APPENDIX B

Town of Southold

Suffolk County, New York

Post-Closure Monitoring and Maintenance Manual

Southold Landfill

Town of Southold
Suffolk County, New York

DRAFT

August 2003

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POST-CLOSURE
MONITORING AND MAINTENANCE MANUAL

SOUTHOLD LANDFILL
TOWN OF SOUTHOLD, SUFFOLK COUNTY, NEW YORK

Prepared For

TOWN OF SOUTHOLD

By

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AUGUST 2003

SOUTHOLD LANDFILL

POST-CLOSURE
MONITORING AND MAINTENANCE MANUAL

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Section 1

1.0 INTRODUCTION

In accordance with Title 6 New York Codes, Rules and Regulations (6 NYCRR) Part 360, this Monitoring and Maintenance Manual has been prepared to provide 30-year post closure care and monitoring following the closure of the Southold Landfill, Cutchogue, New York.

1.1 Site Description and History

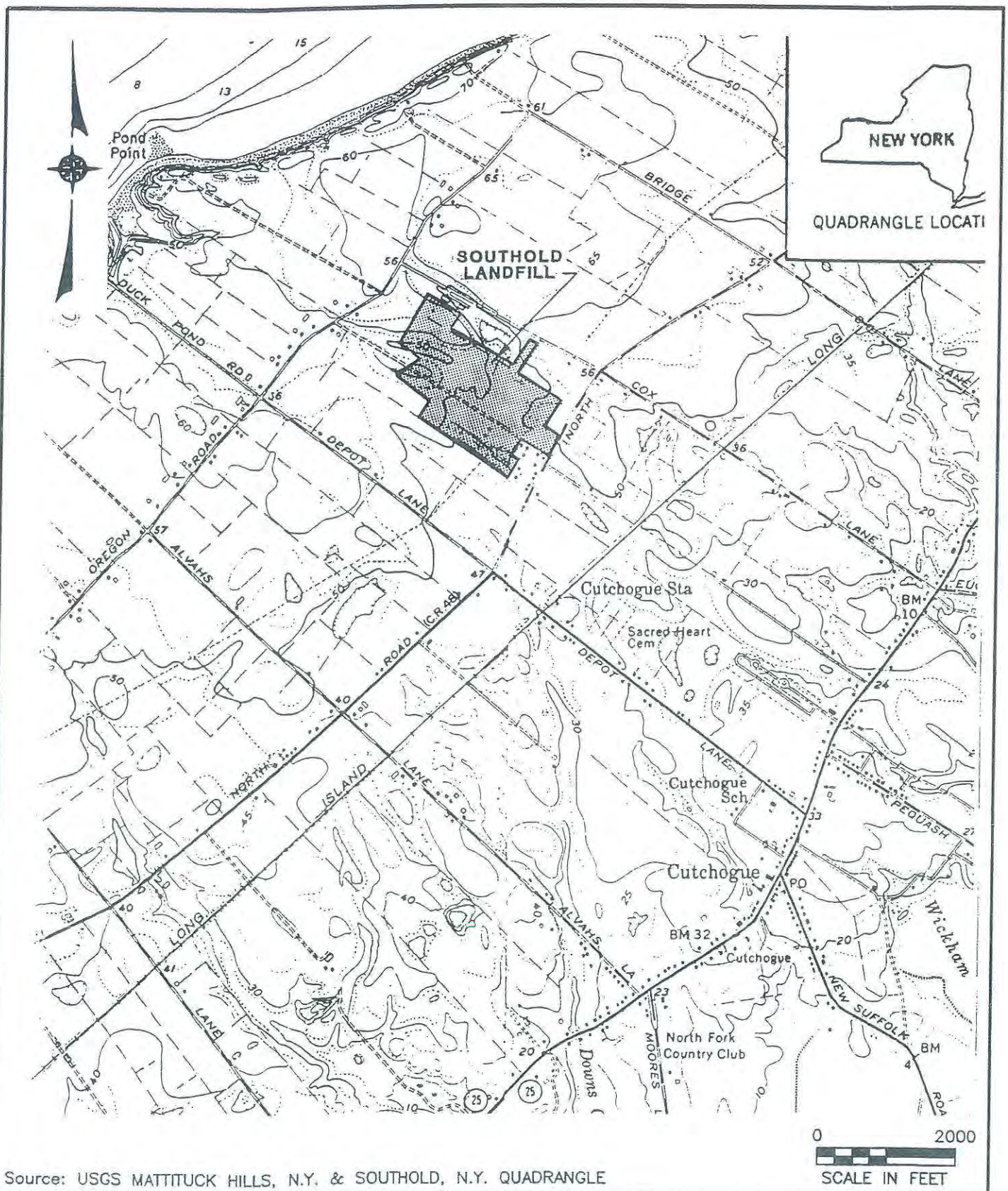
The Southold Landfill is an inactive municipal landfill located between Oregon Road and North Road (also known as Middle Road and County Road 48) to the north and south, respectively, and Cox Lane and Depot Lane to the east and west, respectively, Suffolk County, New York (see Figure 1-1). The landfill is situated in a rural, agricultural area of Cutchogue, approximately 2.5 miles east of Mattituck and 8 miles west of the Incorporated Village of Greenport.

The landfill property is approximately 62 acres, including the 17 acres north of the landfill which was formerly used for borrow operations and 11 acres south of the landfill currently used as a waste collection and recycling center and transfer facility. The area formally used for landfilling, including two former scavenger waste lagoons located in the western portion of the landfill, comprises 34 acres.

The Town of Southold initiated operations at the landfill site in 1920 for the disposal of municipal solid waste, refuse, debris and scavenger (septic system) waste, and operated the landfill continuously until 1993, when it was closed.

1.2 Landfill Closure Design

The current contour elevations and drainage characteristics of the closed Southold Landfill (see Figure 1-2) reflect the intent of the New York State Department of Environmental Conservation (NYSDEC) - approved Final Closure Plan design and the results of construction



Source: USGS MATTITUCK HILLS, N.Y. & SOUTHOLD, N.Y. QUADRANGLE

TOWN OF SOUTHOLD – SOUTHOLD LANDFILL
FINAL CLOSURE PLAN

SITE LOCATION MAP

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FIGURE 1–1

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activities for closure/capping of the landfill. For the purposes of the following discussion, and consistent with design of the subgrade grading plan, the landfill is divided into eastern and western sections, which are delineated by the main access road which runs in a north/south direction through the center of the landfill cap area.

The final cover for the Southold Landfill was designed to: (1) support vegetation; (2) protect the hydraulic barrier layer (i.e., the geomembrane) from physical damage; (3) restrict precipitation from infiltrating the landfill waste mass; and (4) provide collection and passive venting of the landfill gases. The installed capping system consists of the following, from the surface downward:

- Topsoil Layer: A 6-inch surface layer of uncompacted soil capable of supporting vegetation;
- Barrier Protection Layer: A 12-inch layer of clean fill;
- Geocomposite Drainage Layer: A fabricated composite consisting of a geosynthetic (polyethylene) drainage layer (geonet) core with a nonwoven geotextile (8 oz./sq. yd., polyethylene) permanently bonded to each side of the geosynthetic drainage layer, which was installed in all drainage swales and over areas with slopes of 20 percent or greater;
- Geomembrane Cap: A high-density textured 60-mil flexible polyethylene (HDPE) geosynthetic liner;
- Gas Venting Layer: A 12-inch layer of sand with a minimum coefficient of permeability of 1×10^{-3} cm/sec. Passive gas vents are placed within the sand to collect gas from this layer and vent the gases to the atmosphere; and
- Prepared Subgrade: The prepared subgrade surface serves as the graded and compacted surface upon which the veneered layers of the capping system are sequentially constructed. The prepared subgrade surface was achieved through a combination of activities which included: excavation of waste in areas of cut, relandfilling of excavated waste in areas of fill, and placement of contour grading material (general fill) to achieve the proposed subgrade contours. The subgrade was completed within a 6-inch layer of soil. Because the final subgrade layer and gas venting layer comprised the same material, no geotextile was used between these two layers.

The above-described capping system was constructed over the entire landfill waste mass.

1.3 Purpose and Scope

The purpose of the Southold Landfill Post-Closure Monitoring and Maintenance Manual is to define the procedures for personnel performing routine inspection, maintenance or repair work on the landfill following its closure. The Manual is based upon the site remaining in an as-built and fully passive state. Any change in use requires Town and NYSDEC approval and revision, update and/or modification of this Manual. This Manual has been prepared in accordance with 6 NYCRR Part 360 requirements effective November 24, 1999. The Manual is intended to ensure the following:

- Site is maintained effectively and efficiently;
- Site is monitored for the prescribed parameters;
- All parties are aware of the specific monitoring and maintenance needs of the site; and
- Provide a smooth transition of the site from the closure construction phase to the post-closure monitoring and maintenance phase.

The guidelines and procedures presented in this Manual are based on site-specific information, including:

- Site visits
- Southold Landfill General Construction Contract (Contract No. 2000)
- Southold Landfill Final Closure Plan
- As-built construction conditions

The Post-Closure Monitoring and Maintenance Manual includes the following information:

- Site Inspection Guidelines

- Maintenance and Repair Procedures
- Groundwater Monitoring Plan
- Landfill Gas Monitoring Plan
- Personnel and Equipment Requirements
- Contingency Plan
- Post-closure Cost Estimate
- Communication Procedures
- Record Keeping and Reporting

Section 2

2.0 SITE INSPECTION GUIDELINES

Following the closure of the Southold Landfill, the site will be monitored in accordance with 6 NYCRR Part 360-2.15 criteria. The monitoring process requires the inspection of the site at least four times a year by qualified, trained landfill personnel. In addition, inspections will also be performed after a specified rainfall event (5-year storm or greater as required by NYCRR Part 360). The results of these inspections will be recorded on the Post-Closure Site Inspection Checklist, a copy of which is provided in Appendix A. The location and extent of any damage discovered during an inspection will be noted on the 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 Manual. A copy of all the inspection reports will be maintained on file in the offices of the Town of Southold Solid Waste Coordinator located at the landfill site and included in the facility's annual report.

2.1 Cap Integrity

During closure construction, a minimum of 18 inches of soil cover was placed over the geomembrane. The cap must be inspected to assure its 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 storm water. The minimum final cover thickness must be maintained at 18 inches.

The Town will perform visual observation to determine if settlement has occurred. The following will be noted on inspection logs:

- Visible debris or litter (housekeeping);

- Visible waste (indication of damage to the cap);
- 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 soil cover was vegetated during the cap construction according to the seeding specifications approved through the submittal process. Inspections of the 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, erosion or vector damage. The apparent cause of any damage will be noted in the inspection report.

2.2 Storm Water Collection and Recharge System

The storm water collection system for the Southold Landfill closure construction consists of open drainage swales, subsurface piping and drainage structures (such as a stilling basin, catch basins, headwalls and manholes), which convey collected storm water runoff to the three on-site groundwater recharge basins (see Figure 1-2).

Each of these structures will be monitored for wear or damage and the results of these inspections will be reported in the inspection logs. Any necessary repairs will be performed in according to the guidelines provided in Section 3 of this Manual.

All of the storm water collection, conveyance, drainage and control structures will be visually inspected for obstructions, siltation, ponded water and erosion damage, such as washouts. The location of any obstruction or damage and its cause, if known, will be noted in the inspection logs. Drainage swales will also be inspected for loss of vegetation, collection of debris or damage to the erosion control fabric.

The drainage swales for Recharge Basin 2 consist of a section of reno mattresses and stone fill. The drainage swales for Recharge Basin 3 consist of a section of reno mattresses and stone fill followed by riprap aprons. The stilling basin, manholes and catch basin for Recharge Basins 1 and 3 are constructed of precast concrete. The headwalls and apron for Recharge Basins 1 and 3 are constructed of cast-in-place concrete followed by riprap and stone fill. These structures will be examined for damage or instability which could affect their performance. Erosion of soil beneath or around the structures or reno mattresses, or signs of slippage of the structures, will be noted on the inspection logs.

2.2.1 Diversion Swales and Gravity Storm Water Drains

Open drainage swales were constructed to convey storm water runoff from the landfill without damaging the integrity of the cap. The northern swales receive storm water runoff via diversion swales from the northern portion of the eastern and western halves of the landfill. Storm water from the northeastern and eastern portions of the landfill is discharged to Recharge Basin 3 and storm water from the northwestern portion of the landfill is discharged to Recharge Basin 2. The southern swales receiving storm water runoff discharge to a drain system which discharges to Recharge Basin 1. Recharge Basins 1 and 3 also receive storm water from gravity storm water drains along the southwestern and eastern edges of the landfill, respectively. The drainage swales, stilling basin, catch basins and manholes will be examined on a regular basis for signs of debris erosion and/or sediment buildup, and noted in the inspection logs.

