.4.

4) Unless otherwise specified, all submissions required by this permit shall be made in triplicate to the Region I office of the Department, Building 40, SUNY, Stony Brook, NY, to the attention of the Regional Solid Waste Engineer. All approvals required by this Permit shall be obtained from the Regional Director of the Region I office, or his designated representative.

5) The issuance of this permit is based on the assumptions that the information submitted by Permittee in connection with the issuance of this permit includes all material information; all the information submitted by the Permittee in connection with the issuance of this Permit is accurate; and the Facility will be operated as specified in the Department approved Operations 7 Maintenance Manual and Contingency Plan, and will be closed as specified in the Department approved Cell 3 Closure Plan. Any significant inaccuracies found in the information presented may be grounds for the termination

or modification of this permit and/or for a potential enforcement action.

6) The permittee shall furnish to the Department, within a 30 day time period, any relevant information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or suspending this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

7) This permit may be modified, revoked or suspended for cause as specified in 6 NYCRR 621.13. The filing of a request for a permit modification, revocation and reissuance, or suspension; or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

8) The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance is held invalid by the Department, the application of such provision to other circumstances and the remainder of this permit may not be affected thereby.

9) The Permittee shall take all steps to minimize or correct any adverse impact on human health or the environment resulting from facility operations. The Permittee shall report any such activity which may endanger human health or the environment to the DEC Region 1 Solid and Hazardous Waste Engineer. Any such information shall be reported orally within 24 hours from the time the permittee becomes aware of the circumstances and followed up in writing within seven days.

10) The Permittee shall allow any authorized representative of the Department and/or the Suffolk County Health Department, upon the presentation of proper credentials to:

(a) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit, including any and all confidential data included in such records;

(b) Enter and inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(c) Sample or monitor, during Department business hours, or other reasonable times, after prior notification

by the Department, for the purpose of assuring permit compliance or as otherwise authorized by the ECL, any substances or parameters at any location.

11) Annual reporting will include, but not be limited to, those items specified in 6 NYCRR Part 360-2.17(t) and shall be submitted to the Department no later than 60 days after the first day of January of each year.

12) The Town shall, during operation of Cell No. 3, promptly submit to the Department for its review and approval any reasonable supplementary information requested in writing by the Department.

13) The following wastes shall not be disposed of at this facility:

(a) waste identified in 6 NYCRR 360-1.5(b);

(b) any empty drum or any container which has held hazardous waste and is not empty according to 40 CFR 261.7(a)(3);

(c) any infectious waste;

(d) any liquids, sludges, slurries, which are less than 20 percent solids and are described in this condition;

(e) any waste(s) regulated by 6 NYCRR Part 364 unless the waste hauler possesses a valid part 364 permit which specifies this landfill as a disposal site for such waste(s) and disposal of such waste has been approved by the Department;

(f) vegetative yard wastes as defined in Local Law 10 of 1989 shall not be accepted for disposal after July 1, 1991;

(g) household hazardous waste which has been separated from the waste stream as defined in 6 NYCRR 360-1.2(b)(77) and small quantity generated hazardous waste as defined in 6 NYCRR 370.2(b)(148) shall not be accepted for disposal after June 1, 1991.

14) Authorization to landfill wastes after December 18, 1990, other than the "products of resource recovery, incineration or composting . . . downtime wastes and untreatable wastes," in accordance with ECL 27-0704.4(c), second paragraph, is limited to disposal of such waste only in Cell 3 of the Town's North Sea Landfill. Such approval shall expire on January 1, 1993. However, if the Town displays to the satisfaction of the

Commissioner that such deadline is inappropriate for good cause, the Commissioner may extend this deadline as he deems appropriate.

15) After January 1, 1993, the landfill may only accept for disposal ash residue, non-combustible residue from a materials resource recovery facility, non-combustible residue from a composting facility, compost, downtime waste, untreatable wastes and clean fill.

16) Notice of the occurrence of any on-site activities other than routine daily or weekly operations as described in the Operation and Maintenance Plan must be made to the Department at least five business days in advance of the activity. These activities would include but not be limited to groundwater sample collection, gas migration monitoring activities, and leachate collection system maintenance.

17) All structures, including the leachate collection and removal system, groundwater and gas monitoring wells, access roads, drainage structures, recharge basins, etc., shall be maintained in proper working order. In the event any structure becomes damaged or malfunctions in any way, the Permittee shall immediately notify the Department and shall immediately repair or replace the structure, to the Department's satisfaction. All monitoring wells (groundwater and gas) shall be fitted with locking caps and locked at all times other than during times of sampling.

18) Operations (including the placement of daily cover) at this facility shall be limited to the following:

Monday thru Sunday	7:00 a.m. to 5:00 p.m.

with the exception of major holidays, on which days the facility will be closed.

19) The Permittee shall require that all vehicles delivering waste or cover material to the site be appropriately enclosed or covered so as to prevent littering of roadways approaching the site.

20) The Permittee shall regularly observe the condition of roads on-site and off-site providing immediate access to and from the facility to determine if dust, dirt, mud or litter from the facility or from vehicles using the facility is being deposited thereon. The Permittee shall take such steps as may be necessary to properly maintain on-site access roads (such as, without limitation, mechanically cleaning, wetting and/or paving). No

penetrating or waste oils shall be used for dust control.

21) Wind blown paper and other litter shall be confined to the working face of the Cell No. 3 area by snow fence, portable screens, natural screening or any other necessary devices. The Permittee shall police wind blown paper and litter wastes along the landfill's perimeter at a frequency of no less than every two weeks.

22) The working face shall be restricted to the smallest area practical. Facility staff will routinely observe the solid waste lift during compaction and covering activities for presence of unpermitted waste. Any such waste detected shall be removed from the working face and brought to the attention of the site foreman for appropriate action.

23) Lift height shall not exceed ten feet. Dozers will spread and compact the refuse in layers not to exceed two feet. A compacted layer of at least six inches of cover soil shall be placed on all exposed solid waste at the end of each day of operation, without exception.

24) The Permittee shall maintain a contingency plan which shall identify the alternative leachate treatment and disposal methods that will be employed in the case of: malfunction of the existing leachate disposal system), inadequate system capacity to manage short term increased leachate volumes; and/or the leachate is not acceptable to the existing wastewater treatment plant. Should any element of the contingency plan become unavailable or inoperative, a revised plan shall be submitted, subject to Department approval, within 60 days.

25) The Permittee shall inspect the secondary leachate collection and removal (leak detection) system monthly pursuant to the Department approved Cell 3 Contingency Plan and Cell 3 operations and maintenance manual. Should the defined action, leakage rate levels be exceeded, or the groundwater monitoring wells indicate significant increases in contaminant levels above established background, the Permittee will notify the Department within seven (7) days in writing and immediately initiate the appropriate actions as defined in the contingency plan. A standard report form shall be initiated by the landfill operator indicating the time, date and result of these field inspections (including the results of any field tests which might be performed to determine the nature of detected fluids (i.e. specific conductivity, pH, and temperature)) and submit them to the Department as part of the Annual Report.

26) The primary leachate collection and removal system shall be flushed annually to maintain an unobstructed and free

draining collection system. Should the leachate collection and removal system's efficiency be found to be impaired, then remedial cleaning operations by a qualified repair/maintenance contractor shall be made with notification of such activity given to the Department.

27) Under no circumstances shall leachate be discharged directly or indirectly from the site to surface waters, except pursuant to a SPDES permit. Nor shall leachate be recycled within the landfill without prior Department approval. Leachate shall be hauled from the landfill site by a transporter permitted under 6 NYCRR Part 364 and disposed of in accordance with an executed Memorandum of Understanding with a licensed wastewater treatment facility. Copies of the leachate hauling contract and Memorandum of Understanding will be filed by the Town with the Department and the Department shall receive notification for authorization of any future proposed modifications to these leachate hauling and disposal agreements.

28) Refuse shall be compacted and daily, intermediate and final cover applied in compliance with 6 NYCRR Part 360-2.17(b)(c)(d) and (e) respectively.

29) Gas monitoring wells shall be monitored as specified in Schedule B. Gas monitoring reports shall be submitted to the Department on a quarterly basis in accordance with monitoring frequencies and report formats specified in Schedule B. Gas control measures shall be implemented in accordance with the approved contingency plan during the operational life of the landfill and in compliance with the approved Cell 3 closure plan and 6 NYCRR Part 360-2.15(c)(d)(e) and (f).

30) Cell No. 3 groundwater monitoring will continue according to the approved plan and specified parameter lists as referenced in Schedule A of this permit, except as the Department modifies Schedule A following continuing re-evaluation of the Cell No. 3 groundwater monitoring program to determine its effectiveness in monitoring primary and secondary liner system performance in Cell No. 3. The groundwater monitoring data shall be submitted on a quarterly basis to the Department. Remedial actions will be implemented based on the approved Cell 3 contingency plans and contaminant trigger mechanisms defined therein, pursuant to 6 NYCRR Part 360-2.11(c)(5).

31) Following cessation of landfilling operations in Cell 3 in compliance with Department approved permit time frames and any extensions granted thereto, closure operations shall commence in accordance with the approved Cell 3

closure plan and implementation schedule, pursuant to 6 NYCRR Part 360-2.15.

32) The landfill must accept up to three thousand (3,000) tons of solid waste per year from the Town of Shelter Island (if delivered by the Town of Shelter Island) for a period of two years from the date this permit is issued and must charge a reasonable tipping fee. The following solid wastes from the Town of Shelter Island shall not be accepted for disposal at the landfill and shall not be counted as part of this tonnage requirement: yard waste, clean fill as defined in 6 NYCRR 360-1.2(b)(22) or recyclables that have been separated from the waste stream.

33) The Permittee must make good faith efforts to negotiate a contract for municipal solid waste composting culminating in a signed vendor contract by June 1, 1991. However, if the Town displays to the satisfaction of the Commissioner that such date cannot for good cause be met the Commissioner may extend the June 1, 1991 deadline to another date as he deems appropriate.

ATTACHMENT 2

Town of Southampton

GEORGE S. STAVROPOULOS
SUPERVISOR

December 14, 1990

Mr. Langdon Marsh
Executive Deputy Commissioner
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233-1015

Re: Renewal of Permit to Operate the North Sea Landfill Cell #3 in Compliance with N.Y. Environmental Conservation Law, Section 27-0704, and 6 NYCRR, Section 621.13, NYSDEC Permit No. 1-4736-00324/00002-0

Dear Mr. Marsh:

The Town of Southampton ("Town") is in receipt of the New York State Department of Environmental Conservation's ("NYSDEC") letter dated November 27, 1990, in which NYSDEC expressed its intent to grant the Town's petition to renew operations at the North Sea Landfill Cell #3 ("Cell #3"), subject to certain procedural requirements and "substantive conditions" indicated therein. On December 3, 1990, the Town received, via telecopi another copy of NYSDEC's letter of November 27, 1990, along wi document entitled, "Special Permit Conditions, Permit to Opera Town of Southampton." This document consists of 34 separate conditions, which NYSDEC intends to include in the renewal per to be issued by the Town.

In concluding its November 27, 1990 letter of intent, NYS referenced earlier correspondence with the Town and reiterated that NYSDEC was "treating the ("Town's") Petition as a permit renewal application and () consequently () would follow the procedures governing (such NYS)DEC permits found in 6 NYCRR Pa 621. Pursuant to the uniform procedures governing permit renewals, 6 NYCRR, Section 621.13, NYSDEC was obligated to not the Town of its decision within 15 days of its receipt of the renewal application. See 6 NYCRR Section 621.13(c).

NYSDEC's obligation to render such a decision is absolved only when NYSDEC decides to treat the application for renewal as "new" application. However, to do this, NYSDEC must have notifi the Town of its determination to treat the application as "new" within 15 days of its receipt of the Town's petition.

Additionally, NYSDEC's November 27, 1990 letter states that pursuant to the Uniform Procedures Act, "there must be a minimum 15-day (sic) public comment period on the application." The provisions of 6 NYCRR Part 621 relating to applications for perm renewal neither require nor even provide NYSDEC the option for mandating public comment on such renewal applications.

Instead, the 15-day comment period provided by NYSDEC seems to derive from procedures relating to "new" applications for maj projects. See 6 NYCRR, Section 621.5(d)(6). With respect to the Town's renewal application, NYSDEC's provision of 15 days for public comment is inappropriate. The Town submitted a petition for the renewal of its "permit() to operate" Cell #3. Clearly, the renewal of an existing solid waste management facility permi is defined as "minor" in 6 NYCRR Section 621.4(m)(2)(v). Moreover, because it failed to provide the Town notice of its intent to treat the renewal application as "new", NYSDEC cannot now treat the Town's petition as anything other than a renewal application. Although public comments are not required by law, the Town submits the following comments to both NYSDEC's letter November 27, 1990 and the Special Permit Conditions transmitted the Town on December 3, 1990.

In reviewing the various requirements of the Long Island Landfill Law ("LILL"), NYSDEC has found that the Town has satisfied both the letter and spirit set forth in N.Y. Environmental Conservation Law ("ECL") Section 27-0704. Nevertheless, NYSDEC attempts to link further landfilling in Southampton with the imposition of several Special Permit Conditions in the renewal permit to operate Cell #3.

Draft Special Permit Condition #14:

NYSDEC intends to permit the landfilling of wastes "other than the products of resource recovery, incineration or composting. . . downtime wastes and untreatable wastes" in Cell #3 until January 1, 1993. The Town contends that as long as the Commissioner can make the finding in ECL Section 27-0704.4(g), the Town should be able to dispose of these wastes even after January 1, 1993.

The Commissioner has already made the requisite finding u ECL Section 27-0704(f)(g). In its November 27, 1990 letter, NYSDEC found that:

(i) no resource recovery facility is available to accept such waste;

(ii) the Town is making all reasonable efforts to implement a resource recovery system acceptable to the commissioner; and

(iii) the landfilling of such wastes will not have significant adverse environmental impacts.

Upon this finding and approval of the Commissioner, Cell #3 may also accept wastes "other than those" identified above and authorized in ECL Section 27-0704(4)(g). In effect, imposition this draft Special Permit Condition requires the Town to have i resource recovery system operational by January 1, 1993. Howe as long as the Commissioner can continue to make the above findings, the Town must be permitted to dispose of those other wastes after January 1, 1993. Moreover, the complexities invo in implementing resource recovery as contemplated by the Town mandate that NYSDEC permit the landfilling of such other waste until the Town's system is operational.

It is in the Town's best interest to implement its compos facility as soon as possible. As further related in the discussion below relating to draft Special Permit Condition #3 the Town can not blindly forge into implementation without protecting itself from the legal, technological and financial risks inherent in the development of a state-of-the-art facili Further, imposition of this draft Special Permit Condition hel the fact that NYSDEC's interests are also served if the Town's resource recovery system is implemented properly. The Town at most is under a continuing obligation to "make all reasonable efforts" to implement resource recovery under the LTLL. As lo as such efforts are being made, NYSDEC need not impose any additional conditions in this regard.

Draft Special Permit Condition #15:

NYSDEC intends to limit the disposal of materials after January 1, 1993 to "ash residue, non-combustible residue from materials resource recovery facility, non-combustible residue f a composting facility, compost, downtime waste, untreatable was and clean fill." In effect, by imposition of this condition, NYSDEC is also mandating that the Town have its resource recov system in place by January 1, 1993.

