OFF-SITE FEASIBILITY STUDY

A.K. ALLEN COMPANY, INC.
MINEOLA, NY

Site Number 1-30-100

June 2005

Prepared for:

A.K. ALLEN COMPANY, INC.
255 East Second Street
Mineola, NY 11501

Prepared by:

CA RICH CONSULTANTS, INC.
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and

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Second Submission

CA RICH
ENVIRONMENTAL SPECIALISTS

June 29, 2005

NYSDEC
Division of Hazardous Waste Remediation
625 Broadway
Albany, New York 12233-7015

Attention: Kevin Carpenter, P.E.

Re: Off-Site Feasibility Study Report
A.K. Allen Company, Inc.
Mineola, NY
Site No. #130100

Dear Mr. Carpenter:

Attached is the Second Submission of the Off-Site Feasibility Study Report for the above-referenced Site. If you have questions or require any additional detail, please do not hesitate to contact us.

Respectfully submitted,

CA RICH CONSULTANTS, INC.

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Seal: STATE OF NEW YORK STEPHEN J. OSMUNDSEN LICENSED No. 056136 PROFESSIONAL ENGINEER

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Users/Eric/docs/AKAllen/Feasibility Study/Off-site/Rpt cover letter

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1.0 EXECUTIVE SUMMARY

A.K. ALLEN COMPANY, INC. (AK Allen) is a manufacturer of precision-machined metal cylinders and valves, and has been in operation at 255 East Second Street in Mineola on Long Island since 1957. Releases from this manufacturing facility led to a series of subsurface investigation and remediation efforts performed under the auspices of the Nassau County Department of Health (NCDH) and the New York State Department of Environmental Conservation (NYSDEC). A summary of these activities is included in Section 4 of this Report. The Remedial Investigation (RI), Interim Remedial Measure (IRM), and subsequent remedial actions have been performed at a cost to AK Allen of nearly $1,000,000.

An IRM for this site was performed in 2002 and included the excavation and removal of approximately 770 tons of impacted soil from the rear of the property and the embankment of the east-west oriented Long Island Railroad (LIRR) tracks. The on-site soil end-point samples from the IRM were deemed acceptable by the NYSDEC and no additional excavation was required. The southern extent of off-site excavation was limited by the existence of the LIRR tracks. Additional sampling performed in 2004 as part of a Supplemental Remedial Investigation (SRI) confirmed that soil below the middle of the southern LIRR track is not impacted and the area of concern is primarily below the northern track and possibly below the third rails. As a follow up to the IRM, the NYSDEC concurred that future site activities should be divided into both on-site and off-site efforts.

Based on the investigation and remediation activities completed to date, two off-site concerns remain: an area of soil containing volatile organic compounds (VOCs); polychlorinated biphenyls (PCBs); and metals below and adjacent to an active LIRR main line that runs immediately south of, and parallel to, the AK Allen property; and the underlying uppermost groundwater beneath this area. Remediation of these soils beneath the track-bed will require the cooperation of the LIRR and/or its parent agency, the Metropolitan Transit Authority (MTA). The feasibility of available alternatives to address this situation is discussed herein.

Four remedial alternatives were developed and analyzed for this Off-Site Feasibility Study. They are outlined as follows:

1. No action;
2. Long-term groundwater monitoring with Engineering Controls (EC) and Institutional Controls (IC);
3. Removal of impacted soil below the LIRR tracks and post-remediation groundwater monitoring; and
4. Removal of impacted soil below the LIRR tracks during future maintenance activities and post-remediation groundwater monitoring.

Based upon an evaluation of these alternatives using the criteria included in the NYSDEC's Department of Environmental Remediation document, DER-10, Remedial Alternative 4 is the recommended remedy for this area.

2.0 PURPOSE

This off-site Feasibility Study (FS) Report was prepared by CA RICH Consultants, Inc. ("CA RICH"; Plainview, NY) and Air Resources Group, LLC (ARG; Albany, NY) for the AK Allen Company, Inc. or the subject property located at 255 East Second St., Mineola, NY (hereafter referred to as AK Allen, site, or facility). The purpose of this Report is to analyze the Remedial Investigation (RI) results and determine feasible remediation options. AK Allen performed the RI under terms of NYSDEC Consent Order Index #W1-0932-02-08.

FS reporting has been developed in two documents: an "On-Site" FS Report and this second, separate, "Off-Site" FS Report. This approach allows off-site decision-making that will require further Long Island Rail Road (LIRR) input to proceed, independent of on-site concerns. The LIRR's parent agency, the MTA, is presently considering a new 2005-2009 ($2.4B) Capital Plan that includes improvements to this main service line running through mid-Long Island. This would involve various track improvements and station upgrades, and may allow an opportunity to remediate the off-site concerns with minimal rail service interruptions.

This off-site FS identifies and evaluates options available for site-related, off-site remedial action. It identifies the overall goal of the remediation based upon review of environmental data collected, reduced, and analyzed, and ascertains the preferred remedial objective. The intent of this off-site FS is to serve as a basis for remedy selection decision-making processes.

Thus, this particular Report focuses on "Off-Site" FS issues and remedial alternatives analyses. The "On-Site" FS Report will be submitted under separate cover.

3.0 SITE DESCRIPTION & HISTORY

A.K. ALLEN COMPANY, INC. (AK Allen) at 255 East Second Street in Mineola is a manufacturer of precision-machined metal cylinders and valves and has been in operation on Long Island since 1957. The Manhasset Machine Company was the initial leasehold in the building from 1947 to 1957 prior to occupation by AK Allen. The facility contains approximately 120,000 square feet of industrial manufacturing, warehouse and office space within a modernized one-story industrial building situated on an approximate 195,000 square foot lot (about 4.5 acres). Surface elevations in the area of the site exhibit a slight slope to the south and west.

Neighboring and nearby land use directly across East Second Street to the north and to both the east and west of the property boundaries is industrial and has been since at least the early 1900s. The main track line of LIRR borders the site immediately to the south and serves as an active, east-west right-of-way carrying passengers between Pennsylvania Station (NYC); Jamaica (Queens); Mineola Station; and points east on Long Island. Across the tracks and to the south, there's a residential area which generally continues across Old Country Road into the Village of Garden City.

The site is municipally sewered and serviced with public well water provided by the Village of Mineola (Town of North Hempstead) in Nassau County. Mineola Building Department records indicate that the 255 East Second Street structure was constructed in 1945 and originally included three cesspools. One of the cesspools was connected to a series of bathrooms and the other two cesspools were connected to water fountains. The building was connected to the municipal sewer system in 1953, approximately eight years after its construction. Results of groundwater sampling from on-site monitoring wells confirm that the cesspools are not historical contaminant sources.

Historical research using aerial photos, Sanborn maps, New York State and U.S. Environmental Protection Agency (EPA) databases, and other documents, show several sites or areas of industrial/commercial land use within close proximity that either predated the 255 East Second Street facility or developed along with it, including: a coal yard; a NY telephone maintenance and repair facility; a manufacturer of railroad cars and components; a plastics manufacturing facility airplane parts manufacturing; as well as LIRR tracks, and others.

4.0 SUMMARY OF REMEDIAL INVESTIGATION, INTERIM REMEDIAL MEASURE, and EXPOSURE/RISK ASSESSMENT

4.1 General

During the 1990's and early 2000's, a sequence of exploratory remedial investigations and a NYSDEC-approved Interim Remedial Measure cleanup (IRM) were performed under the auspices of the Nassau County Department of Health (NCDH) and/or the NYSDEC. In total, approximately 770 tons of impacted soil from two excavations and cleaned-out storm drains were transported off-site to the GCI disposal facility in Quebec, Canada. These activities were conducted under NYSDEC supervision.

The following discussion summarizes the rationale and results of these prior informational-gathering efforts and includes a subsequent qualitative exposure/risk assessment. Based upon these results, the remaining residual substances of concern in the off-site soils are:

- Halogenated Volatile Organic Compounds (VOCs) including: perchloroethene (a.k.a. PCE or tetrachloroethene), trichloroethene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA).
- Polychlorinated Biphenyls (PCBs)

Heavy metals (cadmium, chromium, lead and arsenic), like the semivolatile class of organic compounds (SVOCs), are present off-site within the railroad right-of-way and are not uniquely attributable to the site. Based upon review of the technical literature, this is consistent with heavily-utilized railroad tracks set within a long-established and active railroad easement. Residual PCBs indicated by the presence of only one PCB isomer, Aroclor 1254, will remain immobile buried in the off-site soils along and beneath the tracks. PCB compounds, which have low solubility and adsorb onto soils with high humic and clay content, do not readily desorb by water infiltration and thus are extremely unlikely to reach groundwater.

Based upon the unknown low concentrations of VOCs and PCBs in these off-site earth materials, together with the fact that the LIRR property will in all likelihood remain a secured railroad right-of-way in perpetuity, remediation considerations have been narrowed to four alternative cleanup approaches:

1. No action;

2. Periodic uppermost aquifer groundwater monitoring, and EC/ICs;

3. Removal of impacted soils below the affected LIRR track-bed area in an expedited manner similar to an Interim Remedial Measure, and periodic uppermost aquifer groundwater monitoring; and

4. Removal of impacted soils below the affected LIRR track-bed area during future track-bed maintenance activities, and periodic uppermost aquifer groundwater monitoring.