On occasion, storm water control structures may become damaged and diminished in function by intense rainfall events or by alternating freeze-thaw cycles. Stone fill is particularly susceptible to movement by erosion and undermining. Care should be taken to inspect reno mattresses, as well as the diversion swales, after intense rainfall events. If erosion or undermining is observed, the Town should notify NYSDEC immediately and corrective action should be taken. Any obstructions found in and along the storm water collection route will be promptly removed.

Eroded vegetated areas will be promptly filled with imported soil fill, compacted and seeded. Eroded or undermined armored channels, such as areas with reno mattress, will have the

subgrade material repaired with material equivalent to the original construction and the mattress area repaired or replaced, also with material equivalent to that used in the original construction. Any sediment buildup will also be promptly removed with hand tools and will be spread over existing grassed sideslopes.

2.2.2 Recharge Basins

The groundwater recharge basins, located on the northeast, northwest and southwest corners of the landfill, receive storm water discharge from the landfill. Periodic removal of silt and other fines may be necessary to maintain the proper functioning of the three recharge basins. The recharge basins' sideslopes will be periodically inspected and monitored for signs of erosion and repairs will be made, if required.

2.3 Access and Maintenance Roads

The access and maintenance roads for the Southold Landfill consist of a main access road, an east maintenance road, a west maintenance road and a middle maintenance road. Portions of the west maintenance road and the main access road are paved, while the remaining roads are constructed of a recycled concrete aggregate having a minimum thickness of 6 inches (Figure 1-2). Visual inspections of the roads will be conducted for potholes, erosion gullies, loss of aggregate cover and obstructions. The results of these inspections will be noted on the inspection logs and repairs made, if required.

2.4 Landfill Gas Monitoring

A passive venting system was installed on the landfill 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.

Perimeter landfill gas migration control trenches are located in areas along portions of the northern, southern, western and eastern property boundaries. These trenches were constructed to control off-site migration of landfill gas. These trenches were constructed to a depth of 10 feet, lined with geotextile and filled with gravel. These trenches will likely not require any maintenance during the post-closure period.

Fifteen perimeter gas monitoring wells are located at approximately 200-foot intervals along the southern, western and eastern property boundaries. These wells are located at the property boundaries beyond the gas migration control trenches. Explosive gas monitoring at these wells will be performed regularly during the post-closure period. Explosive gas monitoring will also be performed in the scale house and at the six gas vents in the collection center. 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, and to determine if corrective action is necessary to mitigate 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.

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.

2.5 Groundwater Monitoring Wells

Twelve groundwater monitoring wells are installed at six locations at the landfill. Each location comprises two wells, one shallow (water table) and one deep (approximately 100 feet below the water table). Two wells are located upgradient of the landfill to determine background/ambient groundwater quality, and the remaining wells are downgradient to monitor landfills impacts on groundwater quality.

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 evaluated to determine whether the problem can be corrected. This determination will be facilitated by comparing data from previous monitoring activities to determine the cause of the problem. In particular, the following signs of damages or deterioration will be examined:

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

The inspection report will include details of any 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 will be decommissioned by appropriate methods (i.e., overdrilling, pulling of casing or grouting in place) and replaced by construction of a replacement groundwater monitoring well to re-establish the integrity of the sampling plan for groundwater monitoring.

2.6 Site Perimeter Fencing

Site perimeter fencing consists of 6 or 12-foot high chain link fence and temporary fencing on the eastern boundary of the landfill. The gates for the site are located on the east side of the landfill on Cox Lane and on the south side of the landfill on Middle Road.

The fencing will be visually inspected for any signs of vandalism or trespass including, but not limited to, damaged or cut fence fabric, bent fence posts, rails or gates, damaged locks or chains, etc., and repairs will be made, if required.

Section 3

3.0 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. This section describes the maintenance and repair procedures which will be followed during the post-closure inspection and monitoring period for the Southold 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, access and maintenance road repair, additional seeding, vector control and the removal of undesirable vegetation species are considered typical maintenance tasks and are discussed in this section.

3.1.1 Landfill Gas Control

In addition to the landfill gas monitoring program that will occur at the perimeter monitoring wells, maintenance of the gas vents will also occur. During the post-closure period, the vents will be inspected and maintained on a regular basis.

3.1.2 Drainage and Erosion Control

Surface drainage features to control and convey storm water runoff have been designed for the 100-year, 24-hour storm. The groundwater recharge basin system has also been designed for the 100-year, 24-hour storm. The drainage swales 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. Discharge areas will be inspected for foreign debris and sediment which may interfere with its proper functioning, and for areas of erosion which may

sediment which may interfere with its proper functioning, and for areas of erosion which may degrade the integrity of the cap. The recharge basins will be kept free of litter and foreign objects that would inhibit groundwater recharge and degrade the integrity of the sideslopes and basin floors. Vegetation species that would inhibit access for maintenance purposes will be removed. In addition, the accumulation of silt on the basin floors which interfere with recharge will be removed by periodic scraping of the basin bottom.

The gravity storm water drain piping, catch basins, stilling basin and manholes will be periodically inspected for debris, sedimentation and visual settlement of the catch basin, stilling basin and manhole structures. Debris and sediment in the piping, catch basins, stilling basin or manhole structures will be periodically cleaned. The cleaning will consist of rodding or flushing of the pipeline with appropriate sewer cleaning devices and hand or equipment excavation of the interiors of manholes and catch basins. If entry into any of the catch basins, stilling basin or manholes is required, continuous gas monitoring and ventilation of these structures with an explosion proof blower will be implemented, along with confined space entry procedures.

3.1.3 Vegetative Cover

The vegetative (grass) cover will be mowed at the discretion of the Town to control the growth of wild and deep-rooted species, and to minimize the potential for the introduction of vector habitats. 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 their presence poses a threat to the integrity of the final cover system. Herbicides and insecticides will not be used to control undesirable plant and/or animal species unless the nonchemical methods do not yield desired results. NYSDEC will be notified of the use of herbicides and insecticides prior to use. Areas of the cap with dead vegetation or lack of vegetation will be inspected by qualified personnel for possible causes of defoliation and devegetation. Bare areas of the cap will be seeded according to the seeding specification provided in the Landfill Closure Construction Contract Documents (Contract No. 2000).

3.1.4 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 reestablish the affected areas of the cap system. The areas of erosion or landfill subsidence which affect the performance of the cap system will be restored to original grade to prevent surface ponding and further collection of water on the cap membrane. Deterioration of the access and maintenance roads will be repaired by regrading where possible, by the placement of additional RCA or repaving, 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 Town will pursue additional efforts to further restrict access to the site.

3.1.5 Vector Control and Aesthetics

Vectors common to active landfill operations are not expected to be a problem at the closed landfill. However, suspected rodent or insect infestation will be addressed 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 nonroutine events are provided in Section 9 of this Manual.

3.1.6 Access

Access to, and onto the landfill will be continually maintained. Vehicular access will be limited to authorized personnel and will only be accomplished through the main site entrance off County Road 48 and exit onto County Road 48, Cox Lane or the Town's Compost Facility along the western boundary of the landfill. The access and maintenance roadways will be inspected for foreign objects and vegetative growth which could degrade their integrity and inhibit access.

3.1.7 Fencing

A six-foot high chain link security fence surrounds the majority of the perimeter of the site with 12-foot high chain link fence in the vicinity of the collection center/transfer station. Two 20-foot wide double leaf gates are located at the entrance from Middle Road and Cox's Lane. Periodic inspections will be made of the fences to determine if they have been damaged by vandals or the weather. Routine repairs will be made to damaged sections using the same type and quality materials as were used in the original fence installation.

3.2 Repairs

This section details the procedures which could be used to perform nonroutine repairs of the cap system and, as such, are considered to be outside of the scope of the normal maintenance procedures for the landfill. These activities may include, but not be limited to, repair of storm water structures, the geomembrane, gas vents, landfill gas monitoring wells, groundwater monitoring wells and the vegetative cover.

3.2.1 Storm Water Structures

Should settlement of the gravity storm water drain piping, manholes, catch basins or stilling basin be observed during routine maintenance and cleaning of the pipeline and structures, the Town will monitor the area where the settlement has occurred in order to determine the nature of the settlement and whether the geomembrane cap may have been damaged or disrupted.

3.2.2 Geomembrane

If the geomembrane cap has been damaged or disrupted, the Town will immediately notify the NYSDEC of the problem and propose a plan to repair the liner. This proposed plan will incorporate the requirements for repair of the cap membrane. Upon approval by the NYSDEC of the proposed repairs, the Town will proceed and implement the repairs as set forth in the proposal.

Once the geomembrane cap has been repaired, or if excavation reveals that the geomembrane cap has not been damaged, the Town will backfill the area of settlement with compacted backfill material. Proper construction procedures will be followed as set forth in the closure design drawings and specifications for the Southold Landfill.

3.2.3 Gas Venting System

Landfill gas vent damage will most likely occur during normal maintenance of the site, such as during mowing. If damage occurs to a gas vent, the vent will be replaced according to the approved closure construction documents. Breakage of landfill vents, which can damage the membrane beneath the cover soils or the watertight seal around the pipe penetration, will be examined. The cover soils will 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 18 inches. All repairs 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 of this Manual.

3.2.4 Landfill Gas Monitoring Wells

The repairs required for the landfill gas monitoring wells may involve installation of a new monitoring well. Repair of the well will be based on the extent of the damage observed and the corrective action will be discussed with and approved by the NYSDEC prior to their implementation.

Abandonment of the well will be performed in accordance with the closure construction documents and will include, but not be limited to, the following procedures:

- Removal of surface protective casing and concrete slabs, as appropriate;

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

3.2.5 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 corrective measures will be discussed with and approved by the NYSDEC prior to implementation.

Damaged monitoring wells that cannot be rehabilitated will be abandoned in accordance with the closure construction documents to prevent potential contaminant migration downward through/along the monitoring well.

The monitoring well abandonment procedures will follow NYSDEC protocols and comprise the following:

- Removal of surface protective casing and concrete slabs, as appropriate;
- 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, soil will be placed into the depression and repacked to grade level. If severe settlement occurs, the settled portion will be regrouted and backfilled with soil.

Section 4

4.0 GROUNDWATER MONITORING PLAN

The procedures described below will be followed during the sampling and analysis of samples associated with the groundwater monitoring plan. These procedures are expected to continue to be followed for all routine sampling and analysis of groundwater conducted at the landfill. Detailed sample collection and quality assurance control procedures and requirements are provided in Appendix B.

The groundwater monitoring well network consists of six existing and six new monitoring wells at the landfill (see Figure 1-2). Groundwater sampling will be conducted on a quarterly basis, with three of the quarters consisting of analysis for 6 NYCRR Part 360 Routine Parameters and one quarter consisting of analysis for Baseline Parameters. Quarterly sampling will be conducted for a minimum of 2 years. Once a baseline has been established, the results will be evaluated to determine if the frequency, number of wells and monitoring parameters can be modified/reduced. During each sampling event, each well will be purged a minimum of three well volumes prior to sample retrieval. 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 Town and the laboratory performing the quarterly sampling and analysis.

Field measurements will be obtained for temperature, conductivity and pH, and the static water level of each well will be determined prior to purging each groundwater monitoring well. The results of the groundwater sample results will be provided to NYSDEC.

Section 5

5.0 LANDFILL GAS MONITORING PLAN

The purpose of the landfill gas monitoring plan, which will be conducted on a quarterly basis for the first 3 years of the post-closure period and modified accordingly thereafter, is to detect the possible migration of methane gas across the boundaries of the site to neighboring properties before the gas becomes a hazard to the public safety. The procedure for methane gas monitoring and the Landfill Gas Monitoring Form are contained in Appendix C.

Each of the 15 landfill gas monitoring wells will be monitored for the percent of methane accumulated in the well's atmosphere. The locations of these monitoring wells are shown in Figure 1-2. In addition, explosive gas monitoring will be performed at the scale house and the six gas vents located in the collection center. The results of the monitoring will be submitted to the NYSDEC. Any indication of dangerous levels of methane in the wells will be 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, as described in Section 7, will be implemented. The Contingency Plan identifies the appropriate authorities to contact should excessive levels of methane be detected.