The only types of waste which NYSDEC intends to permit for disposal in Cell #3, subsequent to January 1, 1993, are encompassed in NYSDEC's definition of "products of resource recovery." As currently provided, draft Special Condition #15 would require the Town, after January 1, 1993, to seek incineration--no matter the cost--for all combustible residue in its waste stream. Although the LILL makes use of the term "product of resource recovery", there is no indication that the legislature intended to restrict disposal under the LILL to only non-combustible materials.

The Town contends that NYSDEC's "regulatory" definition materially alters the nature of the LILL. Effectively, NYSDEC has--exceeding the scope of its authority--"legislated" new requirements into the LILL. Rather, the Town contends that prio to implementation of a municipal solid waste ("MSW") composting facility (currently the subject of a draft Request for Proposals continuation of its aggressive recycling efforts resulting in significant "volume reduction" of the Town's waste stream constitutes resource recovery for purposes of the LILL.

"Resource recovery" is defined under ECL Section 27-0701.4 "the separation, extraction and recovery of usable materials. . through source separation, recycling centers or other programs, projects or facilities." Usable materials recovered after separation are the "products" of such "resource recovery," and pursuant to ECL Section 27-0704.4(g) may be disposed of in LILL complying landfills without regard to quantity.

Even if for some reason the Commissioner does not approve disposal of such <u>other</u> wastes as related above in the Town's discussion of draft Special Permit Condition #14, disposal of su "products" are specifically permitted under the LILL itself. As result, there is no need for NYSDEC to impose this draft Special Permit Condition limiting disposal to specified wastes after January 1, 1993.

<u>Draft special Permit Condition #32:</u>

In its letter of November 27, 1990, NYSDEC clearly states that the Town has satisfied the obligations of the LILL. Nevertheless, NYSDEC further relates a finding that it is necessary to further mitigate adverse impacts by imposing severa new special conditions "in order to achieve the central objectiv of the (LILL) to discontinue disposal of solid waste in unlined landfills." <u>See</u> November 27, 1990 letter at 3. Even if such an objective can be gleaned from the legislation, nowhere in the LI does it require complying towns to accept waste from noncomplyin towns as a way to mitigate impacts.

Rather, the Commissioner's ability to mitigate impacts as provided in ECL Section 27-0704.4 relates only and specifically those impacts directly associated with the continued landfillin in question. In connection with continued landfilling at Cell NYSDEC has determined that there are no impacts to mitigate. Instead, NYSDEC seeks to impose a condition forcing Southampton accept significant amounts of solid waste from two noncomplying towns--in an attempt to mitigate impacts resulting from noncompliance with the LILL by other municipalities.

On September 5, 1990, NYSDEC responded to the Town's origi petition by issuing a report entitled "Proposed Solid Waste Management Strategy for Long Island: A Technical Assistance Planning Document - August 1990 ("Technical Assistant Plan" or "Plan") to encourage intermunicipal cooperation and requesting that the Town provide additional information to NYSDEC. The To has provided NYSDEC with such additional information. With respect to NYSDEC's Technical Assistance Plan, NYSDEC states th the Plan was developed as a way to resolve some of the solid wa management pressures facing municipalities in Nassau and Suffol counties and released in accord with ECL Section 27-0715.

Further, NYSDEC has enunciated very clearly that the Plan not mandatory. Despite the acknowledgement that it lacks legal basis to mandate, direct or control the flow of solid waste, NYSDEC now attempts, by way of imposing a draft Special Permit Condition on the Town, to require Southampton to accept 23,000 cons of solid waste per year for two years from the Towns of Ea Hampton and Shelter Island. This draft Special Permit Conditio should be eliminated from the renewal permit to be issued by NYSDEC since the agency has no authority to require its imposit

Additionally, this draft Special Permit condition would mandate that the Town charge a "reasonable" tipping fee. As opposed to the way solid waste disposal is treated in some othe states, such activities are not regulated under New York Law. Therefore, tipping fees cannot be subject to a regulatory standard. Instead, such fees must be a function solely of mark conditions. The Town has spent considerable sums of money in t design, construction and operation of Cell #3, and closure of C #2. Additionally, similar or greater costs are anticipated for the ultimate closure of Cell #3, and the design, construction a operation of Cell #4. These costs must be evaluated in determining appropriate tipping fees for accepting solid waste, the Town decides to change its local law and voluntarily accept such out-of-town waste in the future.

As referenced directly above, the Town is prohibited fr accepting any solid waste originating outside Town boundarie See Southampton Code Section 205-3(E). The law provides, in pertinent part:

> The Town disposal areas are maintained by the taxpayers of the Town of Southampton and are provided for the use of the residents of the Town of Southampton only. No material of any sort that is transported from outside the limits of the Town of Southampton shall be deposited in said disposal areas.

Additionally, as a matter of equity, the Town is one of select few municipalities to have even complied with the one requirements of the LILL. The Town initiated its compliance efforts more than four years ago. Such efforts have resulte capital expenditures approaching Twenty Million Dollars ($20,000,000.00). Having evaluated various Town solid waste planning goals, the Town designed Cell #3 with a capacity commensurate with such needs and goals. By conditioning con landfilling at Cell #3 on the acceptance of significant amou additional solid waste from other towns, NYSDEC is effective penalizing the Town for complying with the LILL. Various so waste disposal alternatives are available to the other towns NYSDEC should encourage the pursuit of such alternatives.

Moreover, the useful life of Cell #3 is finite. At NYS request and without prejudice to itself, the Town prepared a Supplemental Environmental Impact Statement ("SEIS") to eval the impacts associated with the continued landfilling at Cel As stated in the SEIS, the capacity of Cell #3 is estimated 423,000 cubic yards. If the Town was forced to accept 46,00 of solid waste over the next two years, this represents more twenty percent (20%) of Cell #3's useful life.

As related above, the Town contends that NYSDEC is with the legal authority to require a complying town to accept wa municipalities without approved landfills. However, if NYSD deemed to have such authority, the Town would submit that NY imposition of a Special Permit Condition to this effect, wit proper impacts review, violates requirements set forth in th State Environmental Quality Review Act ("SEQRA").

Imposition of this draft Special Permit Condition would materially alter the nature of the proposed action. Although Town opposed NYSDEC's request for supplementation to its initi review under SEQRA, the Town prepared a SEIS to expedite NYSDE issuance of Cell #3's renewal permit. Moreover, the Town revi was limited to those issues identified by NYSDEC as "warrantin additional assessment. With the imposition of this draft Spec Permit Condition, NYSDEC would be required to prepare the necessary SEQRA review to assess, among other concerns, impact associated with the exportation of solid waste by other towns Southampton and the drastic reduction of the Town's existing landfill capacity.

Draft Special Permit Condition #33:

NYSDEC's imposition of a condition that the Town must mak "good faith efforts to negotiate a contract for municipal soli waste ("MSW") composting culminating in a signed Vendor contra by April 1, 1991" is neither feasible nor practicable.

As required by NYSDEC's letter of November 27, 1990, the issued a Draft Request for Proposals ("RFP") on December 3, 19 The innovative technology contemplated by the Town for this composting facility, in conjunction with its size and the underlying legal and technical requirements mandated by Genera Municipal Law ("GML") Section 120-w, makes the RFP process for such a project extremely complex.

The Town has interviewed underwriters, financial advisors legal counsel in connection with representation on this projec In each instance, because of both the legal constraints and financial commitment inherent in moving forward with a project this nature, the Town has been warned that even expedited effo would not yield the signing of a vendor contract by April 1, 1991. Even in the best of all possible situations, there is n practical way that the Town can comply with the requirements o GML Section 120-w and execute a vendor contract by April 1, 19 Rather, with "best efforts," the Town has been advised that contract execution can take as much as one year to complete.

Moreover, if proposals received by the Town are non-responsive, it may be in the best interests of both the To and NYSDEC for the Town to initiate reprocurement. Further, i not yet clear whether an evaluation of site specific impacts w be required pursuant to SEQRA prior to execution of a vendor contract. The Town has been advised that it would be unrealis to expect satisfaction of such SEQRA obligations in less than year.

Composting on a large scale represents a new and innovative approach to processing MSW. As of this date, successful procurements for such facilities are few and far between. Nevertheless, the Town has committed itself to constructing a state-of-the-art MSW composting facility. Because of the legal and technological complexities involved in the procurement proces for such a facility, the Town is compelled to move with caution, rather than haste. As a result, the Town cannot accept even the slightest possibility that its permit to operate Cell #3 will be revoked if a vendor contract for MSW composting is not signed by April 1, 1991. Also, this situation of undue pressure on the Tow would only give significant advantages to any vendor in such negotiations. In all likelihood, such a contract will not be ready for execution until December 1991 or January 1992, at the earliest.

Draft Special Permit Condition #34:

NYSDEC intends to condition continued landfilling upon its approval of the Town's Local Solid Waste Management Plan ("SWAMP"), and implementation of the milestone dates presented therein in a timely manner. However, for purposes of satisfying the mandate of the LILL for continued landfilling after December 18, 1990, there is no requirement that the Town have an approved SWAMP.

Although NYSDEC in earlier correspondence indicated that the Town's SWAMP may be considered a binding commitment for the purposes of meeting the requirement of "making all reasonable efforts" to implement resource recovery, NYSDEC has clearly found that the Town is making all reasonable efforts without reference to and independent from the status of the Town's SWAMP.

In establishing its SWAMP, the Town, as lead agency under SEQRA, has complied with all requirements set forth in ECL Sectio 8-0101 et seq. and 6 NYCRR Part 617. Following issuance of a Draft GEIS/SWAMP on September 1, 1989, public comments were received through October 10, 1989. Subsequent to a public hearing, the Town accepted the Final GEIS/SWAMP on March 22, 1990. Even though comments on FGEIS/SWAMP were received through April 12, 1990, the Town provided NYSDEC additional review time, and NYSDEC comments received through June 29, 1990 were assessed in the SEQRA Statement of Findings for the FGEIS/SWAMP issued by the Town on August 28, 1990. Despite providing ample time for comment prior to completing its SEQRA review with respect to the FGEIS/SWAMP, NYSDEC nevertheless submitted additional comments which were received by the Town only eight (8) days prior to issuance of the Town's Statement of Findings. Although these comments were not addressed in the Statement of Findings, the Town is currently evaluating NYSDEC's most recent comments.

Derivation of an implementation schedule from the Town's SWAMP is wholly inappropriate. It must be noted that the SWAMP a planning document, and, moreover, the milestone dates presente therein are likely to change. Nevertheless, the milestone dates presented in the SWAMP relate solely to implementation of the SWAMP, and not to compliance with the LILL. The LILL requires t commissioner to find that the Town is making all reasonable efforts to implement resource recovery. This finding has been made.

Utilization of an implementation schedule is not per se objectionable to the Town, provided that the schedule is the bas for establishing that the Town "continues" to make all reasonab efforts to implement resource recovery. Any implementation schedule must be agreed to by both NYSDEC and the Town. Moreov such a schedule must be subject to modification to adjust for changing market conditions and any delay beyond the Town's control. Negotiation of such a schedule will certainly ensure hat the Town "continues" to make all reasonable efforts to implement resource recovery.

The Town respectfully requests that the above-mentioned dr Special Permit Conditions be modified or eliminated, as stated herein. In view of the fact that its recommendations may be rejected, the Town reserves the right to request an adjudicator hearing pursuant to the Uniform Procedures Act, and its implementing regulations. However, it is the Town's hope that comments contained herein will be the basis for change in the Special Permit Conditions--thereby making the renewal permit acceptable to all parties without the need for a hearing.

Sincerely,

George Stavropoulos
Supervisor

cc: Commissioner Thomas C. Jorling
Harold D. Berger
Norman H. Nosenchuck, P.E.

Appendix G

APPENDIX G

NYSDEC COMMENT LETTER ON DRAFT O & M PLAN

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233 -7010

Thomas C. Jorling
Commissioner

July 16, 1992

Ms. Caroline Kwan
U.S. Environmental Protection Agency
Region II
26 Federal Plaza, Room 747
New York, NY 10278

Dear Ms. Kwan:

Re: Draft Operations and Maintenance Plan
North Sea Landfill, O.U. #1 (ID #152052)

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the referenced document and offers the following comments:

1) The number of wells proposed for sampling is insufficient. Monitoring wells 12a and 12b as well as 4a, 4b and 4c must also be included. The inclusion of monitoring wells 12a and 12b is important because they are placed in an entirely different area of the plume and have yielded detections of contaminants not routinely seen in the other wells. Also, 12a and 12b are located between the landfill mound and residences which are served by domestic wells and, therefore, should be routinely sampled to assure contaminant release in that direction does not worsen.

   Monitoring wells 4a, 4b and 4c represent the only off-site wells within the accepted plume boundaries and, as such, need to be routinely sampled to determine when groundwater standards have been achieved throughout the plume area. These wells also serve as a useful indication of contaminant loading to Fish Cove, the eventual receptor of groundwater/leachate discharge.

2) The parameters to be sampled for are unclear. If, by Table 4-2, it is meant that a full Priority Pollutant Analysis (i.e., metals, volatiles, semi-volatiles, etc.) will be performed annually, this would be acceptable. My only suggestion would be to rotate the season in which the more exhaustive analysis is run so as to preclude missing potential seasonal fluctuations.

   If Table 4-2 is not referencing a full scan, the list of analytes would be too limited and, therefore, unacceptable.

   As a matter of clarity, the entire list of analytes along with the analytical methods to be used should be listed as an appendix.

3) In the submittal of quarterly data to the NYSDEC, results from at least one well associated with the former sludge lagoon area (e.g., MW-6 or MW-7) should be included. It is my understanding that sampling of these wells is a current procedure and, therefore, no extra expenditure is required. These results would be used to confirm that the plume emanating from the area is indeed diminishing.

4) Semi-annual (i.e., once every 2 years) monitoring of Fish Cove should also be included in the plan. This sampling should include flux core measurements of select landfill constituents as well as a limited benthic survey similar to that which was conducted in January 1992. This data is necessary to assure that the actions taken to remedy the site (i.e., capping) are sufficient to restore Fish Cove to an environmentally healthy state.

5) Section 7.0: This section implies that corrective action will be taken if necessary, however, the administrative procedure is not clear. I suggest that language be included which lays out such a plan. For example, should the Town, NYSDEC or USEPA become aware of a statistically significant increase in the level of contamination emanating from the site via the groundwater pathway, a first step may be to monitor for the expanded list of parameters during the next round. Should the elevated levels continue or if new contaminants are discovered, the parties may then request that a work plan be submitted to investigate the nature, extent and cause of the contamination. Upon completion of the report, corrective measures should be discussed and implemented, if deemed necessary.

   A similar plan should be stated for the gas monitoring program.

6) It is my understanding that certain gas monitoring wells east of the landfill have shown readings above 25% of the LEL. Though houses exist in this direction at a distance of 1000 feet or more, I feel some additional monitoring points should be placed between the existing wells and these houses so as to assure the concentrations are diminishing with distance.

7) Section 6.1.2.2, Unfenced Groundwater Recharge Basin: The groundwater recharge basin should be protected by an artificial or natural barrier which completely surrounds the recharge basin.

8) Any households on the periphery of the plume which are currently supplied water via a residential well must undergo a monitoring program to assure that the landfill does not negatively impact their water supply. It is our understanding that approximately five homes will need to be monitored. This plan should continue until two successive years reveal no detections of volatiles and metals, and do not show an increase over the baseline results.

