ALTERNATIVES ANALYSIS REPORT

TIOGA AVENUE PROPERTY
BCP SITE #C851031
CORNING, NEW YORK

by

Haley & Aldrich of New York
Rochester, New York

on behalf of

Corning Property Management Corporation
And
Corning Incorporated

for

New York State Department of Environmental Conservation
Avon, New York

File No. 33123-016
15 December 2011

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15 December 2011
File No. 33123-017

New York State Department of Environmental Conservation
Region 8 Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, New York 14414

Attention: Timothy A. Schneider, P.E.

Subject: Alternatives Analysis Report
BCP Site #C851031/BCA Index #B8-0767-08-01
Tioga Avenue Property
Corning, New York

Dear Mr. Schneider:

On behalf of Corning Property Management Corporation and Corning Incorporated (collectively referred to as Corning), Haley & Aldrich of New York is submitting herewith the revised Alternatives Analysis Report (AAR) for the above referenced Brownfield Cleanup Program (BCP) Site. This document is submitted in accordance with the Brownfield Cleanup Agreement (BCA) for the Tioga Avenue Property, BCA Index #B8-0767-01/Site #C851031, between the New York State Department of Environmental Conservation (NYSDEC) and Corning.

This AAR is provided based on the findings of the Remedial Investigation (RI) Program conducted on the BCP Site as documented in the Haley & Aldrich Report on Remedial Investigations & Recommended Remedial Actions (RI Report) dated April 2010 (revised July 30, 2010), as approved by the Department on October 22, 2010. The RI Report describes environmental conditions on the Site with a finding that remedial action is warranted to mitigate the potential for exposure to contaminants that could be associated with future commercial and/or industrial developments at the Site.

In response to this finding, the AAR provides documentation of the process for assessing remedial alternatives potentially applicable to the Site, a description of the remedy selected by the alternatives analysis process, and details on the environmental controls to be implemented as part of the Site remedy. This information is provided in the context of the planned future development of the Site as described in the AAR. The primary objective of the AAR is to provide the Department with sufficient information for consensus on the need and scope for remedial action at the Site.

The AAR is revised to reflect the comments that have been provided by the Department on earlier versions of this document and the resulting technical review meetings we have conducted to facilitate the review process and enable the selection of the Site remedy.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

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Vice President

Enclosures

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EXECUTIVE SUMMARY

Corning Property Management Corporation and Corning Incorporated (collectively referred to as "Corning") are planning for the future reuse and development of the Tioga Avenue Property that formerly contained the Corning Fall Brook manufacturing plant and related facilities located in the City of Corning, Steuben County, New York. With closure of manufacturing operations, Corning entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), in cooperation with the New York State Department of Health (NYSDOH), as a "participant" to investigate and, as necessary, to remediate any contaminants on the Tioga Avenue Property (referred to as the "Site") to allow for its intended future commercial or industrial use. The goal of these actions is to facilitate the reuse and development of the Site in ways that are protective of human health and the environment. Corning is implementing these actions in accordance with the process and procedures applicable to the Brownfield Cleanup Program (BCP) as contained in the NYSDEC 6 NYCRR Part 375 Regulations, the NYSDEC DER-10 Technical Guidance Document and related technical, process, and policy memoranda issued by the NYSDEC and NYSDOH as are referenced through this document.

The Tioga Avenue Site is currently vacant and mostly enclosed by security fencing except for a small paved area with an office trailer located at the southeast corner of the Site. Corning has completed the investigation process for the Site and determined that no apparent risk to human health or the environment currently exists at the Site, but that remedial actions are warranted as a precaution during the future re-development of the Site to maintain protection of human health and the environment. As required by the BCA and in conformance with the associated BCP regulatory program, this document comprises the Alternatives Analysis Report (AAR) that documents the remedial action alternatives analysis process, the remedy selected by this analysis, and the site management planning necessary for the use and the future development of the Site.

Findings and Recommendations of the Remedial Investigation Program

Following execution of the BCA, Corning completed the investigation process for the Site under the oversight of the NYSDEC and NYSDOH to evaluate whether "contaminants," as defined by NYSDEC's BCP regulations and guidelines, are present on the Site. The RI Program process was performed under the oversight of NYSDEC pursuant to the Remedial Investigation Work Plan (RIWP) that was reviewed and approved by the NYSDEC subject to a public review process in accordance with the Citizen Participation Plan (CPP) developed for this Site. (*A chronology of project work activities, report deliverables and review timeframes since issuance of the BCA for the Site is provided in Section 1.3 of the following report text*.)

The investigations as defined in the approved RIWP were implemented in the fall and winter of 2009/2010 and results of the investigation program are presented in the Report on Remedial Investigations and Recommended Remedial Actions (RI Report), dated April 2010 (Revised July 30, 2010). The RI Report was reviewed and approved by the NYSDEC on October 22, 2010, in conjunction with the NYSDOH. The RI Report documents environmental conditions on the Site in fulfillment of the scope and objectives of the RIWP, and as required under Section II C of the BCA for this Site. The RI Report documents the following conclusions regarding environmental conditions on the Site:

- Significant remedial investigations have been performed on the Tioga Avenue Property BCP Site. The investigations have enabled a comprehensive characterization of Site conditions, and assessment of the potential for human or environmental risk to exist as posed by Site contaminants, as required by the BCA. The RI program results provide recommendations on need for remedial actions and a sufficient quantity and quality of data for development of remedial alternatives for the Site.

- The nature and extent of contaminants present at the Site has been defined in accordance with the RIWP objectives and the future commercial and/or industrial land use objectives specified in the BCA.

- The Site contains historic fill material as defined by the 6 NYCRR Part 375 regulations that is broadly distributed across the property at varying thickness between a few feet to 20 feet below ground surface. A small percentage of the historic fill samples contain certain elements, identified as Compounds of Concern (COCs) based on past Site use, at concentrations higher than the NYSDEC Soil Cleanup Objectives (SCOs) for commercial property that are dispersed on the property (arsenic detected above SCOs in 32 of 182 samples and lead detected above SCOs in 7 of 182 samples). These COCs were detected above SCOs primarily within the 0 to 1 foot below ground surface (BGS) strata and generally relegated to the 0 to 3 foot bgs strata. *(A comprehensive summary of detections of arsenic and lead by sampling location and depth interval is provided on Table I of this document and depicted on a series of figures as described and referenced in the following text of this document.)*

- In addition, some of the historic fill material contains apparent petroleum residues that, except for one low level value, do not exceed any chemical specific SCO, but may present some future "nuisance" condition ("nuisance" is defined in NYSDEC Soil Cleanup Policy, CP-51, as an aesthetic condition such as staining or odors). Presence of petroleum residues were identified based on observations during drilling (i.e. staining/odors) and from samples that required dilution because of non-target analytes indicative of weathered petroleum substances. Sample dilutions were observed in 10 of 66 soil/historic fill samples that required elevated laboratory reporting limits, but none at levels that exceeded the applicable SCOs. None of the groundwater samples required dilution.

- Multiple groundwater sampling events have been conducted on the Site and determined not to be significantly affected by past Site operations given the overall lack of detections of any COCs higher than comparison criteria. In total, there have been four groundwater sampling events at the Site including two sampling events conducted in the timeframe between July 2007 and September 2008 when the BCA was first submitted and then executed by NYSDEC; and one sampling event after execution of the Site BCA. The pre-BCA data was presented in the RI Work Plan upon which additional investigations were undertaken in accordance with the review and approval of the RI Work Plan by the NYSDEC. The fourth groundwater sampling event was performed in June 2010 during review of the RI Report as requested by the NYSDEC to assess conditions within the deep monitoring well adjacent to an off-site industrial pumping well. There were no significant differences in the data produced from these sampling events. A single petroleum-derived compound (isopropylbenzene) was the only organic compound detected in groundwater on the Site above the comparison criteria, and this compound was detected only slightly above the NYS Drinking Water Standards. This detection was only present in two of thirteen wells on the Site and none of the groundwater samples required dilution by the laboratory.

- Certain other organic substances, including Site related COCs, were detected in upgradient and downgradient wells along the perimeter of the Site, most of which were below the laboratory practical quantitation limit (thus only estimated), and all of which were below the NYS Drinking Water Standards.

- Certain inorganic substances have been detected in groundwater above the NYS Drinking Water Standards. Except for antimony, all of these elements were detected in monitoring wells that are both up-gradient and down-gradient of the Site and indicative of the ambient groundwater quality conditions in the general area of the Site. All of the inorganic substances detected are naturally occurring elements in soil. The limited antimony detections stand out because the comparison criterion for this substance is set at an even lower level compared to other elements that have comparable or higher natural abundance.

- Human or environmental exposure to historic fill is currently precluded by the existing ground surface on the property (concrete, gravel or macadam) that effectively "covers" the Site. Stormwater on the property continues to be collected, treated, monitored and discharged from the Site under a NYSDEC SPDES permit and via the municipal storm sewer system.

- Ground water is not used for potable purposes on the Site.

The RI Program results indicate that there is no current apparent risk of exposure to human health or the environment from any of the contaminants identified on the Site because the Site is effectively covered; however, it is reasonable to conclude that historic fill will be exposed during future development and use of the Site, and that human exposure to the historic fill could theoretically occur through mechanisms such as inadvertent contact or ingestion of historic fill by workers, or that the future exposure of historic fill could otherwise create "nuisance" conditions such as petroleum odors in certain areas of the Site. Consistent with the BCP, the RI Report states that it is reasonable and appropriate to conclude that the potential future risk presented by exposure to historic fill, or "nuisance" conditions contained therein, can be mitigated during and after future Site development such as by institutional and engineering controls with appropriate site management planning which measures are documented and enforceable into the future in an Environmental Easement for the Site.

Proposed Future Site Use and Development

The intended future use of the Site is restricted to commercial or industrial use in accordance with the BCA for this Site.

Assessment of Remedial Alternatives and Selected Remedy

Remedial action objectives are established for the Tioga Avenue Site in accordance with the requirements of the Site BCA which state the overall remedial action goal is to be protective of public health and the environment. Accordingly, based on the conditions identified during the RI Program, alternatives have been developed to mitigate the potential exposures identified. These alternatives have been assessed for their relative effectiveness to meet this remedial goal based on the prescribed balancing criteria (6 NYCRR 375-1.8[f]), and current and proposed future Site uses. This assessment identifies and documents the preferred action for the Site consisting of: 1) engineering controls comprised of cover systems conforming with NYSDEC requirements; 2) institutional controls that will restrict future property use to commercial or industrial uses and that will preclude the future use of groundwater on the Site for potable purposes; 3) development of a Site Management Plan for long term operation and maintenance of engineering and institutional controls; and 4) placement of an Environmental Easement on the property enforcing the engineering and institutional controls described in preceding items 1 through 3.

Based on this analysis, it is concluded that current conditions of the Site being comprised of a hard cover system is protective of human health and the environment as it provides an acceptable engineering control that mitigates the potential for exposure to COCs that may exist within the underlying historic fill and conforms with the regulatory definition of an acceptable cleanup track. This cover system will be documented within an Environmental Easement that will include a Site Management Plan. The Site Management Plan will be developed in accordance with NYSDEC guidelines for the maintenance of the engineering control including details that describe replacement of the existing engineering control (Site cover system) during future Site development.

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1. INTRODUCTION

Corning Property Management Corporation and Corning Incorporated (collectively referred to in this document as "Corning") have entered into a Brownfield Site Cleanup Agreement (BCA), Index #B8-0767-08-01/Site #C851031, with the New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), for the real property located at 213, 219, and 239 East Tioga Avenue in the City of Corning, Steuben County, New York as shown on Figure 1. This property is owned and was used by Corning to support the former Fall Brook glass manufacturing plant, the General Machine Shop, Pilot Plants and related facilities. Historically this property was previously owned and used by other entities unaffiliated with Corning for various railroad operations and maintenance facilities. This property is referred to as the Tioga Avenue Site or the "Site".

In 2007, Corning completed the process of closure of the Fall Brook facility and demolition of the manufacturing buildings to ground surface under NYSDEC oversight including removal of structures to grade and securing the Site. With execution of the BCA, and in conjunction with the NYSDEC and NYSDOH, Corning is committed to investigate and to remediate any environmental impairment identified on the Site as necessary for the protection of public health and the environment. Corning has completed the initial step in this process by completion of the Remedial Investigation phase of work and determined, with NYSDEC and NYSDOH concurrence, that environmental remediation will be warranted to mitigate the potential for adverse human or environmental impact during future development of the Site. Accordingly, this document presents the analysis of remedial alternatives that may be reasonably applicable to the Tioga Avenue BCP Site based on current and intended future use of the Site.