Section 6

6.0 PERSONNEL AND EQUIPMENT REQUIREMENTS

The post-closure monitoring of the Southold Landfill will be performed by the Town of Southold personnel or subcontractors retained for this purpose. Town personnel or subcontractors retained for this purpose will be responsible for the entire site's routine operation and maintenance. In the event that a component of the landfill becomes damaged, inoperative or requires repair, the procedures outlined in Section 3 of this Manual will be followed. The personnel and equipment requirements described below represent an estimate of the time that will be required to maintain and repair the landfill closure system. 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 7 and 9 of this Manual.

6.1 Staffing Plan

The personnel required to conduct quarterly inspections and perform routine maintenance and repairs will be furnished on a part-time basis. Periodic training will be provided to Town personnel to satisfy the requirements for the monitoring and maintenance activities at the landfill. Equipment needed for operations and maintenance activities will be provided by the Town on an as-needed basis during the post-closure period. For events occurring outside the scope of the routine maintenance and repair program, the guidance described in Sections 7 and 9 of this Manual will be followed. Sections 6.1.1 and 6.1.2 provide a summary of the required training for monitoring and maintenance personnel. Records will be routinely kept for Town personnel and are described in Section 10 of this Manual.

6.1.1 Staff Training

Selected Town personnel should be trained on specific duties at the site. These personnel should be given additional training in the recognition of, and response techniques to first aid, confined space entry and basic firefighting. These training programs will be updated annually and as newly developed procedures are implemented. The Town's personnel training will

include 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 Town will make arrangements for and acquire professional assistance, if required. Evaluations of alternatives and implementation of solutions will be directed by the Town.

6.1.2 Safety Plan

The Southold Landfill after closure is not expected to expose personnel to waste or hazardous substances, and routine monitoring and maintenance activities are expected to be conducted using general site safety equipment personal protective equipment under normal conditions. Health and safety procedures for the performance of routine operations and maintenance of the site are outlined in this section. A site specific health and safety plan for the closure of the landfill was prepared by the construction contractor to address the conditions associated with the construction of the landfill capping system and appurtenances. This plan is provided as a reference document and as a resource in the event that extensive or invasive activities or repairs become necessary in the future. The document may need to be updated to address the activities to be undertaken.

Personnel involved in the post closure monitoring and maintenance of the landfill should familiarize themselves with the health and safety program which was implemented during closure construction, but should recognize that it represents conditions with heavy construction, earthwork and activities directly involving the excavation and relandfilling waste.

Based on available information, it appears that the landfill contains the following potential chemical and physical hazards:

- Methane gas;
- Open drainage swales;
- Large diameter drainage piping, manholes, catch basins and stilling basin;

- Recharge basins;
- Severe weather; and
- Deer ticks.

The items listed above are not meant to be all inclusive, but are a minimum listing of hazards which should be taken into consideration during the post-closure monitoring and maintenance period, and which should be considered in the approach taken during post-closure activities. The Town should include other hazards as it determines appropriate. The landfill personnel must be made aware of these potential hazards, given special instructions as needed, and utilize issued safety equipment (as necessary), all in conformance with the Town's health and safety program, and in conformance with the Occupational Safety and Health Administration (OSHA) requirements.

Methane Gas

Methane, an odorless, colorless and tasteless gas, is an asphyxiant under high concentrations. There are no systemic effects, either at 5 percent concentration or for long-term exposure. Neither are there any 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.

Post-closure monitoring personnel must be aware of: 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 must avoid generating arcs, sparks or flames in areas where methane gas is detected at levels of 10 percent of the LEL or greater and are prohibited from smoking on site. An explosive gas/oxygen analyzer will be used to detect the presence of methane gas and determine its concentration.

Open Drainage Swales/Recharge Basins

There are drainage swales, approximately 2 to 3 feet deep, located throughout the landfill. Three recharge basins are located at the site. Consistent with typical industry practice, the swales and recharge basins are not fenced and, therefore, could be a potential physical hazard to personnel traveling across the site. Personnel performing inspection, maintenance or repair work at the landfill should be aware of this potential hazard and the necessary precautions needed to be taken to avoid it becoming a hazard.

Large Diameter Drainage Piping, Manholes, Catch Basins and Stilling Basin

Along the southwest and eastern portion of the landfill are drainage systems which includes a series of open drainage swales which discharge into a buried 24- to 36-inch diameter gravity storm water drain. There are several manholes, catch basins and a stilling basin as part of the buried gravity storm water drain systems which provide access to the pipe system. It is expected that all of these buried structures will require periodic inspection, cleaning and maintenance. Prior to entering any of these buried structures for any purpose, it is imperative that they be tested for the presence of gases, particularly methane. Confined space procedures should be implemented by personnel when entering and working in these areas.

Severe Weather

The Southold Landfill is open and 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 from the sun. These conditions 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 at the landfill will be advised of the severe weather hazards and necessary precautions as part of the safety orientation program.

Deer Ticks

Personnel working at the 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, that 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 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. Therefore, 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.

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.

6.2 Equipment

The equipment utilized for post-closure monitoring and maintenance of the Southold Landfill will consist of standard construction equipment from the Town's inventory or from that of

subcontractors retained by the Town for monitoring and maintenance purposes. In addition, the Town's standard maintenance equipment, such as mowers and trimmers, will be used at the discretion of the Town to maintain the site following its closure.

6.2.1 Minimum Requirements for Maintenance

The principal operations to be performed by the Town on a regular basis during the post-closure period will be maintenance of the vegetative cover and the repair of cover soil erosion. 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 on the size and depth of the area which has been eroded. This equipment may be available in the Town's inventory or will be rented or leased, or provided by subcontractors retained by the Town for monitoring and maintenance purposes. The equipment must 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 additional equipment for emergencies should available from the inventory of subcontractors retained by the Town. Because the Town will utilize necessary additional equipment from its subcontractors, resources will not be designated solely for landfill post-closure activities at the landfill.

6.2.2 Firefighting Equipment

Fire extinguishers will be carried on all equipment used on the site for maintenance or repair work. In addition, the local fire company will provide assistance and/or equipment, as needed, to control any fires which may occur at the site.

Section 7

7.0 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 scheduled maintenance and repair. Natural occurrences, such as storms, drought and landfill settlement, are considered "expected occurrences" and have been addressed in the previous sections of this Manual. 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 Manual.

The Contingency Plan which follows addresses new degradation of the groundwater quality, the migration of methane gas and the possibility of a fire on the landfill. The guidelines which follow will be used to determine when the Contingency Plan should be implemented and which corrective measures should be implemented. The appropriate regulatory agencies and public officials will be notified of any emergency which is governed by this plan.

7.1 Groundwater Contamination

Groundwater will be monitored quarterly during the first 2 years of post-closure period according to the provisions of Section 4 of this Manual. In the event that a statistically significant increase in the level of contamination emanating from the landfill via the groundwater pathway occurs, the Town will notify the NYSDEC. Based on this occurrence, the next round of sampling will include testing of the wells for the Part 360 Baseline Parameters. Should the elevated levels continue, or if new contaminants are discovered, a work plan may be developed that will investigate the nature, extent and cause of the contamination, including the possible installation of additional groundwater monitoring wells.

Upon development of the work plan and completion of the investigation involved, a report will be prepared describing the findings of the investigation and providing

recommendations for corrective measures, if necessary. At a minimum, any corrective measure will be accomplished in accordance with 6 NYCRR Part 360-2.20.

7.2 Landfill Gas Migration

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

Currently, a gas monitoring system exists along the southern, western and eastern boundaries of the landfill. The landfill gas monitoring wells are designed to detect the presence of methane migration. A description of the routine gas monitoring plan is provided in Section 5 of this Manual.

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 monitoring period, the NYSDEC will be notified and all steps necessary will be immediately undertaken to ensure safety and protection of human health. If deemed necessary, the following will be implemented.

- Within seven days of detection, the Town will submit to the NYSDEC 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, the Town will 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 will assess the nature and extent of the gas release problem and describe the proposed remedy.

7.3 Fire and Explosion

The Southold Landfill has been inactive since 1993. As a result, the likelihood of an underground fire in the waste is 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. Any damage to the landfill closure structures will be repaired according to the guidelines in Section 3 of this Manual after extinguishing the fire.

7.4 Emergency Response

Emergencies are events which fall outside of the reasonable range of occurrence and have not been included in the Contingency Plan. Such events may include, but not limited to, a catastrophic failure of one of the storm water control features or a catastrophic failure of the landfill cap.

7.4.1 Notification Procedure

For emergencies that present an immediate danger or threat to human health and welfare, the 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, the NYSDEC will be notified.

7.4.2 Telephone Numbers

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

Table 7-1

EMERGENCY RESPONSE TELEPHONE NUMBERS

Town of Southold Landfill Contact: Southold Solid Waste Management District Solid Waste Coordinator	(631) 734-7685
Southold Police Department	(631) 765-2600
Local Emergency Response Resources	911
Cutchogue Fire Department	911
Ambulance	911
Medical Services	911
Eastern Long Island Hospital 201 Manor Place Greenport, NY 11944	(631) 477-1000
NYSDEC Region I Division of Solid and Hazardous Materials	(631) 444-0375
NYSDEC Albany Division of Solid and Hazardous Materials	(518) 402-9706
Suffolk County Department of Health Services	(631) 853-3081

Section 8

8.0 POST-CLOSURE COST ESTIMATE

This section of the Manual provides an estimate of the costs expected to be incurred during the post-closure monitoring and maintenance of the Southold Landfill. This annual cost estimate is based on 2003 dollars and is presented on Table 8-1. The projected cost of the three basic components (inspection, monitoring and maintenance) is presented below. The total projected cost during the 30-year post-closure period, based on quarterly inspection and monitoring, and an escalation rate of 5 percent annually, is approximately $5,771,000. 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 which could require the installation of additional monitoring wells or additional testing of the existing wells;
- A change in groundwater quality which could require less testing;
- Migration of landfill gas beyond the perimeter of the landfill which could require the installation of additional monitoring wells or additional testing; and
- Increase in annual escalation rate, fees, special levies, changes in insurance rates or other unexpected administrative costs.

8.1 Inspection Costs

It is assumed that it will take one person to perform the inspection at an hourly rate of $50 per hour. Assuming that the inspection will be performed during a 4-hour period, this would amount to $200 per inspection. The landfill will be inspected four times per year, therefore, the annual estimated cost of performing the site inspections is estimated to be $800 per year.

Table 8-1

POST-CLOSURE COST ESTIMATE - ANNUAL SUMMARY

Inspection	$800
Routine Maintenance and Repair	18,880
Contingency Repair	4,240
Groundwater Monitoring	
Sample Collection	14,400
Laboratory Analysis	19,600
Gas Monitoring	8,800
Record Keeping and Report Preparation	16,000
Total	**$82,720**

8.2 Maintenance Costs

Routine maintenance of the landfill cap is anticipated to include three activities: 1) repair of erosion damage to the landfill cap, drainage swales, access road and maintenance roads; 2) mowing landfill vegetation; and 3) removal of silt and debris from the drainage structures, including the gravity storm water drainage systems and recharge basins. 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 two workers and appropriate equipment. Routine repairs are anticipated to involve one 8-hour day per specific component (e.g., drainage swales), and routine repair to the access and maintenance roads and landfill cover system is anticipated to take two days for each occurrence.

On average, it is expected that the erosion repair and maintenance of the swales, stilling basin, manholes, catch basins and drainage outlet structures will be performed twice per year. Mowing (at the discretion of the Town) will occur once per year. Routine erosion repair of the vegetative cover and to the roads will probably occur twice per year. The cost of these maintenance services, including general site maintenance, is anticipated to average approximately $16,760 annually (see Table 8-2). The cost of this maintenance work may be greater during the first 3 years of the post-closure period as the vegetative cover develops, but is expected to decrease to a lower value for the remainder of the 30-year post-closure period.

Other costs which may be incurred during the maintenance period include groundwater and landfill gas monitoring, monitoring well repair or replacement, gas vent repair or replacement, reconstruction of drainage structures, or repairs to the geomembrane or barrier protection cover. These costs are contingent upon need and, therefore, are unable to be estimated at this time. However, an amount equal to approximately 25 percent of the routine inspection and maintenance costs is estimated for contingencies. This amount for these non-routine (contingent) repairs is estimated to be approximately $4,240 per year. 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. Unspent contingency budget monies should be carried over, and accrued, from year to year.