   Of course, elimination of potential threat by water main extension is also acceptable.

9) In order to be compliant with Part 360, Section 2.11(c)(1)(i), new monitoring locations may be necessary on the northeast portion of the property and on the eastern portion of the property. Please address this issue in the next submittal.

If you have any questions regarding this matter, please feel free to contact me at (518) 457-3976.

Sincerely,

Jonathan Greco

Jonathan Greco
Engineering Geologist
Bureau of Eastern Remedial Action
Div. of Hazardous Waste Remediation

JG/dh
a:kwan.jg

bcc: S. Ervolina
M. Chen/File

Appendix H

APPENDIX H

WATER QUALITY ANALYSIS TABLES

H 1 - Routine Parameters
H 2 - Baseline Parameters
H 3 - Extended Parameters

H-1 ROUTINE PARAMETERS

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Safrole.....	94-59-7	8270	10
Silvex; 2,4,5-TP.....	93-72-1	8150	2
Styrene.....	100-42-5	8020	1
		8021	0.1
		8260	10
2,4,5-T; 2,4,5-trichloro-phenoxyacetic acid.....	93-76-5	8150	2
1,2,4,5-Tetrachlorobenzene	95-94-3	8270	10
2,3,7,8-Tetrachlorodi-benzo-p-dioxin; 2,3,7,8-TCDD.....	1746-01-6	8280	0.005
1,1,1,2-Tetrachloroethane.	630-20-6	8010	5
		8021	0.05
		8260	5
1,1,2,2-Tetrachloroethane.	79-34-5	8010	0.5
		8021	0.1
		8260	5
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene.....	127-18-4	8010	0.5
		8021	0.5
		8260	5
2,3,4,6-Tetrachlorophenol.	58-90-2	8270	10
Toluene.....	108-88-3	8020	2
		8021	0.1
		8260	5
o-Toluidine.....	95-53-4	8270	10
Toxaphene.....	See Note 14	8080	2
1,2,4-Trichlorobenzene....	120-82-1	8021	0.3
		8120	0.5
		8260	10
		8270	10
1,1,1-Trichloroethane; Methylchloroform.....	71-55-6	8010	0.3
		8021	0.3
		8260	5
1,1,2-Trichloroethane.....	79-00-5	8010	0.2
		8260	5
Trichloroethylene; Trichloroethene.....	79-01-6	8010	1
		8021	0.2
		8260	5
Trichlorofluoromethane; CFC-11.....	75-69-4	8010	10
		8021	0.3
		8260	5
2,4,5-Trichlorophenol.....	95-95-4	8270	10
2,4,6-Trichlorophenol.....	88-06-2	8040	5
		8270	10
1,2,3-Trichloropropane....	96-18-4	8010	10
		8021	5
		8260	15

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
m-Nitroaniline; 3-Nitroanile.....	99-09-2	8270	50
p-Nitroaniline; 4-Nitroaniline.....	100-01-6	8270	20
Nitrobenzene.....	98-95-3	8090	40
		8270	10
o-Nitrophenol;	88-75-5	8040	5
2-Nitrophenol.....		8270	10
p-Nitrophenol;	100-02-7	8040	10
4-Nitrophenol.....		8270	50
N-Nitrosodi-n-butylamine..	924-16-3	8270	10
N-Nitrosodiethylamine.....	55-18-5	8270	20
N-Nitrosodimethylamine....	62-75-9	8070	2
N-Nitrosodiphenylamine....	86-30-6	8070	5
N-Nitrosodipropylamine; N-Nitroso-N-dipropyl-amine; Di-n-propylni-trosamine.....	621-64-7	8070	10
N-Nitrosomethylethalamine.	10595-95-6	8270	10
N-Nitrosopiperidine.....	100-75-4	8270	20
N-Nitrosopyrrolidine.....	930-55-2	8270	40
5-Nitro-o-toluidine.....	99-55-8	8270	10
Parathion.....	56-38-2	8141	0.5
		8270	10
Pentachlorobenzene.....	608-93-5	8270	10
Pentachloronitrobenzene...	82-68-8	8270	20
Pentachlorophenol.....	87-86-5	8040	5
		8270	50
Phenacetin.....	62-44-2	8270	20
Phenanthrene.....	85-01-8	8100	200
		8270	10
Phenol.....	108-95-2	8040	1
p-Phenylenediamine.....	106-50-3	8270	10
Phorate.....	298-02-2	8140	2
		8141	0.5
		8270	10
Polychlorinated biphenyls; PCB's; Aroclors.....	See Note 11	8080	50
		8270	200
Polychlorinated dibenzo-p-dioxins; PCDD's.....	See Note 12	8280	0.01
Polychlorinated dibenzo-furans; PCDF's.....	See Note 13	8280	0.01
Pronamide.....	23950-58-5	8270	10
Propionitrile;	107-12-0	8015	60
Ethyl cyanide.....		8260	150
Pyrene.....	129-00-0	8100	200
		8270	10

ROUTINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Field Parameters:			
Static water level..... (in wells and sumps)			
Specific Conductance.....		9050	
Temperature.....			
Floaters or Sinkers[5].....			
pH.....		9040	
		9041	
Eh.....			
Dissolved Oxygen[6].....			
Field Observations[7].....			
Turbidity.....		180.1	
Leachate Indicators:			
Total Kjeldahl Nitrogen...		351.1	60
		351.2	
		351.3	
		351.4	200
Ammonia.....	7664-41-7	350.1	60
		350.2	
		350.3	100
Nitrate.....		9200	
Chemical Oxygen Demand....		410.1	50000
		410.2	50000
		410.3	50000
		410.4	80000
Biochemical Oxygen Demand (BOD_5).....		405.1	2000
Total Organic Carbon.....		9060	
Total Dissolved Solids....		160.1	40000
Sulfate.....		9035	
		9036	
		9038	
Alkalinity.....		310.1	20000
		310.2	6000
Phenols.....	108-95-2	8040	
Chloride.....		9250	
		9251	
		9252	
Bromide.....		320.1	2000
Total hardness as $CaCO_3$...		130.1	20000
		130.2	30000

ROUTINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Inorganic Parameters:			
Cadmium.....	(Total)	6010	40
		7130	50
		7131	1
Calcium.....	(Total)	7140	40
Iron.....	(Total)	7380	100
		7381	4
Lead.....	(Total)	6010	400
		7420	1000
		7421	10
Magnesium.....	(Total)	7450	4
Manganese.....	(Total)	7460	40
		7461	0.8
Potassium.....	(Total)	7610	40
Sodium.....	(Total)	7770	8

The department may modify this list as necessary.

Notes

[1]This list contains parameters for which possible analytical procedures are provided in EPA Report SW-846 Test Methods for Evaluating Solid Waste, third edition, November 1986, as revised December 1987, and Methods for Chemical Analysis of Water and Wastes, USEPA-600/4-79-020, March, 1979. The regulatory requirements pertain only to the list of parameters; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnote 4.

[2]Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3]Chemical Abstracts Service Registry Number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4]Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 ml samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[5]Any floaters or sinkers found must be analyzed separately for baseline parameters.

[6]Surface water only.

[7]Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

H-2 BASELINE PARAMETERS

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Field Parameters:			
Static water level (in wells and sumps)			
Specific Conductance		9050	
Temperature			
Floaters or Sinkers[5]			
pH		9040	
		9041	
Eh			
Dissolved Oxygen[6]			
Field Observations[7]			
Turbidity		180.1	
Leachate Indicators:			
Total Kjeldahl Nitrogen		351.1	60
		351.2	
		351.3	
		351.4	200
Ammonia	7664-41-7	350.1	60
		350.2	
		350.3	100
Nitrate		9200	
Chemical Oxygen Demand		410.1	50000
		410.2	50000
		410.3	50000
		410.4	80000
Biochemical Oxygen Demand (BOD_5)		405.1	2000
Total Organic Carbon		9060	
Total Dissolved Solids		160.1	40000
Sulfate		9035	
		9036	
		9038	
Alkalinity		310.1	20000
		310.2	6000
Phenols	108-95-2	8040	
Chloride		9250	
		9251	
		9252	
Bromide	24959-67-9	320.1	2000
Total hardness as $CaCO_3$		130.1	20000
		130.2	30000
Color		110.1	
		110.2	
		110.3	80

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Boron.....	7440-42-8		
Inorganic Parameters:			
Aluminum.....	(Total)	7020	10
Antimony.....	(Total)	6010	300
		7040	2000
		7041	30
Arsenic.....	(Total)	6010	500
		7060	10
		7061	20
Barium.....	(Total)	6010	20
		7080	1000
Beryllium.....	(Total)	6010	3
		7090	50
		7091	2
Cadmium.....	(Total)	6010	40
		7130	50
		7131	1
Calcium.....	(Total)	7140	40
Chromium.....	(Total)	6010	70
		7190	500
		7191	10
Chromium (Hexavalent)*....	18540-29-9	7195	
		7196	600
		7197	30
		7198	
Cobalt.....	(Total)	6010	70
		7200	500
		7201	10
Copper.....	(Total)	6010	60
		7210	200
		7211	10
Cyanide.....	(Total)	9010	200
Iron.....	(Total)	7380	100
		7381	4
Lead.....	(Total)	6010	400
		7420	1000
		7421	10
Magnesium.....	(Total)	7450	4
Manganese.....	(Total)	7460	40
		7461	0.8
Mercury.....	(Total)	7470	2
Nickel.....	(Total)	6010	150
		7520	400
Potassium.....	(Total)	7610	40

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Selenium.....	(Total)	6010	750
		7740	20
		7741	20
Silver.....	(Total)	6010	70
		7760	100
		7761	10
Sodium.....	(Total)	7770	8
Thallium.....	(Total)	6010	400
		7840	1000
		7841	10
Vanadium.....	(Total)	6010	80
		7910	2000
		7911	40
Zinc.....	(Total)	6010	20
		7950	50
		7951	0.5
Organic Parameters:			
Acetone.....	67-64-1	8260	100
Acrylonitrile.....	107-13-1	8030	5
		8260	200
Benzene.....	71-43-2	8020	2
		8021	0.1
		8260	5
Bromochloromethane.....	74-97-5	8021	0.1
		8260	5
Bromodichloromethane.....	75-27-4	8010	1
		8021	0.2
		8260	5
Bromoform; Tribromomethane	75-25-2	8010	2
		8021	15
		8260	5
Carbon disulfide.....	75-15-0	8260	100
Carbon tetrachloride.....	56-23-5	8010	1
		8021	0.1
		8260	10
Chlorobenzene.....	108-90-7	8010	2
		8020	2
		8021	0.1
		8260	5
Chloroethane; Ethyl chloride.....	75-00-3	8010	5
		8021	1

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Chloroform; Trichloromethane.....	67-66-3	8010	0.5
		8021	0.2
		8260	5
Dibromochloromethane; Chlorodibromomethane....	124-48-1	8010	1
		8021	0.3
		8260	5
1,2-Dibromo-3-chloropropane; DBCP.....	96-12-8	8011	0.1
		8021	30
		8260	25
1,2-Dibromoethane; Ethylene dibromide; EDB.....	106-93-4	8011	0.1
		8021	10
		8260	5
o-Dichlorobenzene; 1,2-Dichlorobenzene.....	95-50-1	8010	2
		8020	5
		8021	0.5
		8120	10
		8260	5
		8270	10
p-Dichlorobenzene; 1,4-Dichlorobenzene.....	106-46-7	8010	2
		8020	5
		8021	0.1
		8120	15
		8260	5
		8270	10
trans-1,4-Dichloro-2-butene.....	110-57-6	8260	100
1,1-Dichloroethane; Ethylidene chloride.....	75-34-3	8010	1
		8021	0.5
		8260	5
1,2-Dichloroethane; Ethylene dichloride.....	107-06-2	8010	0.5
		8021	0.3
		8260	5
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride.....	75-35-4	8010	1
		8021	0.5
		8260	5
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene..	156-59-2	8021	0.2
		8260	5
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene.....	156-60-5	8010	1
		8021	0.5
		8260	5
1,2-Dichloropropane; Propylene dichloride.....	78-87-5	8010	0.5
		8021	0.05
		8260	5
cis-1,3-Dichloropropene...	10061-01-5	8010	20
		8260	10
trans-1,3-Dichloropropene.	10061-02-6	8010	5
		8260	10

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
Ethylbenzene.....	100-41-4	8020	2
		8221	0.05
		8260	5
2-Hexanone; Methyl butyl ketone.....	591-78-6	8260	50
Methyl bromide; Bromomethane.....	74-83-9	8010	20
		8021	10
Methyl chloride; Chloromethane.....	74-87-3	8010	1
		8021	0.3
Methylene bromide; Dibromomethane.....	74-95-3	8010	15
		8021	20
		8260	10
Methylene chloride; Dichloromethane.....	75-09-2	8010	5
		8021	0.2
		8260	10
Methyl ethyl ketone; MEK; 2-Butanone.....	78-93-3	8015	10
		8260	100
Methyl iodide; Iodomethane	74-88-4	8010	40
		8260	10
4-Methyl-2-pentanone; Methyl isobutyl ketone..	108-10-1	8015	5
		8260	100
Styrene.....	100-42-5	8020	1
		8021	0.1
		8260	10
1,1,1,2-Tetrachloroethane.	630-20-6	8010	5
		8021	0.05
		8260	5
1,1,2,2-Tetrachloroethane.	79-34-5	8010	0.5
		8021	0.1
		8260	5
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene.....	127-18-4	8010	0.5
		8021	0.5
		8260	5
Toluene.....	108-88-3	8020	2
		8021	0.1
		8260	5
1,1,1-Trichloroethane; Methylchloroform.....	71-55-6	8010	0.3
		8021	0.3
		8260	5
1,1,2-Trichloroethane.....	79-00-5	8010	0.2
		8260	5
Trichloroethylene; Trichloroethene.....	79-01-6	8010	1
		8021	0.2
		8260	5
Trichlorofluoromethane; CFC-11.....	75-69-4	8010	10
		8021	0.3
		8260	5

BASELINE PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods	PQL[4] (µg/l)
1,2,3-Trichloropropane....	96-18-4	8010	10
		8021	5
		8260	15
Vinyl acetate.....	108-05-4	8260	50
Vinyl chloride; Chloro-ethene.....	75-01-4	8010	2
		8021	0.4
		8260	10
Xylenes.....	1330-20-7	8020	5
		8021	0.2
		8260	5

The department may modify this list as necessary.

Notes

[1]This list contains 47 volatile organics for which possible analytical procedures provided in EPA Report SW-846 Test Methods for Evaluating Solid Waste, third edition, November 1986, as revised December 1987, includes Method 8260; 25 metals for which SW-846 provides either Method 6010 or a method from the 7000 series of methods; and additional parameters for which possible procedures are provided in Methods for Chemical Analysis of Water and Wastes, USEPA-600/4-79-020, March, 1979. The regulatory requirements pertain only to the list of parameters; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnote 4.

[2]Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3]Chemical Abstracts Service Registry Number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4]Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 ml samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[5]Any floaters or sinkers found must be analyzed separately for baseline parameters.

[6]Surface water only.

[7]Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

[8]The department may waive the requirement to analyze Hexavalent Chromium provided that Total and Hexavalent and Trivalent Chromium values do not exceed 0.05 mg/l.