1.1 Future Site Land Use

The intended future use of the Site is restricted to commercial or industrial use in accordance with the BCA for this Site.

1.2 Development of the Remedial Program

Corning is implementing the Remedial Investigation and Remedial Action program in accordance with the process and procedures applicable to the Brownfield Cleanup Program as contained in the NYSDEC 6 NYCRR Part 375 Regulations, the NYSDEC DER-10 Technical Guidance Document, and other related technical, process, and policy memoranda issued by the NYSDEC as are referenced in this document.

The remedial program for the Tioga Avenue Site has been developed based on results of the Site investigation process as documented in the Report on Remedial Investigations & Recommended Remedial Actions dated April 2010 and revised on July 30, 2010 (the Remedial Investigation Report) as approved by the NYSDEC and the NYSDOH. The RI Report identifies the presence of environmental contaminants on the Site. The RI Report does not identify any current adverse risk to human health or the environment based on existing conditions on the Site but recommends remedial actions during future Site development to mitigate the potential for future risk of an adverse human or environmental exposure to media that may be impacted at this Site. The AAR provides an analysis of remedial alternatives considered to support the decision-making process for the selected remedy for the Site.

The content of the AAR conforms to the scope and process outlined by relevant NYSDEC guidelines (i.e. DER-10).

1.3 Regulatory Framework & Timeline

This AAR presents the Site remedy and has been prepared in accordance with the following primary documents:

- the Report on RI Programs & Recommended Remedial Actions dated April 2010 as approved by the NYSDEC in consultation with the NYSDOH;
- NYSDEC (6 NYCRR) Part 375 Brownfield Cleanup Regulations dated December 2006;
- NYSDEC "Technical Guidance for Site Investigation and Remediation" (DER-10 dated May 2010);
- other relevant NYSDEC technical and administrative guidance for Site investigation and characterization, and;
- the additional documents identified in the List of References at the end of the AAR text.

Implementation of the Remedial Investigation (RI) Program included public notification and document availability consistent with the approved Citizen Participation Plan (CPP) for this Site in accordance with regulatory requirements and CPP requirements. The RI Program field investigations were implemented with the oversight of NYSDEC during the period October through November 2009. The Report on Remedial Investigations & Recommended Remedial Action dated April 2010 (as revised July 30, 2010) documents the results of the RI investigation and was approved by the NYSDEC and NYSDOH on 22 October 2010.

As a basis for the information provided herein, the following is a summary of activities associated with the Site environmental assessment, remedial investigations and facility closure process for the Site:

- Mid - 2006 Initiate Environmental Site Assessment (ESA)
- Late - 2006 Initiate Decommissioning and Demolition of the Fall Brook plant and ancillary facilities
- Mid 2007 Complete Decommissioning and Demolition
- July 2007 BCP Application (including finalized ESA Report)
- September-October 2007 Undertake Phase II ESA Investigations
- November 2007 BCP Application Accepted by NYSDEC
- April 2008 Corning Executes (signs and submits) BCA with Clarifications/Revisions Reviewed with NYSDEC
- September 2008 NYSDEC Executes (signs) BCA
- October 2008 BCP Remedial Investigation Work Plan (RIWP) Submitted to NYSDEC
- February 2009 NYSDEC Comments on RIWP
- March 2009 Corning Meets with NYSDEC and NYSDOH to Review RIWP Comments
- April 2009 Revised RIWP Submitted & Approved by NYSDEC
- August 2009 NYSDEC Comments on Revised RIWP
- September 2009 RIWP and Addendum Approved by NYSDEC and NYSDOH
- September-November 2009 Undertake RI Program Field Investigations

- October 2010 NYSDEC Approves the Report on RI Programs & Recommended Remedial Actions, April 2010
- February 2011 Corning Submits the Remedial Alternatives Report (RAR) to NYSDEC and NYSDOH
- March 2011 NYSDEC Comments on the RAR Followed by Meeting with NYSDEC
- March 2011 Corning Submits RAR Comment Response Letter
- May 2011 Corning Submits a Revised Document the Alternatives Assessment Report (AAR)
- June/July/August 2011 NYSDEC Comments on the AAR Followed by Meetings with NYSDEC to Review Responses to Comments and Content of AAR Revisions
- August 2011 Corning Submits the Revised AAR
- September/October 2011 Corning/NYSDEC Work Toward Completion of AAR

1.4 AAR Content

The AAR provides the basis for the selection of the remedy for the Tioga Avenue BCP Site. The following sections of this document provide the details of the remedial program for the Tioga Avenue Site.

Section 2 of the AAR presents the property use information and project background, which includes a Site description, historical use summary, and describes the physical and environmental setting of the Site. Section 2 provides a summary of the recent decommissioning and demolition activities of former manufacturing facilities on the Site, and a description of current Site conditions and land use.

Section 3 provides a summary of the RI Program scope and results of investigations performed and the Site Conceptual Model developed there-from including an assessment of changed Site conditions anticipated to occur during future development of the Site. This information includes recommendations on remedial actions and overview of the citizen participation planning activities that have occurred to date.

The results of the RI Program presented in Section 3 were used to develop the Remedial Goals and Remedial Action Objectives as detailed in Section 4 of the AAR. In addition to the RI Program findings, the Remedial Goals and Objectives presented in Section 4 are described in the context of the proposed future development for the Site.

Section 5 presents the detailed analysis of remedial alternatives potentially applicable to the Site to achieve the remedial action goals identified in Section 4 in support of the decision-making process for remedy selection. Remedial Alternatives are described and evaluated/screened relative to the criteria specified by NYSDEC in the Part 375 Regulations and DER-10 in deriving an appropriate Site remedy. The alternatives assessment process includes consideration of the NYSDEC guideline on green remediation principals (DER-31).

Section 6 provides an evaluation of the Institutional Controls, including the scope of a Site Management Plan (SMP), to be placed on the Site as part of the Site remedy for the attainment of the Remedial Goals and Objectives during and after implementation of the Site remedy.

Section 7 summarizes the evaluation of the existing engineering controls for the selected Site remedy as being protective of human health and the environment.

References used in assessment of remedial actions and for development of this AAR are referenced throughout the AAR document and are comprehensively identified in the "List of References" presented at the end of the Report text. The AAR contains tables, figures and appended information supporting the remedy selection process as assembled at the end of the AAR report text.

2. SITE DESCRIPTION AND HISTORY

The Site comprises 14.18 acres of property located within the City of Corning, Steuben County, New York being generally situated along the north side of East Tioga Avenue between Steuben Street to the east and Chemung Street to the west. The Site location is shown on Figure 1. The northern Site boundary is formed by railroad and flood control levee easements that separate the Site from the Chemung River. The Site is situated within an area of mixed residential, commercial and industrial development which includes the existing operating World Kitchen LLC (World Kitchen) glass manufacturing facility that is contiguous with the northeastern boundary of the Site. The Site is mostly undeveloped pending future development and is zoned "Industrial (I)" under the "Zoning Ordinance of the City of Corning, NY".

The Tioga Avenue Site contained the former Corning Fall Brook glass manufacturing plant, General Machine Shop, Pilot Plants and related support facilities; the demolition of which was completed in 2007 in accordance with the City of Corning demolition permit and with oversight and routine inspections by the NYSDEC. Documentation for the planning and execution of the demolition project is contained in reports and related documentation materials on demolition debris management and disposal that have been provided to the NYSDEC and the NYSDOH. The property boundary and former manufacturing facility layout is shown on Figure 2.

Prior to closure and decommissioning of the Corning Fall Brook and other Site facilities, the Site contained approximately 400,000 square feet of space in seven main buildings. These buildings included the former main glass manufacturing facility and associated warehouse and batch material storage areas, various trades shops (the mason, platinum and fabrication shops and central trades pilot plants), and the general machine shop (GMS). Glass manufacturing activities were discontinued in the Fall of 2002, but operation of the central trades (including the platinum shop), the mason shop, and batch material storage (mix house), continued until facility decommissioning that started in late 2006. All of these pre-existing buildings and support structures have been demolished to ground surface except for certain small storage buildings maintained by Corning as well as other "non-Corning" support structures and certain existing infrastructure associated with the neighboring manufacturing facility as further described below.

Currently the Site is generally level, largely covered by low permeable surfaces including concrete floor slabs and asphalt paving remaining after the Site buildings were razed, and all of which were thoroughly cleaned at the conclusion of the demolition process to provide a clean ground cover on the Site. The Site is largely vacant and unused except for small storage buildings, a well house, certain facilities associated with an off-Site waste water treatment plant (notably the equalization tank and pump house), as well as the areas, access ways and structures used by an adjacent manufacturing facility to support its operations.

Access to the Site is secured by perimeter fencing that nearly surrounds the entire property except for an asphalt covered parking area with an office trailer situated in the southeast corner of the Site at the intersection of Tioga Avenue and Steuben Street. All of the low permeable concrete/asphalt surfaces were thoroughly cleaned using mechanical washing methods to remove any visual evidence of loose solid debris/particulate matter/dust on these surfaces. These actions were completed in the final stages of the demolition project as described in the demolition reports provided to the Department.

2.1 BCA Property Boundary

The Tioga Avenue BCA Site is 14.18 acres in size. The Site boundary is shown on Figure 2 relative to the former Site layout including locations that remain in operation that occupy a portion of the BCA Site. The Tioga Avenue Site is contiguous with property owned by World Kitchen which is not affiliated with Corning. The World Kitchen facility is an active manufacturing operation producing consumer glassware products and uses/occupies portions of the BCA Site for its operations. Such uses are mostly located in the northeast area of the BCP Site next to the World Kitchen plant including the re-constructed batch house used for the storage and "batching" of the solid raw materials prior to manufacture of glass products, the associated rail spur for delivery of batch materials, housed and un-housed raw materials storage areas (mostly for cullet storage), access ways to the World Kitchen facility from adjacent streets, and other supporting infrastructure. These facilities are generally shown on Figure 2. The batch house shown on the Figures in this report depict the former batch house area that was removed as part of the demolition project and replaced with a new structure to support World Kitchen operations.

A portion of the World Kitchen property houses the wastewater treatment plant (WWTP) that remains in operation by Corning for treatment of stormwater from the former Fall Brook and related facilities areas that currently comprise the Tioga Avenue Property BCA Site. The WWTP is operated in accordance with the State Pollution Discharge Elimination System (SPDES) Permit #NY-0003981 maintained by Corning with the NYSDEC, Division of Water. Corning formerly used the WWTP for treatment of process waste water and storm water related to the former manufacturing operations on the Site. With closure of the manufacturing activities, the WWTP and SPDES permit are now maintained to treat stormwater from the Tioga Avenue BCA Site. Future disposition of the WWTP and the Corning SPDES permit withdrawal will be coordinated with the NYSDEC, Division of Water. Corning has been engaged with the Division of Water on the status of the Site and WWTP operations and has kept the Division of Water updated on future plans under the BCA. Cessation of the current stormwater controls and WWTP will be conducted pursuant to the applicable NYSDEC requirements and purview of the Division of Water.

The WWTP is not part of the Site or BCA based on the BCA determination letter from NYSDEC dated November 2007 wherein the Department has determined that the WWTP parcel does not meet the definition of a "brownfield site" as there is "no reasonable basis to believe that contamination is likely to be present on this parcel or that contamination or the potential presence of contamination is complicating the development or reuse of this parcel". Accordingly, this AAR is focused on the 14.18-acre Tioga Avenue property which comprises the BCA Site, as shown on the figures in this AAR.

2.2 Property History

The BCA Site property has a history of at least 148 years of manufacturing and industrial activity recently by Corning and previously by other parties unrelated to Corning. Most notably, the Blossburg and Corning Railroad Company acquired the property in 1854 and actively used the Site to support the transportation of coal. Remnants of the former rail use appear evident from the recent RI program. The historic fill identified on the property is comprised of materials that are in large part coal-derived. Corning razed the former Railroad site and adjoining residential structures along Tioga Avenue and Steuben Street to construct the original portions of the Fall Brook glass manufacturing plant in the late 1920's and subsequently further developed the vacant western portions of the Site over the 70-plus years of Site use. Corning's operations on the property included approximately 400,000 square feet of space in seven main buildings with associated infrastructure that fully occupied the Site. The history of the Tioga Avenue Site property is detailed in the Environmental Site Assessment Report by Haley & Aldrich dated July 2007 and appended to the BCA application for this Site.