In correspondence from NYSDEC to CA RICH dated June 22, 2004, NYSDEC suggested that a deep off-site monitoring well should be designed, installed and sampled. This was evaluated with respect to the available groundwater data for the site. 2001 data from NCDH show the wide-spread presence of the same or similar compounds in wells located in other areas of the County (Ref.16). Given the low VOC detections in the on-site wells, the absence of VOCs in the current off-site well, and the fact that no deeper water impact could result without more substantial impact first in the uppermost water column above it, it is believed that the current network of monitoring wells is adequate to monitor this site's uppermost groundwater quality. Neither a dense non-aqueous phase liquid (DNAPL) nor higher levels of dissolved VOCs at lower depths have been identified or are expected from this site. However, the installation of a one-time, deep off-site geoprobe to monitor VOCs will be included as part of the remedial design.

Selected reference documents listed below summarize the systematic sequence of NYSDEC-approved remedial investigations and cleanup efforts accomplished over the past ten years:

Document	**Date**
Remedial Investigation Work Plan, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 1)	October 1994
Remedial Investigation Report, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 2)	February 1996
Interim Remedial Measures Work Plan, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 3)	March 2003
Supplemental Interim Remedial Measures Work Plan No. 2, Additional Sampling along LIRR Embankment, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 11)	August 2003
Interim Remedial Measures Report, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 4)	February 2004
Supplemental Remedial Investigation Report, Monitoring Well Sampling & Analysis & Off-Site Soil Borings, A.K. ALLEN COMPANY, MINEOLA, NY, CA RICH CONSULTANTS, INC. (Ref. 12)	April 2004

4.2 Remedial Investigations

On June 25, 1992, a representative of NCDH inspected the facility and collected three soil samples from the rear of the property. On June 30 and July 1, 1992, NCDH representatives returned and collected an additional 13 soil samples from the former metal shavings drum storage area and along a portion of the adjoining LIRR right-of-way.

Soil was found to contain halogenated VOCs at levels above applicable NYSDEC cleanup guidance levels that were prevailing at that time. The VOCs included: 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethene, tetrachloroethene and trichloroethene. Non-halogenated VOCs that exceeded State cleanup guidance levels were: toluene, ethylbenzene, o-xylene and naphthalene. Metals analyses (using a sample preparation method to assess leachability) of the soils revealed only cadmium above NYSDEC's cleanup guidance level. The locations of the County's soil samples with a summary of their test results, is included in Remedial Investigation Report (Ref. 2).

During November 1995, in response to the aforementioned test results, the initial Remedial Investigation (RI) was designed and performed under NCDH oversight. This investigation included four data-gathering efforts: 1) a series of exploratory soil test borings advanced into the ground in the rear of the property; 2) collection and analyses of shallow soil samples from along the LIRR embankment; 3) collection and analyses of sediment samples from inside two storm drains in the rear parking lot area and from inside one interior floor drain; and 4) the collection and analyses of two samples of uppermost groundwater at water table depth beneath the property.

Test results confirmed the presence of the same compounds and constituents first detected in the soil by NCDH. Importantly, the underlying uppermost groundwater did not contain elevated levels of any of the contaminants detected in the soil. Cross-sectional illustrations and tables summarizing the 1995 RI results are included in Remedial Investigation Report (Ref. 2).

The principal findings of the initial RI indicated four (4) on-site potential soil source areas of concern. These four areas are illustrated in the subsequent IRM Report (Ref. 4), and characterized as follows:

1) the former metal shavings drum storage area located in the rear parking lot and the adjacent LIRR embankment (a.k.a. "western excavation area");

2) an area approximately 100 feet east of the former drum storage area and the adjacent LIRR embankment (a.k.a. "eastern excavation area");

3) storm drains SD-1, SD-2, SD-3 & 3OF and SD-4; and

4) interior floor drain, FD-1.

4.3 Interim Remedial Measure (IRM)

4.3.1 General

Based on the RI, a NYSDEC-approved cleanup referred to an Interim Remedial Measure or "IRM" was developed to address the above-listed four source areas of soil/sediment. This interim remedial measure was implemented to expedite the removal of known, identifiable impacted soils and sediments. The NYSDEC-approved IRM was completed during May - September of 2003. The completed IRM consisted of the following four elements:

- Collection of additional soil samples to supplement the data collected in the 1995 Remedial Investigation;
- Design and installation of groundwater monitoring wells;
- Excavation and removal of impacted soils in both the eastern and western excavation areas; and
- Cleanout of storm drains SD-1, SD-2, SD-3 & 3OF and SD-4 and floor drain FD-1.

Remedial exploratory excavations in the study areas were advanced both laterally and vertically until soils were visually not impacted and did not have any impact-related odor and/or PID meter detection. Excavation of impacted soil extended south of the property line, off-site down along the slope of the LIRR embankment, and up to the gravel ballast bed of the LIRR tracks. Sidewall and bottom excavation end-point samples were collected as outlined in the approved NYSDEC Work Plan with results summarized in Reference 3.

4.3.2 Western Excavation

The western excavation (beneath and surrounding the former metal shavings drum storage area) extended from the southern portion of the parking lot south to the property line and along the embankment of the LIRR. Per LIRR instruction, remedial excavation was terminated five (5) feet from the railroad ties of the northern track (i.e., closest to the site). Drums of metal shavings that were historically stored within the western excavation area are no longer stored outside of the building. Excavated soils were temporarily staged on-site and subsequently transported off-site to an approved disposal facility in Canada.

VOC and SVOC concentrations in final post-excavation bottom and sidewall samples were found to be below NYSDEC Technical Administrative Guidance Memorandum (TAGM) guidance levels. Two samples from the southern sidewall (EP-2 & 3) displayed a black coloration and exceeded cleanup objectives for VOCs and SVOCs. In general, metals were below TAGM cleanup objectives although three samples: EP-2, 3 and 4 (from the southern sidewall) also displayed a black coloration and exceeded cleanup objectives. These discolored soils were too close to the railroad tracks and were not removed at the direction of the LIRR (for track structural integrity and safety reasons) with the concurrence of NYSDEC.

PCBs were found below the NYSDEC TAGM cleanup objective with the singular exception of location EP-46D at four (4) feet. A subsequent deeper sample, EP-46D2, collected at 10 feet below grade at this same testing location did not exceed the cleanup objective for PCBs. All excavation sidewall samples were below cleanup objectives with the exception of the same three southern sidewall samples referenced above where metals still exceeded cleanup objectives (EP-2, 3 & 4). The general area of affected soil off-site is illustrated in the Supplemental Remedial Investigation Report (Ref. 12).

4.3.3 Eastern Excavation

The eastern excavation was smaller than the western excavation and extended from the southern part of the parking lot south to the property fence line, and down along the embankment of the LIRR. Soil in the south sidewall of the excavation along the embankment of the LIRR was visibly not contaminated, and clean/acceptable NYSDEC-agreed upon end-points were obtained by testing.

VOCs, SVOCs, and metals levels in all of the final excavation bottom and sidewall samples were below applicable NYSDEC TAGM cleanup objectives. PCB levels in all of the final excavation bottom and sidewall samples were below TAGM cleanup objectives, with the exception of locations EP-44U (3,270 ug/kg) and EP-45U (1,650 ug/kg). These two surficial soil samples collected to 1 foot below grade exceeded the PCB TAGM of 1,000 ug/kg.

4.3.4 Storm & Floor Drain Cleanouts

Five (5) storm water drains identified as: SD-1, SD-2, SD-3 and 3OF, SD-4 installed in the rear parking lot area of the facility, and one floor drain (FD-1) inside the building, were thoroughly cleaned out concurrently with the aforementioned remedial excavation program. These drains are considered discharge structures and are federally regulated. They are subject to applicable requirements under the Federal Underground Injection Control (UIC) Program, administered by

NCDH acting as local agent for the EPA. Further details of the regulatory requirements and the drain cleanouts are included in Reference 3.

All impacted soil and sediment removed from the bottoms of storm water drains SD-1, 3OF, and 4 was replaced with imported clean sand backfill and these three rehabilitated drains now effectively discharge storm water from the facility. Exterior storm drains SD-2 and SD-3, and the building interior floor drain FD-01, were filled-in with clean backfill material and closed. Upon satisfactory completion of this work, the USEPA/NCDH UIC Case was closed-out for AK ALLEN. Additional IRM detail is summarized in Interim Remedial Measures Report (Ref. 4).

4.3.5 Monitoring Wells

As part of the IRM, on March 27 & 28, 2003, three (3) small-diameter monitoring wells identified as IRM-MW-1, MW-2 and MW-3 were installed in the northern (front), eastern, and western corners of the property in a triangular configuration. Elevations of the tops of the PVC well casings were surveyed to 0.01 foot accuracy so that reproducible depth-to-water measurements could be used to prepare a water table elevation contour map to determine the elevation and apparent direction of horizontal groundwater flow.

On September 15, 2003, two (2) new monitoring wells, IRM-MW-4 & IRM-MW-5, were installed. MW-4 was installed within the backfilled western excavation area in the rear on-site, and MW-5 was installed off-site in the hydraulically downgradient southward direction - across the tracks at the intersection of Albertson Place & Wisteria Avenue in Mineola. A map illustrating the locations of all five monitoring wells is included as Figure 2 in the Supplemental Remedial Investigation Report (Ref. 6).

4.4 Additional Testing

4.4.1 General

A Supplemental Remedial Investigation (SRI) was the most recently completed remedial work. The SRI involved further on-site and off-site soil, soil gas (soil vapor) and groundwater quality investigation (supplementing the 2003 IRM) to address remaining information needs.