H-3 EXPANDED PARAMETERS

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Field Parameters:			
Static water level (in wells and sumps)			
Specific Conductance		9050	
Temperature			
Floaters or Sinkers[6]			
pH		9040	
		9041	
Eh			
Dissolved Oxygen[7]			
Field Observations[8]			
Turbidity		180.1	
Leachate Indicators:			
Total Kjeldahl Nitrogen		351.1	60
		351.2	
		351.3	
		351.4	200
Ammonia	7664-41-7	350.1	60
		350.2	
		350.3	100
Nitrate		9200	
Chemical Oxygen Demand		410.1	50000
		410.2	50000
		410.3	50000
		410.4	80000
		405.1	2000
Biochemical Oxygen Demand (BOD_5)			
Total Organic Carbon		9060	
Total Dissolved Solids		160.1	40000
Sulfate		9035	
		9036	
		9038	
Alkalinity		310.1	20000
		310.2	6000
Phenols	108-95-2	8040	
Chloride		9250	
		9251	
		9252	
Bromide	24959-67-9	320.1	2000
Total hardness as $CaCO_3$		130.1	20000
		130.2	30000

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Color		110.1	
		110.2	
		110.3	80
Boron	7440-42-8		
Inorganic Parameters:			
Aluminum	(Total)	7020	10
Antimony	(Total)	6010	300
		7040	2000
		7041	30
Arsenic	(Total)	6010	500
		7060	10
		7061	20
Barium	(Total)	6010	20
		7080	1000
Beryllium	(Total)	6010	3
		7090	50
		7091	2
Cadmium	(Total)	6010	40
		7130	50
		7131	1
Calcium	(Total)	7140	40
Chromium	(Total)	6010	70
		7190	500
		7191	10
Chromium (Hexavalent)*	18540-29-9	7195	
		7196	600
		7197	30
		7198	
Cobalt	(Total)	6010	70
		7200	500
		7201	10
Copper	(Total)	6010	60
		7210	200
		7211	10
Cyanide	(Total)	9010	200
Iron	(Total)	7380	100
		7381	4
Lead	(Total)	6010	400
		7420	1000
		7421	10
Magnesium	(Total)	7450	4
Manganese	(Total)	7460	40
		7461	0.8
Mercury	(Total)	7470	2

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Nickel	(Total)	6010	150
		7520	400
Potassium	(Total)	7610	40
Selenium	(Total)	6010	750
		7740	20
		7741	20
Silver	(Total)	6010	70
		7760	100
		7761	10
Sodium	(Total)	7770	8
Sulfide	18496-25-8	9030	4000
Thallium	(Total)	6010	400
		7840	1000
		7841	10
Tin	(Total)	6010	40
Vanadium	(Total)	6010	80
		7910	2000
		7911	40
Zinc	(Total)	6010	20
		7950	50
		7951	0.5
Organic Parameters:			
Acenaphthene	83-32-9	8100	200
		8270	10
Acenaphthylene	208-96-8	8100	200
		8270	10
Acetone	67-64-1	8260	100
Acetonitrile; Methyl cyanide	75-05-8	8015	100
Acetophenone	98-86-2	8270	10
2-Acetylaminofluorene; 2-AAF	53-96-3	8270	20
Acrolein	107-02-8	8030	5
		8260	100
Acrylonitrile	107-13-1	8030	5
		8260	200
Aldrin	309-00-2	8080	0.05
		8270	10
Allyl chloride	107-05-1	8010	5
		8260	10
4-Aminobiphenyl	92-67-1	8270	20
Anthracene	120-12-7	8100	200
		8270	10

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Benzene	71-43-2	8020	2
		8021	0.1
		8260	5
Benzo[a]anthracene; Benzanthracene	56-55-3	8100	200
		8270	10
Benzo[b]fluoranthene	205-99-2	8100	200
		8270	10
Benzo[k]fluoranthene	207-08-9	8100	200
		8270	10
Benzo[ghi]perylene	191-24-2	8100	200
		8270	10
Benzo[a]pyrene	50-32-8	8100	200
		8270	10
Benzyl alcohol	100-51-6	8270	20
alpha-BHC	319-84-6	8080	0.05
		8270	10
beta-BHC	319-85-7	8080	0.05
		8270	20
delta-BHC	319-86-8	8080	0.1
		8270	20
gamma-BHC; Lindane	58-89-9	8080	0.05
		8270	20
Bis(2-chloroethoxy)methane	111-91-1	8110	5
		8270	10
Bis(2-chloroethyl) ether; Dichloroethyl ether	111-44-4	8110	3
		8270	10
Bis-(2-chloro-1-methyl-ethyl) ether; 2,2'-Dichlorodiisopropyl ether; DCIP, See note 9	108-60-1	8110	10
		8270	10
Bis(2-ethylhexyl)phthalate	117-81-7	8060	20
Bromochloromethane; Chlorobromomethane	74-97-5	8021	0.1
		8260	5
Bromodichloromethane; Dibromochloromethane	75-27-4	8010	1
		8021	0.2
		8260	5
Bromoform; Tribromomethane	75-25-2	8010	2
		8021	15
		8260	5
4-Bromophenyl phenyl ether	101-55-3	8110	25
		8270	10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	8060	5
		8270	10
Carbon disulfide	75-15-0	8260	100
Carbon tetrachloride	56-23-5	8010	1
		8021	0.1
		8260	10

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Chlordane	See Note 10	8080	0.1
		8270	50
p-Chloroaniline	106-47-8	8270	20
Chlorobenzene	108-90-7	8010	2
		8020	2
		8021	0.1
		8260	5
Chlorobenzilate	510-15-6	8270	10
p-Chloro-m-cresol; 4-Chloro-3-methylphenol.	59-50-7	8040	5
		8270	20
Chloroethane; Ethyl chloride	75-00-3	8010	5
		8021	1
		8260	10
Chloroform; Trichloromethane	67-66-3	8010	0.5
		8021	0.2
		8260	5
2-Chloronaphthalene	91-58-7	8120	10
		8270	10
2-Chlorophenol	95-57-8	8040	5
		8270	10
4-Chlorophenyl phenyl ether	7005-72-3	8110	40
		8270	10
Chloroprene	126-99-8	8010	50
		8260	20
Chrysene	218-01-9	8100	200
		8270	10
m-Cresol; 3-methylphenol	108-39-4	8270	10
o-Cresol; 2-methylphenol	95-48-7	8270	10
p-Cresol; 4-methylphenol	106-44-5	8270	10
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	8150	10
4,4'-DDD	72-54-8	8080	0.1
		8270	10
4,4'-DDE	72-55-9	8080	0.05
		8270	10
4,4'-DDT	50-29-3	8080	0.1
		8270	10
Diallate	2303-16-4	8270	10
Dibenz[a,h]anthracene	53-70-3	8100	200
		8270	10
Dibenzofuran	132-64-9	8270	10
Dibromochloromethane; Chlorodibromomethane	124-48-1	8010	1
		8021	0.3
		8260	5

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
1,2-Dibromo-3-chloro-propane; DBCP.....	96-12-8	8011	0.1
		8021	30
		8260	25
1,2-Dibromoethane; Ethylene dibromide; EDB.	106-93-4	8011	0.1
		8021	10
		8260	5
Di-n-butyl phthalate.....	84-74-2	8060	5
		8270	10
o-Dichlorobenzene; 1,2-Dichlorobenzene.....	95-50-1	8010	2
		8020	5
		8021	0.5
		8120	10
		8260	5
		8270	10
m-Dichlorobenzene; 1,3-Dichlorobenzene.....	541-73-1	8010	5
		8020	5
		8021	0.2
		8120	10
		8260	5
		8270	10
p-Dichlorobenzene; 1,4-dichlorobenzene.....	106-46-7	8010	2
		8020	5
		8021	0.1
		8120	15
		8260	5
		8270	10
3,3'-Dichlorobenzidine....	91-94-1	8270	20
trans-1,4-Dichloro-2-butene.....	110-57-6	8260	100
Dichlorodifluoromethane; CFC 12.....	75-71-8	8021	0.5
		8260	5
1,1-Dichloroethane; Ethyldidene chloride....	75-34-3	8010	1
		8021	0.5
		8260	5
1,2-Dichloroethane; Ethylene dichloride.....	107-06-2	8010	0.5
		8021	0.3
		8260	5
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride.....	75-35-4	8010	1
		8021	0.5
		8260	5
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene..	156-59-2	8021	0.2
		8260	5
trans-1,2-Dichloroethylene trans-1,2-Dichloroethene	156-60-5	8010	1
		8021	0.5
		8260	5
2,4-Dichlorophenol.....	120-83-2	8040	5
		8270	10

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
2,6-Dichlorophenol.....	87-65-0	8270	10
1,2-Dichloropropane; Propylene dichloride....	78-87-5	8010	0.5
		8021	0.05
		8260	5
1,3-Dichloropropane; Trimethylene dichloride.	142-28-9	8021	0.3
		8260	5
2,2-Dichloropropane; Isopropylidene chloride.	594-20-7	8021	0.5
		8260	15
1,1-Dichloropropene	563-58-6	8021	0.2
		8260	5
cis-1,3-Dichloropropene...	10061-01-5	8010	20
		8260	10
trans-1,3-Dichloropropene.	10061-02-6	8010	5
		8260	10
Dieldrin.....	60-57-1	8080	0.05
		8270	10
Diethyl phthalate.....	84-66-2	8060	5
		8270	10
0,0-Diethyl 0-2-pyrazinyl phosphorothioate; Thionazin.....	297-97-2	8141	5
		8270	20
Dimethoate.....	60-51-5	8141	3
		8270	20
p-(Dimethylamino)azo-benzene.....	60-11-7	8270	10
7,12-Dimethylbenz[a]-anthracene.....	57-97-6	8270	10
3,3'-Dimethylbenzidine....	119-93-7	8270	10
2,4-Dimethylphenol; m-Xylenol.....	105-67-9	8040	5
		8270	10
Dimethyl phthalate.....	131-11-3	8060	5
		8270	10
m-Dinitrobenzene.....	99-65-0	8270	20
4,6-Dinitro-o-cresol 4,6-Dinitro-2-methylphenol..	534-52-1	8040	150
		8270	50
2,4-Dinitrophenol.....	51-28-5	8040	150
		8270	50
2,4-Dinitrotoluene.....	121-14-2	8090	0.2
		8270	10
2,6-Dinitrotoluene.....	606-20-2	8090	0.1
		8270	10
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol.	88-85-7	8150	1
		8270	20
Di-n-octyl phthalate.....	117-84-0	8060	30
		8270	10

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Diphenylamine	122-39-4	8270	10
Disulfoton	298-04-4	8140	2
		8141	0.5
		8270	10
Endosulfan I	959-98-8	8080	0.1
		8270	20
Endosulfan II	33213-65-9	8080	0.05
		8270	20
Endosulfan sulfate	1031-07-8	8080	0.5
		8270	10
Endrin	72-20-8	8080	0.1
		8270	20
Endrin aldehyde	7421-93-4	8080	0.2
		8270	10
Ethylbenzene	100-41-4	8020	2
		8221	0.05
		8260	5
Ethyl methacrylate	97-63-2	8015	5
		8260	10
		8270	10
Ethyl methanesulfonate	62-50-0	8270	20
Famphur	52-85-7	8270	20
Fluoranthene	206-44-0	8100	200
		8270	10
Fluorene	86-73-7	8100	200
		8270	10
Heptachlor	76-44-8	8080	0.05
		8270	10
Heptachlor epoxide	1024-57-3	8080	1
		8270	10
Hexachlorobenzene	118-74-1	8120	0.5
		8270	10
Hexachlorobutadiene	87-68-3	8021	0.5
		8120	5
		8260	10
Hexachlorocyclopentadiene	77-47-4	8270	10
		8120	5
		8270	10
Hexachloroethane	67-72-1	8120	0.5
		8260	10
		8270	10
Hexachloropropene	1888-71-7	8270	10
2-Hexanone; Methyl butyl ketone	591-78-6	8260	50
Indeno(1,2,3-cd)pyrene	193-39-5	8100	200
		8270	10

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
Isobutyl alcohol.....	78-83-1	8015	50
		8240	100
Isodrin.....	465-73-6	8270	20
		8260	10
Isophorone.....	78-59-1	8090	60
		8270	10
Isosafrole.....	120-58-1	8270	10
Kepone.....	143-50-0	8270	20
Methacrylonitrile.....	126-98-7	8015	5
		8260	100
Methapyrilene.....	91-80-5	8270	100
Methoxychlor.....	72-43-5	8080	2
		8270	10
Methyl bromide;	74-83-9	8010	20
Bromomethane.....		8021	10
Methyl chloride;	74-87-3	8010	1
Chloromethane.....		8021	0.3
3-Methylcholanthrene.....	56-49-5	8270	10
Methyl ethyl ketone; MEK;	78-93-3	8015	10
2-Butanone.....		8260	100
Methyl iodide; Iodomethane	74-88-4	8010	40
		8260	10
Methyl methacrylate.....	80-62-6	8015	2
		8260	30
Methyl methanesulfonate...	66-27-3	8270	10
2-Methylnaphthalene.....	91-57-6	8270	10
Methyl parathion;	298-00-0	8140	0.5
Parathion methyl.....		8141	1
		8270	10
4-Methyl-2-pentanone;	108-10-1	8015	5
Methyl isobutyl ketone..		8260	100
Methylene bromide;	74-95-3	8010	15
Dibromomethane.....		8021	20
		8260	10
Methylene chloride;	75-09-2	8010	5
Dichloromethane.....		8021	0.2
		8260	10
Naphthalene.....	91-20-3	8021	0.5
		8100	200
		8260	5
		8270	10
1,4-Naphthoquinone.....	130-15-4	8270	10
1-Naphthylamine.....	134-32-7	8270	10
2-Naphthylamine.....	91-59-8	8270	10
o-Nitroaniline;			
2-Nitroaniline.....	88-74-4	8270	50

EXPANDED PARAMETERS[1]

Common Name[2]	CAS RN[3]	Suggested Methods[4]	PQL[5] (µg/l)
0,0,0-Triethyl phosphorothioate.....	126-68-1	8270	10
sym-Trinitrobenzene.....	99-35-4	8270	10
Vinyl acetate.....	108-05-4	8260	50
Vinyl chloride; Chloroethene.....	75-01-4	8010	2
		8021	0.4
		8260	10
Xylene (total).....	See Note 15	8020	5
		8021	0.2
		8260	5

The department may modify this list as necessary.

EXPANDED PARAMETERS[1]

Notes

[1]The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[2]Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3]Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4]Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 Test Methods for Evaluating Solid Waste, third edition, November 1986, as revised, December 1987 and Methods for Chemical Analysis of Water and Wastes, USEPA-600-4/79-020, March, 1979. CAUTION: The methods listed are representative procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

[5]Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 ml samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[6]Any floaters or sinkers found must be analyzed separately for baseline parameters.

[7]Surface water only.

[8]Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

[9]This substance is often called Bis(2-chloroisopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2"-oxybis[2-chloro- (CAS RN 39638-32-9).

[10]Chlordane: This entry includes alpha-chlordane (CAS RN 5103-71-9), beta-chlordane (CAS RN 5103-74-2), gamma-chlordane (CAS RN 5566-34-7), and constituents of chlordane (CAS RN 57-74-9 and CAS RN 12789-03-6). PQL shown is for technical chlordane. PQLs of specific isomers are about 20 µg/l by method 8270.