The Fall Brook facility decommissioning and demolition project started in late 2006 and finished in 2007 under NYSDEC oversight who provided frequent Site inspections during the project, and who conducted review of the process and procedures for characterization and disposition of demolition materials. Copies of the demolition planning and work activities, and management of materials created by the demolition process are documented in records that have been provided to the NYSDEC Division of Solid & Hazardous Materials during and at the conclusion of the project. These records indicate that the former building elements were characterized for disposal purposes, removed, and disposed, scrapped or recycled off-site at appropriate waste management facilities and that the post-demolition ground surface (mostly concrete and asphalt) was thoroughly cleaned along with the sewer conveyance piping. A closure report dated February 2008 was prepared by Corning Incorporated to document the building demolition project. This report provides an overview description of the process and procedures used during building demolition and decommissioning of associated structures including the sewer system. A copy of this report was filed with the NYSDEC Division of Environmental Remediation in response to its request in February 2009 during review of the Remedial Investigation Work Plan for the Tioga Avenue Site.

Most of the buildings and support structures on the Fall Brook property (the BCA Site) were demolished to ground surface except for certain small storage buildings and other facilities associated with the operating waste water treatment plant (e.g. equalization tank, well house, and associated water conveyances). In addition, World Kitchen uses portions of Corning property to facilitate the ongoing operations of the World Kitchen plant that will need to be integrated into any future remedial program planning for the Site. Structures on the Site that were demolished were removed to ground surface leaving floor slabs and asphalt areas that currently cover most of the Site; the Site continues to be secured with perimeter fencing and access is controlled. This condition effectively provides an effective cover or "cap" in addition to access controls on the Site pending redevelopment of the Site.

3. REMEDIAL INVESTIGATION PROGRAM

In accordance with the BCA, Corning has undertaken a RI Program at the Site consistent with the applicable NYSDEC Brownfield Cleanup Program (BCP) regulations and related guidance documents, and most notably the guidance criteria in NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation. The investigation was performed in accordance with the Remedial Investigation Work Plan (RIWP) dated April 2009 that was reviewed and approved verbally on September 24, 2009 and in writing on September 28, 2009 by the NYSDEC in conjunction with the NYSDOH. Results of the investigation program are documented in the "Report on Remedial Investigations & Recommended Remedial Action" (RI Report) for the Site dated April 2010 (as revised July 30, 2010) and approved by the NYSDEC, in conjunction with the NYSDOH, by letter dated October 22, 2010. The review process for both the RIWP and the RI Report included public notification and document availability consistent with the Citizen Participation Plan (CPP) for this BCA Site.

In overview, the remedial investigations at the Site have included a comprehensive sampling program designed to characterize soil/fill and groundwater across the Site involving both targeted investigations of specific "areas of concern" (AOCs) as well as systematic characterization of historic fill material that is present across the Site. Delineation of AOCs was facilitated by the Environmental Site Assessment (July 2007) activities and related information as contained in the Corning BCA application and which are described in the RIWP. The Remedial Investigation (RI) program was implemented with the oversight of NYSDEC, in cooperation with the NYSDOH. Figure 3 shows the location of the AOCs and the corresponding exploration locations.

The investigation program for the Site was conducted in accordance with the RIWP to identify if "contaminants," as defined in the BCP regulations, are present on the property. The RIWP provides a description and analysis of the AOCs identified on the BCA Site based on Site historical documentation and on results of pre-BCA "Site characterization" investigations on the property. This information enabled development of an exploration program to evaluate substances of potential concern and to refine the Site Conceptual Model. The RIWP was reviewed with the NYSDEC and NYSDOH, and the final RIWP reflects the comments and suggestions of those agencies which, after agency approval, were offered for public review and comment in accordance with the CPP.

Based on historical Site use, the soil and groundwater investigations focused on the organic and inorganic constituents known or suspected to be associated with the Site referred to as "Site-related" parameters, as well as for an "expanded" and much broader suite of substances irrespective of any known or reasonably expected use on the Site. The expanded parameter list was analyzed to provide the data necessary to verify the presence or absence of these substances on the property. The "Site-related" parameters included the class of compounds or individual constituents that could be present in most any historic fill (as defined by applicable regulations) or otherwise could be present associated with Corning's and/or the historical railroad operations on the Site and included: petroleum hydrocarbon compounds, polynuclear aromatic hydrocarbons (PAHs), and the primary inorganic/metallic substances that were formerly used in glass manufacturing on the Site (antimony, arsenic, barium, cadmium and lead). All of the analytical data were collected, analyzed and validated in accordance with the NYSDEC-approved Quality Assurance/Quality Control Program in the RIWP.

The significance of the investigation data obtained was evaluated in accordance with the applicable NYSDEC BCP regulations contained in 6 NYCRR Part 375. For soil and historic fill samples, results were compared to the risk-based Soil Cleanup Objectives (SCOs) as specified under Subpart 375-6 of the regulations assuming the future land use will be restricted to commercial and/or industrial development in accordance with the BCA for this Site. However, for purposes of the RI program, the evaluation criteria defaulted to the lower of the SCOs (commercial being the most restrictive) in assessing the significance of the data. The significance of the groundwater results were screened against the New York State Drinking Water Standards and Criteria found in NYSDEC's "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations", dated June 1988. Use of the NYS Drinking Water Standards for this comparison represents a conservative screening level analysis given lack of any actual use of Site groundwater for potable purposes.

3.1 Remedial Investigation Results

Results of the characterization and investigation program for the Site have enabled development of the following Site Conceptual Model:

3.1.1 Site Stratigraphy and Hydrogeology

Subsurface conditions on the Tioga Avenue Property generally consist of a mixture of fill materials placed over a long period of Site use. This material can be described as "historic fill material" consistent with the definition of such material in the BCP regulations and guidelines. Investigations performed indicate the historic fill to be characterized as reworked soil intermixed with various materials including coal derived materials (dust, ash and coal pieces), brick and other debris. The depth of this material generally ranges across the Site generally from 1 to 14 feet in thickness below ground surface (BGS); however, up to 20 feet of fill was observed at one of the sampling locations. Investigations indicate that historic fill is several feet above the water table surface.

3.1.2 Soil Conditions

The historic fill material is underlain by alluvial soils comprised of sand deposits that are more than 70 feet deep. The alluvial materials that underlie the Site have characteristics similar to those of the Chemung River Valley regional groundwater aquifer. Well measurements on the Site indicate depth to water ranging from 17 to 25 feet BGS. Groundwater at the Site generally flows in a west to east direction consistent with natural groundwater flow conditions within the Chemung River Valley. Groundwater is being extracted on-site for industrial use by Corning (at the WWTP described above) and extracted off-site by World Kitchen for industrial use (at its facilities as described above). These pumping activities may locally influence groundwater flow conditions.

3.1.2.1 General Soil Conditions

As summarized on Table I sampling performed during the RI Program indicates that certain inorganic elements, including Site related COCs, were detected in historic fill at levels in excess of the prescribed NYSDEC Soil Cleanup Objectives (SCOs) established for commercial or industrial property (6 NYCRR 375-6). These sampling results indicate the presence of arsenic and, to a lesser degree lead, at concentrations exceeding SCOs. In addition, there were single detections of both mercury and copper reported in samples higher than SCOs. In the case of arsenic, there were 32 of 182 detections higher than the restricted commercial SCOs. These detections were identified in historic fill across the Site and generally within the upper strata (upper 1 to 4 feet) with more limited detections in deeper strata. In the case of lead, there were 7 of 182 historic fill samples exceeding the restricted commercial SCOs. These detections were generally observed within the upper fill strata (within the upper 1 to 3 feet) with some of the detections observed in deeper strata within historic fill.

Analysis of the halogenated and non-halogenated volatile and semi-volatile organic parameters (VOCs and SVOCs) were reported as either "not-detected" or at levels below the relevant SCOs with two exceptions. Only benzo(a)pyrene and trimethylbenzene were detected at two locations within the historic fill at levels slightly higher than the SCOs. There were no detections of any of these elements or compounds above SCOs in non-fill (natural) soils below the historic fill or in groundwater. Analysis of samples Site wide for Target Compound List (TCL) VOCs were reported as not-detected expect for Trimethylbenzene (a petroleum related compound) detected slighted higher than the analytical detection limit at one of the sample locations within an AOC where petroleum products were in past use.

The sampling program included extensive analysis of historic fill as well as the underlying undisturbed soil within AOCs 6, 7 and 8 where bulk above and below ground tanks of fuel oil and, to a lesser extent, gasoline products were in use in the past. Investigations in these areas indicated the presence of residual petroleum substances with staining and odors observed during drilling. When analyzed, representative impacted samples lacked the presence of any detectable levels of the SCO petroleum constituents at levels higher than the applicable SCO. Despite these results, it appears, based on observations of staining, odors and/or elevated photo-ionization detector (PID) readings during drilling, as well as the presence of non-target petroleum related constituents detected in samples during analysis (some requiring dilution), that residual weathered petroleum substances remain in this area of the Site most likely related to past storage/use activities. The locations where petroleum constituents have been identified are summarized on Table II indicating the type of observation made by boring location and depth interval. This information was used to develop Figure 4, showing the area where petroleum "nuisance" conditions may exist on the BCP Site proximate to the water table surface ("nuisance" condition is defined in NYSDEC Soil Cleanup Policy, CP-51, as an aesthetic condition such as staining or odors).

3.1.2.2 Distribution of Arsenic and Lead in Site Fill

Evaluation of the distribution of arsenic and lead in the Site soil and fill results in the following major conclusions:

- Arsenic and lead occur throughout the Site and appear in both historic fill (with some concentrations higher than SCOs) and native soil (without any concentrations higher than SCOs).
- The distribution of lead and arsenic is by discrete occurrence rather than by continuous gradients of concentration from high to low because there is no transport mechanism to cause arsenic and lead in soil to migrate.

- In general, the concentrations of arsenic and lead in historic fill samples are distributed mostly within shallow depth across the Site.

- There are only a few locations where historic fill samples have concentrations or characteristics of arsenic or lead which comparatively differ from Site-wide conditions. Investigations demonstrate that these substances exist only within historic fill material, are mostly relegated to the near ground surface depth horizon.

- Sampling at the Site has demonstrated that groundwater is not currently a transport mechanism to cause arsenic or lead to migrate and form a plume or concentration gradient.

Figures 5 through 8 show that both arsenic and lead occur throughout the Site; there are arsenic and lead detections in virtually every boring where samples were collected from the fill.

The distribution of arsenic in Site fill is shown in Figure 5 (samples from 0 - 1 ft depth) and Figure 6 (samples from below 1 ft depth). The Figures depict the range of arsenic concentration at each boring using color coding. Different colored dots indicate the following ranges of arsenic concentrations:

- Less than 13 ppm (the Unrestricted Use SCO).
- Between 13 and 16 ppm (16 ppm is the Restricted Commercial Use SCO).
- Between 16 and 40 ppm.
- Between 40 and 250 ppm.

The 40 – 250 ppm range encompasses seven locations where samples were observed to have significantly higher arsenic concentrations than the remainder of the data. Lead concentrations exceeded the restricted commercial SCO in only three of these higher arsenic locations and all three were in the 0 – 1 ft depth interval.

The distribution of lead in Site fill is shown in Figure 7 (samples from 0 - 1 ft depth) and Figure 8 (samples from below 1 ft depth). The Figures depict the range of lead concentration at each boring using color coding. Different colored dots indicate the following ranges of lead concentrations:

- Less than 63 ppm (the Unrestricted Use SCO).
- Between 63 and 450 ppm (450 ppm is the Protection of Groundwater SCO).
- Between 450 and 1,000 ppm (1000 ppm is the Restricted Commercial Use SCO).
- Between 1,000 and 3,900 ppm (3,900 is the Restricted Industrial Use SCO).

The 1,000 – 3,900 ppm range encompasses the seven locations where lead concentrations were greater than the restricted commercial use SCO. No samples had concentrations that were greater than the restricted industrial use SCO.