4.4.2 Soil

Additional perimeter soil borings identified as SB-2W and SB-4E were advanced west and east of the initial western excavation area. At each location, soil samples were collected at depths of 20 to 26 inches and 36 to 42 inches and analyzed for VOCs, SVOCs, metals, and PCBs. Additional deeper samples were also collected at the five-foot horizon and held for analysis, pending results from the shallower samples. Only one of these samples, SB-4NT (54-60 inches) was analyzed for SVOCs based on the results of the shallower samples. Results for these samples are presented in the SRI report (see Reference 6, Table 3).

4.4.3 Soil Gas

Soil gas samples were collected south of, and parallel to, the southern railroad tracks. None of the VOCs detected in on-site or off-site impacted soils were detected in these off-site soil gas locations. The absence of impacted soil gas beneath the tracks suggests that soil gas potentially emanating from on-site soil residuals has not migrated laterally through the subsurface soils this far south, and that VOCs below the LIRR tracks are not migrating to the south as vapor. MTBE, a compound used only as a gasoline oxygenate additive, was detected in soil gas beneath the railroad tracks, but it is not an artifact of the facility's historical manufacturing processes, and thus, not considered uniquely attributable to AK Allen.

On April 7, 2004, three soil gas probes (SG-3, SG-4 and SG-5) were advanced on-site in the rear of the facility. SG-3 and SG-4 were set alongside the building's south central wall beneath the building footing at 5 to 5-1/2 feet (SG-3), and at 4 to 4-1/2 feet (SG-4, east of SG-3), respectively. SG-5 was placed further south, away from the building within the former western remedial excavation area at 9 to 9-1/2 feet below grade. The deeper SG-5 sampling depth was designed to correspond to the elevation of the soils beneath the LIRR tracks. VOCs were detected in all three soil gas testing locations at varying concentrations (Reference 6, Table 8 and Figure 11).

4.4.4 Groundwater

The depth to groundwater on-site is approximately 53 feet, roughly equivalent to an elevation of 58 feet above mean sea level. This water table elevation represents the surface of the uppermost saturated aquifer occurring beneath the site. The direction and rate of horizontal groundwater flow at the water table elevation is to the southwest at a regional rate of about 1 foot per day (U.S.G.S.). A water table map is included as Figure 2 in Reference 6. It is also provided herein as Figure 2 (not listed in TOC).

The property is situated within Long Island's Hydrogeologic Zone 1 – one of several hydrogeologic zones that have been mapped on Long Island to define and delineate the island's specific aquifer recharge and discharge areas. Zone 1 delineates the deep flow, sole source Magothy Aquifer drinking water recharge area.

The existing upgradient monitoring well was found to be free of VOCs and SVOCs. On-site groundwater contained low levels of tetrachloroethene, trichloroethene, 1,1-dichloroethane and xylene (e.g., 2 to 14 ug/L). No other VOCs are present above groundwater standards and no VOCs, SVOCs, or metals occur above standards hydrologically downgradient to the south. It is important to note that similar VOC compounds are reported in many NCDH groundwater monitoring wells throughout Nassau County (see NCDH Groundwater report). The NCDH set four primary criteria for selecting water wells to be tested, with one of these four criteria being the well's proximity to railroad tracks indicating their concerns with possible releases from railroad tracks as potential groundwater contaminant sources.

PCBs were not detected in underlying on-site or off-site groundwater. This was expected in consideration of their extremely low solubilities and low mobilities in both soil and groundwater.

4.5 Exposure Risk/Assessment

4.5.1 General

This section presents a qualitative human health Exposure Risk/Assessment (EA) to evaluate whether VOCs, SVOCs, PCBs and metals levels remaining in off-site soil, and/or soil gas (VOCs only), could present risk to human health. This was accomplished by characterizing exposure settings, identifying potential and completed exposure pathways, and evaluating contaminant fate and transport.

4.5.2 Chemical Usage & Waste Streams

The facility currently has four (4) separate hazardous waste streams and ceased generating a former hazardous waste stream previously reported. Locations of the waste management units, and past and present waste stream types and inventory, are listed in the IRM Work Plan (Reference 3). Waste constituents include mineral spirits, alcohols, blackening caustics, chromic acid and alodine solutions. Small quantities of chlorinated solvents are currently used from time to time for parts cleaning. Various degreasing products, cutting fluids, and grinding oils were, and still are, used for industrial purposes. AK Allen has formal RCRA (Resource Conservation and Recovery Act) management practices to properly store chemicals used on-site, as well as to store, handle and dispose of solid and hazardous wastes.

As agreed to with the NYSDEC, federal OSHA permissible exposure limits (PELs) will provide the applicable regulatory guidance for indoor air quality at this facility (Reference 15, letter dated April 4, 2005).

Cleaning and lubricating products now used at the facility do not contain PCBs. There is no evidence of on-site AK Allen history of use of PCBs in these kinds of materials. PCB use has been identified historically with the LIRR and railroads in general, and is clearly reflected in the literature as a likely contaminant in railroad rights-of-way.

A description of the present-day physical characteristics of the existing AK Allen facility is available in Reference 12, Supplemental Remedial Investigation Report.

4.5.3 Receptors

Categories of potential human receptors likely to be present at the LIRR right-of-way were developed and are listed below. This list is based upon the history of past and current industrial/commercial and residential land use in the surrounding area, and is projected to a future of continued industrial/commercial uses.

- LIRR/MTA and contractor workers (current/future)
- Workers Immediately outside the LIRR area (current/future)
- Immediately adjacent residents (current/future)

Trespassers and LIRR supervised visitors would have significantly less or low potential for exposure as compared to that for the LIRR workers and were consequently deleted from further consideration.

4.5.4 Routes of Potential Exposure

The primary exposure routes by which the identified substances could contact and/or enter the body are considered to be: ingestion of water and/or soil; inhalation of vapors and dust; and/or dermal contact (with water or soil).

The source areas were the five exterior storm drains (SD-1, SD-2, SD-3, 3OF and SD-4); the interior floor drain (FD-1); the 'eastern excavation' area; and the 'western excavation' area. The storm drains and the interior floor drain were fully remediated to the satisfaction of both EPA and NCDH. The 'eastern excavation' area was remediated to satisfactory end-point tests, and the 'western excavation' area achieved clean endpoints along its north, east and west sidewalls. The western excavation south sidewall (parallel to the tracks) still had exceedances of VOCs,

SVOCs, metals and PCBs (detailed on Tables EP-1 through 4 of the IRM Report) relative to the end point agreement with NYSDEC and the LIRR. Further exploratory subsurface testing between the completed backfilled western excavation, and along the railroad embankment and out onto the active railroad track-bed, revealed soils containing both PCBs and VOCs at 2-foot depths (see Figure 1).

4.5.5 Exposure Pathway(s)

The potential exposure pathway from soil would require future excavation(s) or construction by LIRR/contractor workers. It is not reasonable to expect that the other 'receptor groups' (i.e., residents, site visitors, passers-by) would have contact with these substances, because the soil remains below grade (buried) and is found in an inaccessible, restricted and secured area that is fenced, posted, patrolled by LIRR and Nassau County police, and is a high hazard area due to the frequency of trains. This LIRR area soil remains isolated in-situ beneath at least 6-inches of railroad track ballast (crushed stone) with mixed-in, non-impacted, soils. Railroad ballast and the soil cover over the impacted soil serve as a cap preventing direct contact/release.

There is no potential ingestion exposure pathway from groundwater to LIRR area workers, non-LIRR area workers and non-workers, or area residents, since the locality is permanently serviced by public water from deep (e.g., 400-500 ft.) municipal supply wells – none of which are situated in close proximity to the subject site and all of which must meet Federal and State drinking water and monitoring standards.

There is only one potential exposure pathway from the impacted soil, and a remote possibility of soil gas migration. Ground elevation of the 'below grade' LIRR right-of-way is lower than that of the higher ground to both the north and south of the tracks. Soil gas behind the AK Allen building (see the On-Site Feasibility Study Report) could possibly migrate laterally to the LIRR right-of-way. However, this migration pathway would be eliminated by the installation of the soil vapor extraction system discussed in the on-site FS Report.

There is no demonstrated evidence indicating the presence of soil gas in the railroad right-of-way. Therefore, the emphasis in this exposure assessment is on soil and groundwater mitigation pathways.

4.5.6 Summary

As related to this off-site FS, the human exposure pathway from subsurface impacted soils would only be complete for construction workers working on the LIRR property performing excavation-type activities in the specifically-impacted area beneath the tracks. This concern would be addressed in an appropriate Health & Safety Plan for construction workers at the time of construction activities. Although there are still some off-site residual materials remaining adjacent to, and below, the LIRR tracks which are impacted with VOCs and PCBs, these off-site soils are covered by a cap of non-impacted soil and crushed stone ballast, both of which will remain in place however long the LIRR continues to utilize and maintain this active rail line. In addition, the buried impacted soil is fixed in-situ within a highly restricted and routinely monitored, fenced-in and controlled corridor area. Workers on these tracks are typically LIRR personnel or the approved equivalent, with an understanding in matters relating to their areas of professional expertise with respect to track safety, worker hazards, materials exposure, and emergency response.

Because PCBs have low solubility and high affinity for organic materials and clays in soils to which they adsorb, there is a tendency for these compounds to remain fixed in-situ. It is highly unlikely that groundwater beneath this soil will be degraded with PCBs. These factors coupled with long-term groundwater monitoring create a long-term management control for soils with PCBs. It is highly improbable that low level VOCs observed in the uppermost groundwater quality beneath the site -- whether from historical site activities or from regional ambient groundwater quality within the shallow Upper Glacial Aquifer -- will reach any public supply well in the deeper Magothy Aquifer at any significant concentration. This is based upon: considerable horizontal distances from the site to municipal public supply well fields; significant screen depths of these same water wells in the deep Magothy Aquifer; and the attenuation capability of the multi-layered stratified geology that exists between the site and the deep intake zones of area supply wells. Thus, this potential exposure pathway is considered not complete. Shallow groundwater upgradient and downgradient of the site, and downgradient of the LIRR tracks, is presently monitored using the existing network of monitoring wells, and at least one more deep geoprobe is being proposed to augment the existing database.