Table 8-2

ROUTINE MAINTENANCE AND MONITORING SCHEDULE
ANNUAL POST-CLOSURE BUDGET

Activity	No. of Personnel	Labor Combined Rates $/hr	Labor Combined Rates $/day	Days/yr.	Total Labor $/yr.	Equipment $/day	Equipment $/yr.	Sample Analysis $/sample	No. of Samples yr.	Total Analysis $/yr.	Total $
Landscaping											
• Mowing (at the Town's discretion)	1	35	280	4	1,120	500	4,000	--	--	--	5,120
Storm Water Control Features											
• Swales	2	70	560	2	1,120	100	200	--	--	--	1,320
• Recharge Basins	2	70	560	2	1,120	100	200	--	--	--	1,320
• Stilling Basin	2	70	560	2	1,120	100	200	--	--	--	1,320
• Manholes	2	70	560	2	1,120	100	200	--	--	--	1,320
Environmental Monitoring											
• Groundwater Sampling and Analysis (first 2 years)	2	100	800	8	6,400	500	8,000	300 500	42 14	12,600 7,000	34,000
• Landfill Gas Monitoring	1	50	200	4	800	500	8,000	--	--	--	8,800
Contingency Repair	2	70	560	4	2,240	500	2,000	--	--	--	4,240
Access and Maintenance Roads	2	70	560	4	2,240	500	2,000	--	--	--	4,240
General Site Maintenance	2	70	560	4	2,240	500	2,000	--	--	--	4,240
Record Keeping and Report Preparation	1	100	800	20	16,000	--	--	--	--	--	16,000
Total					35,520		26,800			19,600	81,920

8.3 Monitoring Costs

8.3.1 Groundwater Monitoring

Twelve wells will be utilized to monitor groundwater during the post-closure period. It is anticipated that well sampling will be conducted by two field personnel, and that two (8-hour) days will be required for collection of a complete round of samples. With four rounds of monitoring required each year, a field labor budget of $6,400 is anticipated.

Groundwater sampling will be conducted on a quarterly basis, with three of the quarters consisting of analysis for Part 360 Routine Parameters and one quarter consisting of analysis for Baseline Parameters for the first 2 years of sampling. The annual budget for laboratory analyses of groundwater samples is estimated to be $19,600. An estimated cost of $8,000 per year will be required to cover costs for sampling equipment resulting in a total annual groundwater monitoring budget of $34,000 per annum.

8.3.2 Landfill Gas Monitoring

Gas monitoring will be conducted on a quarterly basis during post-closure period. This involves the effort of one individual for a 4-hour day for each monitoring event. This results in a labor and equipment expense of $9,600 on an annual basis.

Section 9

9.0 COMMUNICATION PROCEDURES

During the 30-year post-closure period at the Southold Landfill, routine inspections will be performed quarterly as described in Section 2 of this Manual. In addition to these scheduled inspections, non-routine inspections may be necessary as a result of extraordinary incidences which may occur at the landfill, such as fires, natural disasters or significant vandalism. Sections 2 and 3 of this Manual identify the procedures to be followed for routine site inspections and scheduled 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 Manual 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.

Table 7-1 lists the telephone numbers of the appropriate authorities to contact in case of emergencies.

9.1 Vandalism

Routine inspection of the soil cover will reveal if any unauthorized dumping or vandalism has occurred on site. Should this occur, inspection personnel will record evidence of such activity (e.g., vehicle tracks) or attempt to identify source of the illegally placed waste and those who caused the vandalism, and immediately notify the Town. One form of vandalism that may occur on this landfill during the post-closure period will be the result of off-road vehicles using the area. These vehicles tend to damage vegetation and create ruts, possibly exposing the geomembrane and damaging it.

When vandalism, trespassing or unauthorized dumping has occurred, the Town 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 Town determines that additional labor or materials are needed to protect the site, the Town will 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 Town Solid Waste Coordinator will coordinate and direct all emergency repairs.

9.2 Fires

All Town equipment, or equipment used by subcontractors retained by the Town, used for maintenance and/or repair work, will be equipped with fire extinguishers. However, should a fire occur which cannot be contained by on-site personnel or equipment, the local fire department will be contacted. In addition, the Town Solid Waste Coordinator will be notified immediately so that he/she can coordinate the other on-site activities.

After a fire, the Town 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 Manual. The Town will coordinate and direct all emergency repairs and notify the appropriate agencies of any adverse conditions at the site.

9.3 Natural Disasters

Some natural disasters that might occur at the site may include, but not be limited to, hurricanes, heavy rains, ice storms, lightning 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, Town personnel (or personnel of subcontractors retained by the Town) will follow emergency procedures to ensure protection and prevent personal injury during the event, and will notify the Town 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 includes erosion of the cover system and clogging of storm water conveyance structures. Lightning 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 landfill has sustained significant damage, an emergency site inspection will be undertaken to determine the extent of such damage. When the Town determines that conditions are safe to inspect the site, it will dispatch a team of qualified personnel to inspect the site as described in Section 2 of this Manual. The Town will coordinate and direct all emergency repairs and notify the appropriate agencies of adverse conditions at the site.

9.4 Vectors

During 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 Town will be notified of these conditions. The Town will contact an appropriate extermination service to eliminate rodents or insects, as needed.

9.5 Methane

The site will be monitored quarterly for methane at 15 locations to determine the percent of methane accumulated within the landfill gas monitoring well's atmosphere. Methane gas monitoring will also be performed in the scale house and six vents in the collection center. 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 as described in Section 7 of this Manual.

9.6 Dust

Prolonged dry periods are not expected to present the same problems at the closed/capped 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, the use of areas that are not vegetated (e.g., access roads) will be minimized.

9.7 Storm Water Control System

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

Drainage swales of the storm water conveyance system will be inspected for excessive build-up of silt; the gravity drain, manholes, catch basins and stilling basin will be cleared of silt and other debris; and the recharge basins will be scraped to remove silt and other fine particles that would prevent or impede groundwater recharge.

9.8 Excessive Landfill Settlement

The landfill will periodically be visually inspected for cap integrity and differential settlement to determine if a change has occurred which could indicate potential malfunction of one of the landfill closure 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 Town will notify the NYSDEC. Upon a physical examination of the site by the Town and the NYSDEC, a work plan will be prepared to repair any damage that may have been caused to the landfill cover system.

9.9 Groundwater Contamination

Should there be a statistically significant increase in the level of contamination emanating from the site via the groundwater pathway, the NYSDEC will be notified and the Town or its subcontractor will monitor the Part 360 Baseline Parameters during the next round of sampling. Should the elevated levels continue, or if new contaminants are discovered, the Town will prepare a work plan to investigate the nature, extent and cause of the contamination. The work

plan will be submitted to the NYSDEC for approval. Following implementation of this work plan, the results will be evaluated and recommendations for corrective measures will be made to the NYSDEC.

Section 10

10.0 RECORD KEEPING AND REPORTING

10.1 Record Keeping

The Town will maintain records of inspections, maintenance (routine and non-routine), and monitoring of the landfill. Table 10-1 presents a schedule summary of the overall inspection, record keeping and maintenance schedules for operations and monitoring 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 10.2. The remaining information will be available in the files maintained at the Town offices. Records also will be maintained regarding the results of the environmental monitoring plan as presented in Sections 4 and 5 of this Manual.

10.2 Reporting

The Town will prepare and submit quarterly reports to NYSDEC on groundwater and landfill gas monitoring, and an annual report to summarize the operation, maintenance and monitoring of the landfill as described below.

10.2.1 Groundwater Quality Reports

Groundwater Quality Monitoring Reports will be prepared and submitted to the NYSDEC Region 1 office quarterly. Summary groundwater quality data will be included as a component of the Annual Monitoring Report. These reports will contain the following information:

- Results of groundwater sampling events; and
- An analytical review of the data to determine exceedances of applicable water quality criteria, as well as discernable trends in data.

Table 10-1

INSPECTION, RECORD KEEPING AND MAINTENANCE SCHEDULES

Item	Activity Frequency
Inspect landfill area for litter dumping and integrity of perimeter fencing	Weekly
Equipment maintenance and repairs	As Required
Clean landfill access and maintenance roads	As Necessary
Maintain access and maintenance roads	As Necessary
Clean storm water conveyance systems and recharge basins to maintain design capacity	As Necessary
Mow vegetation	As Determined by the Town
Maintain and resurvey vertical and horizontal control monuments	As Necessary
Perform topographic survey of landfill	As Necessary
Update Emergency Contingency Plan	As Necessary

Note:

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

10.2.2 Landfill Gas Reports

Landfill Gas Monitoring Reports will be prepared and submitted to the NYSDEC quarterly and as a component of the Annual Monitoring Report, and will contain the following:

- A compilation of the methane monitoring results;
- 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.

10.2.3 Annual Monitoring and Maintenance Report

An annual report for the Southold Landfill 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;
- A summary of all non-routine inspections;
- A compilation and summary of all emergency activities;
- A compilation and summary of all groundwater quality data collected during the year;
- A compilation and summary of all landfill gas data collected during the year;
- A summary of all routine and contingent expenses incurred throughout the year; and
- Any changes from the approved reports, plans and specifications will be listed, with justification provided for each change.

Appendix A

APPENDIX A

POST-CLOSURE SITE INSPECTION CHECKLIST

SOUTHOLD LANDFILL

POST-CLOSURE SITE INSPECTION CHECKLIST

DATE: _____

INSPECTED BY: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
1) Vegetative Cover:						
a) Landfill Site:						
bare spots						
dead areas						
undesirable growth						
trees						
debris						
b) Drainage Structures:						
bare spots						
dead areas						
undesirable growth						
loose ties						
slippage of reno mattresses, riprap and stone						
2) Groundwater Monitoring Wells:						
damage/vandalism						
settlement						
vector infestation						
3) Gas Monitoring Wells:						
damage/vandalism						
settlement						
vector infestation						

ADDITIONAL COMMENTS:

_____

_____

_____

_____

SOUTHOLD LANDFILL

POST-CLOSURE SITE INSPECTION CHECKLIST

DATE: _____

INSPECTED BY: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
4) Soil Cover:						
erosion damage						
settlement						
holes						
vector infestation						
waste breakthrough						
leachate breakthrough						
vandalism						
unauthorized dumping						
litter						
5) Access and Maintenance Roads:						
potholes/burrow holes						
erosion gullies						
loss of RCA cover						
asphalt cracking						
obstructions						
settlement						
6) Gas Venting System:						
odor						
damage/vandalism						
settlement						
vector infestation						

ADDITIONAL COMMENTS:

_____

_____

_____

_____

SOUTHOLD LANDFILL

POST-CLOSURE SITE INSPECTION CHECKLIST

DATE: _____

INSPECTED BY: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
7) Storm Water Collection:						
a) Drainage Swales:						
damage/instability						
stone erosion						
erosion beneath						
silt accumulation						
ponded water						
wash outs						
vegetative cover						
debris						
b) Culvert Outlets:						
damage/instability						
soil erosion beneath						
loose ties						
slippage of gabion						
c) Drainage Structures:						
damage/instability						
stone/riprap erosion						
soil erosion						
silt accumulation						
debris						
settlement						

ADDITIONAL COMMENTS:

_____

_____

_____

_____

SOUTHOLD LANDFILL

POST-CLOSURE SITE INSPECTION CHECKLIST

DATE: _____

INSPECTED BY: _____

Item	Acceptable	Not Acceptable	Present	Not Present	Location	Remarks
d) Recharge Basins:						
damage/instability						
stone/riprap erosion						
soil erosion						
silt accumulation						
debris						

ADDITIONAL COMMENTS:

_____

_____

_____

_____

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL PLAN

SOUTHOLD LANDFILL
QUALITY ASSURANCE/QUALITY CONTROL PLAN

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1.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

1.1 Objective and Scope

The objective of this project is to provide post closure monitoring of the Southold Landfill. The post closure monitoring program includes groundwater monitoring.

The purpose of this Quality Assurance/Quality Control (QA/QC) Plan is to develop and describe the detailed sample collection and analytical procedures that will ensure high quality, valid data for use during post closure monitoring.

1.2 Data Usage

The data generated from the field sampling program will be used to evaluate the effectiveness of the landfill closure in accordance with Part 360. In addition, data will be used to monitor health and safety of workers at the site and the health and safety of persons off-site.

1.3 Sampling Program Design and Rationale

The following presents a general discussion of the sampling to be conducted during year 1 of post closure monitoring.

- Groundwater: Four rounds of 12 groundwater samples will be collected. Each round will consist of one sample from each of the six newly installed wells and the six existing wells.

For a discussion of the sampling program and sample locations, see Section 4.0 of the Manual.