[11]Polychlorinated biphenyls (CAS RN 1336-36-3): This category contains congener chemicals, including constituents of Aroclor 1016 (CAS RN 12674-11-2), Aroclor 1221 (CAS RN 11104-28-2), Aroclor 1232 (CAS RN 11141-16-5), Aroclor 1242 (CAS RN 53469-21-9), Aroclor 1248 (CAS RN 12672-29-6), Aroclor 1254 (CAS RN 11097-69-1), and Aroclor 1260 (CAS RN 11096-82-5). The PQL shown is an average value for PCB congeners.

[12]Polychlorinated dibenzo-p-dioxins: This category contains congener chemicals, including tetrachlorodibenzo-p-dioxins (see also 2,3,7,8-TCDD), pentachlorodibenzo-p-dioxins, and hexachlorodibenzo-p-dioxins. The PQL shown is an average value for PCDD congeners. Upon request of the applicant, the department may waive the requirement to analyze for dioxins, where appropriate.

[13]Polychlorinated dibenzofurans: This category contains congener chemicals, including tetrachlrodibenzofurans, pentachlorodibenzofurans, and hexachlorodibenzofurans. The PQL shown is an average value for PCDF congeners. Upon request of the applicant, the department may waive the requirement to analyze for furans, where appropriate.

[14]Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), i.e., chlorinated camphene.

[15]Xylene (total): This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7). PQLs for method 8021 are 0.2 for o-xylene and 0.1 for m- or p-xylene. The PQL for m-xylene is 2.0 µg/L by method 8020 or 8260.

[16]The department may waive the requirement to analyze Hexavalent Chromium provided that Total and Hexavalent and Trivalent Chromium values do not exceed 0.05 mg/l.

Appendix I

APPENDIX I

SAMPLE PRESERVATION GUIDELINES

REF MANUAL OF METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES EPA 600/4-79-020 MARCH 1983

SAMPLE PRESERVATION

Complete and unequivocal preservation of samples, either domestic sewage, industrial wastes, or natural waters, is a practical impossibility. Regardless of the nature of the sample, complete stability for every constituent can never be achieved. At best, preservation techniques can only retard the chemical and biological changes that inevitably continue after the sample is removed from the parent source. The changes that take place in a sample are either chemical or biological. In the former case, certain changes occur in the chemical structure of the constituents that are a function of physical conditions. Metal cations may precipitate as hydroxides or form complexes with other constituents; cations or anions may change valence states under certain reducing or oxidizing conditions; other constituents may dissolve or volatilize with the passage of time. Metal cations may also adsorb onto surfaces (glass, plastic, quartz, etc.), such as, iron and lead. Biological changes taking place in a sample may change the valence of an element or a radical to a different valence. Soluble constituents may be converted to organically bound materials in cell structures, or cell lysis may result in release of cellular material into solution. The well known nitrogen and phosphorus cycles are examples of biological influence on sample composition. Therefore, as a general rule, it is best to analyze the samples as soon as possible after collection. This is especially true when the analyte concentration is expected to be in the low *ug*/l range.

Methods of preservation are relatively limited and are intended generally to (1) retard biological action, (2) retard hydrolysis of chemical compounds and complexes, (3) reduce volatility of constituents, and (4) reduce absorption effects. Preservation methods are generally limited to pH control, chemical addition, refrigeration, and freezing.

The recommended preservative for various constituents is given in Table 1. These choices are based on the accompanying references and on information supplied by various Quality Assurance Coordinators. As more data become available, these recommended holding times will be adjusted to reflect new information. Other information provided in the table is an estimation of the volume of sample required for the analysis, the suggested type of container, and the maximum recommended holding times for samples properly preserved.

TABLE 1

RECOMMENDATION FOR SAMPLING AND PRESERVATION OF SAMPLES ACCORDING TO MEASUREMENT[1]

Measurement	Vol. Req. (ml)	Container[2]	Preservative	Holding Time[3]
100 Physical Properties				
Color	50	P,G	Cool, 4°C	24 Hrs.
Conductance	100	P,G	Cool, 4°C	24 Hrs.[4]
Hardness	100	P,G	Cool, 4°C HNO_3 to pH < 2	6 Mos.[5]
Odor	200	G only	Cool, 4°C	24 Hrs.
pH	25	P,G	Det. on site	6 Hrs.
Residue				
Filterable	100	P,G	Cool, 4°C	7 Days
Non-Filterable	100	P,G	Cool, 4°C	7 Days
Total	100	P,G	Cool, 4°C	7 Days
Volatile	100	P,G	Cool, 4°C	7 Days
Settleable Matter	1000	P,G	None Req.	24 Hrs
Temperature	1000	P,G	Det. on site	No Holding
Turbidity	100	P,G	Cool, 4°C	7 Days
200 Metals				
Dissolved	200	P,G	Filter on site HNO_3 to pH < 2	6 Mos.[6]
Suspended	200		Filter on site	6 Mos.
Total	100	P,G	HNO_3 to pH < 2	6 Mos.[6]

TABLE 1 (CONT)

Measurement	Vol. Req. (ml)	Container[2]	Preservative	Holding Time[3]
Mercury				
Dissolved	100	P.G	Filter on site HNO_3 to pH < 2	38 Days (Glass) 13 Days (Hard Plastic)
Total	100	P.G	HNO_3 to pH < 2	38 Days (Glass) 13 Days (Hard Plastic)
300 Inorganics, Non-Metallics				
Acidity	100	P.G	None Req	24 Hrs.
Alkalinity	100	P.G	Cool, 4°C	24 Hrs.
Bromide	100	P.G	Cool, 4°C	24 Hrs.
Chloride	50	P.G	None Req.	7 Days
Chlorine	200	P.G	Det. on site	No Holding
Cyanides	500	P.G	Cool, 4°C NaOH to pH 12	24 Hrs.
Fluoride	300	P.G	None Req.	7 Days
Iodide	100	P.G	Cool, 4°C	24 Hrs.
Nitrogen				
Ammonia	400	P.G	Cool,4°C H_2SO_4 to pH < 2	24 Hrs.
Kjeldahl, Total	500	P.G	Cool, 4°C H_2SO_4 to pH < 2	24 Hrs.[6]
Nitrate plus Nitrite	100	P.G	Cool, 4°C H_2SO_4 to pH < 2	24 Hrs.[6]
Nitrate	100	P.G	Cool, 4°C	24 Hrs.
Nitrite	50	P.G	Cool, 4°C	48 Hrs.

TABLE 1 (CONT)

Measurement	Vol. Req. (ml)	Container[2]	Preservative	Holding Time[3]
Dissolved Oxygen				
Probe	300	G only	Det. on site	No Holdin
Winkler	300	G only	Fix on site	4–8 Hour
Phosphorus				
Ortho-phosphate. Dissolved	50	P,G	Filter on site Cool. 4°C	24 Hrs
Hydrolyzable	50	P,G	Cool. 4°C H_2SO_4 to pH < 2	24 Hrs.[4]
Total	50	P,G	Cool. 4°C H_2SO_4 to pH < 2	24 Hrs.[4]
Total. Dissolved	50	P,G	Filter on site Cool. 4°C H_2SO_4 to pH < 2	24 Hrs.[4]
Silica	50	P only	Cool. 4°C	7 Days
Sulfate	50	P,G	Cool. 4°C	7 Days
Sulfide	500	P,G	2 ml zinc acetate	24 Hrs.
Sulfite	50	P,G	Det. on site	No Holding
400 Organics				
BOD	1000	P,G	Cool. 4°C	24 Hrs.
COD	50	P,G	H_2SO_4 to pH < 2	7 Days[4]
Oil & Grease	1000	G only	Cool. 4°C H_2SO_4 or HCl to pH < 2	24 Hrs.
Organic carbon	25	P,G	Cool. 4°C H_2SO_4 or HCl to pH < 2	24 Hrs.
Phenolics	500	G only	Cool. 4°C H_3PO_4 to pH < 4 1.0 g $CuSO_4$/l	24 Hrs.
MBAS	250	P,G	Cool. 4°C	24 Hrs.

TABLE 1 (CONT)

Measurement	Vol. Req. (ml)	Container[2]	Preservative	Holding Time[3]
NTA	50	P,G	Cool, 4°C	24 Hrs.

1. More specific instructions for preservation and sampling are found with each procedure as detailed in this manual. A general discussion on sampling water and industrial wastewater may be found in ASTM, Part 31, p. 72–82 (1976) Method D-3370.

2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.

3. It should be pointed out that holding times listed above are recommended for properly preserved samples based on currently available data. It is recognized that for some sample types, extension of these times may be possible while for other types, these times may be too long. Where shipping regulations prevent the use of the proper preservation technique or the holding time is exceeded, such as the case of a 24-hour composite, the final reported data for these samples should indicate the specific variance.

4. If the sample is stabilized by cooling, it should be warmed to 25°C for reading, or temperature correction made and results reported at 25°C.

5. Where HNO_3 cannot be used because of shipping restrictions, the sample may be initially preserved by icing and immediately shipped to the laboratory. Upon receipt in the laboratory, the sample must be acidified to a pH < 2 with HNO_3 (normally 3 ml 1:1 HNO_3/liter is sufficient). At the time of analysis, the sample container should be thoroughly rinsed with 1:1 HNO_3 and the washings added to the sample (volume correction may be required).

6. Data obtained from National Enforcement Investigations Center-Denver, Colorado, support a four-week holding time for this parameter in Sewerage Systems. (SIC 4952).

Appendix J

APPENDIX J

FISH COVE BENTHIC SURVEY

Fish Cove Benthic Survey

Prepared by: Bruce Anderson
Town of Southampton
January, 1992

Fish Cove Benthic Survey

Executive Summary

A benthic survey within the previously identified "impacted zone" at Fish Cove (1990) was conducted by Southampton Natural Resources staff with support from a bayman familiar with Southampton waters and in the presence of Southampton Town Bay Constables. This survey was conducted at the request of H2M and in response to previous documentation indicating that a plume originating from Cell #1 and upwelling at Fish Cove was sufficiently toxic such that adult clams and clam larvae could not survive. This previous conclusion was based upon bioassay work conducted by Marine Sciences Research Center, SUNY at Stony Brook in lieu of a detailed survey of the "impacted zone" for the presence of shellfish. The results of the benthic survey conducted by the Town reveal adult clams of different sizes and ages are found within the "impacted zone" in sufficient quantities as to support a viable commercial shellfish industry at this locale. In addition, the benthic survey revealed the presence of numerous other aquatic species within the impacted zone.

Introduction

In March of 1987, the Town of Southampton signed an Administrative Order on Consent ("Order on Consent") with EPA. The Order on Consent directed the Town to prepare a Remedial Investigation/Feasibility Study ("RI/FS") for Cell #1 at the North Sea Landfill. The Order on Consent partitioned RI's in connection with the North Sea Landfill into two operable units. Operable Unit 1 addressed source control at both Cell 1 and the septic waste lagoons, while activities associated with Operable Unit 2 have addressed the nature and extent of off-site groundwater contamination and its potential impact on downgradient wells and/or Fish Cove. To date, the RI/FS Study for Operable Unit #1 has been completed. In 1990, the Draft North Sea Landfill RI/FS: Phase II RI - Fish Cove Study ("Draft Report") was submitted to EPA for comment. The Draft Report alleged that a groundwater plume emanating from Cell #1 at the North Sea Landfill and upwelling in the southeast region of Fish Cove (impacted zone) has impacted these waters as to prevent or preclude the survival and propagation of the hard clam, Mercenaria mercenaria.

Objectives

The primary objective of this investigation was to determine whether the hard clam was present within the impacted zone as

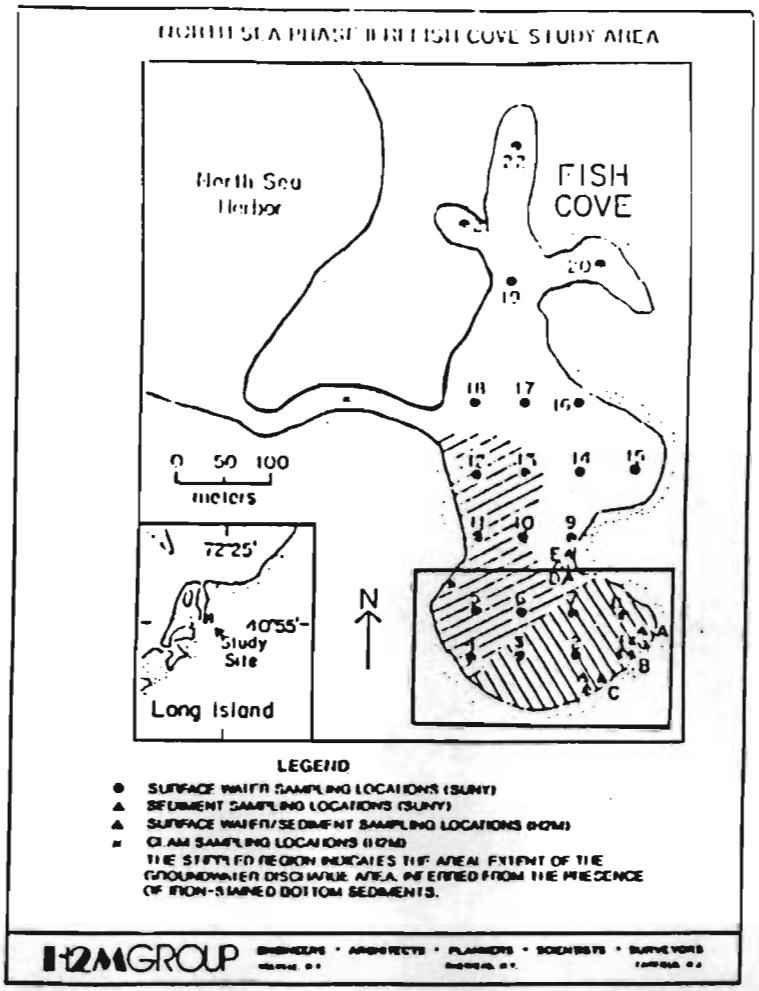
previously identified by H2M in the Draft Report (See Figure 1). A secondary objective included the evaluation of the population structure of the hard clam and other fauna and flora found within the "impacted area". The final objective included a feasibility assessment for the development of a commercial fishery for shellfish in Fish Cove as consistent with the Town's efforts to open Fish Cove for shellfishing by reducing and/or eliminating stormwater runoff impacts to Fish Cove, pursuant to Management Plan and Proposal: Surface Water Quality Enhancement of Fish Cove and its Adjacent Waters (1990) and in accordance with Grant Application, Stormwater Abatement Measures at North Sea (December, 1991).

Materials and Methods

On January 8, 1992, a shellfish survey was conducted in the southeastern portion of Fish Cove previously identified as the "impacted zone" by H2M Group in the Draft Report. The survey commenced at approximately 8:00 am representing the beginning of the flood tide and continued until approximately 11:45 am at which time the tide was approximately midway between low and high. Winds were from the northwest averaging between 10 and 15 miles per hour during the survey.