3.1.3 Groundwater Conditions

Groundwater samples have been collected Site-wide and analyzed for expanded parameters in accordance with the approved RIWP and comments provided by the NYSDEC during review of the RI Report. Inorganic analyses indicate the detection of certain naturally occurring metals above criteria in wells that are located both on the up-gradient and down-gradient peripheries of the Site including: aluminum, iron, manganese, selenium, and sodium. In addition, antimony was also detected at 2 of 13 well locations at levels slightly higher than the analytical detection limit and ground water standard. All of these inorganic analyte detections are indicative of the levels these metals are naturally present within the soil strata and which sediments/silt become entrained in ground waters during sampling, or which have higher solubility and could be dissolved in groundwater such as is likely the case with sodium. Inorganic COCs (arsenic and lead) have not been detected above applicable criteria (NYS Drinking Water Standards) during any of the groundwater sampling events at the Site. Arsenic was detected at selected well locations lower than comparison criteria (NYS Drinking Water Standards) in 2007 and 2009. Arsenic is a Site related COC as it was used as an ingredient in glass making and present in process waste of the glass industry. Arsenic is also naturally occurring and is a trace metal that can be associated with petroleum products.

There were no organic compounds detected higher than comparison criteria in any of the water samples except for an isolated detection of isopropylbenzene reported in two samples at levels slightly higher than drinking water standards. These samples were collected at locations within and down-gradient of AOCs 6, 7 and 8 where petroleum substances were observed in subsurface soil/fill. Other organic substances, including 1,1,1 TCA were detected during the groundwater sampling events in 2007 and 2009, most of which were below the laboratory practical quantitation limit (thus only estimated) and all of which were below the Drinking Water Standards. These low detections were reported in monitoring wells along the up-gradient and down-gradient periphery of the Site.

3.1.4 Soil Vapor Conditions

Soil vapor was not sampled during the RI program. While the presence of 1,1,1 TCA, a Site related COC, has been confirmed in shallow soil samples and detected in shallow groundwater along the upgradient and downgradient periphery of the Site at concentrations below comparison criteria, this, combined with the participants redevelopment plans did not warrant vapor investigation during the remedial investigation program. As further described in Section 6.1 below, the Site Management Plan will address measures to evaluate soil vapor should future development involve the construction of occupied buildings on the Site.

3.1.5 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment (QHHEA) was performed based on the investigation information for this Site in accordance with NYSDEC and NYSDOH guidelines as identified in the RIWP consistent with the requirements of Section II E of the Site BCA (e.g. determining the need for remediation). The assessment evaluates whether any of the substances of concern identified on the Site could present a pathway of human exposure and the extent to which such exposure could present unacceptable risk. The QHHEA analysis is driven by the historical fill on the Site and presence of certain inorganic elements detected sporadically in this material, primarily arsenic. These substances were detected at locations in the historic fill as are detailed in Section 3.1.2 above. The detection of these elements above SCOs is isolated mostly within the uppermost depth of historic fill and determined to have not caused any adverse impact to the natural underlying soil or to groundwater based on the groundwater investigation performed on the Site.

The main conclusions of the QHHEA are that: 1) theoretical potential human health risk may exist from direct contact with the historic fill (ingestion or inhalation) that may contain a substance above SCOs regardless of the origin of that fill/substance; 2) direct contact with historic fill could constitute exposure; 3) currently, the potential for human exposure to historic fill is precluded because the Site is covered and secured by fencing from any unauthorized entry; 4) there is no potential for exposure to groundwater by ingestion lacking any potable use of that resource on the Site; and 5) any other pathway (dermal contact or inhalation) is inconsequential based on the groundwater detections at the Site. The QHHEA also considers the presence of apparent petroleum substances in subsurface soil on a portion of the Site. From an exposure perspective, these conditions represent only a "nuisance" condition in the absence of any organic petroleum constituent detections, and similarly there is no current exposure pathway.

3.2 Assessment of Mobility of COCs

During the review of the AAR, data contained in an appendix of the 2009 RI Report, including Toxic Characteristic Leaching Procedure (TCLP) analysis of environmental samples, raised the concern that lead contaminated soils demonstrated the potential to leach or become mobile at concentrations below the proposed soil cleanup objectives for the Site. In response to this concern, the Participant prepared a technical report to be included in the AAR Appendix A that documents the behavior and mobility characteristics of inorganic compounds such as arsenic and lead in the environment. This report concludes that arsenic and lead contaminated soils are not expected to be mobilized if exposure to precipitation through a high permeable cover system as may exist from future Site development were to occur. Acknowledging the Participant's technical report indicating that TCLP analysis would not best simulate Site conditions, the NYSDEC and NYSDOH requested the two sample locations of TCLP failure be re-sampled and analyzed using the Simulated Precipitation Leaching Procedure (SPLP) analysis. In lieu of conducting additional sampling analyses, the Participant has proposed the recommended Site remedy include the use of low permeable cover systems (or other remedy as approved by NYSDEC) into the future in certain areas of the Site as specifically defined herein to mitigate potential concerns with future mobility of inorganic COCs. Alternatively, additional testing as identified by the NYSDEC can be conducted and the requirement for low permeable covers removed if these data show low mobility of COCs.

3.3 Remedial Investigation Conclusions

The RI Report documents environmental conditions on the former Fall Brook property BCA Site in fulfillment of the scope and objectives of the RIWP. Results of the RI investigations were compared to relevant comparison criteria established by NYSDEC (SCOs, New York State Drinking Water Standards, "nuisance" conditions) based on land use criteria applicable to the Site. COCs have been identified at this Site as are summarized in Tables I and II. In accordance with ECL 27-1411(1) and 6 NYCRR 375-1.6, and as required by Section II C. of the BCA for this Site, the RI Report supports the following conclusions:

- The Site has been secured pending completion of the Remedial Investigation process and future redevelopment. The Site contains concrete floor slabs, asphalt and other infrastructure elements that remain from former development on the Site and, as appropriate, identified as AOCs that were assessed during the RI Program.

- Significant remedial investigations have been performed on the Tioga Avenue Property BCP Site in 2007 and 2009. These investigations have achieved the fundamental goal of collecting sufficient environmental data to assess existing Site conditions and evaluate effective Site remedial alternatives and the BCP Remedial Investigation was concluded.

- The nature and extent of contaminants present at the Site has been defined in accordance with the RIWP objectives.

- Areas of the Site that contain petroleum residues that only minimally exceed relevant SCOs largely due to attenuating affects of chemical weathering. These areas are nevertheless identifiable visually and by odors and have been determined to represent a potential "nuisance" condition. This condition is carried forward in the remedial alternatives assessment process.

- Areas of the Site contain inorganic COCs including arsenic and lead detected above SCOs. These detections comprise a small percentage of the overall Site sampling and are primarily relegated to the upper 0 to 4 feet below ground surface. Identifiable source areas as defined in 6 NYCRR 375-1.2 (au), (f) and (u) have not been identified during the BCP remedial investigation of the Site. Exposure to historic fill is currently precluded by the existing ground cover on the property that effectively "caps" the Site. Stormwater on the property is collected, treated, monitored and discharged from the Site under a NYSDEC SPDES permit or to the municipal storm sewer.

- The presence of higher levels of inorganic COCs that present future concern relative to the potential that lead contaminated soils could become mobile at concentrations below the proposed soil cleanup objectives for the Site is carried forward in the remedial alternatives assessment process. The area to which this potential concern applies is depicted on Figure 11 as developed in conjunction with NYSDEC and is addressed through application of the groundwater protection criterion for lead in 6 NYCRR 375-6.5 in addition to the commercial use SCO for this substance. The area shown on Figure 11 is defined based on the results of the RI program showing the area where these criteria have been documented to be exceeded.

- The presence of historic fill throughout the property that could potentially contain COCs is a condition carried forward in the remedial alternatives assessment process. Remedial investigations document that inorganic COCs that are present in some of the historic fill do not appear to be mobilized and adversely impact other surrounding media (e.g. underlying natural overburden soil or groundwater) under current site conditions with a low permeable surface cover. Based on these conditions, potential pathways for any future human or environmental exposure can be reasonably mitigated through covering of historic fill as currently exists at the Site.

- Groundwater has been sampled as required by NYSDEC in the approved RI Work Plan, primarily along the periphery and at varying depths on the Site for the "expanded parameters" and determined not to be significantly affected by past Site operations given the overall lack of detections of these substances higher than comparison criteria. Arsenic and lead have not been detected in groundwater above the NYS drinking water standards. A single petroleum-derived compound (isopropylbenzene) was the only organic compound detected on the Site above the comparison criteria and this compound was detected only slightly above the NYS Drinking Water Standards. This detection was only present in two of thirteen wells located at the water table surface within or near the Area of Concern (e.g. former tank location). Sampling of other wells including wells completed in deeper zones approximating the locations and depths of existing on-Site and off-Site wells used for production and industrial use of groundwater had no detection of any petroleum related constituent. The petroleum substances present at the Site have significantly attenuated since the use and storage of petroleum products was discontinued and the storage facilities were removed. These substances will continue to naturally attenuate.

- Groundwater is not used for potable purposes on the Site, but is used for industrial purposes.

- Soil vapor was not sampled during the RI program. While the presence of 1,1,1 TCA, a Site related COC, has been confirmed in shallow soil samples and detected in shallow groundwater along both the upgradient and downgradient perimeter of the Site at concentrations below comparison criteria, this combined with the participants redevelopment plans did not warrant vapor investigation during the remedial investigation program. The Site Management Plan will address measures to evaluate soil vapor should future development involve construction of occupied buildings on the Site.

- The Qualitative Human Health Exposure Assessment (QHHEA) for the Site does not identify any complete pathways under which human exposure to Site related contaminants of concern could reasonably occur under current Site conditions. The QHHEA does not identify any pathway that could be reasonably considered to be complete in the future; but does identify certain pathways that could become potentially completed under a future Site commercial or industrial development/land use scenario. Analysis of future use conditions for soil (historic fill), air and groundwater identifies that:

  - A pathway for human contact with soil (historical fill) on the Site could potentially occur in the future, as for example by a construction or maintenance worker under a future development/land use scenario, and could potentially create an inadvertent exposure to the historic fill.
  - A pathway for exposure to "nuisance" petroleum related odors within the historic fill could potentially occur in the future under a future construction or maintenance scenario as described above.
  - No complete or potentially complete groundwater exposure pathway is identified under a future development and land use scenario.

- The QHHEA does not identify any other complete or potentially complete pathway for environmental resource exposure currently or in the future.

The Remedial Investigation was performed to identify if contaminants are present on the Site that present the potential for adverse affect on human health or the environment currently or during the planned future commercial and/or industrial development of the Tioga Avenue Property. The RI Program was performed with agency approval and oversight following the RIWP, DER-10 and other applicable guidance of the NYSDEC and NYSDOH. Based on the RI Program conclusions summarized above, the RI Report provides recommendations that remedial actions appear to be warranted during future use and development of Tioga Avenue Property to mitigate the potential for inadvertent exposure to historic fill during future development and use of the Site. These recommendations include the placement of appropriate engineering and institutional controls on the Site to mitigate the potential that an inadvertent human exposure to Site related contaminants could occur in the future.

3.4 Remedial Action Recommendations

The remedial investigation results indicate that remedial action is warranted to mitigate the potential for exposure to contaminants that could theoretically occur during future commercial and/or industrial development of the Site. Implementation of a Site remedy is considered in accordance with Section II.A.2. of the BCA and the related BCP regulatory program, that require development of remedial action goals and objectives, and analysis of remedial alternatives for deriving an appropriate Site-specific remedial action program for the Site. The following sections of this document provide the detailed analysis of remedial alternatives that may be applicable to the Site to reasonably mitigate the exposure risk identified during the RI program for the Tioga Avenue Site.

3.5 Citizen Participation

Corning has assisted NYSDEC with implementation of a program for informing and involving the affected and interested public throughout the Tioga Avenue Site BCP program. Starting with execution of the BCA for the Site in August 2007, a Citizen Participation Plan (CPP) was developed and approved by NYSDEC to document the communication process and to identify a broad list of nearby or potentially affected parties, local media sources, and public officials who will receive project related communications, in addition to the general public notices, at key decision making points in the BCP program for the Tioga Avenue Site.