No impact is expected from "on-site" (i.e., AK Allen building-related) soil gas migrating under the tracks to area homes to the south, since no VOCs were detected in the sampling points within the right-of-way between the homes and the site. The soil vapor extraction system proposed for on-site soil gas will enhance this separation between the site and homes to the south by creating a soil gas capture zone. Thus, we conclude that the impacted soil below the LIRR tracks does not present potential soil, soil gas, and/or groundwater exposure pathways.

5.0 REMEDIAL GOAL & REMEDIAL ACTION OBJECTIVE

The remedial goal of this Off-Site Feasibility Study is to insure the area of impacted soil on the LIRR property is protective of human health and the environment, and to preserve groundwater quality flowing beneath it.

The media of concern are soil and groundwater. Surface water (storm water) from the site is not expected to come into contact with these off-site media, and off-site soil gas data do not indicate any concern.

As such, the substances of concern with respect to potential off-site impacts are VOCs and PCBs. The categories and source of their respective compliance Standards, Criteria & Guidance (SCG) are listed below by media:

Media	Contaminant	SCG
Soil	VOCs	TAGM*
	PCBs	TAGM*, EPA**
	Cadmium & Chromium	TAGM*
Groundwater	VOCs	TOGS*
	PCBs	TOGS*
	Cadmium & Chromium	TOGS*

* Guidance

** Regulatory Standard, TSCA Policy

Based upon VOCs and PCBs as the substances of concern in the soil, the remedial action objective (RAO) is designed to:

1. prevent ingestion/dermal contact with soil by humans;
2. prevent the inhalation of VOC vapors; and
3. prevent migration of contaminants by groundwater.

6.0 RESPONSE ACTIONS

Based on the results of the Supplemental Remedial Investigation, the defined impacted soil within the railroad right-of-way consists of an area of approximately 70 feet by 15 feet or 1,000 square feet and a thickness of approximately 2.5 to 3 feet yielding an approximate volume of 3,000 cubic feet or 110 cubic yards. This soil exists within LIRR property and is covered with one

foot or more of soil and crushed-rock gravel material referred to as "ballast". The substances of concern are the PCB isomer Aroclor 1254, and the chlorinated VOCs: perchloroethene, trichloroethene, and 1,1,1-trichloroethane.

Selected SVOCs and the metals arsenic, cadmium and chromium were detected at levels slightly above the TAGM, but at concentrations typical of urban areas and railroad right-of-ways. All of the off-site impacted soil is either below or adjacent to the active LIRR tracks. Any physical excavation and disposal of this soil will require a temporary commuter service interruption and shut down of the LIRR main line.

7.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The affected soil is dense and compacted due to long-term heavy utilization of these important railroad tracks for which the LIRR has specific fill and ballast engineering standards. As such, the only feasible remedial technologies are:

1) leaving the contaminated soil in place with an appropriate cover or cap; and the incorporation of LIRR security and technical standards for the site as EC/ICs; along with the addition of health and safety plan provisions related to the site chemistry.
2) soil excavation and off-site disposal.

8.0 DEVELOPMENT OF ALTERNATIVES

8.1 General

Four (4) remedial alternatives have been developed for the impacted off-site portion of the AK Allen site. Two of these are identical regarding the excavation and disposal of affected soils, the difference being in the manner of expediency. These are explained below and analyzed individually in detail.

8.2 Alternative 1 – No Action

Alternative 1 is the "No Action" alternative. This alternative consists of leaving the impacted soils in place with no additional monitoring or control actions. LIRR controls access to the off-site area and its technical standards for track maintenance (soil cover and ballast) would act as EC/ICs. As these tracks have been in use for more than 140 years, no change of use is expected for this off-site area in the foreseeable future.

8.3 Alternative 2 - Long-Term Groundwater Monitoring with EC/ICs

Based upon EPA TSCA guidance documents for PCBs, the soil and ballast cover overlying the impacted soil serve as an acceptable cap separating these soils from the environment above. In addition, a network of five (5) groundwater monitoring wells which includes upgradient on-site and downgradient off-site locations has been established. Furthermore, LIRR institutional controls such as right-of-way security, fencing, patrols, along with the LIRR technical standards for soil cover, density, and ballast provide effective EC/ICs. Since the tracks have been in use for more than 140 years, no change of use is expected for this off-site area in the foreseeable future. The "Long-Term Groundwater Monitoring with LIRR EC/ICs" alternative includes ensuring that cover and ballast materials remain permanently in place, along with periodic monitoring of the underlying groundwater.

8.4 Alternative 3 - Removal of Impacted Soils Below the LIRR and Post-Remediation Groundwater Monitoring

This third remedial alternative includes temporarily curtailing railroad service to this active LIRR main line, temporarily removing the overlying tracks, railroad ties & electrified portion of the third rail, excavating the gravel aggregate ballast and underlying impacted soils, placing clean and compacted backfill into the excavation and replacing the track bed and tracks, all of which would require extensive coordination with the LIRR. Alternative 3 assumes that the time needed to perform the removal is not a factor and that the excavation can continue until all end-point samples meet or achieve the TAGM using an off-site laboratory. This action would then be followed by the periodic monitoring of the underlying groundwater quality for the substances of concern.

8.5 Alternative 4 - Removal of Impacted Soils Below the LIRR During Future Track Maintenance and Post-Remediation Groundwater Monitoring with EC/ICs

This fourth remedial alternative is similar to the third: "Removal of Impacted Soils Below the LIRR and Post-Remediation Monitoring and EC/ICs" (Item 8.3 above), with the exception that the work would be performed at some time in the future that would correspond with MTA's planned physical improvements and construction upgrades to this particular section of LIRR track-bed. The LIRR has informed us that a 48-hour track outage has been scheduled for a track-related construction project in March 2007. This will require extensive cooperation with the LIRR.

The fourth remedial alternative differs from alternative 3 in that the time allotted by the LIRR for the excavation of impacted soils would be limited to its implementation within the period of the 48-hour track outage. Thus, this alternative may not ensure that all excavation end-points

sample results will meet the TAGM. Due to this time constraint, soil analyses will be performed using an on-site mobile laboratory to determine the final end-point results for the excavation in an expeditious fashion.

Note: By letter dated January 11, 2005, NYSDEC requested that AK Allen consider removal of the impacted soil as part of a planned May 2005 track outage. As part of the ongoing remediation effort, the possibility of performing this work during a planned 22-hour May 2005 LIRR track outage was researched. The option to perform this work was deemed infeasible as the 22-hour track outage only allowed a window of 6-hours for the actual physical remedial excavation of soil and replacement and compaction of clean backfill. In addition, it was determined that there was no LIRR plan to remove the southern track and third rail during this constrained work period. Therefore, no assurances could be provided that an IRM in May 2005 could remove all significant impacted soils in the LIRR right-of-way. Correspondence regarding this effort is attached as References 13, 14 and 15.

9.0 ANALYSIS OF ALTERNATIVES

In accordance with the NYSDEC DER-10 guidance document, the following evaluation of the four proposed alternatives has been performed.

9.1 Alternative 1 - No Action

9.1.1 Protection of Human Health and the Environment

The "No Action" alternative may be protective of human health and the environment. However, there are no ongoing monitoring or control components to assure such protection over time. This alternative does not meet SCGs for soil.

9.1.2. Standards, Criteria & Guidance (SCG)

The SCGs are:

Media	SCG	PCE	TCE	TCA	PCBs	Metals
Ground Water	NYSDEC TOGS*	5 ug/L	5 ug/L	5 ug/L	0.09 ug/l	Cd – 5 ug/l Cr – 50 ug/l
Soil	NYSDEC TAGM*	1,400 ug/Kg	700 ug/Kg	800 ug/Kg	10,000 ug/Kg (below 1 ft.)	Cd – 1 mg/kg Cr – 10 mg/kg
Soil	EPA**	NA	NA	NA	100,000 ug/Kg (with a soil cap)	Cd - NA Cr - NA
Soil Gas	None available					

* Guidance

** Regulatory Standard

This alternative does not achieve the NYSDEC TAGM for PCBs in soil but does meet the EPA SCG for PCB-impacted material covered with a soil cap. Furthermore, as a soil cap is present and the rail lines are secured, there will be no contact with the lower soils and there is no completed exposure pathway for dermal contact or inhalation of these materials. This alternative does currently achieve the TOGS for groundwater at off-site well (MW-5). Long-term groundwater monitoring is not included in this alternative. LIRR site security and technical standards for soil compaction, cover, and ballast would remain in place as EC/ICs.

9.1.3 Long-Term Effectiveness & Permanence

Impacted soil will remain sub-surface below the LIRR tracks as part of this remedy. Controls for this alternative, which are a permanent soil and crushed rock cap, coupled with LIRR site controls and security, are reliable factors to ensure that there will not be a pathway for dermal contact or inhalation. However, these potential controls are not addressed in the form of an EC or IC. Long-term effectiveness cannot be assured and there is no EC or IC that addresses groundwater monitoring.

9.1.4 Reduction of Toxicity, Mobility or Volume

The objective of this alternative is to continue to immobilize the contaminants within the impacted soil through use of a cap and site security. This alternative will not change the toxicity, mobility or volume of impacted soil.