A systematic shellfish sampling methodology was employed in assessing the presence and abundance of the hard clam, Mercenaria mercenaria (see Figure 1). Sampling methodology consisted of two

(A)



(B)

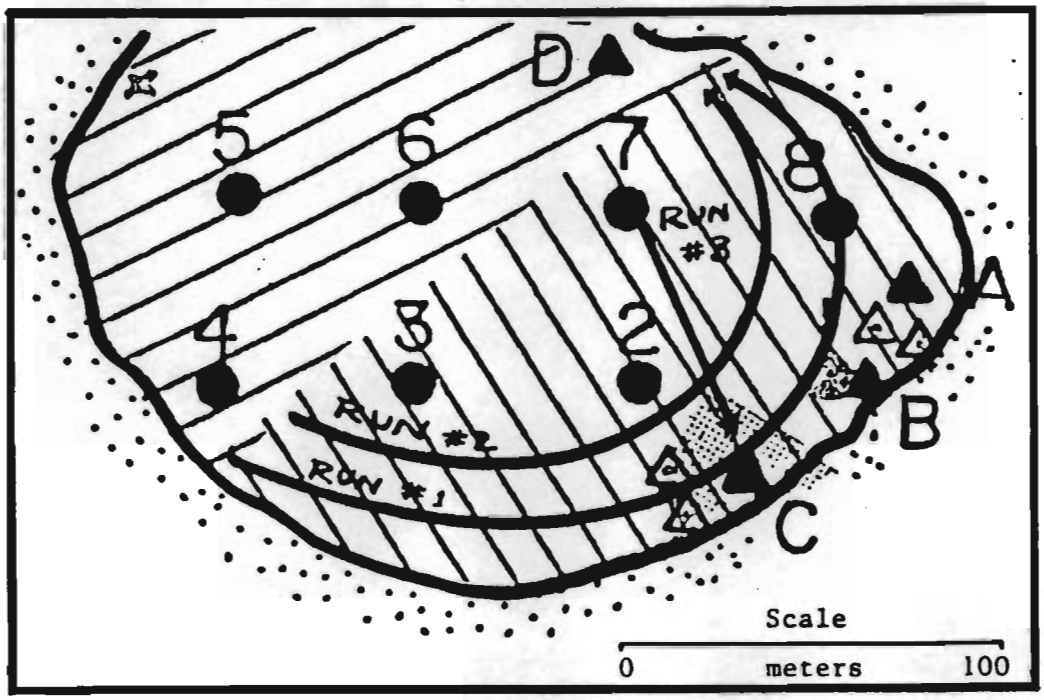


Figure 1. (A) North Sea Landfill Phase II RI Fish Cove Study Area as per H2M Group (January, 1990). (B) Enlargement of Impacted Zone as defined by H2M Group also showing sampling runs 1, 2, and 3. Note: Transitional Zone is delineated by ///////; Impacted Zone is delineated by \\\\\\\\.

runs parallel to the shoreline within the "impacted zone" (Run #1 and Run #2) and one additional run perpendicular to the shoreline beginning at sample Location 7 and extending towards Location C terminating approximately 75 feet from the shoreline (Run #3). Systematic sampling along predetermined transects or runs is a widely accepted sampling practice (Scheaffer et. al., 1979). Additionally, shovel probes were conducted in the submergent flats at the beginning of Run #1.

Sampling was conducted using a commercial clamming rake and a clamming tong. The commercial clam rake used was of the mud rake variety having teeth spaced at 15/16 inches and having basket wiring spaced at 1 inch. The clamming rake was equipped with interchangable aluminum shafts of 8 feet each. This allowed for the sampling of deep water encountered in all sampling runs and the determination of sampling depths associated with the various portions of each run. A clamming tong, featuring wire baskets (on both sides) and having one inch spacing, was likewise employed. While the clamming tong enabled greater amounts of sediment to be captured with each grab, it was used sparingly (ie. only on a couple of grabs) as the clam rake was a more effective sampling device for hard clams.

The sampling vessel had to be continuously re-positioned during sampling Runs 1 and 2 due to persistent winds from the northwest, which tended to push the sampling vessel towards the shoreline. However, the winds were used to advantage in the sampling of Run #3 thus providing for a continuous sampling

effort. Sampling of bottom lands was carried out every 50 to 100 feet during Runs 1 and 2. The bottom was raked in a perpendicular motion relative to the shoreline. Sampling depths were found to range from 4 to 10 feet throughout Run #1, 10 to 15 feet throughout Run #2, and 8 to 23 feet during Run #3.

All three runs were timed so that analysis of catch per unit effort ("CPUE") could be determined. Shell length measurements using metric calipers, were conducted for all hard clams collected during this study. Size distributions were determined based upon these measurements. In addition, age determinations were made based upon measured shell lengths in comparison to documented growth rates for hard clams in Long Island (Green, 1978).

Incidental catches were noted and preserved in formalin where appropriate.

Salinity measurements were taken during sampling Run 3 in a topographic hole approximately 100 feet north of Sampling Location C. Taken at 11:30 am from the surface and at a depth of approximately 23 feet, salinity was measured in the lower and upper water column using a refractometer.

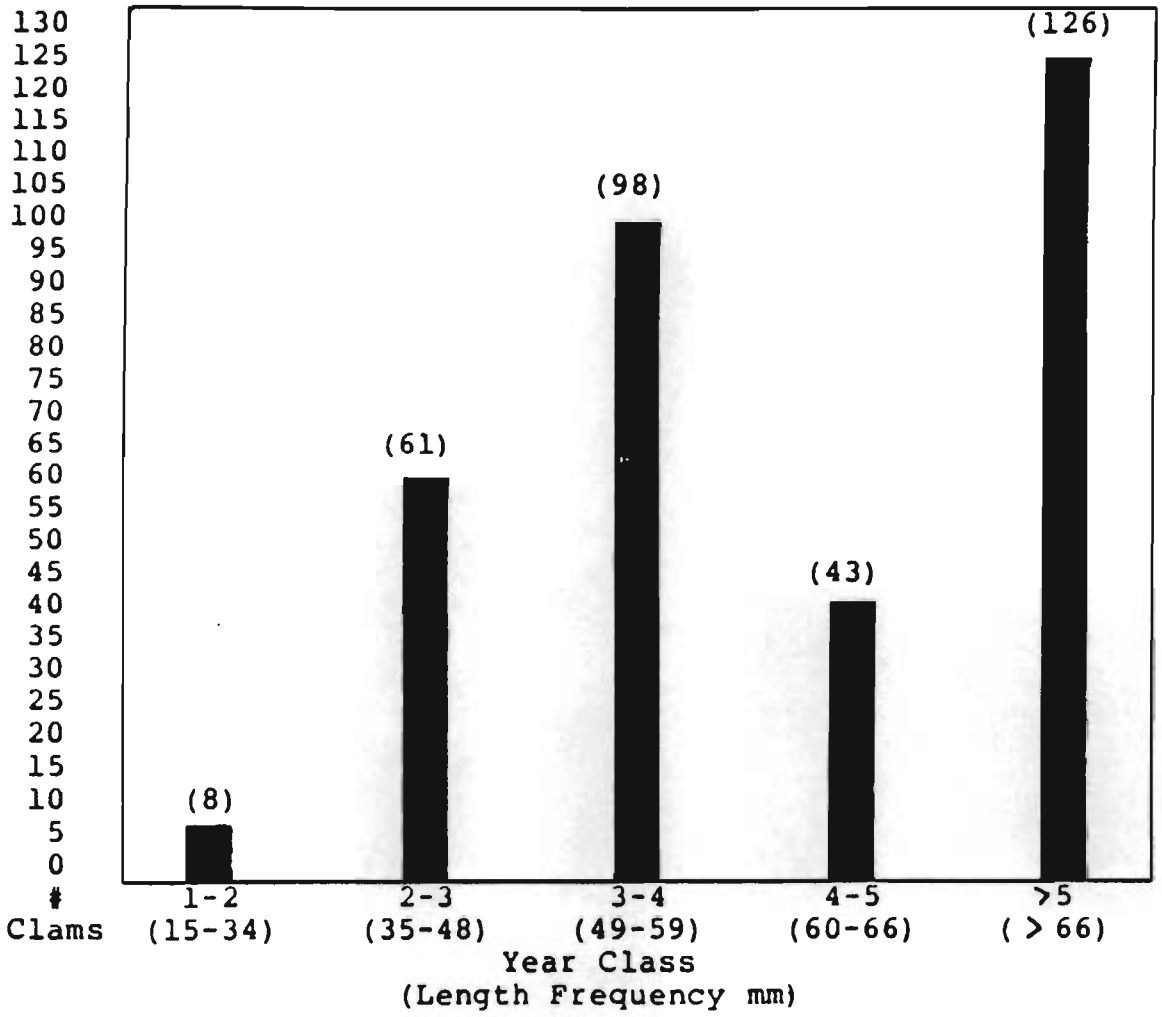
Results

A total of 336 hard clams were harvested in 2 hours and 3 minutes from the impacted zone within Fish Cove. The calculated catch per unit effort (CPUE) from the benthic survey was 164 hard clams per hour effort. Table 1 and Figure 2 provide a summary of

Table 1. Data summary on the shellfish survey conducted within the impacted zone at Fish Cove showing (1) numbers of clams harvested; (2) average shell length and (3) range in shell length with respect to sampling runs.

Sampling Run	Quantity Hard Clams Collected	Average Shell Length (mm)	Range Shell Length (mm)
1	130	62.6	25 - 90
2	148	51.9	26 - 79
3	58	55.8	24 - 80

Figure 2. Length frequency histogram for shellfish harvested within the impacted zone at Fish Cove also showing age distribution as per known growth rates for hard clams in Long Island (Green, 1978).



the hard clam harvest including abundance, size and age of hard clams collected with respect to the various sampling runs.

The abundance of hard clams was greatest along the underwater lands where the most marked drop off occurs. The least productive areas for hard clams were found at Location C and the underwater hole situate south of Location 7 (See Figure 1). Sediments at Location C and were highly compacted and redish in color. The bottomlands associated with the observed underwater hole were characterized as mucky and containing large accumulations of oak leaves.

The flats adjacent to the shoreline within the impacted zone were found to be less productive for hard clams than some of the deeper areas, but more productive than the underwater hole and Location C. However, these same flats supported abundant quantities of the soft clam, Mya arenaria. Shovel probes within these areas produced both seed hard clams and seed soft clams. In addition, the bank mussel, Modiolis demissus, was found in abundance on all Spartina alterniflora stands along the shoreline of the impacted zone.

Harvesting by means of clam rake revealed significant stands of sea lettuce as well as other species of submergent aquatic plants. Incidental catches (aquatic fauna) within the impacted zone are as follows:

Northern hogsucker	Trinectes maculatus
Duck clam	Macoma balthica
Ribbed (bank) mussel	Modiolis demissus
Common Atlantic slipper	Crepidula fornicata

Mud snail	Nassarius obsoletus
Channel whelk	Busycon canaliculatum
Blue crab	Calinectes sapidus
Horseshoe crab	Limulus polyphemus
Skate (egg capsules)	Roja spp.
Killifish	Fundulus spp.
Bamboo worm	Clymenella spp.
Sand worm	Nereis verens
Hard clam	Mercenaria mercenaria notata
Loosanoff's haliclona	Halichondria bowerbanki
Toad fish	Opsanus tau

The salinity investigations taken during Run #3 in the previously described hole revealed salinity in both surface and bottom samples to be 26 parts per thousand.

Discussion

Hard clams in the impacted zone at Fish Cove are found in commercial quantities. The catch per unit effort (CPUE) pooled for all three runs support this conclusion. Yet at the same time, the pooled CPUE grossly underestimates the commercial viability of the hard clam resource in this locale primarily because of the sampling methodology employed. Typically, baymen will work bottomlands for shellfish in a continuous manner by aligning their boats along the shoreline such that the winds will push the boat parallel to the shoreline. In doing so, the constant re-positioning of the vessel becomes unnecessary. However, in our shellfish survey of the impacted area at Fish Cove, the vessel had to be constantly re-positioned for sampling Runs 1 and 2 due to wind conditions experienced on that day. The constant re-positioning of the boat resulted in significant "down time" as

sampling was briefly terminated each time the boat was re-positioned.

Additionally, baymen will typically rake in a direction parallel to the shoreline for maximum fishing success. In sampling Runs 1 and 2, bottomlands were raked in a perpendicular direction relative to the shoreline due to persistent northwest winds occurring at that time. However, sampling Run 3 provided for continuous harvesting of hard clams resulting in a CPUE of 696 clams per hour or roughly 5 times greater than Runs 1 and 2 (pooled). It is clear that Fish Cove may be among the most productive shellfishing areas in the Town of Southampton.

The length frequencies and corresponding age frequencies of hard clams collected in the impacted zone at Fish Cove suggest that significant recruitment of the hard clam stock in this locale is occurring. While the distributions reported show variations in numbers of clams collected relative to size and age, such variations are best explained by varying success rates of hard clam annual spawns which occur naturally. Additionally, variations may be related to the size of the database used herein. Nevertheless, the observed recruitment of this resource suggests clam populations to be self-sustaining. Further, the distribution of clams encountered during this study suggests the "impacted zone" to be of good ecological health.

The relative lack of one to two year clams collected in our sampling efforts is best attributed to the selectivity of the

commercial clam rake employed. That is, the sampling rake having teeth and basket wire spaced at 15/16 inch and 1 inch, respectively, would not ordinarily capture clams with shell height less than one inch. In fact, shellfish collected and reported in the one to two year class were only caught as a result of mud which at times adhered to shell surfaces -- making them thicker -- and thus enabling them to be retained in the wire basket of the clamming rake. The fact that seed clams of both hard and soft clams were caught in the shovel probes along the shoreline within the impacted zone documents that a set of these clams occurred in the summer of 1991.

The most productive habitats for hard clams within the impacted zone were found along the banks where bottomlands drop off. The abundance of hard clams in this locale is natural and expected. Areas where steep drop offs occur are preferred habitats for clam setting and survival, because such sediments; (1) typically contain a mixture of sand and mud; (2) are sufficiently loose, enabling clams to rapidly penetrate these bottomlands thereby reducing predation; and (3) are not too silty or mucky which otherwise tend to clog the feeding gills of the hard clam.

The least productive habitats for shellfish within the impacted zone at Fish Cove are found at Location C and midway between Locations C and 7 where a deep hole of approximately 23 feet is found. Location C is an area stained red apparently by the continued accumulation of iron sediments and debris. The

epicenter of this stained area at Location C is marked by the outflow of a street culvert located at Fish Cove Road. The street culvert was blocked and replaced with a formal catch basin and leaching pool in April of 1991, pursuant to the Town's Stormwater Abatement Project at Fish Cove. The area of the stained sediments appears to be diminishing since such drainage improvements were affected, thereby suggesting that the cause of the staining of Location C sediments to be related to stormwater runoff rather than groundwater upwelling.

Nevertheless, these sediments remain highly compacted, rendering the mud rake capture method to be less effective in the capture of hard clams than otherwise found in areas where sediments were less compacted. In addition, the highly compacted nature of these sediments would make the setting of both hard and soft clams unlikely, because (1) it would be difficult for both hard clams and soft clams to penetrate these sediments; (2) predation of hard clams and soft clams on these sediments would be significant; and (3) some of the fine grained silts resulting from previous stormwater runoff impacts to this area would tend to clog feeding gills of both hard and soft clams.