To date, Corning has or is currently undertaking three public notice/involvement events for the Site under the above described CPP: the first announcing Corning's submittal of a BCP application for the Tioga Avenue Site with opportunity for public comment; the second announcing the local availability of the Remedial Investigation Work Plan for public review and comment prior to implementation; and the third announcing issuance of the Remedial Investigation Report and Recommended Remedial Actions (RI Report) which documents the results of the remedial investigation process. These and future public notice and comment periods have allowed interested stakeholders and citizens the opportunity to review project documents and provide comments through the NYSDEC at the key points in the BCP program.

The CPP identifies the objectives, timeframes and activities undertaken at the Site. The CPP scope and actions taken in response to the CPP are further described as follows:

- The CPP was established at the outset of the BCA program to document the process and procedures for informing and involving the public throughout the remedial investigation and remedial action program for the Site. The CPP was reviewed and approved by the NYSDEC, in cooperation with the NYSDOH. The CPP was developed in accordance with the scope, timeframes and content of Section I of the BCA, the associated BCP regulatory requirements of 6 NYCRR Part 375-1.10 and 375-3.10, and the related NYSDEC CPP Guidance (see references).

- Fact sheets were prepared based on the NYSDEC templates and content requirements for the purpose of informing the affected and interested public during the progress of the BCP program. These fact sheets provided an overview of the BCP program scope including:

property information, background, history and environmental summary; project description; proposed schedule; and general BCP process information. The fact sheets identified the locations where project documents are made locally available for review by the public along with identification of NYSDEC and NYSDOH representatives who may be contacted with questions or comments regarding this Site or the BCP process. Copies of fact sheets have been provided to property owners that are adjacent to the Tioga Avenue Site and to the individual residents of the adjoining apartment buildings through their landlords or apartment building managers. Other parties receiving fact sheets include the City of Corning, and other local, county, state, and U.S. government officials and representatives.

- In addition to the mailing of project fact sheets, outreach also includes public notices posted in local media outlets, and mailing and distribution of CPP communications to stakeholders.

- Establishment of local repositories (Southeast Steuben County Library, located in Corning, New York and the NYSDEC Region 8 Office in Avon, New York) to provide public access to project documentation including the approved BCP Application, the CPP, the approved RIWP, the RI Report, the AAR (this document) as approved by NYSDEC, and related project information.

Execution of the CPP in accordance with the relevant notice and review period requirements has been or will be completed prior to and after completion of the BCP program for the Tioga Avenue Site. Information (such as documentation of public notices and mailing affidavits) has been submitted to the NYSDEC in accordance with the CPP requirements.

4. REMEDIAL GOALS AND REMEDIAL ACTION OBJECTIVES

In accordance with the BCA for this Site, the overall goal of the Brownfield Cleanup Program activities at the Site is to restore the property to beneficial reuse and development in a manner that is protective of human health and the environment. The remedial project goal is to eliminate or mitigate, to the extent feasible, potential environmental threats to public health and the environment given the intended future commercial or industrial use of the Site as specified by the BCA.

One of the fundamental objectives of the remedial investigations is to provide sufficient and adequate data for evaluation of remedial alternatives. The Data Usability Summary Reports (DUSR) and Quality Assessment/Quality Control program documented in the Remedial Investigation and Recommended Remedial Action Report confirm that the data sets generated for the Site are useable for this purpose. These data indicate that certain environmental conditions on the Site present the potential to create adverse exposure on the Site because substances have been detected at levels that exceed the SCOs established in the NYSDEC Part 375 Regulations for commercially or industrially used property or because these substances, if exposed, could otherwise create a "nuisance" condition if exposed (e.g. an odor). More specifically, the RI Report documents that the following conditions exist on the Site as relevant to the remedial action planning process:

1. A small proportion of the near surface historic fill contains Site related inorganic COCs (arsenic and lead) higher than relevant SCOs for commercially or, in some cases, industrially used property. The elevated levels of these COCs are confined within the historic fill strata on the Site and are not present at elevated levels in natural soil that underlies the historic fill or in groundwater above the NYS drinking water standards. A substantially higher proportion of the detections of inorganic elements exceed SCOs for unrestricted property use.

2. Significantly weathered and degraded petroleum substances exist within the historic fill and in groundwater in the general areas of the Site that were formerly used for storage and dispensing of petroleum fuel products at the Site. These petroleum substances have degraded to the point where petroleum constituents are largely not detectable, but evidence of petroleum staining and odors may remain that represents a potential "nuisance" condition to the extent this material could be encountered in the subsurface.

3. The potential for adverse human or environmental exposure to the conditions identified in Items 1 or 2 above have not been identified to exist currently as such exposures are precluded by ground cover systems that exist on the Site that provide an effective engineering control combined with lack of potable groundwater use.

Investigation of other media and potential pathways (e.g. soil vapor pathway should occupied buildings be constructed) will be appropriately evaluated under the Site Management Plan and will be determined to either not be present (there are no environmental resources such as streams or surface waters on the Site which potentially could be impacted) or not to be applicable (lack of VOCs on-Site would mitigate a potential vapor intrusion condition or pathway) at this Site.

The remedial action objectives encompass mitigation of the potential for future human or environmental exposure to the above conditions through analysis and selection of a remedial program following the procedures and guidelines specified in the Part 375 regulations, DER-10 and related NYSDEC guidance (notably the CP-51 policy on "Soil Cleanup Guidance") regarding selection of soil cleanup levels appropriate under the BCP. Based on results and recommendations of the RI process and the overall remedial program goal, the remedial action program for the Site has been developed to address the following specific objectives:

- the Site remedy is protective of human health and the environment based on the planned future restricted commercial or industrial use of the property;

- the Site remedy is determined based on an iterative process following the recommended screening process and procedures specified by NYSDEC, most notably DER-10 (e.g. "Alternatives Analysis"), and documented in the Alternatives Analysis Report (AAR);

- the Site remedy considers analysis of restricted and unrestricted "remedial tracks" including analysis under the applicable unrestricted use SCOs in accordance with the process recommended in Section 3.8 of the 6 NYCRR Part 375 regulations;

- the Site remedy contains NYSDEC-approved institutional and engineering controls as necessary that will remain in place for future Site management including a Site Management Plan (SMP) as is detailed in Section 6.1 below. The SMP will prescribe requirements for future management of institutional and engineering controls for the Site.

5. DEVELOPMENT AND ANALYSIS OF REMEDIAL ALTERNATIVES

The Remedial Investigation program has identified the presence of certain environmental contaminants impacting the subsurface at the Site. These contaminants are currently isolated from human or environmental exposure either because they are covered by concrete or other low permeable surfaces thus providing an effective contact barrier or because potential exposure pathways are otherwise precluded such as the case with no potable use of groundwater. The extent of the existing ground cover surfaces on the Site as providing a barrier to physical contact is more fully described and documented in Section 7 below. Remedial alternatives are presented to provide for the protection of human health and the environment based on the existing Site conditions and if any of these conditions are changed in the future through Site redevelopment and removal or replacement of the existing Site cover system.

As described in Section 3 above, potential Site contaminants are associated with historical fill on the property some of which may contain inorganic COCs in excess of relevant SCOs based on future Site use (restricted commercial and/or industrial) and the presence of weathered and chemically degraded petroleum residuals within historic fill and soil in the former petroleum use areas on the Site. A petroleum compound slightly higher than NYS drinking water standards has also been detected in ground water in a limited area of the Site.

Development and analysis of remedial alternatives for the Site are based on the remedial investigation program findings of the Qualitative Human Health Exposure Assessment (QHHEA) and remedial action objectives identified in Sections 3 and 4 above with the overall goal that the remedial action program is protective of human health and the environment in accordance with the BCP Program.

Based on results of the RI program it is reasonable to conclude that historic fill is not exposed currently but could be exposed during future development and use of the Site, and that human exposure to the historic fill could theoretically occur through mechanisms such as inadvertent contact or ingestion of historic fill by workers, or that the future exposure of historic fill could otherwise create "nuisance" conditions such as petroleum odors in certain areas of the Site. Exposure to residual petroleum substances in groundwater could occur through extraction and use as drinking water. Based on these conditions and the requirements of the BCA and associated BCP regulations (6 NYCRR 375-3.8[f]), the alternatives analysis considers remedial alternatives for potentially impacted media under both unrestricted and restricted land use scenarios. This analysis is based on conservative assumptions for the protection of human health and the environment. Based on the remedial requirements of the Site BCA and the associated BCP regulatory program, the fundamental assumptions for the remedial alternatives assessment are that:

1. Remedies considered are protective of public health and the environment based on the RI program findings and the current, intended and reasonably anticipated future land uses of the Site and its surroundings. Remedial alternatives are considered for mitigation of potential complete exposure pathways as defined by the QHHEA summarized above. Remedial alternatives are considered based on the cleanup tracks specified in 6 NYCRR 375-3.8(e).

2. Consistent with the BCA and the relevant City of Corning land use regulations (zoning), intended future land use is restricted commercial or industrial. Analysis of remedial alternatives is based on the more restrictive of the remedial tracks (e.g. commercial).

3. In accordance with 6 NYCRR 375-3.8 and DER-10, and regardless of the actual intended future land use for the Site as specified in the BCA, the remedial alternatives analysis should include the evaluation of remedial technologies that would achieve unrestricted land use identified as "Track 1" in the BCP regulations. Unrestricted use considers alternatives for remediation of historic fill on the Site to meet the unrestricted use SCOs prescribed by 6 NYCRR 375-6. Unrestricted or restricted use of groundwater considers that the remaining petroleum substance detections are very limited (one substance detected at a trace level slightly higher than drinking water standards) and would be appropriately managed under a monitored natural attenuation remedy.

4. Assessment of remedial alternatives for the Site is based on the following assumptions regarding the nature and extent of Site contaminants that warrant remedial action:

   - The areas of the Site that contain residual petroleum impacts may represent "nuisance" conditions. These areas are located in specific areas of the Site where petroleum products were stored and used, and where impacts may remain as observed in the subsurface as described in Table II and shown on Figure 4.

   - The inorganic COCs (arsenic and lead) that have been detected above Site SCOs occur in a relatively small overall percentage of the historical fill samples on the Site. COCs have been detected above SCOs mostly, but not exclusively, within the upper fill strata (generally uppermost 4 feet) and that the distribution of arsenic and/or lead above SCOs is present across much of the Site. These conditions are confined to the historic fill and have not been documented above comparison criteria in other media (underlying natural soil or groundwater). The extent of historic fill is characterized in the remedial investigation report which contains plan and profile drawings showing the horizontal and vertical distribution of historic fill on the Site in relation to ground cover conditions and the water table surface elevation that is present well below the deepest historic fill elevation on the Site.

   - Exploration data indicate that historic fill is ubiquitous on the Site and is present at approximate depths ranging from approximately 1 to 14 feet in thickness (with up to 20 feet thickness at one of the boring locations). Statistics inferred from soil boring data and mapping of the Site using digital terrain modeling (DTM) by Carlson Civil Suite for Auto CAD indicates an average thickness of historic fill of approximately 6 feet and associated volume of approximately 130,000 cubic yards. These estimates are approximate and intended to provide a basic level of Site information and are sufficient support the alternatives analysis process. These estimates are not sufficient for detailed remedial engineering analysis given the variability that historic fill is present at the Site (e.g. varies by several feet in thickness between adjacent exploration locations) and interpolation between exploration locations was necessary for the software to create a surface.

5.1 Screening of Remedial Cleanup Tracks

For sites that have been determined to warrant remediation, relevant requirements described in 6 NYCRR 375-3.8(e) identify four "cleanup tracks" from which a remedial program is required to follow. The scope and relevance of each of these tracks is considered for the Tioga Avenue Site, as required, based on results of the RI process and the overall objective to restore the Site property to beneficial reuse and development in a manner that is protective of human health and the environment. This screening process provides the basis for identification and retention or deletion of cleanup tracks that are potentially applicable to the Site. Alternatives identified to be potentially applicable to the Site are defined in greater detail and comparatively assessed as detailed in the balance of the Alternatives Assessment Process contained in this document. The screening process provides the following basis for selection of appropriate remedial cleanup tracks to be assessed for the Tioga Avenue Site:

- Track 1/Unrestricted Use – A Track 1 remedy entails a cleanup that would allow the Site to be used for any purpose without any restrictions on the use of the Site. In accordance with 6 NYCRR 375-3.8 and DER-10, and regardless of the actual intended future land use for the Site as specified in the BCA, the remedial alternatives analysis should include the evaluation of remedial technologies that would achieve a level of cleanup sufficient to achieve Track 1 unrestricted land use. This cleanup track is therefore retained as part of the remedial analysis process. Unrestricted use considers alternatives for remediation of historic fill on the Site to meet the unrestricted use SCOs prescribed by 6 NYCRR 375-6. Unrestricted or restricted use of groundwater considers that the remaining petroleum substance detections are very limited (one substance detected at a trace level slightly higher than drinking water standards) and would be appropriately managed under a monitored natural attenuation remedy. Assessment of a Track 1 remedial alternative to mitigate potential impact from historic fill that may contain arsenic and lead at levels higher than unrestricted land use SCOs would necessitate removal of these materials by excavation and off-site disposal. Implementation of a Track 1 alternative is depicted on Figure 9 showing the estimated extent of these actions in terms of the areas, depths and quantities of materials to be removed or managed. This information supported the assumptions developed for comparative assessment of the Track 1 remedial alternative.