9.1.5 Short-Term Impacts

There are no short-term impacts from this alternative.

9.1.6 Implementability

This alternative is fully implementable.

9.1.7 Cost

There is no further cost to enact this alternative.

9.1.8 Community Acceptance

This alternative may not achieve community acceptance as there is no long-term control or monitoring component.

9.2 Alternative 2 - Long-Term Groundwater Monitoring with EC/ICs

9.2.1 Protection of Human Health and the Environment

The "Long-Term Monitoring with EC/ICs" alternative with a cap over the impacted soil is coupled with long-term groundwater monitoring, and is considered protective of human health and the environment, although it does not return the impacted soil to SCG levels.

9.2.2. Standards, Criteria & Guidance (SCG)

The SCGs are:

Media	SCG	PCE	TCE	TCA	PCBs	Metals
Ground Water	NYSDEC TOGS*	5 ug/L	5 ug/L	5 ug/L	0.09 ug/l	Cd – 5 ug/l Cr – 50 ug/l
Soil	NYSDEC TAGM*	1,400 ug/Kg	700 ug/Kg	800 ug/Kg	10,000 ug/Kg (below 1 ft.)	Cd – 1 mg/kg Cr – 10 mg/kg
Soil	EPA**	NA	NA	NA	100,000 ug/Kg (with a soil cap)	Cd - NA Cr - NA
Soil Gas	None available					

* Guidance

** Regulatory Standard

This alternative does not achieve the NYSDEC TAGM for PCBs in soil but does meet the EPA SCG for PCB-impacted material covered with a soil cap. Furthermore, as a soil cap is present and the rail lines are secured, contact with the buried contaminants is highly unlikely and thus there is no completed pathway for dermal contact or inhalation of these earth materials. This alternative does achieve the TOGS for groundwater at the location of the off-site well (MW-5). Long-term groundwater monitoring will track this pathway and any groundwater quality trends. EC/ICs will be required to ensure that the cap, site security and groundwater monitoring continue forward into the future.

9.2.3 Long-Term Effectiveness & Permanence

Impacted soil will remain below the LIRR tracks as part of this remedy. Controls for this alternative, which are a permanent soil and crushed rock cap, coupled with site security enforced by the LIRR, are reliable factors to ensure that there will not be a completed pathway for dermal contact or inhalation. Through the use of long-term groundwater monitoring, these controls are expected to continue to meet the RAOs.

Soil, if left in place within the right-of-way, would pose minimal to no chance of significant exposure to any of the receptor groups. Many remedial decisions incorporate soil cover as a protective component. In this case, the LIRR compaction standards for soil and the LIRR ballast requirements ensure that a integral soil cover would remain in place indefinitely over the area of

contaminated soil (which occurs primarily at depths greater than 2 feet near the tracks). Runoff in the right-of-way area is managed to prevent track flooding and would thereby minimize the potential for surface infiltration of water. The right-of-way is secured with chain link fencing and is well posted. LIRR security continually patrols the track and the LIRR train crews provide further opportunities to spot unauthorized access. Since this property is projected to be used as a railroad indefinitely, no change of use is anticipated that could increase the potential for exposure.

Therefore, the only likely exposure scenario would occur during major track construction activities. Since these are planned well in advance, health and safety procedures, along with soil management planning, can be used to prevent exposure to the subsurface soils in the site. EC/ICs already in place for normal track and right-of-way maintenance & security, along with health and safety and soil management plans, would therefore, be highly effective tools for preventing exposure to the site soils.

The literature (Reference 17 and 18) contains examples of remediation decisions made for railroad right-of-ways and other railroad-associated sites where similar chemical compounds have been left in place. In New York, active railroad sites and inactive sites have been identified where soil has been allowed to remain in place under conditions using engineering and institutional controls with monitoring similar to those existing for this site. At the Amtrack/Sunnyside Long Island City rail yard facility, soils containing PCBs have been allowed to remain in place while this railroad facility continues to operate (Reference 19).

9.2.4 Reduction of Toxicity, Mobility or Volume

The objective of this Alternative is to continue to immobilize the contaminants within the impacted soil through use of a cap and site controls and security. This alternative will not change the toxicity, mobility or volume of impacted soil.

9.2.5 Short-Term Impacts

There are no short-term impacts from this alternative.

9.2.6 Implementability

This Alternative is fully implementable with the cooperation of the LIRR. The soil and crushed rock cap are in place, the site is protected by fences and LIRR security personnel, and the groundwater monitoring wells are in place. Establishment of EC/ICs would be coordinated, implemented and maintained in joint cooperation with the LIRR.

9.2.7 Cost

The cost for this Alternative projected over the next 30 years is estimated below in present-value dollars (excludes inflation, scope adjustments, changes in CPI, etc.) and is based upon a 5% annualized rate of return:

Activity	Estimated Cost
Establishment of EC/ICs with LIRR	$ 10,000
Annual monitoring and reporting for 5 groundwater monitoring wells $10,000 per year x 30 years =	$300,000
Annual site inspection and certification of EC/ICs ($1500 x 30)	$ 45,000
Estimated total	$355,000
Present Worth	**$187,000**

9.2.8 Community Acceptance

This alternative is expected to achieve community acceptance. There are no identified completed exposure pathways for contaminants to contact residents, and no additional construction activity is required. EC/ICs will be in-place to ensure these controls continue into the future.

9.3 Alternative 3 - Removal of Impacted Soils Below the LIRR and Post-Remediation Groundwater Monitoring

9.3.1 Protection of Human Health and the Environment

This third alternative could return impacted soil to assumed pre-release conditions, and as such, is protective of human health and the environment. Leaving acceptable residuals that meet clean-up standards and guidance is also protective of human health and the environment.

9.3.2 Standards, Criteria & Guidance (SCG)

The SCGs are:

Media	SCG	PCE	TCE	TCA	PCBs	Metals
Ground Water	NYSDEC TOGS*	5 ug/L	5 ug/L	5 ug/L	0.09 ug/l	Cd – 5 ug/l Cr – 50 ug/l
Soil	NYSDEC TAGM*	1,400 ug/Kg	700 ug/Kg	800 ug/Kg	10,000 ug/Kg (below 1 ft.)	Cd – 1 mg/kg Cr – 10 mg/kg
Soil	EPA**	NA	NA	NA	100,000 ug/Kg (with a soil cap)	Cd - NA Cr - NA
Soil Gas	None available					

* Guidance

** Regulatory Standard

This alternative achieves the TAGM for soil, and the TOGS for groundwater at the location of the off-site well (MW-5). Post-Remediation groundwater monitoring will be used to track this pathway over time.

9.3.3 Long-Term Effectiveness & Permanence

Impacted soil below the LIRR tracks would be physically removed as part of this remedy. This alternative is expected to achieve long-term effectiveness with no long-term impacts. Through the use of post-remediation groundwater monitoring, this alternative is expected to meet the RAOs.

9.3.4 Reduction of Toxicity, Mobility or Volume

This alternative will permanently and significantly reduce the toxicity, mobility and volume of impacted soil.

9.3.5 Short-Term Impacts

There are major short-term (temporary) impacts to LIRR commuters (and the LIRR) from the implementation of this alternative. The only feasible way that the impacted soil beneath the railroad bed can be physically removed is to temporarily shut down both the main eastbound and westbound LIRR commuter lines. The tracks and ties will be removed before the remedial excavation program proceeds. Commuters on this very active important transportation corridor

would have to rely upon alternate forms of transportation, and/or the LIRR would have to provide the means to link passengers/commuters with the LIRR stations situated to the east and west of the remedial excavation track-bed area. This activity, in turn, impacts commuter work schedules, railroad stations, transportation routes, traffic, surrounding areas, involved public and private agencies, and certain commercial activities (RR station-related vendors, etc.).

Any excavation activity will, by necessity, result in the temporary shutdown of commuter rail operations on this line segment during the remediation effort as noted above. Construction activities for the soil removal effort are expected to occur during weekend evening and daytime hours when, the residences to the south of the track are at their highest occupancy rate. The soil removal effort will require round-the-clock construction activities involving heavy equipment (trucks and backhoes), cutting and handling of rails and ties, excavation of the contaminated soil, and restoration of the site. This overall construction effort is expected to take a minimum of 48 hours, not including mobilization and site preparation activities.

Night time work will necessitate high-intensity construction lighting. Construction activities will cause construction-related noise such as back-up warning signals, heavy equipment operation, work crews, and rail-handling equipment. Equipment and all construction activities will be readily visible to the public at all times, thereby serving as a potential attractive nuisance for on-lookers. Trucks and vehicles will be active in the area on nearby Village roads during the day and night until the soil removal effort is completed. Construction workers may routinely be visible to the public and may wear protective equipment including respirators. It is anticipated that contaminated soil would be excavated, staged, and moved through the area over a period of several days.

9.3.6 Implementability

Implementability of this alternative is technically and institutionally challenging. The LIRR main line situated over the impacted soil is a very active and heavily-utilized transportation corridor between Long Island and New York City. Disturbance of the existing two lines for any period of time will require participation by the LIRR as well as Village, Town, Nassau County, and NY State agencies, including NYSDEC, and will have potential impact(s) upon the surrounding community. The implementability issues will be addressed in detail with input from the LIRR and others during the remedial design (RD) phase of this alternative, if selected in the Record of Decision (ROD).

However, the following technical and institutional challenges must be considered as part of this remedy:

- Service interruption and rerouting of passengers;
- Delays and possible work cancellation due to weather conditions;
- Possible public opposition;
- Overhead utility lines impose constraints on equipment selection, such as a crane; and
- Coordination of remedial efforts with LIRR/MTA.