Also, hard clams would not be expected to be abundant in the deep hole located between Locations 7 and C for several other reasons. First, the deep hole is characterized by an accumulation of silts, debris and most notably, oak leaves. The decomposition of these organic materials results in an accumulation of fine

sediments which would tend to clog the feeding gills of hard clams. Second, the accumulation of these organic materials would also result in increased biological and chemical oxygen demand contributing to the anoxic conditions that likely occur during the warmer months of the year. Third, if this portion of Fish Cove is found to stratify, then bottom waters of this area may become too fresh during the warmer months of the year to support hard clams. Whatever the cause of low hard clam abundance in this area, the presence of accumulated oak leaves suggests that previous and existing stormwater runoff impacts have been and are significant. These stormwater impacts are unrelated to the North Sea Landfill and its associated groundwater plume.

Soft clams along the shoreline in both submergent and emergent flats are likewise abundant. The shovel probes conducted in these areas revealed both adult and seed clams to be present in significant quantities. In addition, the exposed flats (during low tide) were marked by "puddling" depressions caused by waterfowl. Puddling is a behavioral practice carried out by waterfowl wherein the waterfowl will flap their wings rapidly displacing the surface sediments exposing soft clams which are captured and subsequently eaten.

The documented incidental catches within the impacted zone at Fish Cove (see page 8) suggest this area to be of good ecological health. Yet, the documented presence of other aquatic species found in the impacted area most likely under-estimates species diversity in this area because the sampling technique

employed is selective for hard clams only. Nevertheless, the presence of finfish, crustacea, analids, other pelecypods, and gastropods in this area would not be expected if impacts were as great as previously suggested. Most of these aquatic species are highly mobile and thus would tend to avoid areas that are environmentally impacted in preference to other less impacted or unimpacted areas. Moreover, the documented presence of skate egg capsules in the impacted zone suggests that the impacts, if any, in this area are insignificant as skates utilize this area as a spawning ground.

Conclusion

The findings of this benthic survey support the conclusion that whatever impacts are occurring to or in the southeast region of Fish Cove, they are not sufficiently large as to cause a corresponding mortality of the hard clam population. Further, the benthic survey did not reveal any impact to the diverse aquatic community that exists today within the southeast region of Fish Cove.

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Appendix K

APPENDIX K

SEVERE WEATHER PRECAUTIONS

SEVERE WEATHER PRECAUTIONS

Cold Weather Dangers

Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm, sweet drinks and soups will be provided for caloric intake and fluid. The intake of coffee should be limited because of its diuretic and circulatory effects.

Shielding the work area from the wind or wearing a windbreaker will reduce wind chill effect. A water-repellant outer garment with good ventilation should be worn. Older workers or workers with circulatory problems require special precautionary protection against cold injury. The use of extra insulating clothing and/or a deduction in the duration of the exposure period are among the special precautions which should be considered. If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work shall be modified or suspended until adequate clothing is made available or until weather conditions improve.

Hypothermia is defined as a decrease in a person's body core temperature to 95°F (35°C). A freezing or rapidly dropping temperature is not needed to produce hypothermia. A person's ability to maintain normal body temperature may be affected by medications/drugs, alcohol, wind, or by becoming wet. The use of prescribed drugs during site activities should be reviewed with the site safety officer. Alcoholic beverage and illegal drug intake are strictly forbidden during site-work activities.

Although protective clothing provides protection from many sources of external wetting, perspiration is often increased while working, causing the skin and clothing to become moist or wet. Wet clothes and skin can result in a rapid loss of body heat. In addition, the effects of wind can exacerbate this problem, creating a condition for extreme loss of body heat. Any exposed skin should be covered when the wind chill factor results in a relative temperature of -25°F or below, and wet clothes should be replaced at temperatures below 36°F.

With proper surveillance, hypothermia can be identified in its earliest stage, thus preventing a potential hazard to the worker. The single most important sign of hypothermia is a change in behavior, which is often subtle and best recognized by a co-worker. Other changes may include:

- a decrease in usual efficiency;
- forgetfulness and a decreased level of communication;
- decline in manual dexterity;
- poor motor skills or repetitive behavior;

- poor judgment; and
- lack of concern for physical needs.

Physical signs of hypothermia include a cold, pale skin appearance, shivering, and "goose flesh." Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F. This must be taken as a sign of danger to workers and exposure to cold should be immediately terminated.

Mild hypothermia is treated by rewarming the affected person by:

- moving to a protected area;
- removing wet or damp clothing;
- providing hot fluids; and
- wrapping the person in dry blankets.

More severe cases of hypothermia require prompt intervention by medical personnel in addition to the above activities.

Frostbite is a local cold injury which rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F (-6.7°C). Frostbite commonly occurs on the exposed portions of flesh (e.g., ears, nose, hands) and is recognized by a whitened area which, in mild cases, is slightly burning or painful.

Frostbite can be prevented by:

- covering exposed flesh with loose, dry clothing;
- avoiding skin contact with bare metal, gasoline, or other hydrocarbons;
- avoiding tobacco and drug use; and
- maintaining dry clothing.

Field personnel should frequently (i.e., every 15 minutes) inspect each other for signs of frostbite during very cold weather conditions.

Mild cases of frostbite, where the affected area is still painful, may be treated in the field by rewarming. More serious cases of frostbite should be treated at a medical facility since attempting to thaw the frozen area can cause severe damage. A victim of serious

frostbite should be protected from the environment and further heat loss prevented, but the skin should not be rubbed or thawed with warm water or dry heat.

Hot Weather Dangers

To keep internal body temperature within the safe limits, the body rids itself of excess heat. This automatic response results in blood circulating closer to the surface of the skin where excess heat is lost to a cooler environment. If the air temperature is as warm or warmer than the skin, the blood brought to the body's surface cannot lose heat. The evaporation of sweat becomes the principal effective means of cooling the body. Sweating does not cool the body unless the moisture is removed from the skin by evaporation. In high humidity, the evaporation of sweat is decreased, and the body's efforts to maintain an acceptable body temperature are impaired.

Heat stress is probably one of the most common and potentially serious illnesses which may occur at a hazardous waste site. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. The effects of heat stress can range from mild symptoms, such as fatigue, irritability, and decreased mobility, to severe symptoms, such as nausea, dizziness, and coma, and in extreme cases, even death. The body's responses to heat stress include the following:

- Heat Rash: A result of continuous exposure to heat and humidity, heat rash decreases the body's ability to tolerate heat.

- Heat Cramps: A result of profuse perspiration with inadequate fluid intake and chemical replacement, heat cramps are signalled by muscle spasms and pain in the abdomen and extremities.

- Heat Exhaustion: A result of increased stress on various organs. The signs of heat exhaustion include shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.

- Heat Stroke: The most severe form of heat stress, heat stroke must be relieved immediately to prevent severe injury or death. The signs of heat stroke are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma. The body must be cooled by soaking with water, fanning or other means, and medical attention sought immediately.

Preventative measures to avoid heat stress include regular work breaks during field activities, regular fluid replenishment, and the availability of shelter (e.g., shaded area, trailer, etc.). As a part of the site safety orientation, all personnel will be made aware of the symptoms of heat stress. Should one or more symptoms be detected, the affected worker will be assisted to seek shade, drink plenty of fluids, and seek medical attention, as required.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. The following measures are recommended to avoid the hazards of heat stress:

- Establish work-rest cycles (short and frequent breaks are more beneficial than infrequent breaks of long duration).
- Identify a cool, shaded area for breaks.
- Rotate personnel and alternate job functions to equally distribute the most labor-intensive work.
- Drink plenty of water. Over the course of an 8-hour work day, 50 ounces of fluids should be consumed at regular intervals, regardless of thirst.
- Eat lightly salted foods to replace lost salt.
- Save the most strenuous tasks for early morning or early evening (non-peak heat hours).
- Avoid caffeine during prolonged periods of heat as it causes dehydration.

If the ambient temperatures exceed 85°F, site personnel should monitor their heart rate as an indicator of heat stress. Count the radial pulse during the 30-second period as early as possible in the rest period. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, it is recommended that the next work cycle be shortened by one third while keeping the rest period the same. If the heart rate still exceeds 100 beats per minute at the next rest period, the following work cycle should be shortened by one third.

Appendix L

APPENDIX L

SEEDING SCHEDULE

SEEDING SCHEDULE

The following Seeding Schedule has been excerpted from the Landscaping Specification (Section 2K1) for the North Sea Landfill Cell No. 1 Cap.

1 GENERAL

The type of work required includes, but is not necessarily limited to, the following:

- Topsoil from off-site sources.
- Turf Work.
- Maintenance Work as specified until completion of the Contract.
- Soil Amendments.
- Fertilizers.
- Tall fescue and crown vetch.
- Recharge basin mix.
- Miscellaneous landscape materials.
- Guarantees.
- Temporary seeding.

Seeding will comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:

- ASTM C 602, Agricultural Liming Materials.
- ASTM D 2487, Classification of Soils for Engineering
- Association of Official Analytical Chemists, Official Methods fo Analysis.
- American Joint Committee on Horticultural Nomenclature, Standardized Plant Names.
- Official Seed Analysis of North America, Standards of Quality.
- FSO-F-241D, Fertilizer, Mixed, Commercial.
- FSO-P-166E, Peat Moss; Peat, Humus; and Peat, Reed-sedge.

2 PRODUCTS

2.1 MATERIALS

2.1.1 Commercial Fertilizers

- Complete fertilizer of neutral character, with a minimum of 75 percent nitrogen derived from natural organic sources of ureaform, 40-50 percent of the nitrogen shall be water soluble. Available phosphoric acid derived from superphosphate bone, or tankage. Potash derived from muriate of potash, containing 60 percent potash. Uniform in composition, freeflowing and suitable for application with approved equipment. Provide fertilizer with the following percentages of available plant nutrients:
  -For crownvetch areas provide 0-20-20 farm grade fertilizers.
  Superphosphate: Soluble mixture of treated minerals; 20 percent available phosphoric acid.

- Hydroseeding fertilizer for grass areas:
  - Commercial designation of 18-24-6. Provide a complete fertilizer of neutral character with a minimum of 75 percent nitrogen derived from natural organic sources.
  - Minimum 40-50 percent of nitrogen shall be water soluble.
  - Uniform in composition, free-flowing and suitable for application with approved equipment.
  - Product and Manufacturer: Provide Scotts Starter Fertilizer by Scotts and Sons Incorporated, equal.

2.1.2 Crownvetch and Tall Fescue Materials

- Crownvetch and Tall Fescue Seed Mixtures: Provide fresh, clear, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed fo the grass and crownvetch species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified in Section 2.1.D.4. Provide inoculant type Nod-o-gen (or equal) in quantities specified by manufacturer's requirements, use within stated expiration date, and keep cool until used. Do not use inoculant above 80 degrees F.
- The "Schedule of Grass Seed Requirements" is as follows: "Crownvetch and Tall Fescue" shall be placed as indicated on the Contract Drawings, and shall be seeded with 75 lbs/acre of seed conforming to the following mix (by weight):

Percent Mix	Latin Name	Common Name
33%	Coronilla Varia	Crownvetch
67%	Festuca arundinacea	Tall Fescue

"Recharge Basin Seed Mix" shall be placed as noted on the Contract Drawings and shall be seeded with 220 lbs/acre (5 lbs. per. 1000 square feet) conforming to the following mix (by weight):

Percent Mix	Latin Name	Common Name
60%	Festuca arundinacea "Clemfine"	Clemfine Tall Fescue
35%	Lolium perenne "Palmer"	Palmer Perennial Rye-grass
5%	Trifolium repens	White Clover

In addition to the seed mixtures listed above, on bushel/acre of Lolium perenne (English Rye grass) shall be placed over the entire area, including drainage ditches, to provide a quick shade cover and to prevent erosion during turf establishment. The landfill area and all drainage ditches shall be seeded within seven (7) days of final field grading.

- Quality of Seed*:

Common Name	Minimum** Seed Purity (%)	Minimum*** Germination (%)
Clemfine Tall Fescue	97	85
Palmer Perennial Rye-grass	98	85
White Clover	96	90
Crownvetch	95	68
Tall Fescue	97	85
English Rye-grass	98	85

*Seed containing prohibited or restricted noxious weeds will not be accepted.
Prohibited weeds: Bindweek, Canada thistle, quackgrass, hedge bindweed, and horse nettle.
Restricted weeds: Wild garlic, bermudagrass, cheat, wild onion, corn cockle, Johnson grass, perennial sweet sudan grass, sorghum alum and other perennial sorghum hybrids.
**Seed should not contain in excess of 2.5% weed seed.
***Lower germination is allowed if seeding rates are raised to compensate.

2.1.3 Miscellaneous Materials:

- Hydromulch Adhesive:
  - provide adhesive in quantities recommended by manufacturer for slopes graded between 2:1 and 3:1, and incorporate into the hydroseed slurries.
  - provide the following:
    1) A non-ionic galatomannan polysaccharide that forms a colloidal dispersion. Once adhesive film is formed and has been allowed to dry or cure, its resistance to solubility increases. Adhesive film shall be biodegradable, so that it eventually is broken down by water and/or by microbial action.
    2) Color: off-white with orange specks dispersed throughout.
    3) Viscosity: 3000 CPS +/- 500 1 percent Sol. 25 degrees C 24 hours. Brookfield Viscometer 3 Spindle, 20 rpm.
    4) Ph: 6 to 7.
- Mulch
  - Anti-erosion mulch: Provide clean, seed-free salt hay or threshed straw or wheat, rye oats or barley, free from noxious weeds. materials which are low grade and unfit for farm use, such as "U.S. Sample Grade: are acceptable
  - Peat mulch: Provide peat moss in the natural, shredded or granulated form, of fine texture, with a pH of 4 to 6 and a water absorbing capacity of 1100 to 2000 percent.
  - Wood Cellulose Fiber Pulp:
    1) Provide specially prepared wood cellulose fiber, processed to contain no growth or germination inhibiting factors.
    2) Moisture content not to exceed 10 percent air dry weight, manufactured so that after addition and agitation in slurry tank the

fibers become uniformly suspended to form a homogeneous slurry that when hydraulically sprayed on cover impregnated uniformly with seed and which after application allows the absorption of moisture, either rainfall or mechanical watering, to percolate to the underlying soil.

3) Product and Manufacturer: Provide one of the following:
   a) Conwed Virgin Wood Fiber Mulch by Conwed Incorporated.
   b) Silva Fiber by Weyerhaeuser Company.
   c) Or equal.

- Water: Potable.

3 SEEDING AND PLANTING SCHEDULE

3.1 Seeding Time

Sow seed from April 1 to June 1 for the spring-summer planting and from August 15 to October 15 for fall planting.

3.2 Hydroseeding

- Prepare turfbed as described for turfbed under 3.2.A. above.
- Hydraulic seeding equipment shall arrive on the site empty and clean. Use hydraulic equipment with a power-driven built-in paddle agitation system with a minimum tank capacity of 1500 gallons.
- Proportions for seed slurries to be homogeneously mixed per instructions below:

-Crownvetch and Tall Fescue:

1) 100 gallons of water per 50 pounds of wood fiber pulp, as determined by the capacity of the equipment used.
2) 50 pounds of seed per acre.
3) (12)-50 pound bags of 0-20-20 farm grade fertilizer per acre (12 pounds per 1,000 square feet).
4) 30 bales of wood fiber pulp (approx. 1800 pounds) per acre.
5) Add hydromulch adhesive as described in 2.1.G.1.
6) Depending on installation conditions encountered, as specified, add a tackifier.