- Track 2/Restricted Use – A Track 2 remedy prescribes the removal of historic fill containing COCs higher than restricted commercial SCOs in 6 NYCRR 375-6 on the Site to a maximum depth of 15 feet below ground surface (bgs) provided that: 1) the soils below 15 feet do not represent a source of contamination; 2) that any remaining contaminated soil at depth will be managed under a Site Management Plan; 3) off-site groundwater does not exceed standards; and 4) on-site groundwater use is restricted. As shown on Figure 10, application of this standard to the Site would, at a minimum, entail the removal and off-site disposal of historic fill over significant areas of the Site where arsenic and lead have been identified above commercial SCOs. The effectiveness of a Track 2 remedy in protection of human health and the environment would be based on the level of assurance that COCs above SCOs can be readily and precisely defined on the Site so as to mitigate the potential for there to be any remaining potential for a direct exposure pathway to occur in the future because of the remaining presence of these substances on the Site. As defined in 6 NYCRR 375-3.8(e)(2)(iv) a Track 2 remedy precludes the use of long term institutional or engineering controls. As shown on Figures 5 through 8 and summarized in Section 3.1.2 above, the distribution of arsenic and lead are widely disbursed across the Site and lack any readily defined points of release or transport mechanisms. The data show a higher level of COCs within the near ground surface samples but also show that elevated detections are somewhat sporadic and random across the Site. A Track 2 remedy would be effective in removal of COC mass but may not be fully protective of human health and the environment unless implemented on a more comprehensive basis to assure the removal of any amount of COCs greater than SCOs is performed Site-wide. Because of these conditions, it is reasonable and conservative to assume that to be completely protective a Track 2 (removal action) may need to be applied over much of the Site since any use of engineering controls as a component of a Track 2 remedy would be precluded based on the regulatory definition of a Track 2 remedy [6 NYCRR 375-3.8(e)(2)(iv)]. . A Track 2 alternative does not provide any incremental higher level of human or environmental protection than other cleanup tracks (comprehensive removal or engineering controls) considered by the AAR process and, is not retained as part of the remedial analysis process.

- Track 3/Modified SCOs - A Track 3 alternative is not applicable to the Site since modified soil cleanup objectives are not proposed for the Site. This cleanup track is therefore not retained as part of the remedial analysis process.

- Track 4/Restricted Use With Site-Specific SCOs – A Track 4 remedy involves attainment of SCOs that are protective of human health and the environment with use of acceptable engineering and institutional controls. As relevant and applicable to Site conditions, a Track 4 remedy would be implemented through appropriate institutional and engineering controls consistent with 6 NYCRR 375-3.8(e) as applicable to commercially (or industrially) used property which purpose is to mitigate the potential for future human or environmental exposure to Site COCs that have been identified within historic fill on the Site. This cleanup track is retained as part of the remedial analysis process.

5.2 Unrestricted Use with No Institutional or Engineering Controls (Track 1)

As defined by the BCP regulations, a "Track 1" remedial program for unrestricted use of the Site would need to achieve a remedial level what would allow the Site to be used for any purpose without any restrictions such as environmental easements or other land use controls, and that:

- the soil component of the remedial program shall achieve the unrestricted soil cleanup objectives for all soils above bedrock;

- the remedial program does not include the use of long-term institutional or engineering controls; and

- the remedial program may include the use of short-term employment of institutional or engineering controls provided:

  - the remedial program includes an active treatment system, either ex-situ or in-situ, which will operate for, or require, no more than 5 years to meet the applicable contaminant-specific soil cleanup objectives or remedial goals established for other contaminated media;
  - the remedial program requires the institutional control to assure the operation and integrity of the remedy, as well as to address potential human health exposures during this period; and
  - the remedial program includes a provision for the applicant to implement an alternative remedy to meet the soil cleanup objectives in the event that the short-term institutional period is exceeded.

The RI Program results indicate that historic fill is present across the Site at varying depths generally ranging from 1 to 14 feet in thickness (and up to 20 feet observed at one boring location) below the existing Site cover material (e.g. concrete). The historic fill overlies native alluvial soils. Bedrock was not encountered during the remedial investigation program and is reported to be approximately 100 or more feet below ground surface. Extensive sampling of historic fill has indicated that certain elements (arsenic and lead) were present in a small percentage of the soil sample population at levels that exceed SCOs based on current and future Site use. Under a Track 1 remedy and the assumption of unrestricted use, a significantly higher percentage of the historic fill samples show exceedence of the unrestricted use SCOs in historic fill, but no other exceedence in other media (natural soil or groundwater). The Site data are summarized on Table III relative to both the restricted (commercial and industrial) and unrestricted land use criteria. The area and depth of historic fill that may contain arsenic and lead higher than the lowest unrestricted SCO (13 ppm for arsenic and 63 for lead) are shown on the Conceptual Excavation Plan for the Track 1 Alternative on Figure 9.

There are areas on the Site that have been generally defined that could potentially exhibit "nuisance" characteristics as remaining from past petroleum storage areas as are shown on Figure 4 and described in Section 3.1.2 above. Results of the QHHEA indicate the exposure to soil (historic fill) could inadvertently occur in the future thus creating the potential for adverse risk by direct contact mechanisms (e.g. ingestion or inhalation of dust). Other media (e.g. air, groundwater) and potential exposure pathways (e.g. vapor intrusion) were not identified at the Site. The vapor pathway was evaluated empirically during the RI based upon the participants' intended future use of the Site.

Based on the Site characterization process and the BCP regulatory program requirements, it is anticipated that attainment of a Track 1 cleanup objective for the Site would be achieved through excavation and removal of historic fill that has the potential to contain certain elements higher than the SCOs for unrestricted land use as identified in 6 NYCRR 375-6.8 as are summarized on Table III and shown on Figure 9. The extent of the removal action would be significant to achieve the unrestricted use criteria for COCs above SCOs within the historic fill and overall extent of historic fill on the Site. Accordingly, the removal action alternative would achieve the Track 1 remedial objectives by the elimination of any historic fill that may contain levels of elements higher than the unrestricted SCOs and would also result in removal any historic fill media that may exhibit petroleum "nuisance" characteristics. Other remedial options (on-site/in-situ or off-site) such as destruction, treatment/separation, or solidification would not achieve the unrestricted use alternative or otherwise do not represent reasonably applicable or practical remedial alternatives for the Site and are not considered in this assessment.

The remedial program to achieve the unrestricted land use scenario (Track 1) is assumed to contain the following basic elements to address historic fill on the Site.

- Completion of demolition activities on the Site largely including removal of concrete from the remaining building foundations and floor slabs and related infrastructure would be necessary for a Track 1 remedy. This material would be transported off-site for appropriate management or could be appropriately sized and stored on-site for possible reuse on-site as an engineered fill during Site restoration.

- Excavation of historic fill on the Site based on the Conceptual Excavation Plan on Figure 9. The depth of historic fill on the Site is variable ranging in thickness below the existing ground covers (e.g. concrete) from approximately one foot up to 20 feet as observed in one of the borings completed during the RI Program. An excavation involving removal of the historic fill that may contain COCs above unrestricted SCOs would entail the removal of significant quantities of soil which, based on current estimates, could entail more than 135,000 tons of material for appropriate disposal and replacement with suitable backfill materials. Excavation would likely require some amount of geotechnical stabilization for protection of remaining structures (as are shown on Figure 9) and implementation of extensive efforts/measures for environmental monitoring and control to mitigate impact in the community (e.g. noise, dust, truck traffic, etc).

- Transportation and disposal of the excavated unused surface materials and historic fill to an appropriately licensed landfill.

- Backfilling and grading of the Site with imported soil (and/or processed/recycled concrete) as tested and approved for use based on approved sampling protocol.

- Management of the limited remaining groundwater impact area by monitored natural attenuation.

5.3 Restricted Use with Institutional and Engineering Controls (Track 4)

A remedial program for restricted use of the Site (Track 4) would involve application of the lower (more restrictive) SCOs consistent with 6 NYCRR 375-6 for the protection of public health based on the intended future commercial or industrial land use for the Site. For this Site, use of commercial criteria are applied and a restricted use cleanup objective may include the use of long term institutional or engineering controls.

The Site characterization process has determined that the Site is protective of human health and the environment based on existing Site conditions that are comprised of engineering controls consisting of cover systems over the Site. The Track 4 alternative is assumed to contain the following elements:

- Documentation of the existing engineering controls on the Site as defined by 6 NYCRR 375-1.2(o) and DER-10-1.3(b)(16) consisting of cover systems on the entire Site. These controls eliminate the potential for any human or environmental exposure pathways to Site contaminants as required for engineering controls. The existing Site cover system is comprised of: concrete slabs remaining from prior building foundations and related infrastructure; asphalt and gravel surfaces; active railroad grade including tracks and associated ballast; existing buildings and improvements that support the ongoing operations of World Kitchen as described in Section 2 above; existing structures associated with the operating Waste Water Treatment Plant (equalization tank, engineering building, pumping station/wet well, diversion structure, and related facilities), and other miscellaneous features that provide an acceptable cover system such as the well house.

- An engineering evaluation of the condition and extent of existing engineering controls as described above to meet the 6 NYCRR 375-3.8 requirements for cover systems. Based on a recent Site inspection, the existing surface cover precludes direct contact with residual contaminants in the fill. Based on the inspection and subsequent actions, no improvements or upgrades to the existing cover controls are needed (the engineering evaluation of existing engineering controls and subsequent actions at the Site is described in greater detail in Section 7 below).

- Development of a Site Management Plan (SMP), as approved by the NYSDEC and NYSDOH, detailing the process and procedures for the future management of the engineering controls and institutional controls on the Site. Based on relevant NYSDEC guidance "the SMP will describe, as applicable: 1) implementation and management of all engineering and institutional controls;

2) media monitoring; 3) operation and maintenance of all treatment, collection, containment, or recovery systems; 4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and 5) defining criteria for termination of treatment system operations." The SMP will contain a "Soils Management and Excavation Plan" and a "Soil Vapor Assessment Management Plan" as applicable to the Site. Additional discussion and detail on the content of the SMP for this Site is provided in Section 6.1 below.

- Consistent with Section 3.2, the SMP will define the requirements for the future use of engineering controls (cover systems) and/or other remedial activities that will be consistent with the current protective remedy.

- Placement of an institutional control on the Site to preclude the future potable use of groundwater on the Site.

- Placement of an Environmental Easement on the Site in favor of New York State subject to the provisions of ECL, Title 36, that will document any institutional or engineering controls placed on the Site property. Consistent with NYSDEC guidance, the basic intent of this instrument will be to "provide an effective and enforceable means of encouraging the reuse and development of a controlled property, at a level that has been determined to be safe for a specific use, while ensuring the performance of operation, maintenance, and/or monitoring requirements."

5.4 Analysis of Alternatives

Based on the Remedial Program objectives for the Site (refer to Section 4 above), selection of a remedial alternative for the Site is based upon the screening criteria contained in the BCP Program Regulations (6 NYCRR 375-1.8[f]) and the associated DER-10 guidelines for application of these criteria. These criteria are considered in juxtaposition to each of the identified potential Site remedies described above in determining the recommended remedy for the Site. Nine criteria are used to quantify the degree of human health and environmental protectiveness of each of the proposed remedies. Accordingly, these nine criteria are described and evaluated below for an unrestricted (Track 1) and restricted (Track 4) remedial program at the Site. A summary of this comparative analysis is provided on Table IV.