9.3.7 Cost

It is expected that the cost of this alternative will be high. For the purpose of this report, the costs for this alternative are divided into two components, LIRR-related activities and activities performed on behalf of AK Allen.

LIRR-related activities - As part of the ongoing remedial effort, the LIRR was contacted and asked to develop its costs for removing the northern track and third rail during a May 2005 22-hour track outage (the southern track was to remain in place). The LIRR's estimate to remove a sufficient section of the north track to allow AK Allen's contractors to perform the required soil remediation during the scheduled outage, and then reconnect the tracks, was $135,000. (a detailed estimate from LIRR is included as Appendix A).

The option to perform this work during May 2005 was deemed infeasible because the 22-hour track outage allowed a relatively small window of only 6-hours to complete the actual physical remedial excavation to the satisfaction of NYSDEC. At a minimum, that work would need to include the removal of impacted soils and the placement and compaction of clean backfill. In addition, there was not sufficient time to consider the necessity to remove the southern track and third rail during this same work period. As such, the LIRR was asked to revise its cost estimate to reflect the combined removal of both north and south tracks. As of the date of this Report, the LIRR has not provided a revised estimate for both tracks. For purposes of this FS and absent further LIRR information, it is assumed that the cost to remove two tracks and rails for a 48-hour period is double its 22-hour estimate, or $270,000.

In addition to the fees for construction-related activities, the LIRR will have to reschedule and reroute trains and provide commuter bus transportation service during this construction activity. The LIRR was requested to provide a budgetary estimate for this as well. As of the date of this Report, the LIRR has not responded in writing, but has verbally indicated that its expense to accommodate the outage may be on the order of $1,000,000. Therefore, the combined LIRR

cost is $270,000 plus $1,000,000, or $1,270,000. We cannot assess the accuracy of this cost estimate against the FS standard of -30% to +50% cost uncertainty without further input from the LIRR.

In addition to the fees for construction-related activities, the LIRR will have to reschedule and reroute trains and provide commuter bus transportation service during this activity. The LIRR was asked to provide a budgetary estimate for this as well. As of the date of this Report, an estimate for this activity has not yet been provided.

Activities performed on behalf of AK Allen – The following is an estimate of the identified activity costs for the work to be performed by parties acting on behalf of AK Allen.

Work Plan & Health & Safety Plan Preparation	$ 8,000
LIRR required right-of-way training for all site personnel	$ 5,000
NYSDEC oversight costs	$10,000
Public relations	$ 5,000
Establishment of EC/ICs with LIRR	$10,000
Prepare on-site work ramp	$ 8,000
Excavate impacted soil and place clean backfill	$ 30,000
Soil Staging and Off-Site Disposal (based on 225 tons)	$ 50,000
Field screening, oversight and lab fees	$ 26,000
Reporting	$ 30,000
Groundwater Monitoring (semi-annual 2 yrs)	$ 20,000
Insurance	$ 8,000
Total	$210,000

Estimated Total Job Cost

LIRR-related activities	$1,270,000
Activities performed by non-LIRR parties	$ 210,000
Subtotal	$1,480,000
20% contingency	$ 296,000
Estimated total	$1,776,000

Present Worth **$1,773,000**

9.3.8 Community Acceptance

The community may have comments regarding acceptance of this alternative. That portion of the LIRR line situated over the impacted soil is a very active and heavily-utilized transportation corridor between Long Island and New York City. Disturbance of this line for any period of time (including the need for alternate passenger/commuter transportation over the road) will have an impact upon the surrounding community.

9.4 Alternative 4 - Removal of Impacted Soils Below the LIRR During Future Track Maintenance and Post-Remediation Groundwater Monitoring

9.4.1 Protection of Human Health and the Environment

This fourth alternative, if implemented, would return the impacted soil to acceptable levels, and as such, it is protective of human health and the environment. Leaving acceptable residuals that meet clean-up objectives and guidance would also be protective of human health and the environment.

9.4.2 Standards, Criteria & Guidance (SCG)

The SCGs are:

Media	SCG	PCE	TCE	TCA	PCBs	Metals
Ground Water	NYSDEC TOGS*	5 ug/L	5 ug/L	5 ug/L	0.09 ug/l	Cd – 5 ug/l Cr – 50 ug/l
Soil	NYSDEC TAGM*	1,400 ug/Kg	700 ug/Kg	800 ug/Kg	10,000 ug/Kg (below 1 ft.)	Cd – 1 mg/kg Cr – 10 mg/kg
Soil	EPA**	NA	NA	NA	100,000 ug/Kg (with a soil cap)	Cd - NA Cr - NA
Soil Gas	None available					

* Guidance

** Regulatory Standard

This alternative may achieve the TAGM for soil and achieves the TOGS for groundwater at the location of the off-site monitoring well (MW-5). Post-remediation monitoring will be used to track this pathway, and any discernible groundwater quality trends, over time.

9.4.3 Long-Term Effectiveness & Permanence

Impacted soil below the LIRR tracks will be removed as part of this remedy. Therefore, this alternative is expected to achieve long-term effectiveness with no long-term impacts. Through the use of long-term groundwater monitoring, this alternative is expected to meet the RAOs.

9.4.4 Reduction of Toxicity, Mobility or Volume

This alternative will permanently and significantly reduce the toxicity, mobility and volume of impacted soil at the LIRR area.

9.4.5 Short-Term Impacts

There are major short-term impacts to LIRR commuters from the implementation of this alternative. The only feasible way that the impacted soil beneath the railroad bed can be physically removed is to temporarily shut down both the main eastbound and westbound LIRR commuter lines.

The affected tracks and ties will have to be removed by LIRR and temporarily placed aside, while the remedial excavation program proceeds. Commuters on this very active important transportation corridor would have to rely upon alternate forms of transportation, and/or the LIRR would have to provide the means to link passengers/commuters with the LIRR stations situated to the east and west of the remedial excavation track-bed area. This activity, in turn, impacts commuter work schedules, railroad stations, transportation routes, traffic, surrounding areas, involved public and private agencies, and certain commercial activities (RR station-related vendors, etc.). As the scheduling of this alternative would correspond with LIRR's planned track maintenance improvements, the short-term impacts associated with implementation of this remediation alternative would effectively be integrated into the required track maintenance and upgrade work.

Any excavation activity will, by necessity, result in the temporary shutdown of commuter rail operations on this line segment during the remediation effort as noted above. Construction activities for the soil removal effort are expected to occur during weekend, evening, and day time hours when the residences to the south of the track may be at their highest occupancy rate. The soil removal effort will require round-the-clock construction activities involving heavy equipment (trucks and backhoes), cutting and handling of rails and ties, excavation of the contaminated soil, and restoration of the site. This overall construction effort is expected to take a minimum of 48 hours, not including mobilization and site preparation activities.

Night time work will necessitate high-intensity construction lighting. Construction activities will cause construction-related noise such as back-up warning signals, heavy equipment operation, work crews, and rail-handling equipment. Equipment and all construction activities will be readily visible to the public at all times, thereby serving as a potential attractive nuisance for on-lookers. Trucks and vehicles will be active in the area and on nearby roads during both the day and night until the soil removal effort is completed. Construction workers may routinely be visible to the public wearing protective equipment including respirators, and contaminated soil will be excavated, staged, and moved through the area over a period of several days.

9.4.6 Implementability

The implementability of this alternative is more challenging and complicated than alternative three, as many of the work items that would be involved in an overall remediation would be incorporated into, and integrated with, the LIRR's future track maintenance improvement program and performed under time constraints. The LIRR, as well as Village, Town, Nassau County, and NY State agencies will have to be consulted to assess both the scheduling, management coordination, notification and engineering procedures required for this effort. The LIRR line situated over the impacted soil is a very active and heavily utilized transportation corridor between Long Island and New York City. Disturbance of this line for any period will have an impact upon the surrounding community. The implementability issues will be addressed in detail with input from the LIRR and others during the design phase of this alternative.

The fourth remedial alternative differs from alternative three in that the time allotted by the LIRR for the excavation of impacted soils would be limited to a portion of the 48-hour track outage. Thus, this alternative may not ensure that all excavation end-points sample results will meet the TAGM. Due to these time constraints, soil analysis performed by an on-site mobile laboratory will be used to expedite the final end-point results for the excavation.

However, the following technical and institutional challenges must be considered as part of this remedy:

- Time constraints for work will be imposed by the LIRR;
- Service interruption and rerouting of railroad passengers;
- Delays and possible work cancellation due to weather conditions;
- Possible public opposition;
- Overhead utility lines impose constraints on equipment selection, such as a crane; and
- Coordination of remedial efforts with LIRR/MTA.

The amount of track that can be temporarily removed by the railroad and the extent of soil removal that can be achieved will be a function of the amount of time allotted by the LIRR and its ability to prepare the right-of-way for these remedial activities. The implementation of this alternative is dependent upon the LIRR's schedule and can also be adversely impacted by heavy rains, winds or other severe weather. If the remediation program cannot be performed because of severe weather, it will be rescheduled to coincide with a future planned track outage.

9.4.7 Cost

It is envisioned that the cost of this fourth alternative, while somewhat less than alternative three, would also be high but would only involve the cost associated with the removal of impacted soil during such future-planned LIRR track-bed maintenance and improvement activities. Similar to alternative three, the general and definable costs for this alternative are divided into two components, LIRR-related activities and activities performed on behalf of AK Allen.