1.4 Analytical Parameters

The first round of samples will be analyzed for Baseline Parameters as defined in 6 NYCRR Part 360-2.11(c)(6) "Water Quality Analysis Table" (see Attachment A). The subsequent rounds of sampling will be collected at three-month intervals and analyzed for Routine Parameters as described in 6 NYCRR Part 360-2.11(c)(6) "Water Quality Analysis Table" (see Attachment A). If turbidity of a groundwater sample is greater than 50 NTUs, the sample will be filtered for dissolved metals analyses. In such instances both filtered and unfiltered samples will be analyzed for dissolved and total metals, respectively.

Table 1-1 presents a summary of the parameters/sample fractions to be analyzed together with the sample location, type of sample, sample matrix, number of samples, frequency of sample collection, type of sample container, method of sample preservation, holding time and analytical method.

1.5 Data Quality Requirements and Assessment

Data quality requirements and assessments are provided in the 6/00 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol, estimate precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 6/00 NYSDEC ASP, where applicable. Table 1-2 presents a summary of the data quality requirements.

In addition to meeting the requirements provided in the 6/00 NYSDEC ASP, the data must also be useful in evaluating the nature and extent of contamination. Data obtained during post closure monitoring will be compared to specific SCGs. The SCGs to be utilized include:

Matrix	SCG
Groundwater	Division of Water Technical and Operational Guidance Series (TOGs) (1.1.1) - Ambient Water Quality Standards and Guidance Values, dated June 1998.

Table 1-1

SOUTHOLD LANDFILL POST CLOSURE MONITORING SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample matrix	Sample Fraction	Number of Samples*	Frequency*	Container Type/Size/No.	Sample Preservation	Maximum Holding Time**	Analytical Method
Monitoring Wells (Six new wells, six existing wells)	Grab	Groundwater	Total Kjeldahl Nitrogen	12	4	Plastic/1 Liter/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 351.1
	Grab	Groundwater	Ammonia	12	4	Plastic/1 Liter/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 350.1
	Grab	Groundwater	Nitrate	12	4	Plastic/100 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 9200
	Grab	Groundwater	Chemical Oxygen Demand	12	4	Glass/500 ml/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 410.1
	Grab	Groundwater	Biochemical Oxygen Demand	12	4	Glass/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 405.1
	Grab	Groundwater	Total Organic Carbon	12	4	Glass/500 ml/1 ICHEM 300 or equivalent	HCl to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9060
	Grab	Groundwater	Total Dissolved Solids	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	7 days	6/00 NYSDEC ASP Method 160.1
	Grab	Groundwater	Sulfate	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9035
	Grab	Groundwater	Alkalinity	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	12 days	6/00 NYSDEC ASP Method 310.1
	Grab	Groundwater	Total Phenols	12	4	Glass/1 Liter/1 ICHEM 300 or equivalent	0.008% $Na_2S_2O_3$ Cool to 4°C	28 days	6/00 NYSDEC ASP Method 420.1

Table 1-1 (continued)

SOUTHOLD LANDFILL POST CLOSURE MONITORING SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample matrix	Sample Fraction	Number of Samples*	Frequency*	Container Type/Size/No.	Sample Preservation	Maximum Holding Time**	Analytical Method
	Grab	Groundwater	Chloride	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9250
	Grab	Groundwater	Bromide	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 320.1
	Grab	Groundwater	Total Hardness as $CaCO_3$	12	4	Plastic/500 ml/1 ICHEM 300 or equivalent	HNO_3 to pH <2 Cool to 4°C	6 months	6/00 NYSDEC ASP Method 130.1
	Grab	Groundwater	Color	12	1	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 110.1
	Grab	Groundwater	Volatile Organics	12	1	Glass, clear/ 40 ml/2 ICHEM 300 or equivalent	Cool to 4°C***	7 days for analysis	6/00 NYSDEC ASP Method EPA SOW OLMO4.2
	Grab	Groundwater	Metals	12	4	Plastic/ 1 Liter/1 ICHEM 300 or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	6/00 NYSDEC ASP Method EPA SOW ILMO4.0
	Grab	Groundwater	Cyanide	12	1	Plastic, clear/ 250 ml/1 ICHEM 300 or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	6/00 NYSDEC ASP Method 335.2

*Four rounds of sampling with 12 samples per round being collected.
**Holding times as listed for each method in Exhibit D of the 6/00 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
*** Samples are not to be preserved to pH <2.

Table 1-1 (continued)

SOUTHOLD LANDFILL POST CLOSURE MONITORING SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Trip Blank	Water	Volatile Organics	1**	1	Glass, clear/ 40 ml/2 ICHEM 300 series or equivalent	Cool to 4°C***	7 days for analysis	6/00 NYSDEC ASP Method USEPA SOW OLMO4.2

*Holding times as listed for each method in Exhibit D of the 6/00 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One trip blank will accompany each shipment of aqueous samples requiring volatile organic analysis.
*** Samples are not to be preserved to pH <2.

Table 1-1 (continued)

SOUTHOLD LANDFILL POST CLOSURE MONITORING SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Total Kjeldahl Nitrogen	1**	4	Plastic/1 Liter/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 351.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Ammonia	1**	4	Plastic/1 Liter/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 350.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Nitrate	1**	4	Plastic/100 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 9200
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Chemical Oxygen Demand	1**	4	Glass/500 ml/1 ICHEM 300 or equivalent	H_2SO_4 to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 410.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Biochemical Oxygen Demand	1**	4	Glass/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 405.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Total Organic Carbon	1**	4	Glass/500 ml/1 ICHEM 300 or equivalent	HCl to pH <2 Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9060
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Total Dissolved Solids	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	7 days	6/00 NYSDEC ASP Method 160.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Sulfate	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9035
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Alkalinity	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	12 days	6/00 NYSDEC ASP Method 310.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Total Phenols	1**	4	Glass/1 Liter/1 ICHEM 300 or equivalent	0.008% $Na_2S_2O_3$ Cool to 4°C	28 days	6/00 NYSDEC ASP Method 420.1

Table 1-1 (continued)

SOUTHOLD LANDFILL POST CLOSURE MONITORING SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Chloride	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 9250
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Bromide	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	26 days	6/00 NYSDEC ASP Method 320.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Total Hardness as CaCO3	1**	4	Plastic/500 ml/1 ICHEM 300 or equivalent	HNO_3 to pH <2 Cool to 4°C	6 months	6/00 NYSDEC ASP Method 130.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Color	1**	1	Plastic/500 ml/1 ICHEM 300 or equivalent	Cool to 4°C	24 hours	6/00 NYSDEC ASP Method 110.1
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Volatile Organics	1**	1	Glass, clear/ 40 ml/3 ICHEM 300 series or equivalent	Cool to 4°C***	7 days for analysis	6/00 NYSDEC ASP Method USEPA SOW OLMO4.2
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Metals	1**	4	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	6/00 NYSDEC ASP Method USEPA SOW ILMO4.0
	Matrix Spike and Matrix Spike Duplicate	Surface water/ Groundwater	Cyanide	1**	1	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	6/00 NYSDEC ASP Method 335.2

*Holding times as listed for each method in Exhibit D of the 6/00 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD for each round of sampling based upon 12 groundwater samples collected per round.
*** Samples are not to be preserved to pH <2.

Table 1-2

SOUTHOLD LANDFILL POST CLOSURE MONITORING DATA QUALITY REQUIREMENTS

Parameter	Sample Matrix	CRDL* (ug/l)	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
Volatile Organics	Liquid	5-10 5-10	0.87 - 2.48 ug/l	Vol. IB, Chapter 4, Method 8240, Table 7	0.11 - 4.00 ug/l	Vol. IB, Chapter 4, Method 8240, Table 7
Metals (except cyanide)	Liquid	0.2-5000 0.2-5000	--	Vol. IA, Chapter 3, Method 6010**, Table 4	--	Vol. IA, Chapter 3, Method 6010**, Table 4
Cyanide	Liquid	10 10	85% - 102% of recovery	Vol. IC, Chapter 5, Method 9010	±0.02 mg/l	Vol. IC, Chapter 5, Method 9010

*Contract Required Detection Limits

**and SW-846 Methods for:

	Method
Mercury	7470

Table 1-2 (continued)

SOUTHOLD LANDFILL POST CLOSURE MONITORING
DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Groundwater		
VOCs[a]	See Table 1-2a	See Table 1-2a
Metals[b]	± 25%	75-125

NOTES:

[a] Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs are listed in Table 1-2a. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

[b] Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

[c] Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: NYSDEC ASP

Table 1-2a

SOUTHOLD LANDFILL POST CLOSURE MONITORING
DATA QUALITY REQUIREMENTS
ACCURACY REQUIREMENTS FOR VOC

	Spike Recovery Limits (%)
	Water
Surrogate Compound	
Toluene-d8	88-110
4-Bromofluorobenzene	86-115
1,2-Dichloroethane-d4	76-114
Matrix Spike Compound	
1,1-Dichloroethene	61-145
Trichloroethane	71-120
Chlorobenzene	75-130
Toluene	76-125
Benzene	76-127

Source: NYSDEC ASP.

The methods of analysis will be in accordance with the 6/00 NYSDEC ASP. Specific analytical procedures and laboratory QA/QC descriptions are not included in this QA/QC plan, but will be available upon request from the laboratory selected to perform the analyses. The laboratory will be New York State Department of Health (NYSDOH) Environmental Laboratory Approved Program (ELAP) certified for organic and inorganic analyses, and also USEPA CLP certified.

1.5.1 Data Representativeness

Representative samples will be collected as follows:

- Groundwater (Monitoring Well) - Samples will be obtained after the monitoring well has been purged of three to five well casing volumes and field measurements (pH, conductivity, temperature and turbidity) have stabilized, or until the well is purged dry (whichever occurs first) and allowed to recharge. Samples will be collected with a dedicated polyethylene bailer.
- Equipment Calibration - Field equipment used for field measurements will be calibrated daily before use according to the manufacturer's procedures.
- Equipment Decontamination - Nonsterile sampling equipment will be decontaminated prior to use at each location according to the NYSDEC approved procedures described on Section 1.8 of this QA/QC Plan.

1.5.2 Data Comparability

All data will be presented in the units designated by the methods specified by a NYSDOH ELAP and CLP certified laboratory, and the 6/00 NYSDEC ASP. In addition, sample locations, collection procedures, and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

1.5.3 Data Completeness

The acceptability of 100% of the data is desired as a goal for this project. The acceptability of less than 100% complete data, meeting all laboratory QA/QC protocols/ standards, will be evaluated on a case-by-case basis.

1.6 Detailed Sampling Procedures

Groundwater samples will be collected from different locations as part of the post closure monitoring for the Southold Landfill. Sample locations will consist of monitoring wells. Sampling procedures and equipment are described in this section. A summary of the sampling program, including sample media, locations, depths, equipment, rationale and analytical parameters is provided in Table 1-3. Sample collection will be performed in conformance with procedures described in Section 1.6.3.

The materials involved in groundwater sampling are critical to the collection of high quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. Sterile disposable polyethylene bailers will be utilized for this project.

There will be several steps taken after the transfer of the water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field logbook. Associated forms (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature (4°C)

Table 1-3

SOUTHOLD LANDFILL
POST CLOSURE MONITORING SAMPLING MATRIX

Program Element	Environmental Media	Sample Type/Depth	Number of Samples	Equipment	Sample Analyses
Groundwater Sampling (Round 1)	Groundwater	At surface of water in well after purging well.	12	Disposable polyethylene bailer.	Baseline Parameters
Groundwater Sampling (Rounds 2-4)	Groundwater	At surface of water in well after purging well.	12	Disposable polyethylene bailer.	Routine Parameters
Trip Blanks	Aqueous	Laboratory provided distilled water.	1*	Sample supplied by laboratory.	TCL VOC + 10.
Matrix Spike/ Matrix Spike Duplicates	Aqueous	Surface water and groundwater (split of sample).	1**	Sample container or disposable polyethylene bailer.	Baseline/Routine Parameters

Note: No field blanks will be collected in accordance with New York State Department of Environmental Conservation guidance.

*One trip blank will accompany each shipment of aqueous samples requiring volatile organic compound analysis.