Protection of Human Health and the Environment

- Track 1: Implementation of an unrestricted use remedial goal would involve the removal of much or most of the historic fill on the Site. This alternative would, in the long term, achieve protection of human health under any future use scenario including for future unrestricted use of the Site because historic fill that may contain elements or petroleum "nuisance" conditions exceeding the unrestricted use soil cleanup objectives would be removed from the Site. However, implementation of a Track 1 remediation will involve substantial disturbance from a very large scale excavation project on the Site and would create the potential for short term impact (such as truck/vehicle traffic) on the surrounding community and environment because of such disturbance. Potential short term impacts will necessitate extensive controls during implementation to mitigate impact during removal actions at the Site and during the transportation and off-site disposal of the material. It is not apparent the Track 1 removal action will have any significant affect on groundwater because sources of the groundwater impact (e.g. USTs) have been previously removed and investigations indicate remaining impact is very limited in extent and concentration and, what limited contaminants remain, will continue to naturally attenuate absent any removal of historic fill. A Track 1 remedy involving monitored attenuation of groundwater would be fully protective of human health and the environment lacking any apparent complete human health or environmental exposure pathway currently or in the future.

- Track 4: A restricted use remediation goal would enable the historic fill to remain on the Site with proper management to be protective of human health and the environment. Implementation of a Track 4 remedial program in accordance with the Part 375 Regulations would entail the use of engineering and institutional controls to prevent adverse impact to human health or the environment resulting from exposure to contaminants in historical fill material. Potential for exposure to historic fill will be mitigated by a NYSDEC approved cover system and maintained long term under an approved SMP; any potential for exposure from potable use of groundwater on the Site would be mitigated through an institutional control formally precluding any future use of groundwater for drinking water purposes.

Summary: Both a Track 1 and Track 4 remedy as described above will achieve the fundamental RAOs for the Site thereby providing for the overall protection of human health and the environment either through the elimination of historic fill (Track 1) or placement of an acceptable cover system over the Site with an appropriate level of institutional and engineering controls (Track 4).

Compliance with Standards, Criteria, and Guidance

- Track 1: Extensive Site investigations have not indicated that significant levels of contaminants are present on the Site in soil/historic fill or in groundwater. In terms of overall percentages, there are relatively few contaminants from a very large data set that indicate any exceedances of SCGs; however, as indicated in Table IV, exceedence of SCGs is proportionally higher under a Track 1 remedy and consideration of unrestricted use SCGs primarily associated with metals including arsenic, lead and other inorganic substances. A Track 1 remediation alternative would necessitate extensive remedial actions to mitigate/remove/reduce any media containing contaminants exceeding SCGs for unrestricted property use.

- Track 4: A cover system with institutional controls on the Site will mitigate the need for large scale removal actions on the property and will assure that the very low levels of media containing contaminants above SCGs is isolated from human health or environmental exposure. Implementation of a Track 4 represents a consistent and acceptable remedial track based on applicable NYSDEC Part 375 Regulations.

Summary: Based on these factors, this criterion would be fundamentally achieved by either a Track 1 or 4 remedial programs recognizing that some incremental difference (e.g. by eliminating the need for an engineering or institutional control) may be obtained with the complete removal of historic fill to unrestricted use standards. However, any overall benefit from a Track 1 remediation is considered marginal and disproportionate in comparison to the extremely high level of remediation that would be necessary to remove a handful of contaminants that can be otherwise managed with far less disturbance on the Site and be equally effective in reducing a potential future exposure pathway.

Short and Long-Term Effectiveness

- Track 1: Implementation of the Track 1 alternative would likely need to be implemented Site-wide to affect the complete removal of media that may contain contaminants higher than SCGs for unrestricted land use. Therefore, a Track 1 remedial program will require extensive disturbance of the Site as necessary for removal of massive quantities of historic fill and off-site disposal in a solid waste landfill. This alternative would achieve long term effectiveness by removal of contaminants across the Site, but would not be effective in the short term because the very extensive nature of the remediation to achieve a marginal level of additional human health or environmental protection.

- Track 4: Containment of residual impact within historic fill and implementation of institutional controls such as a Site Management Plan will provide effective prevention of exposure to Site contaminants and limit their potential for migration or mobilization. Thus, the remedy provides both short and long-term effectiveness.

Summary: An unrestricted Track 1 remediation would not be effective in the short term because of the scope of disturbance created by this remedy and the extensive resources that would be consumed to implement the remedy. Conversely, a Track 4 remediation can be readily implemented with established methods of engineering and institutional controls that, in conjunction with appropriate institutional controls, are demonstrated to be effective in the short and long term, and that can be implemented with a substantially lower level of short term disturbance.

Reduction of Toxicity, Mobility or Volume

- Track 1: A Track 1 remedial alternative will involve the movement of historical fill from the Site to a properly permitted solid waste disposal facility. This remedy will not reduce the toxicity or volume of the contaminants. Remedial investigations do not indicate the contaminants to be mobile in the environment under current conditions. Therefore, this criterion would be neutral at best and could even increase contaminant mobility during implementation resulting from the excavation, and movement of such significant quantities of historic fill material from the Site to the disposal facility.

- Track 4: The engineering and institutional controls of a Track 4 remedial alternative will not cause the reduction in the toxicity or volume of Site contaminants but will reduce the mobility of the contaminants through controls that will preclude the potential for future exposure to the contaminants in historic fill and groundwater.

Summary: The significance on this criterion is considered in the context of the results of the remedial investigation process which indicate that the overall toxicity and amount of contaminants at the Site is very low relative to the volume of media it is contained within. A Track 1 remedial alternative has the higher potential to increase contaminant mobility as may be related to the movement of such a significant quantity of material from the Site via the excavation and off-site transportation of this material. There appear to be no significant differences between the Track 1 and 4 remedial alternatives relative to reduction of contaminant toxicity and volume. Overall, a Track 4 remedy is considered to achieve this criterion somewhat more fully than a Track 1 remedy that could induce contaminant mobility in the short term.

Implementability

- Track 1: Implementation of the unrestricted use alternative would use conventional excavation and hauling equipment. However, it would result in dramatically increased truck traffic from the Site for the period of time required for removal, potentially increased dust generation and control needs, would require much greater fuel consumption, would necessitate large volumes of replacement fill, and would consume substantial volumes of off-site landfill capacity.

- Track 4: No additional engineering controls are necessary to achieve the remedial objectives for a Track 4 alternative. The existing cover system controls currently preclude exposure pathways and will remain in place until future development occurs as described in Section 6.1 including installation of new engineering controls in accordance with 6 NYCRR 375-3.8(e)(4)(iii)(b). Any future development on the Site would be required to comply with relevant Institution Controls and a Site Management Plan. Installation of engineering controls (i.e. soil cover systems) can be performed using conventional equipment and methods and is a commonly employed remediation alternative. As such, this alternative is readily implemented in combination with institutional controls.

Summary: A Track 4 remedy is a viable and proven remedial alternative which is significantly more implementable than a Track 1 remedy based on the relative difference in the size and scope of the earthmoving efforts for the respective alternatives.

Cost Effectiveness

- Track 1: A Track 1 remedial alternative involving removal of historic fill exceeding Unrestricted Use SCOs from the Site, as shown on Figure 9, would include significant excavations across the Site to depths up to 12 feet below existing grade. Evaluation of the information depicted on Figure 9 indicates that approximately 90,000 cubic yards of historic fill would need to be excavated to remove fill with lead and arsenic concentrations greater than the Unrestricted Use SCOs. Because of this volume of material, this remedial alternative is not cost effective and not justified relative other alternatives that are more cost effective in providing an equal or higher level of protection of human health and the environment.

- Track 4: A Track 4 remedial alternative consistent with the requirements of the Part 375 Regulations can be readily implemented and is considered an effective and much more cost efficient means to mitigate the potential for a future exposure of any current or future Site occupant to Site contaminants.

Summary: It is apparent that the costs for a Track 1 remedial alternative would not be practical or cost effective in comparison to a Track 4 remedial alternative that can achieve the overall protection of human health and the environment in much more cost effective manner.

Land Use

In accordance with relevant regulatory guidance (DER-10), "this criterion is an evaluation of the current, intended and reasonably anticipated future use of the Site and its surroundings, as it relates to an alternative or remedy, when unrestricted levels (Track 1) would not be achieved." Accordingly, a Track 4 remedial alternative provides for the restricted use of the Site for commercial and/or industrial purposes in accordance with the BCA for the Site and which is consistent with the historic, current and anticipated future use of the Site and land use in this area of the City of Corning. Based on the factors identified in DER-10, an inventory of relevant land use considerations is as follows:

Development Patterns – As explained in Section 2 above, the Site is located in a mixed use area in the City of Corning adjacent to industrial, commercial, residential and open-space property. The Site is located adjacent to the Riverfront Greenway & Park and the Chemung River.

Zoning – The Site is currently zoned "Industrial" pursuant to the City of Corning Zoning Regulations. Passive recreational use is identified as a permitted use within the Industrial zoned land use category.

Brownfield Opportunity Areas – The Site is not located within a designated Brownfield Opportunity Area.

Master Plans/Local Waterfront Revitalization or Other Plans – The proposed Site development will require review and approval by the City of Corning pursuant its applicable requirements.

Proximity to Residential and Urban, Commercial, Industrial, Agricultural and Recreational Areas – As explained in Section 2 and shown on Figure 1, the Site is located in an area of mixed use development and is proximate to residential, urban, commercial, industrial and recreational property.

Public Comments – As with prior work plans and reports related to the BCP program for this Site, this AAR will be made available for public review and comment via the established document repositories in accordance with the requirements for the BCA and Citizen Participation Plan (CPP) for this Site. The CPP program is described in Section 3 above.

Environmental Justice Concerns – The CPP has been reviewed and approved by the NYSDEC and the NYSDOH and is being implemented for the Site pursuant to the BCP program. As explained in Section 3, the CPP provides for public notice, document availability (at designated local document repositories) and opportunities/forums for public comment throughout the BCP process. Comments provided under the CPP for the Site have and will continue to be directed to the NYSDEC at designated timeframes in the NYSDEC/NYSDOH decision making process and incorporated into the remedy selection process as appropriate.

Federal or State Land Use Designations Relating to the Property – The Site setting and potential for federal or state land use designations (such as for wetland areas, protected environmental resources, historical resources, etc.) to exist on the Site property has been evaluated via review of agency records and data sources. The result of this evaluation is documented in the Corning BCA Application and information contained therein including the Environmental Site Assessment Report for the BCA Site. These documents do not indicate that the BCP Site property contains any Federal or State land use designations.

Whether the Population Growth Patterns and Projections Support the Proposed Use – The proposed Site development is a "permitted" and allowable use within the current zoning designation for the Site.

Accessibility to Existing Infrastructure – The BCP Site is currently undeveloped and unused. The proposed Site remedy and development will include construction of a "passive recreation area" that will be made fully accessible to the general public and existing infrastructure on Tioga Avenue.

Proximity of the Site to Important Cultural Resources, Including Federal or State Historic or Heritage Sites or Native American Religious Sites – These resources have been documented as described under the summary of "Federal or State Land Use Designations" information category described above.

Natural Resources, Including Proximity of the Site to Important Federal, State or Local Natural Resources, Including Waterways, Wildlife Refuges, Wetlands, or Critical Habitats of Endangered or Threatened Species – See discussion above.

Potential Vulnerability of Groundwater to Contamination that Might Migrate from the Site, Including Proximity to Wellhead Protection and Groundwater Recharge areas and Other Areas Identified by the State Comprehensive Groundwater Remediation and Protection Program – The nature and use of groundwater resources in the area of the Site are detailed in the RI Report as summarized in Section 3 above, along with an assessment of impact to this resource.

Proximity to Floodplains – The Site is situated near the Chemung River, separated by the existing flood control levee as described in the RI Report. The Site is not located within the designated 100-year floodplain.

Geography and Geology – Geography and geology of the Site is described in detail in the Remedial Investigation Report and summarized in Section 3 above.

Current Institutional Controls Applicable to the Site – The Site is currently zoned for "industrial" use under Chapter 240 of the City of Corning Zoning Regulations.