LIRR-related activities - For the purposes of this FS, we assume the LIRR's cost for removing two tracks and the third rail for 48-hours will be approximately double the 22-hour estimate that was provided, or $270,000 (based on assumptions made for this FS) . No cost estimate has been provided by the LIRR for the expansion of the excavation effort to include the southern section of track.

Activities performed by AK Allen parties – The following is an estimate of the costs for work to be performed by non-LIRR parties (assumed similar to the non-LIRR cost for alternative three). The estimates provided do not include pre-remediation planning and coordination beforehand, joint Agency coordination (if needed), any union requirements, or NYSDEC review/oversight costs. It also assumes that all of the required excavation and end-point testing will be completed during the planned 48-hour track outage and that mobile laboratory data will be used to determine the end-points of the excavation.

Work Plan & Health & Safety Plan preparation	$ 8,000
LIRR required right-of-way training for all site personnel	$ 5,000
NYSDEC oversight costs	$10,000
Public relations	$ 5,000
Establishment of EC/ICs with LIRR	$10,000
Prepare on-site work ramp	$ 8,000
Excavate impacted soil and place clean backfill	$30,000
Soil Staging and Off-Site Disposal	$50,000

Field screening, oversight and lab fees	$26,000
Reporting	$ 30,000
Groundwater Monitoring (semi-annual 2 yrs)	$ 20,000
Insurance	$ 8,000
Total	$210,000

Estimated Total Job Cost

LIRR-related activities	$270,000
Activities performed by AK Allen parties	$210,000
Subtotal	$480,000
20% contingency	$ 96,000
Estimated total	$576,000
Present Worth	**$515,000**

9.4.8 Community Acceptance

The community may have comments regarding this alternative. The LIRR line situated over the impacted soil is a very active and heavily utilized transportation corridor between Long Island and New York City. Interruption of service on this line for any period of time will have a major impact upon commuters and the general public utilizing the LIRR and the surrounding community.

9.5 Comparison of Alternatives

Criteria	Alternative 1 No Action	Alternative 2 Long-Term Groundwater Monitoring with EC/ICs	Alternative 3 Removal of Impacted Soils Below the LIRR and Post-Remediation Groundwater Monitoring	Alternative 4 Removal of Impacted Soils Below the LIRR During Future Track Maintenance & Post-Remediation Groundwater Monitoring
Protection of Human Health and the Environment	Yes, but there are no EC/ICs to ensure this over time.	Yes	Yes	Yes
Standards, Criteria & Guidance (SCG)	Does not meet SCGs, no EC/ICs in place.	Does not meet SCGs. EC/ICs will be in place to protect Human Health and the Environment.	Meets SCGs	May Meet SCGs
Long-Term Effectiveness & Permanence	May achieve long-term effectiveness, but no EC/Ics.	Achieves long-term effectiveness with EC/Ics.	Achieves long-term effectiveness.	Achieves long-term effectiveness.
Reduction of Toxicity, Mobility or Volume	Toxicity, mobility & volume of contamination will not be reduced.	Toxicity, mobility & volume of contamination will not be reduced.	Toxicity, mobility & volume of contamination will be reduced.	Toxicity, mobility & volume of contamination will be reduced.
Short-Term Impacts	None	None	There will be major short-term impacts as operation of the LIRR will be interrupted Lights Construction noise Visual impacts Truck/crew traffic Service interruption.	There will be major short-term impacts as operation of the LIRR will be interrupted* Lights Construction noise Visual impacts Truck/crew traffic Service interruption.
Implementability	This alternative is fully implementable.	This alternative is fully implementable. EC/ICs will have to be coordinated with the LIRR.	As the operation of the LIRR will be interrupted, there are many implementability issues related to this alternative.	As the operation of the LIRR will be interrupted, there are many implementability issues related to this alternative. These issues will have to be coupled with the LIRR planned construction.
Cost (in Present Worth)	No Cost	$187,000	$1,773,000 costs estimates are based on extrapolation of incomplete cost information provided by the LIRR.	$515,000 costs estimates are based on extrapolation of incomplete cost information provided by the LIRR.
Community Acceptance	Not expected	Acceptance expected as this alternative is protective of human health & the environment, but does not interrupt operation of LIRR.	Community will likely have comments as operation of the LIRR will be interrupted.	Community will likely have comments as operation of the LIRR will be interrupted. Community acceptance will have to be incorporated into LIRR track improvement program.

* Some of these will occur under normal LIRR outage maintenance.

10.0 RECOMMENDED REMEDY

The fourth remedial alternative: "Alternative 4 - Removal of Impacted Soils Below the LIRR During Future Track Maintenance and Post-Remediation Groundwater Monitoring"—is the recommended remedy for the off-site portion of this Site. This alternative may meet the SCGs and is protective of human health and the environment. Due to time constraints, some isolated areas of soil may be left in place that exceed TAGM. The extent of soil removal that can be achieved will be a function of the amount of time allotted by the LIRR and its ability to prepare the right-of-way for these remedial activities. There will be short-term impacts to the community from construction activities and due to the temporary interruption of the LIRR train service. However, the work will be coupled with a planned track outage by the LIRR for other construction-related issues, thus service interruption is not the result of the AK Allen remediation effort. The LIRR has indicated that its next planned construction outage is scheduled for March 2007.

This alternative is recommended based on the understanding that this work would be completed within the time constraints of a planned 48-hour outage on March 2007, or at a future rescheduled date. The implementation of this alternative may be adversely impacted by heavy rains, winds or other severe weather. If the remediation program cannot be performed because of severe weather or other unforeseen delay, it will be rescheduled to coincide with a future planned track outage.

A post-remediation groundwater monitoring program would be performed to ensure RAOs are achieved. The scope and frequency of the groundwater monitoring program, and thus its overall cost, will be further developed as part of the Remedial Design Phase of this project.

-oOo-

11.0 REFERENCES

1. CA RICH, October 1994, Remedial Investigation Work Plan, A.K. Allen Company, Inc. Mineola, NY.

2. CA RICH, February 1996, Remedial Investigation Report, A.K. Allen Company, Inc. Mineola, NY.

3. CA RICH, March 2002, Interim Remedial Measures Work Plan, A.K. Allen Company, Inc. Mineola, NY.

4. CA RICH, October 2002, Interim Remedial Measures Report, A.K. Allen Company, Inc. Mineola, NY.

5. USGS, *Hydrologic Framework of Long Island, New York*, D.A. Smolensky et. al:, 1989.

6. NYSDEC Technical & Administrative Guidance Memorandum, *Determination of Soil Cleanup Objectives and Cleanup Levels*; January 24, 1994

7. USEPA, 1990, Guidance on Remedial Actions for Superfund Sites with PCB Contamination, EPA/540/G-90/007.

8. Code of Federal Regulations, 40 – CFR – Chapter I – Part 761.

9. NYSDEC, Ambient Water Quality Standards, Guidance Values and Groundwater Effluent Limitations, TOGS 1.1.1 June 1998.

10. NYSDEC, 2002, DER-10 Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation

11. CA RICH, August 2003, Supplemental IRM Work Plan No. 2 Additional Sampling along LIRR Embankment AK Allen Site 255 East 2nd Street, Mineola, NY

12. CA RICH, April 2004, Supplemental Remedial Investigation Report, Monitoring Well Sampling & Analysis & Off-Site Soil Borings, A.K. Allen Company, Inc. Mineola, NY.

13. NYSDEC, November 12, 2004, Correspondence from Kevin Carpenter to Eric Weinstock.

14. NYSDEC, March 18, 2005, Correspondence from Chittibabu Vasudevan to Stephen Latham, Esq,

15. NYSDEC, April 4, 2005, Correspondence from Kevin Carpenter to Ronald Buttner.

16. http://www.co.nassau.ny.us/health/waterquality/Recommendations.html

17. USEPA, (September 1997) Profile of the Ground Transportation Industry Trucking, Railroad, and Pipeline (EPA/310-R-97-02).