**One MS/MSD for each media for every 20 samples collected or one every 2 weeks if fewer than 20 samples.

to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

1.6.1 Sample Identification

All samples collected during post closure monitoring at the Southold Landfill Site will be labeled with a sample identification code. The code will identify the sample location, sample matrix and series numbers for sample locations with more than one sample. Samples will be labeled according to the following system:

- Sample Location: – Monitoring Well "MW"
- Sample Matrix: – Water "W"
- Sample Number: – For circumstances where more than one sample of the same type and/or from the same location will be collected, a consecutive sample number will be assigned.
- Quality Assurance/ Quality Control (QA/QC): – Trip Blank "TB"
  – Matrix Spike "MS"
  – Matrix spike duplicate "MSD"

Based upon the above sample identification procedures, an example of a sample label may be:

1.6.2 Sample Handling, Packaging and Shipping

All analytical samples will be placed in the appropriate sample containers as specified in the 6/00 NYSDEC ASP. The holding time criteria identified in Volume I for the individual methods of the ASP will be followed, as specified in Table 1-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field logbook for accuracy. The samples will then be wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or "blue ice" packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

1.6.3 Groundwater (Monitoring Well)

1. Be certain that the sample location is noted on Location Sketch (see Section 1.9).
2. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.
3. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature, and turbidity) stabilize, or until the well is dry, whichever occurs first, with a submersible pump. (Turbidity must be less than 50 NTUs prior to collection of a sample for metals analysis. Greater than 50 NTUs may require filtering of the sample or waiting a maximum of 24 hours for the turbidity to decrease.)
4. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 1.9).
5. Obtain a sample by using the disposable polyethylene bailer. The order to which the samples are collected is: VOCs, metals, cyanide, and wet chemistry parameters.

6. If the turbidity exceeds 50 NTUs, then the well should be sampled for all constituents except metals. The well can rest for a maximum of 24 hours until a turbidity reading is less than 50 NTUs, once less than 50 NTUs, the metals sample can be collected.

7. If it is determined in consultation with the NYSDEC that filtering of the sample is necessary (i.e., through direction from NYSDEC or after waiting a maximum of 24 hours), first collect an unfiltered sample in a sample container, 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 filter medium (0.45 microns) 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.

8. Gently pour the sample into the sample container taking care not to spill on outside of bottle or overfill container and replace cover on the sample container. Samples for volatile organic analyses, will have no air space in the sample vial prior to sealing. This is done 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 it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

9. Return sample container to sample cooler.

10. Dispose of bailer.

11. Place disposable personal protective equipment into a 55-gallon drum.

1.7 Decontamination Procedures

All field sampling equipment should be sterile and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning (decontamination) procedure will be used in order to reduce the chances of cross contamination between sample locations. A decontamination station will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling area to keep equipment handling to a minimum.

1.7.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that perform the field activities as discussed below. When using field decontamination, it is advisable to start sampling in the area of the site with the lowest contaminant probability and proceed through to the areas of highest suspected contamination.

1.7.2 Decontamination Procedure for Drilling

All equipment such as drill rigs, backhoes and other mobile equipment should receive an initial cleaning prior to use at the site. The equipment will then be decontaminated prior to leaving the site and each time it returns on-site. Unless otherwise specified and approved, all wash/rinse solutions should be collected and contained on-site. The actual fate of this material will be determined after review of analytical data generated from samples and on-site discharge impacts have been evaluated.

After the initial washing, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig items such as auger flights, drill rods, and drill bits are to be cleaned in between sample locations.

All decontamination generated wastes will be contained in 55-gallon drums and stored in the designated area.

Drilling equipment will be decontaminated in the following manner:

- Scrub all surfaces thoroughly with nonresidual nonionic anionic detergent (such as alconox) and tap water using a brush to remove particulate matter or surface film. This is necessary in order to remove any solids buildup on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed.

- Steam clean (212°F).

1.7.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene, polystyrene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual nonionic anionic detergent (such as alconox) and clean potable tap water using a brush to remove particulate matter or surface film.
- Rinse thoroughly with tap water.
- Rinse thoroughly with distilled water.
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry.
- Rinse thoroughly with distilled water and air dry.
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a drum specifically used for this purpose.

The first step, a soap and water wash, is to remove all visible particulate matter and residual oils and grease. This is followed by a tap water rinse and a distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse is designated for trace organics removal. Methanol has been chosen because it is not an analyte of concern in the TCL. The solvent must be allowed to evaporate and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent. The aluminum wrap protects the equipment and keeps it clean until it is used at another sampling location.

1.7.4 Decontamination Procedure for Well Casing/ Screen and Development/Purging Equipment

Field cleaning of well casing and screen should consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil and grease are removed. If precleaned certified well casing and screen can be obtained from the manufacturer this would

also be acceptable. This material should then be stored in such a manner so as to preserve it in this condition. Special attention to threaded joints may be necessary to remove cutting oil or weld burn residues.

Materials and equipment that will be used within the monitoring well casing for the purposes of well development and purging shall also be decontaminated.

The submersible pump will be decontaminated by the following procedures:

1. Place pump in a water solution of an nonionic anionic surfactant solution (such as unscented Tide or Alconox) solution and wash the outside of the pump with a scrub brush.
2. Pump approximately five gallons of the wash solution through the pump.
3. Place pump in bucket of clean water and pump out five gallons of water.
4. Wipe down the cable with deionized water and a paper towel.
5. Decontamination water will be disposed of on-site.

1.8 Laboratory Sample Custody Procedures

A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment will be used. The laboratory's Standard Operating Procedures (SOPs) will be available upon request.

1.9 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QA/QC Plan in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, preparing a Location Sketch, completing Sample Information Record Forms, Chain of Custody Forms maintaining a

daily Field Log Book, preparing Daily Field Activity Reports, completing Field Change Forms and filling out a Daily Air Monitoring Form. Copies of each of these forms are provided in Section 1.21. Proper completion of these forms and the field logbook are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the evidence was gathered and handled properly.

1.9.1 Location Sketch

Each sampling point shall have its own location sketch (found in Section 1.21) with permanent references, to the maximum extent practicable.

1.9.2 Sample Information Record

At each sampling location, the Sample Information Record Form is filled out and maintained including, but not limited to, the following information:

- Site name
- Sample crew
- Sample location
- Field sample identification number
- Date
- Time of sample collection
- Weather conditions
- Temperature
- Sample matrix
- Method of sample collection and any factor that may affect its quality adversely
- Well information (groundwater only)
- Field test results

- Constituents sampled
- Remarks (Sample Compositing Information)

1.9.3 Chain of Custody

The Chain of Custody (COC) is initiated at the laboratory with bottle preparation and shipment to the site. The COC remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the bottles and samples. When the form is complete, it should indicate that there were no lapses in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession, or
- It is in the individual's view after being in his or her physical possession, or
- It is secured by the individual so that no one can tamper with it, or
- The individual puts it in a designated and identified secure area.

In general, COC Forms are provided by the laboratory contracted to perform the analytical services. At a minimum, the following information shall be provided on these forms:

- Project name and address
- Project number
- Sample identification number
- Date
- Time
- Sample location
- Sample type

- Analysis requested
- Number of containers and volume taken
- Remarks
- Type of waste
- Sampler(s) name(s) and signature(s)
- Spaces for relinquished by/received by signature and date/time.

For this particular study, forms provided by the laboratory will be utilized. A copy of this form is contained in Section 1.21.

The COC Form is filled out and signed by the person performing the sampling. The original of the form travels with the sample and is signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler keeps one copy and a copy is retained for the project file. The sample container must also be labeled with an indelible marker with a minimum of the following information:

- Sample number
- Analysis to be performed
- Date of collection
- Compositing information

A copy of the completed form is returned by the laboratory with the analytical results.

1.9.4 Split Samples

Whenever samples are being split with another party, a Receipt for Samples Form must be completed and signed. A copy of this form can be found in Section 1.21. A copy of the COC Form will accompany this form. The present work plan does not provide for split samples.

1.9.5 Field Log Book

Field logbooks must be bound and should have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures must be documented. Notations should be made in logbook fashion, noting the time and date of all entries. Information recorded in this notebook should include, but not be limited to, the following:

The first page of the log contains the following information:

- Project name and address
- Name, address and phone number of field contact
- Waste generator and address, if different from above
- Type of process (if known), generating waste
- Type of waste
- Suspected waste composition, including concentrations

Daily entries are made for the following information:

- Purpose of sampling
- Location of sampling point
- Number(s) and volume(s) of sample(s) taken
- Description of sampling point and sampling methodology
- Date and time of collection, arrival and departure
- Collector's sample identification number(s)
- Sample distribution and method of storage and transportation
- References, such as sketches of the sampling site or photographs of sample collection

- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance), water levels, drilling logs, and organic vapor and dust readings
- Signature of personnel responsible for completing log entries.

1.9.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, completes this form noting personnel on-site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This form is then signed and is subject to review. A copy of the Daily Field Activity Report form is contained in Section 1.21.

1.9.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form must be completed by the Field Operations Manager and approved by the Town.

1.10 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures, which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be done daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.
2. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 6/00 ASP, for laboratory equipment is contained in the laboratory's SOPs and is available upon request.

1.11 Performance of Field Audits

During field activities, the QA/QC officer may accompany sampling personnel into the field to verify that the site sampling program is being properly implemented and to detect and define problems so that corrective action can be taken. All findings will be documented and provided to the Field Operations Manager. A copy of Field Audit form is in Section 1.23.

1.12 Control and Disposal of Contaminated Material

During sampling of the monitoring wells, water will be generated from purging. Specifically, all water associated with the wells will be disposed of on-site. Decontamination water will also be disposed of on-site.

In general, soiled personal protective equipment (PPE) and disposable sampling equipment (i.e., bailers, tongue depressors, scoops) will be considered solid waste and contained and disposed off-site. If hazardous waste contamination of PPE or disposable equipment is suspected, due to elevated measurements of screening instruments, visual observations, odors or other means, PPE and equipment will be drummed and secured on-site until a hazardous waste determination can be made. Once a determination has been made, an approved disposal method will be employed.

1.13 Documentation, Data Reduction and Reporting

A NYSDOH ELAP and CLP certified laboratory meeting requirements for documentation, data reduction, and reporting will be used. All data will be cataloged according to sampling locations and sample identification nomenclature which is described in Section 1.6.1 of the QA/QC plan.

NYSDEC "Sample Identification and Analytical Requirement Summary" and "Sample Preparation and Analysis Summary" forms (for VOC Analysis, B/N-A Analysis, Pesticides/PCB Analysis and Inorganic Analysis) will be completed and included with each data package. These forms are contained in Section 1.22. The sample tracking forms are required and supplied by the 6/00 NYSDEC ASP.

1.14 Data Validation

As described in Section 1.13 above, summary documentation regarding data validation will be completed by the laboratory using NYSDEC forms contained in Section 1.22, and submitted with the data package.

A Data Usability Summary Report (DUSR) will be prepared instead of full data validation. The DUSR is prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with analytical method protocols include all chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, field sampling notes should also be reviewed and any quality control problems should be evaluated as to their effect on the usability of the sample data.

The DUSR shall describe the samples and analysis parameters reviewed. Data deficiencies, analytical protocol deviations and quality control problems shall be described and their effect on the data discussed.

Re-sampling and re-analysis recommendations will be made, if necessary. Data qualifications are documented for each sample analyte following the NYSDEC ASP 6/00 guidelines.

1.15 Performance and System Audits

A NYSDOH ELAP and CLP certified laboratory, which has satisfactorily completed performance audits and performance evaluation samples shall be used.

1.16 Corrective Action

A NYSDOH ELAP and CLP certified laboratory shall meet the requirements for corrective action protocols, including sample "clean up" to attempt to eliminate/mitigate "matrix interference."

The 6/00 NYSDEC ASP protocols include both mandatory and optional sample cleanup and extraction methods. Florisil column cleanup is required for the pesticide/PCB fraction of both soil and water samples. There are several optional cleanup and extraction methods noted in the 6/00 NYSDEC ASP protocol. These include: Silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

It should be noted, that if these optional cleanup and extraction methods are requested by NYSDEC, holding time requirements should not be exceeded due to negligence of the laboratory. However, subsequent to selection of the analytical laboratory for this project, a meeting will be scheduled among representatives of the NYSDEC, the Town and the laboratory to discuss these issues and establish procedures to ensure good and timely communications among all parties.

1.17 Trip Blanks (Travel Blanks)

The primary purpose of this type of blank is to detect additional sources of contamination that might potentially influence contaminant values reported in actual samples both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water
- Sample containers
- Cross contamination in shipment
- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory
- Laboratory reagents used in analytical procedures

A trip blank consists of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks should be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, they just travel with the sample cooler. Trip blanks must accompany samples at a rate of one per shipment. The temperature of the trip blanks must be maintained at 4°C while on-site and during shipment. Trip blanks must return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank travels to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks are implemented only when collecting water samples, and analyzed for volatile organic compounds only (i.e., baseline sampling).