-Recharge Basin Mix:

1) 100 Gallons of water per 50 pounds of wood fiber pulp, as determined by capacity of equipment used.
2) 220 pounds of seed per acre.
3) (2)-44 pound bags of 18-24-6 starter fertilizer per acre.
4) 30 bales of wood fiber pulp (approx 1800 pounds per acre.
5) Add hydro mulch adhesive as described in 2.1.G.1.
6) Depending on installation conditions encountered, as specified, add a tackifier.

- Immediately before seeding, rework the turfbed areas until they provide a finely pulverized smooth seedbed, varying not more than 1/2 inch in

ten feet. All inequities and soft spots shall be corrected before seeding.

- With water filling the tank and equipment power at 1/3 to full throttle begin agitation; load fertilizer, seed and mulch in that order.
- When tank is half full, add hydromulch adhesive, pouring slowly into tank into the area of most agitation.
- Continue to fill with water until all components are loaded.
- Spray the slurry over the area covering a "marked turfbed area", using a properly chosen nozzle, to ensure correct rate of application. Start spraying with power and agitation on full, then throttle down to proper rate of application.
- Prevent damage or staining of construction or other planting adjacent to hydro seeded areas.
- Prevent foot or vehicular traffic, or the movement of equipment over the seeded areas. Reseed areas damaged as a result of such activity.
- Prevent the seeded areas from drying out. After seedlings appear in about 2-3 weeks reseed all bare spots larger than 18 inches in diameter. Areas to be reseeded shall be hand ranked to scarify the surface and seed shall be applied by cyclone spreader. Lightly rake the seed into the soil.

3.3 Dry Seeding:

- Sow seed using a spreader or seeding machine
- Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
- Sow not less than the quantity of seed specified.
- Cultivator-packer, or approved similar equipment may be used to cover seed and to firm the seedbed in one operation. In areas inaccessible to cultivator-packer:

  - Rake the seeded ground and roll in two directions with a water ballast roller, weighing not less than 100 pounds per linear foot.
  - Take care during raking that seed is not raked from one spot to another.

- Protect seeded areas against erosion by spreading a hay or straw mulch after completion of seeding operations. Spread mulch uniformly to form a continuous blanket not less than 1-1/2 inch loose measurement over seeded areas.
- Water areas seeded as necessary to promote plant growth.
- Apply commercial fertilizers within 10 days of seeding.

3.4 English Rye Grass application

- Rate of application: 160 pounds per acre.
- Method of Application: With the exception of number 7, follow dry seeding method as described in Section 3.3.B.
- Watering: Dampen down seeded areas at the end of the work day.

4 MAINTENANCE

- Begin maintenance immediately after planting.

- Maintain grass and crownvetch for not less than the period stated below, and longer as required to establish an acceptable stand, as determined by ENGINEER.
  - Grass and crownvetch, not less than one (1) growing season.
  - If seeded in fall and not given one full (1) growing season of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
- Maintain all landscaped areas by repairing all erosion and reseeding as necessary to establish a uniform stand of crownvetch or grass and continue until final acceptance.
- Instruct OWNER'S personnel in the proper maintenance of landscape work. Review of Operations and Maintenance Data sheet submitted and be sure all instructions are clearly understood by OWNER'S personnel.
- Potable water is not be available on site. CONTRACTOR shall be prepared to provide potable water and maintain temporary piping and hoses and watering equipment as required to convey water from water source and to keep landscape Work moist as required for proper growth. CONTRACTOR shall supply required irrigation materials, equipment and portable water.

Appendix M

APPENDIX M

STANDARD PROCEDURE FOR GROUNDWATER SAMPLING

STANDARD OPERATING PROCEDURE FOR GROUNDWATER SAMPLING

The following procedure is to be followed for all groundwater monitoring well sampling:

1. Unlock well cap and remove PVC cap.

2. Screen well head space for vapors using portable gas meters such as EXOTOX, OVAFID and/or microtip PID. The concentration of vapors will be recorded in the log book and sample information form as a percent of LEL and organic vapors concentrations will be recorded in ppm.

3. Measure the depth of water using a decontaminated water level indicator and calculate the volume of standing water in the well including the sandpack volume.

4. With a decontaminated Grundfos pump set at a flow rate of 2-3 gpm and dedicated 1/2-inch polyethylene tubing, remove three to five times the volume of standing water from the well until field parameters (pH, Eh, conductivity, temperature, dissolved oxygen and turbidity) stabilize, or until the well is dry, whichever occurs first. During purging of a water table well the pump is raised and lowered through the standing water column to assure removal of all the water from the well and sand pack. The purging technique for deep and intermediate wells: set pump at 2 feet below water table and remove minimum 3-5 well volumes and upon stabilization f the field parameters slowly raise the pump up through the top two feet to remove the stagnate water above the pump. Check purge water for the presence of floating or sinking non-aqueous materials; collect a sample, if present.

5. Remove the laboratory precleaned sample containers from the sample cooler, label with an indelible marker, fill our Sample Information Record and Chain of Custody Form.

6. Obtain a volatile organic sample by using a disposal VOA tipped bailer. Gently fill the sample container taking care not to spill water on the outside of the container or overfill the container. Replace the cover on the sample container. Samples for volatile organic analyses should have no air space in the sample vial prior to sealing. This is accomplished by filling the vial such that there is a meniscus on top. Carefully, slide the septum, teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping lightly. If bubbles appear, reopen the vial, remove the septum, recap and check for bubbles. Continue until vial is bubble-free.

7. Obtain a sample and analyze for field parameters (pH, Eh, conductivity, temperature, dissolved oxygen and turbidity).

8. Obtain a sample for inorganic parameters. First collect an unfiltered sample in a sample bottle, replace the cover on the sample container and label the sample. Next, pour an appropriate amount of the remaining sample from the bailer into a second sample container through a 0.45 micron filter to remove particulates from suspension. Replace the cover on the sample container and label the sample. The turbidity of both the filtered and unfiltered sample will be recorded at the time of collection.

9. Collect remaining samples (semivolatile, pesticide/PCB, herbicides, etc.). Gently pour the sample into the sample container taking care not to spill water on the outside of the container or overfill the container. Replace cover on the sample container.

10. Return sample containers to sample cooler.

11. Decontaminate any equipment that is to be re-used.

Appendix N

APPENDIX N

STANDARD PROCEDURE FOR METHANE GAS MONITORING

STANDARD OPERATING PROCEDURE FOR GAS MONITORING

The following procedure is to be followed for monitoring landfill gas wells:

1. Unlock well cap.

2. Place magnehelic pressure gauge on well probe, open probe and record pressure on a landfill gas monitoring form.

3. Close probe, remove pressure gauge.

4. Open probe and, using a combustible gas meter (methane), record lower explosive limit.

5. Close probe, repeat steps 2 through 4 on other probes in well cluster.

6. Close and lock well cap.

7. Weather conditions (i.e. temperature, ambient barometric pressure and direction - rising or falling) shall also be recorded on the monitoring forms for each well.

Appendix O

APPENDIX O

STANDARD PROCEDURE FOR SURFACE WATER SAMPLING

STANDARD OPERATING PROCEDURE FOR SURFACE WATER SAMPLING

The following procedure is to be followed for taking surface water samples:

1. Collect the sample from the surface water body by immersing a clean sample bottle. If a stream is being sampled, collect the sample upstream of the sampler with the opening of the sampling device oriented upstream but avoiding floating debris.

2. Directly fill the appropriate sample containers from the sampling device if one is needed.

3. Measure the following parameters, if possible, in the water body, not the sample:

   - PI meter reading
   - temperature
   - pH
   - specific conductance
   - elevation of significant surface water bodies
   - any other site-specific field measurements required

   If direct measurement is not possible, measure these parameters from water remaining in the sampling device or another sample bottle. This information will be recorded on the sample data record, sample labels will be completed and COC procedures will be initiated.

4. Complete the sample data record on following page.

Appendix P

APPENDIX P

CORRECTIVE MEASURE IMPLEMENTATION
(6 NYCRR 360-2.20(c))

SURFACE WATER AND SEDIMENT FIELD SAMPLE DATA RECORD

Project: ______________________ Site: ______________________
Project Number: ______________________ Date: ______________________
Sample Location ID: ______________________
Time: Start: __________ End: __________ Signature of Sampler: ______________________

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
[ ] STREAM [ ] RIVER
[ ] POND/LAKE [ ] SEEP

DECONTAMINATION FLUIDS USED:
✓ ALL USED
[ ] ETHYL ALCOHOL
[ ] 25% METHANOL/ 75% ASTM TYPE II WATER
[ ] DEIONIZED WATER
[ ] LIQUINOX SOLUTION
[ ] HEXANE
[ ] HNO_3 SOLUTION
[ ] POTABLE WATER
[ ] NONE

WATER DEPTH AND SAMPLE LOCATION __________ (ft)

DEPTH OF SAMPLE FROM TOP OF WATER __________ (ft)

EQUIPMENT USED FOR COLLECTION:
[ ] NONE, GRAB INTO BOTTLE
[ ] BOMB SAMPLER
[ ] PUMP __________

VELOCITY MEASUREMENTS OBTAINED? [ ] YES, SEE FLOW MEASUREMENT DATA RECORD __________

TEMPERATURE __________ Deg. C. SPEC. COND. __________ µmhos/cm pH __________ Units DISS. O_2 __________ ppm

FIELD GC DATA: [ ] FIELD DUPLICATE COLLECTED
DUPLICATE ID __________

SAMPLE LOCATION SKETCH:
[ ] YES
[ ] NO

METHOD USED:
[ ] WINKLER
[ ] PROBE

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE __________ (ft)

EQUIPMENT USED FOR COLLECTION:
[ ] GRAVITY CORER
[ ] S.S. SPLIT SPOON
[ ] DREDGE
[ ] HAND SPOON
[ ] ALUMINUM PANS
[ ] SS BUCKET
[ ] __________

DECONTAMINATION FLUIDS USED:
✓ ALL USED
[ ] ETHYL ALCOHOL
[ ] 25% METHANOL/ 75% ASTM TYPE II WATER
[ ] DEIONIZED WATER
[ ] LIQUINOX SOLUTION
[ ] HEXANE
[ ] HNO_3 SOLUTION
[ ] POTABLE WATER
[ ] NONE

TYPE OF SAMPLE COLLECTED:
[ ] DISCRETE
[ ] COMPOSITE

SEDIMENT TYPE:
[ ] CLAY
[ ] SAND
[ ] ORGANIC
[ ] GRAVEL

SAMPLE OBSERVATIONS:
[ ] ODOR __________
[ ] COLOR __________
[ ] __________

FIELD GC DATA: [ ] FIELD DUPLICATE COLLECTED
DUPLICATE ID __________

SAMPLES COLLECTED

✓ IF REQUIRED AT THIS LOCATION	MATRIX: SURFACE WATER	MATRIX: SEDIMENT	✓ IF PRESERVED WITH ACID-BASE	VOLUME REQUIRED	✓ IF SAMPLE COLLECTED	SAMPLE BOTTLE IDS
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____
[ ]	[ ]	[ ]	[ ]	______	[ ]	____/____/____/____

NOTES/SKETCH

(c) Corrective measure implementation.

(1) Once the corrective measure work plan is approved by the department the facility owner or operator must:

(i) establish and implement a corrective measure groundwater monitoring program, approved in advance by the department, that:

(a) meets the requirements of subparagraph 360-2.11(c)(5)(iii) of this Subpart and any additional condition imposed by the department as part of a permit, administrative order, or court order;

(b) indicates the effectiveness of the corrective measure;

(c) complies with the groundwater protection standard specified in this section; and

(ii) implement the corrective measure selected under subdivision (b) of this section in accordance with the terms, conditions and schedule set forth in an approved corrective measures work plan; and

(iii) take any interim measures necessary to protect public health, safety, the environment and to ensure the protection of natural resources.

(2) The department may determine that compliance with paragraph 360-2.20(b)(2) of this Subpart is not being achieved through the selected corrective measure. In these cases, the department may require the facility owner or operator to implement other methods or techniques that could practically achieve compliance with paragraph 360-2.20(b)(2) of this Subpart, unless the department makes a determination under paragraph (3) of this subdivision.

(3) If the facility owner or operator determines that they cannot practically achieve the requirements of paragraph 360-2.20(b)(2) of this Subpart with any currently available methods, then the owner or operator must:

(i) submit a justification for the department's approval, which indicates that the requirements under paragraph 360-2.20(b)(2) of this Subpart cannot be practically achieved with any currently available methods;

(ii) implement alternate measures acceptable to the department, to control exposure to humans, wildlife, the environment or other receptors to residual contamination;

(iii) implement any technically practical measures acceptable to the department, for control of the sources of contamination, or for removal or decontamination of equipment, units, devices, or structures that are consistent with the overall objective of the corrective measure; and

(iv) notify the department that the report justifying the alternative measures has been placed in the operating record. The department must be notified within 14 days prior to implementing the alternative measures.

(4) All solid wastes that are managed according to a corrective measure required under this section must be managed in a manner that:

(i) protects public health, safety or welfare, the environment or natural resources; and

(ii) complies with applicable State and federal requirements and this Part.

(iii) All actions required to complete the corrective measure have been satisfied.

(6) The facility owner or operator must notify the department within 14 days that the corrective measure has been completed according to the requirements of paragraph (5) of this subdivision. The certification must be signed by the facility owner or operator and be approved by the department.

(7) When, upon completion of the certification, the department determines that the corrective measure has been completed in accordance with the requirements under paragraph (5) of this subdivision, then the facility owner or operator shall be released from the requirements for financial assurance for corrective measure under section 360-2.19 of this Subpart.

(5) Corrective measures selected according to subdivision (b) of this section are considered complete when:

(i) The facility owner or operator complies, to the satisfaction of the department, with the groundwater protection standards specified in this section at all points within the plume of contamination that lie beyond the groundwater monitoring wells system established pursuant to subdivision 360-2.11(c) of this Subpart.

(ii) The facility owner or operator complies with the groundwater protection standards specified in this section.
This is demonstrated when concentrations of contaminants required to be measured have not exceeded the groundwater protection standard for three consecutive years using the procedures and performance standards in the environmental monitoring plan under clause 360-2.11(c)(4)(i)(d) of this Subpart. The department may specify an alternative length of time during which the facility owner or operator must demonstrate that concentrations of baseline and expanded parameters have not exceeded the groundwater protection standard(s) taking into consideration:

(*a*) extent and concentration of the release;

(*b*) behavior characteristics of the contaminants in the groundwater;

(*c*) accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and

(*d*) characteristics of the groundwater.

Appendix Q

APPENDIX Q

CONSTRUCTION RECORD DRAWINGS

INDEX OF RECORD DRAWINGS

Sheet No.	Title
1	Existing Site Plan
2	Final Grading and Drainage Plan
3	Gas Venting and Cap Location Plan
4	Cross Sections
5	Cap and Liner Details
6	Drainage Details Diversion and Perimeter Swales
7	Drainage Details Drainage Discharge Structure
8	Miscellaneous Details and Sections
9	Erosion Control and Chain Link Fence Details
1 of 2	Reconstruction of Gabion Downchutes Plans Sections and Details
2 of 2	Reconstruction of Gabion Downchutes Plans Sections and Details
1 of 1	Record Survey by Geomaps International
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3 of 5	Reinforced Soil Wall Profile