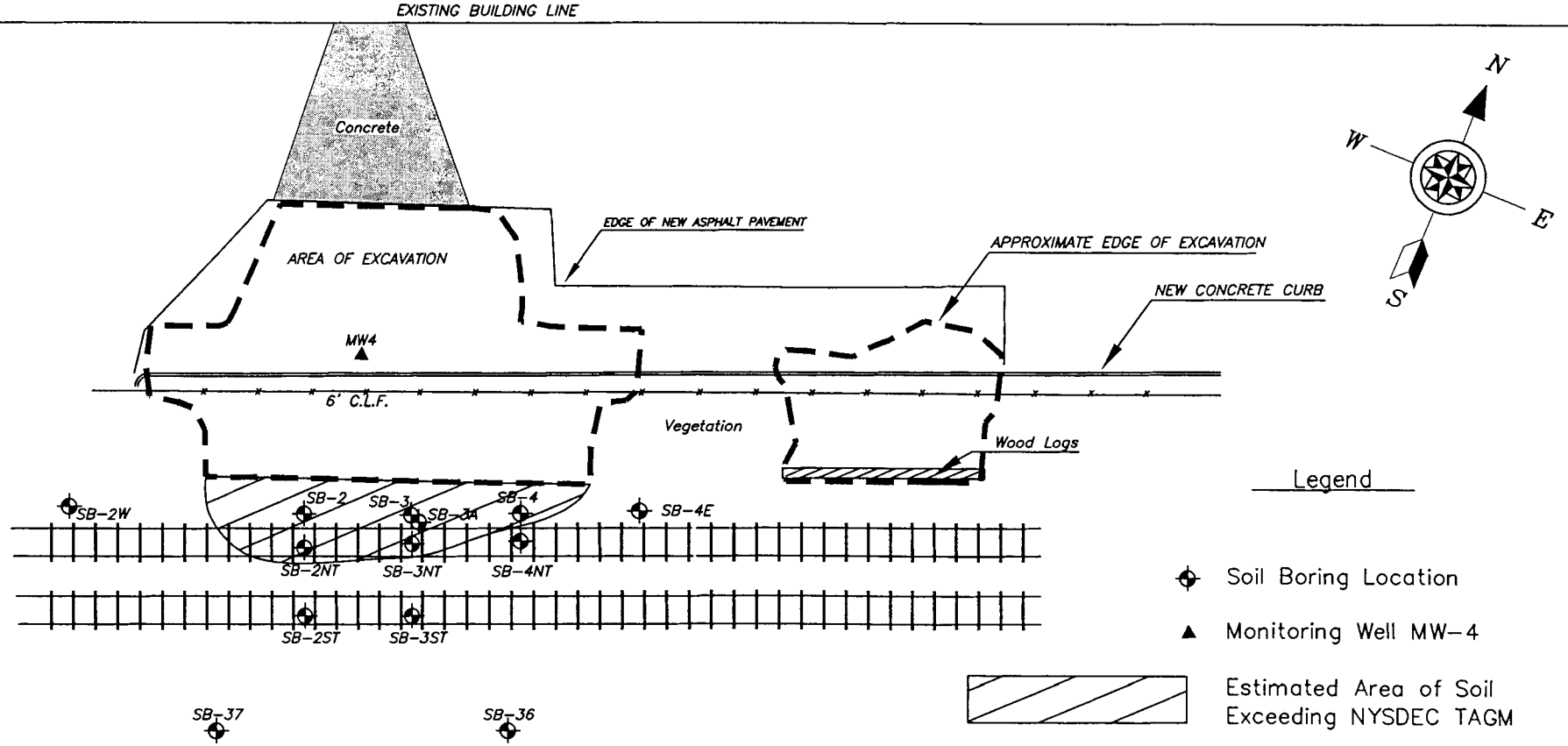
18. The National Transportation Enhancements Clearing House Newsletter (Winter, 2004) Vol. 8, No. 1, Considering Contamination in a Rail-Trail Conversion.

19. NYSDEC (April 2002) Registry of Inactive Hazardous Waste Disposal Sites In New York State Volume 2, page 2-35, Amtrack – Sunnyside Yard.

20. Personal communication between David Alexander of ARG and Tony Findley of the NJDEP (June 29, 2005).

FIGURES

AK ALLEN FACILITY



CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803		
TITLE: OFF-SITE FEASIBILITY STUDY SITE PLAN		DATE: 6/27/05 SCALE: 1" = 30'
FIGURE: 1 DRAWING NO: 9769-1A	AK ALLEN CORPORATION 255 EAST 2ND STREET MINEOLA, NEW YORK	DRAWN BY: S.T.M. APPR. BY: E.A.W.

APPENDIX A

LONG ISLAND RAIL ROAD ENGINEERING DEPARTMENT
ORDER OF MAGNITUDE
LIRR SUPPORT FOR AK ALLEN CO., INC. SOIL REMEDIATION

G:\ESTIMATES\2005\01 - Order of Magnitude Estimates - 2005\[OM-05-05 AKAllen Soil Remediation.xls]Summary Sheet

Date: *03/08/05*

ESTIMATE SUMMARY

F/A CONSTRUCTION	$115,969	3RD PARTY DESIGN	NA
F/A MATERIAL	$12,047	3RD PARTY INSPECTION	NA
F/A INSPECTION	$1,044	3RD PARTY CONTRACTOR	NA
F/A DESIGN	NA	PASSENGER SERVICES	NA
PROJECT MGMT.	$3,071	OTHER DEPT. SUPPORT	NA

ESTIMATE TOTAL $132,130

APPROVED BY:

STRUCT. DEPARTMENT:	NA		**TRACK DEPARTMENT:**		
	RESPONSIBLE MANAGER	DATE		RESPONSIBLE MANAGER	DATE
POWER DEPARTMENT:			**PROJECT MGMT:**	NA	
	RESPONSIBLE MANAGER	DATE		RESPONSIBLE MANAGER	DATE
COMM. DEPARTMENT:	NA		**SCOPES & ESTIMATES:**		
	RESPONSIBLE MANAGER	DATE		RESPONSIBLE MANAGER	DATE
SIGNAL DEPARTMENT:					
	RESPONSIBLE MANAGER	DATE			

COMMENTS:

1) Assumption: All costs are in 2005 dollars.
2) Contaminated soil covers an area of 15' x 75' x 3.5' under and adjacent north to LIRR mainline track #1.
3) Sheeting/shoring will be supplied and installed by AK ALLEN, if needed.
4) All work included in this estimate will be performed during the Roslyn Road double track outage on May 15, 2005.
5) Soil remediation contractor shall be capable of removing all contaminated soil within a continuous 6 hour window.
6) Soil remediation contractor shall access LIRR ROW work area from AK ALLEN property only.
7) Contractor will be responsible for following all LIRR specifications during work on LIRR ROW, and will provide testing equipment and personnel.

DURATION IN MONTH

LIRR Construction
LIRR Design Review
LIRR Inspection
LIRR Project (Mgt.) Duration

Estimated by: R.Keane

LONG ISLAND RAIL ROAD — ENGINEERING DEPARTMENT
SCOPES & ESTIMATES SECTION — ESTIMATE FOR CONSTRUCTION
LIRR SUPPORT FOR AK ALLEN CO., INC. SOIL REMEDIATION — 03/08/05

Work Code	Activity No.	Description of Work	Qty	UM	Crew Size	Crew Days	S T Hours	O T Hours	D T Hours	Total Labor $	Total Material	Total Equipment	Estimate Total
8230		***Signal Department***											
	10	Install jumpers on crossings	1	LS	3	1			24	$7,298		$75	$7,373
	20	Remove jumpers and test signal system	1	LS	3	1			24	$7,298			$7,298
	30	Supervisor/Assistant Supervisor/Surveying	1	LS	1	2	8	8		$2,385			$2,385
		Signal Department Subtotal				**2**	**8**	**8**	**48**	**$16,982**		**$75**	**$17,057**
8423		***Track Department***											
	40	Build new 39' track panels	3	Ea	14	2	224			$18,534	$9,245	$1,950	$29,729
	50	Remove ML1 track , torch rail into pieces, discard rail and ties	117	TF	14	1		112		$13,900		$3,475	$17,375
	60	Install ballast and reinstall track	117	TF	18	1			144	$23,829		$975	$24,804
		Supervisor/Asst. Supervisor	1	LS	1	2	8	8		$2,385			$2,385
8485		***Track Department Surfacing Gang***											
	70	Surface track	70	Tons	7	1		56		$7,188	$1,192	$75	$8,455
		Supervision	1	LS	1	1	8			$954			$954
		Track Department Subtotal				**7**	**240**	**176**	**144**	**$66,790**	**$10,437**	**$6,475**	**$83,702**
8380		***Power Department ET***											
	80	Cut and remove third rail serving main line 1	136	LF	12	1		96		$11,481		$150	$11,631
	90	Reinstall/splice third rail on new track and new	136	LF	12	1		96		$11,481	$1,610	$150	$13,241
		Supervision	1	LS	1	2	8	8		$2,385			$2,385
		Power Department Subtotal				**2**	**8**			**$25,347**	**$1,610**	**$300**	**$27,257**
8004		***F/A Inspection***											
	100	Inspection of Third Party backfill under track #1	1	LS	1	1	10			$1,044			$1,044
	110	Markout Utilities on ROW	1	LS	1	1		8		$1,252			$1,252
		FA Inspection Subtotal					**10**	**8**		**$1,044**			**$1,044**
		Project Management											
8016		Project Manager	1	LS	1	3	24			$3,071			$3,071
		Project Management Subtotal					**24**			**$3,071**			**$3,071**
		E S T I M A T E T O T A L					**290**	**192**	**192**	**$113,233**	**$12,047**	**$6,850**	**$132,130**

TRACK DEPARTMENT YEAR 2000 "SOGR" TRACK PROGRAM MATERIAL

Date: 03/08/01

Description	Quantity		Unit Cost	Dollar Value
Wood Ties				
Wood Track Ties	58	EA	$41.26	$2,393
3rd Rail Wood Ties	20	EA	$49.29	$961
				$3,354
CWR				
115 Head Hard - CWR	236	LF	$15.95	$3,764
Plates 6"	116	EA	$7.61	$883
E - Clips	232	EA	$1.70	$394
Lag Screws	232	EA	$0.61	$142
				$5,183
Stone	134,400		$14.35	$1,928,640
Boutets				
119 RE ST	8		$88.50	$708
				$708
				$9,245

APPENDIX B

Engineering and Institutional Controls for AK Allen Off-Site

The engineering and institutional controls (EC/ICs) necessary and appropriate for the AK Allen Off-Site Area (located within the Long Island Railroad Right of Way directly south of the AK Allen On-Site Area) consist of the following:

- No person shall extract groundwater from below the portion of the LIRR right-of-way subject to the off-site soil remediation program without obtaining prior authorization from the NYSDEC.

- The goal of the remediation program is to remove impacted soils below the LIRR right-of-way to concentrations at or below the NYSDEC TAGM. Due to time constraints, there is a possibility that isolated portions of the soil at the bottom of the excavation may not achieve the TAGM concentration. Should this occur, additional EC/ICs may need to be developed and tailored to address the site conditions as they exist at that time.