1.18 Field Blank (Field Rinsate Blank)/Equipment Blank

Field blanks will not be required for this project, since disposable bailers are being utilized for sample collection.

1.19 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike (MS), matrix spike duplicates (MSD), and matrix spike blanks (MSB) samples are quality control procedures, consistent with 6/00 NYSDEC ASP specifications, used by the laboratory as part of its internal QA/QC program. The MS and MSD are aliquots of a designated sample (water or soil), which are spiked with known quantities of specified compounds. They are used to evaluate the matrix effect of the sample upon the analytical methodology as well as to determine the precision of the analytical method used. A MSB is an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The MSB is subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB are defined in the 6/00 NYSDEC ASP. Site specific MS and MSDs should be collected at a frequency of one per 20 samples or every 7 days (one for each sample delivery group), for each sample matrix collected (i.e., water, soil, etc.). The laboratory is required to analyze an MSB at the same frequency as the MS/MSD.

1.20 Method Blanks

A method blank is an aliquot of laboratory water or soil, which is spiked with the same internal and surrogate compounds as the samples. Its purpose is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 6/00 NYSDEC ASP as follows:

The laboratory shall prepare and analyze one laboratory reagent blank (method blank) for each group of samples of a similar matrix (for water or soil samples), extracted by a similar method (separatory funnel, continuous liquid extraction or sonication) and a similar concentration level (for volatile and semivolatile soil samples only) for the following, whichever is most frequent:

- Each case of field samples received, or

- Each 20 samples in a case, including matrix spikes and reanalyses, or
- Each 7 calendar day period during which field samples in a case were received (said period beginning with the receipt of the first sample in that sample delivery group), or
- Whenever samples are extracted.

Volatile analysis requires one method blank for each 12-hour time period when volatile target compounds are analyzed.

1.21 Field Management Forms

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CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: _____

SAMPLE INFORMATION RECORD

Site: _____ Sample Crew: _____

Sample Location/Well No. _____

Field Sample I.D. Number _____ Time _____

Weather _____ Temperature _____

Sample Type:

Groundwater _____ Sediment _____

Surface Water/Stream _____ Air _____

Soil _____ Other (describe, i.e. water, septage, etc.) _____

Well Information (fill out for groundwater samples)

Depth to Water _____ Measurement Method _____

Depth of Well _____ Measurement Method _____

Volume Removed _____ Removal Method _____

Field Test Results

Color _____ pH _____ Odor _____

Temperature (°F) _____ Specific Conductance (umhos/cm) _____

Other (OVA, Methane Meter, etc. _____

_____

Constituents Sampled

_____ _____ _____ _____

_____ _____ _____ _____

Remarks:

_____

_____

_____

Well Casing Volumes

GAL/FT	1¼" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1½ =0.10	2½ " = 0.24	3½ = 0.50	6" = 1.46

CHAIN-OF-CUSTODY RECORD

Page ____ of ____

REPORT TO		INVOICE TO		
COMPANY	PHONE	COMPANY	PHONE	LAB PROJECT #:
NAME	FAX	NAME	FAX	
ADDRESS		ADDRESS		TURNAROUND TIME:
CITY/ST/ZIP		CITY/ST/ZIP		

CLIENT PROJECT NAME:	CLIENT PROJECT #:	CLIENT P.O.#:

REQUESTED ANALYSES

SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	COMPOSITE	GRAB	WATER	SOIL	OTHER	LAB ID	# OF CONTAINERS														COMMENTS
	/																					
	/																					
	/																					
	/																					
	/																					
	/																					
	/																					
	/																					
	/																					
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	/																					
	/																					

TSF#	RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME	ADDITIONAL REMARKS:	COOLER TEMP:
1		/		/		
2		/		/		
3		/		/		

WHITE: LABORATORY COPY **YELLOW**: REPORT COPY **PINK**: CLIENT'S COPY

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: _____

DAILY EQUIPMENT CALIBRATION LOG

Project Name: _____

Project Number: _____

Calibrated by: _____

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

1.22 NYSDEC Sample Identification, Preparation and Analysis Summary Forms

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*Pest PCBs Method #	*Metals	*Other

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Analyzed

1.23 Field Audit Form

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AND
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FIELD AUDIT FORM

Site: _____ Date: _____

Persons On-site: _____ QA/QC Officer Conducting Audit:

_____ _____

_____ Project:

_____ _____

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

Methanol	YES	NO
Alconox	YES	NO
D.I. Water	YES	NO
Scrub Brushes	YES	NO
Steam Cleaner	YES	NO

Comments: _____

_____

_____

3. Is the site/investigation areas secured (fence, markers, etc.): YES NO

Comments: _____

_____

_____

4. Is contaminated material properly stored and in a secure area: YES NO

Comments: _____

_____

_____

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AND
BARTILUCCI

FIELD AUDIT FORM (continued)

5. Are forms filled out properly:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO

Comments: _____

_____

_____

6. Is the proper sampling and field measurement equipment, including calibration supplies on site: YES NO

Comments: _____

_____

_____

7. Are there adequate sample containers, including deionized water for QA/QC:

Field Blanks	YES	NO
Trip Blanks	YES	NO

Comments: _____

_____

_____

8. Is the equipment decontaminated properly:

Sampling equipment	YES	NO
Construction equipment	YES	NO

Comments: _____

_____

_____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM (continued)

9. Is field measurement equipment calibrated:

Daily	YES	NO
Properly	YES	NO

Comments: _____

_____

_____

10. Are samples collected and labeled properly: YES NO

Comments: _____

_____

_____

11. Are samples stored at 4°C: YES NO

Comments: _____

_____

_____

12. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: _____

_____

_____

13. Is a copy of the Field Investigation Work Plan available on site: YES NO

Comments: _____

_____

_____

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AND
BARTILUCCI

FIELD AUDIT FORM (continued)

14. Is a copy of the QA/QC Plan available on site: YES NO

Comments: _____

_____

_____

15. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: _____

_____

_____

16. Are quality control samples taken:

Trip Blanks	YES	NO
Field Blanks	YES	NO

Comments: _____

_____

_____

17. Are samples shipped in a timely and appropriate manner: YES NO

Comments: _____

_____

_____

18. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: _____

_____

_____

DVIRKA
AND
BARTILUCCI

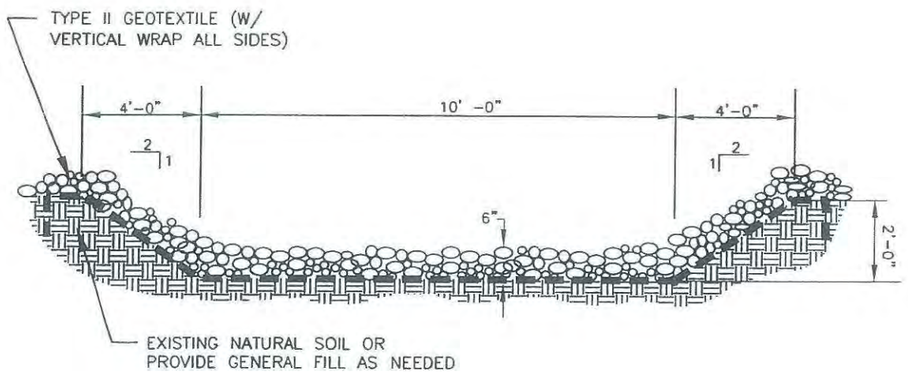
FIELD AUDIT FORM (continued)

General Comments: _____

_____

_____

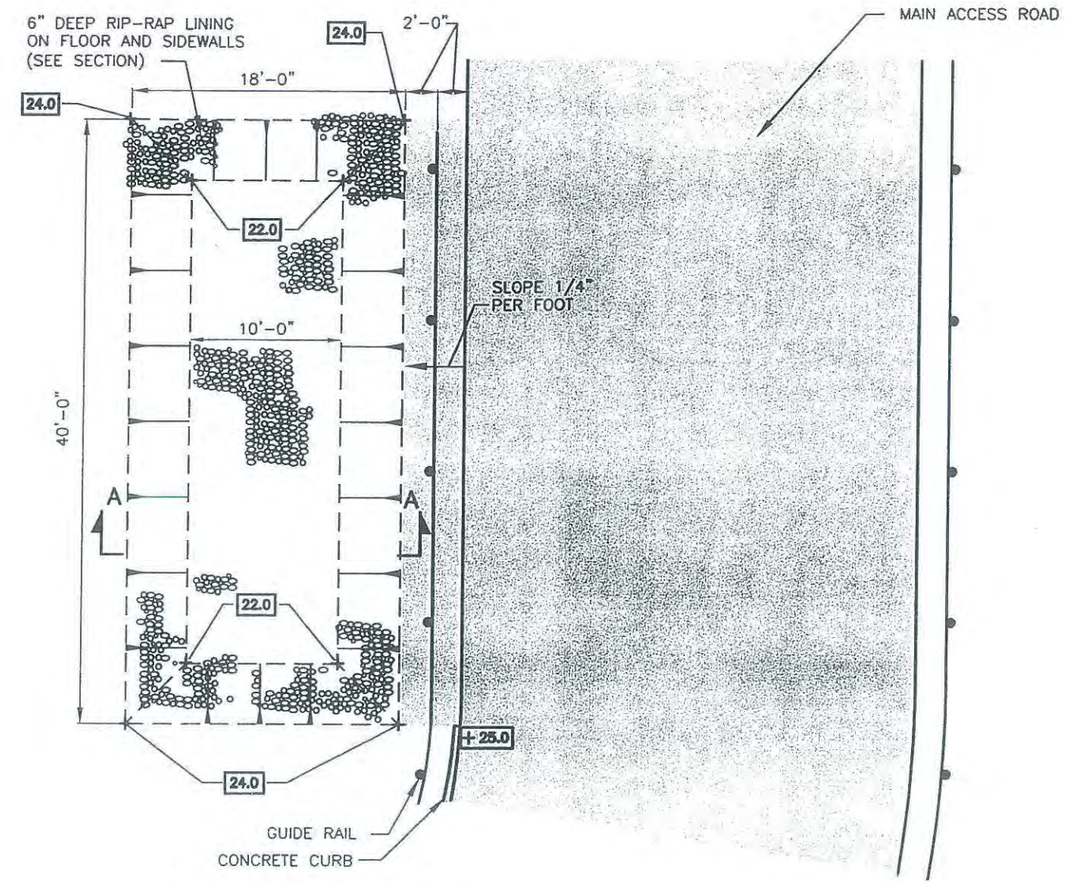
_____



SECTION "A–A"

LEVEL SPREADER

N.T.S.



NOTES:
1. SEE DRAWING NO. 27 FOR LEVEL SPREADER LOCATION.
2. FINAL CONTOUR GRADING IN THE VICINITY OF THE LEVEL SPREADER SHALL CONFORM TO THE ABOVE DETAIL.

PLAN

LEVEL SPREADER

1"=10'

STATE OF NEW YORK
THOMAS F. MAHER
No. 054468
LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	INIT.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.

PROJECT ENGINEER: D.S.G. | DRAWN BY: W.I.M.
DESIGNED BY: R.L.H. | CHECKED BY: R.L.H./D.S.G.

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

TOWN OF SOUTHOLD
SUFFOLK COUNTY, NEW YORK
SOUTHOLD LANDFILL CLOSURE

GENERAL CONSTRUCTION

LEVEL SPREADER

PROJECT NO. 1314
DATE: NOVEMBER 2000
SCALE: AS NOTED
DRAWING NO. 28

WED, NOV 01, 2000 12:48 P WM G:\1314\GEN-CONST\1314-GC28R.DWG

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Southold Landfill

Well Construction Log

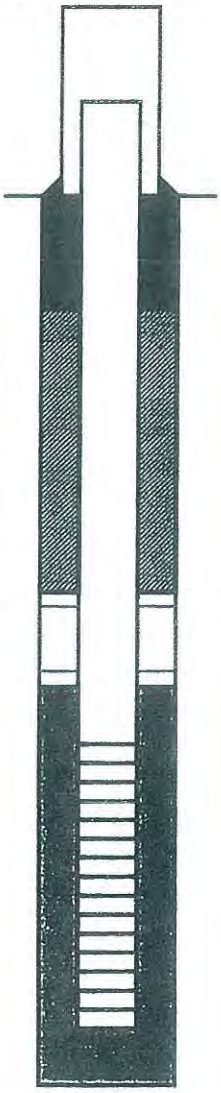
Site Southold L.F. Job No. 1314-F3 Well No. MW-8D

Total Depth 138' Surface Elevation 51.50' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 48.99 1/15/03 1200 Date Installed 12/19/02

Riser	Dia. 2"	Material PVC	Length 127'				
Screen	Dia. 2"	Material St. Steel	Length 10'	Slot Size .010			
Protective Casing	Dia. 6"	Material Steel	Length 6				

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0 Bottom Surface Seal

Grout Type Bentonite Grout

none Top Sand Pack

Seal Type Bentonite Pellets

118' Top Seal

121.5' Top Sand Pack

Sand Pack Type WBLL Gravel
Size #00

122' Top Sand Pack

124' Top Screen

Sand Pack Type Well Gravel
Size #1

134' Bottom Screen

138' Total Depth of Boring

well con (stick)

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CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Well Construction Log

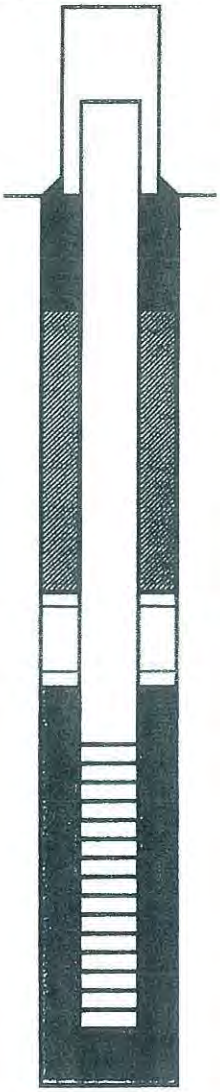
Site Southold L.F. Job No. 1314-F3 Well No. MW-8S

Total Depth 60' Surface Elevation 51.5' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 50.16 1/15/03 1000 Date Installed 12/19/02

Riser	Dia. 2"	Material PVC	Length 41'				
Screen	Dia. 2"	Material S. Stl	Length 20'	Slot Size 0.010"			
Protective Casing	Dia. 6"	Material Stel	Length 6'				

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0' Bottom Surface Seal

Grout Type Bentonite Grout

33' Top Sand Pack

Seal Type Bentonite Pellets

33.5' Top Seal

35.5' Top Sand Pack

Sand Pack Type Well Gravel
Size #00

36' Top Sand Pack

38' Top Screen

Sand Pack Type Well Gravel
Size #1

58' Bottom Screen

60' Total Depth of Boring

Dvirka and Bartilucci
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Well Construction Log

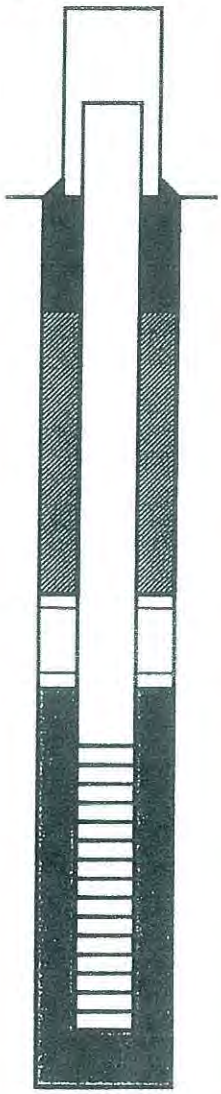
Site Southold L F. Job No. 1314-F3 Well No. MW-6D

Total Depth 144' Surface Elevation 52.4' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 50.99' 1/15/03 1300 Date Installed 12/23/02

Riser	Dia. 2"	Material PVC	Length 134'				
Screen	Dia. 2"	Material St. Stel	Length 10	Slot Size 0.010"			
Protective Casing	Dia. 6"	Material Stel	Length 6'				

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0 Bottom Surface Seal

Grout Type Bentonite Grout

Seal Type Bentonite Pellets

124' Top Seal

127' Top Sand Pack #00

Sand Pack Type Well Gravel
Size #00

127.5' Top Sand Pack #1

131' Top Screen

Sand Pack Type Well Gravel
Size #1

141' Bottom Screen

144' Total Depth of Boring

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Well Construction Log

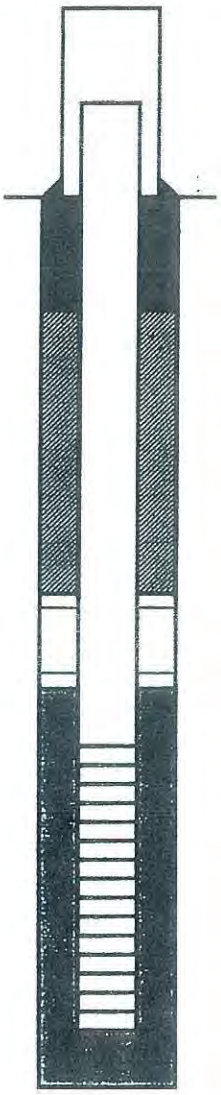
Site Southold L.F. Job No. 1314-F3 Well No. MW-6S

Total Depth 61' Surface Elevation 52.4' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 50.55 1/16/03 1030 Date Installed 12/12/02

Riser	Dia. 2"	Material PVC	Length 42.5'			
Screen	Dia. 2"	Material St. Steel	Length 20'	Slot Size 0.010"		
Protective Casing	Dia. 6"	Material Steel	Length 6'			

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0' Bottom Surface Seal

Grout Type Bentonite Grout

34.5' Top Sand Pack #00

Seal Type Bentonite Pellets

35' Top Seal

37' Top Sand Pack #00

Sand Pack Type well Gravel
Size #00

37.5' Top Sand Pack #1

39.5 Top Screen

Sand Pack Type well Gravel
Size #1

59.5 Bottom Screen

61' Total Depth of Boring

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Well Construction Log

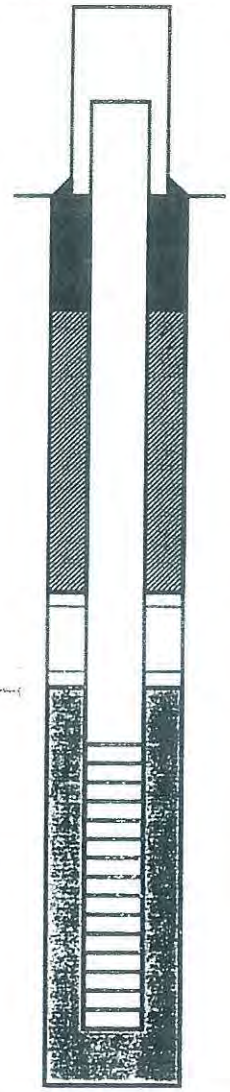
Site Southold LF Job No. 1314-F3 Well No. MW-3A

Total Depth 123' Surface Elevation 47' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 44.02 1/16/03 1300 Date Installed 1/9/03

Riser	Dia. 2"	Material PVC	Length 113'				
Screen	Dia. 2"	Material St. Steel	Length 10'	Slot Size 0.010"			
Protective Casing	Dia. 6"	Material Steel	Length 6'				

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0' Bottom Surface Seal

Grout Type Bentonite Grout

Seal Type Bentonite Pellets

104.5' Top Seal

107.5' Top Sand Pack #00

Sand Pack Type Will Grout
Size #00

108' Top Sand Pack #1

110' Top Screen

Sand Pack Type Will Grout
Size #1

120' Bottom Screen

123' Total Depth of Boring

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Well Construction Log

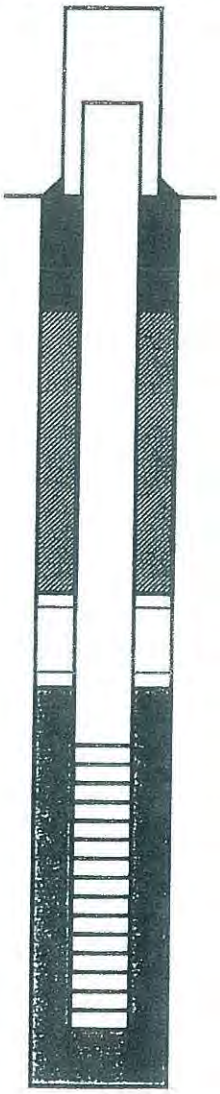
Site Southold L.F. Job No. 1314-F3 Well No. MW-3S

Total Depth 55.5' Surface Elevation 47' Top Riser Elevation _____

Water Levels (Depth, Date, Time) 44.35 1/16/03 1200 Date Installed 12/14/02

Riser	Dia. 2"	Material PVC	Length 38'			
Screen	Dia. 2"	Material St. Steel	Length 20'	Slot Size 0.010"		
Protective Casing	Dia. 6"	Material Steel	Length 6'			

SCHEMATIC



_____ Protective Casing Stickup

3' Riser Stickup

Ground Surface

Surface Seal Type Bentonite Grout

0' Bottom Surface Seal

Grout Type Bentonite Grout

23' Top Sand Pack #00

Seal Type Bentonite pellets

24' Top Seal

29.5' Top Sand Pack #00

Sand Pack Type Well Gravel
Size 00

32' Top Sand Pack #1

35' Top Screen

Sand Pack Type Well Gravel
Size #1

55' Bottom Screen

55.5' Total Depth of Boring

well con (stick)

Currently, there are 16 monitoring wells at the Southold Landfill which are used to monitor groundwater quality. These wells are grouped in pairs, with one well being shallow and screened across the water table, and the other well being screened deep just above the clay unit that underlies the landfill, with the exception of S-68916, which is screened below the water table at 103 feet, and S-68831, which is screened below the clay unit at 190 feet. Depending on location and ground surface elevation, the water table wells vary in depth from 27 to 77 feet below ground surface (bgs) with the average depth being approximately 55 feet, and the deep wells (exclusive of S-68831) vary in depth from 85 feet to 150 feet bgs with the average depth being about 130 feet. The locations of these wells are shown on Drawing 2.

The existing monitoring wells are constructed with 2-inch diameter PVC casing and stainless steel screens with locking steel protective surface casings. Screen lengths for the shallow wells are 20 feet, and screen lengths for the deep wells are 10 feet. These wells, exclusive of S-68831 and S-68916, are constructed in accordance with Part 360 requirements. (S-68831 and S-68916 were constructed by the Suffolk County Department of Health Services in the early 1980s and the construction details are not known.)

As part of closure construction, ten groundwater monitoring wells at five locations will need to be abandoned since they are located in areas that will be graded and capped or where maintenance access roads are planned to be constructed. These wells are MW-2S and 2D; MW-3S and 3D; MW-6S and 6D; MW-7S and 7D; and S-68831 and S-68916. Well abandonment will be in accordance with Part 360 procedures contained in 360-2.11(a)(8)(vi). After the cap and maintenance roads are constructed, six of the ten monitoring wells will be replaced with new wells at approximately the same locations as the abandoned wells and constructed in accordance with Part 360-2.11(a)(8).

Monitoring wells MW-2S and 2D will not be replaced since well clusters MW-4 and MW-5 will effectively monitor groundwater quality downgradient of the MW-2 cluster, and

monitoring wells MW-7S and 7D will not be replaced since they are located upgradient of the area of waste and historically have shown little/background contamination. Locations of the replacement wells are shown on Drawing 3.

Each new groundwater monitoring well will be constructed in a drilled borehole approximately 8 inches in diameter. Drilling will be performed with hollow stem augers. The wells will be constructed of a 2-inch diameter Schedule 304 stainless steel screen and threaded, flush joint Schedule 40 PVC casing. Ten feet of stainless steel wire wrapped screen with 0.02-inch openings will be installed in each deep borehole, and 20-foot screens will be installed in each shallow borehole, 5 feet above the water table and 15 feet below. The PVC riser will extend from the top of the screen to 2½ feet above ground surface and will be contained in a steel protective casing with a locking cover.

The annulus of the borehole in the area of the screen will be sand-packed to a height of 2 feet above the screened interval with No. 1 Grade clean silica sand. A finer grained No. 00 sand pack material (100 percent passing the No. 30 sieve and less than 2 percent passing the No. 200 sieve), 6 inches in thickness, will be placed on top of the sand pack between the sand and the bentonite seal. A 3-foot seal of bentonite pellets or slurry will be placed immediately above the filter material and 6 inches of No. 00 Grade silica sand pack will be placed above the bentonite seal. The remaining annulus will be grouted to the surface with cement/bentonite grout. The bentonite will be tested and/or warranteed to be free or organic and inorganic contaminants. All material placed in the annulus of the borehole will be installed using a tremie pipe.

A 4-inch diameter protective outer steel surface casing with locking cover and a surface cement pad will be installed around each well casing/riser. An illustration of well construction is provided on Drawing 6.