Community Acceptance

The CPP described in Section 3 above is a fundamental component of the BCP program for the Site and is on file at the document repository mentioned in the preceding land use topics. The CPP is specifically intended to inform parties who may be affected by the BCP program, as well as the community at large, of BCP investigation and remediation activities on the Site, and to illicit public comment and feedback during the NYSDEC and NYSDOH approval and decision making processes. Through the CPP, nearby residents, municipal and public officials, the general public, and other interested or potentially affected parties have and will continue to be informed through the remedial investigation and remedial action processes, and provided the opportunity for review and comment on Site documents (including this AAR). Opportunities for citizen participation is encouraged at several steps in the BCP process through distribution of NYSDEC "Fact Sheets", media announcements, mailings, public comment periods, informational meetings and providing for public availability of project documents through document repositories at the Corning public library and at the NYSDEC offices in Avon, New York. The community acceptance criterion for the selected remedy will be evaluated after the public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for the Site.

5.5 Green Remediation and Sustainability

In addition to the balancing criteria described above, the remedial alternatives being considered for this Site are evaluated relative to the NYSDEC guidance provided in DER-31/Green Remediation dated August 2010. NYSDEC defines green remediation as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions". Evaluation of the DER-31 policy is intended to be complimentary to the fundamental BCP program requirements, that is, for application to remedies that have first been determined to be protective of human health and the environment. Application of green remediation principals is a dynamic process used in the remedy selection process and considered during implementation and long term management of the remedy. This guidance provides a listing of factors for evaluation of green remediation as are summarized below.

Based on the examples of metrics recommended in DER-31 as are applicable to the Site, assessment of the of the green and sustainable aspects of the Track 1 and Track 4 remedial alternatives relative to these metrics is summarized as follows:

- Creation of greenhouse gases (GHGs) – In total, a Track 1 alternative would generate substantially higher amounts of GHGs than Track 4 from vehicle emissions during implementation of the Track 1 remedy resulting from the removal of existing ground surface materials and underlying historical fill that contains COCs higher than unrestricted use criteria along with the management and disposal of these materials, and backfilling of the excavated areas in accordance with relevant NYSDEC criteria. The proposed Track 4 remedy does not require new construction and consequently the generation of GHGs would be negligible in comparison to the Track 1 remedy.

- Creation of fugitive emissions – A Track 1 alternative will involve a substantial land modification project and a Track 4 will not; thus the potential for generation of fugitive emissions is much more significant for a Track 1 alternative. Though monitoring and engineering controls will be implemented for dust abatement, the Track 1 alternative has a higher potential for fugitive emissions than Track 4, which are considered to be negligible based on maintenance of the existing cover systems.

- Fuel use – Vehicle use (and fuel consumption) will be significant under a Track 1 alternative associated with the above described removal actions and negligible for Track 4 remedy associated with maintenance of the existing cover systems.

- Reuse of construction debris – Completion of demolition of the Site will be necessary under the Track 1 alternative thereby creating an opportunity to reuse materials as appropriate and approved by NYSDEC such as reprocessing of concrete from the removal of floor slabs and foundations for possible reuse as fill on the Site. Similar opportunities for reuse of demolition materials may exist under a Track 4 remedy as may be associated with future development and Site Management Activities as are further described in Section 6 below.

- Tons of waste disposals avoided – Track 1 will involve the removal and off-site disposal of substantial quantities of historic fill and other materials, and Track 4 will not. In addition to avoiding the off-site disposal of massive quantities of waste (historic fill), a Track 4 alternative also eliminates the need for importation of corresponding quantities of clean fill for backfilling.

5.6 Recommended Remedy

Results of the remedial alternatives analysis are provided on Table IV containing a comparative summary of the prescribed screening criteria to meet the RAOs (as described above) for each of the remedial tracks being considered along with the green remediation and sustainability metrics. The recommended remedy for the Tioga Avenue BCP Site is based on Track 4 with the existing engineering controls consisting of cover systems that are maintained into the future under an approved SMP in accordance with NYSDEC Part 375 Regulations and associated guidance for commercial and/or industrial property. The recommended Site remedy identifies specifically defined areas to be maintained with low permeable cover systems and/or other remedial cover systems that will be consistent with the current remedy, to mitigate potential concerns with future mobility of inorganic COCs. The SMP details the management of engineering controls, remedial activity and/or environmental monitoring for these areas to maintain an effective remedy during future use of the Site.

These recommended controls will be applied in conjunction with an Environmental Easement to be placed on the property in favor of New York State that contains land use restrictions or prohibitions on the use of land in a manner inconsistent with the engineering controls. Consistent with NYSDEC guidance for implementation of Institutional Controls (DER-33), "the environmental easement will provide an effective and enforceable means of encouraging the reuse and development of a controlled (e.g. BCA) property in a manner that is consistent with the remedial program and ensuring the performance of operation and maintenance" of the remedy.

6. INSTITUTIONAL CONTROLS EVALUATION

Institutional controls will be implemented as a fundamental component of the Site remedy. In accordance with the Part 375 Regulations, appropriate institutional controls will be applied to the Site documenting the administrative elements of the Site remedy. As defined by NYSDEC, these controls mean "any non-physical means of enforcing restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial Site."

The institutional controls will be implemented at the Site to conclude the remedial action program and complete the requirements of the BCA. The drafting and recording of these controls will be conducted in accordance with the NYSDEC guidelines provided in DER-33 and are generally described as follows:

- The Site is located within the City of Corning that maintains and provides public water service to the community. Nevertheless, a restriction will be placed on the property to preclude the future use of groundwater from the Site for potable purposes.

- Preparation and implementation of a Site Management Plan (SMP) as applicable to the Site conditions following the NYSDEC-recommended SMP program scope, instructions and template. The SMP will detail the post-remediation requirements for maintenance and management of the engineering and institutional controls that are applied to the Site to preclude the potential for inadvertent future exposure to Site contaminants. A primary component of the SMP will include the process, procedures, and environmental monitoring and controls to be applied for the future maintenance of the Site cover system.

- Redevelopment consistent with the Site remedy will conform to the City of Corning Building Code and Zoning Regulations to allow for development and future use on the Site.

- Periodic certification to NYSDEC by the QEP and Corning that these controls remain in place in the future.

- Pursuant to the BCP regulatory requirements, any required engineering or institutional control for a BCA Site will be embodied in a recorded Environmental Easement (EE) for the Site. An EE will be prepared using the model EE document provided by NYSDEC that will contain the information/documentation/legal instruments as outlined in DER-33, including abstract of title and acquisition of a title insurance policy for the Site. The EE will follow the review and approval process with NYSDEC and will be noticed to the public as specified in DER-33 and the Site CPP. When complete and approved by NYSDEC, the EE will be filed with the Steuben County Clerk's offices in Bath, New York.

6.1 Site Management Plan

The Site contains residual contaminants that will remain under protective surface cover consisting of inorganic substances (arsenic and lead) that are present within some of the historic fill on the Site at levels higher than SCOs for commercially used property. There are other specific areas of the Site where weathered petroleum substances have been identified that mostly do not contain COCs higher than SCOs but do contain weathered petroleum residues that have the potential to create "nuisance" conditions. The selected Site remedy eliminates the potential for impact of these conditions through acceptable Track 4 engineering controls as are pre-defined under the 6 NYCRR 375-3.8(e)(4) regulations, and which is comprised of the existing cover systems on the Site. These cover systems are comprised of passive non-mechanical controls that mitigate the potential for human or environmental exposure to impacted media below the cover systems on the Site. Maintenance of these controls will be conducted in accordance with a Site Management Plan (SMP) to be developed as a component of the Environmental Easement for the Site as verification the selected Site remedy remains protective of human health and the environment as long as they are deemed necessary by the NYSDEC in cooperation with the NYSDOH.

The SMP will be prepared on completion of the AAR and remedy selection process. This document will be reviewed by the NYSDEC, in cooperation with the NYSDOH, and, once approved by these agencies, will be incorporated into an Environmental Easement for the Site (as explained below). The SMP will be a stand-alone self-implementing document that will describe, in detail, the process and procedures for operations, maintenance, monitoring and reporting of activities associated with the Track 4 engineering controls. The SMP will detail requirements for maintenance of the existing engineering controls (concrete/asphalt cover system) and for any future maintenance, removal or replacement of the existing Site cover system with a new equally protective cover system.

The SMP will be prepared using the guidelines provided by the NYSDEC (SMP document template, March 2010). The SMP will be focused on maintenance of the Site cover system and will describe the process and procedures necessary to be implemented for any activities that have the potential to affect this engineering control. The SMP will include an institutional and engineering controls plan, a Site monitoring and contingency plan, and will identify ongoing Site review procedures and administrative requirements. The SMP will be appended with an Excavation Work Plan that will identify the requirements for conducting any intrusive work that may breach the cover systems as may be associated with maintenance of the existing engineering controls or with future development and replacement of protective cover systems on the Site. The SMP will define requirements for management (removal, disposal/reuse, replacement) of existing cover materials (e.g. concrete), historic fill or any other impacted media identified in specific areas of the Site (e.g. where weathered petroleum residuals may exist).

The SMP will be supported with information that describes post-remedial Site conditions to facilitate future Site management by explaining and depicting locations where media may be encountered in the subsurface that would require consideration or special handling pursuant to the SMP. This information will include figures showing the presence and relative distribution of historic fill on the Site that has been determined to contain COCs above the commercial use SCOs, areas that may contain weathered petroleum substances, locations/limits of engineering controls including existing building and infrastructure development that will be temporary or permanent, locations of abandoned sewer conveyances, and, as practical, any specific areas of the Site where COCs may remain beneath cover systems. This information will be presented to document baseline conditions on the Site that will need to be considered, and for which processes and procedure will need to be developed, prior to or in conjunction with the future maintenance and development on the Site. As described below, certain supplementary management actions are planned during future Site development (e.g. removal of historic fill) that will be documented through update of the SMP along with any other changed Site conditions that may occur.

6.1.1. Site Management Plan Content

The SMP will be prepared following relevant guidance based upon Site conditions as determined by the Remedial Investigation Program. The SMP will describe both the function and purpose of the existing engineering controls, as well as the future development of the Site as described under item number 3, below. As described, this future development will involve significant removal and replacement of the existing Site cover the abandonment and replacement of Site-wide stormwater conveyances, and installation of new access controls.

The scope and content of the SMP will be Site-specific to include the following basic elements:

1. *Purpose and Scope* – The framework of the SMP will be provided on the process for maintenance of the existing cover system on the BCP Site until such time that future development will occur that will entail the removal and replacement of the existing cover systems with a new cover system constructed in accordance with the 6 NYCRR 375-3.8(e)(4) regulations for a Track 4 cover system.

   Following the NYSDEC-recommended template, the SMP for the Tioga Avenue BCP Site will contain sections which provide: background and remedial investigation findings leading to remedy selection; an Engineering and Institutional Control Plan; Site Monitoring Plan; and related plans for Inspections, Reporting and Certifications as appended with relevant environmental control plans (including a soil vapor management plan as applicable to occupied structures) and procedures such as worker health and safety, community air monitoring, and quality assurance protocol. The SMP will contain an Excavation Work Plan detailing procedures for handling of any excavated or removed materials from the Site along with the appropriate replacement of these materials based on relevant requirements in the 6 NYCRR 375 Regulations and DER-10. The Track 4 Site remedy involves use of passive non-mechanical controls obviating need for an Operations and Maintenance Plan.

2. *Maintenance of Existing Environmental Controls* – The SMP will identify procedures for monitoring and maintenance of the existing environmental controls as described in Section 5.3 above and requirements for any work that may breach the existing cover systems or reduce the effectiveness of Site access controls for as long as these controls remain in place.

3. *Future Development* - The SMP will detail the process for removal and replacement of the existing engineering controls to the extent necessary for any future development that will be protective of human health and the environment Where necessary, the SMP will describe requirements for low permeable cover systems to include components of Site development (e.g. buildings, concrete and pavement) or geomembranes, low permeability soil approved by NYSDEC, and other materials approved by NYSDEC. The SMP will identify the structures and facilities that are currently existing and will remain in future use as components of the cover system and which are mostly associated with the operations of the adjacent World Kitchen facility. These features are shown on Figure 2 and include: the batch house building and interconnected railroad spur tracks and surrounding ballast; a raw material (cullet) storage structure; a small well house; two electrical substations; and facilities associated with the operating Waste Water Treatment Plant (equalization tank, engineering building, pump station/ wet well, and diversion structure).

The SMP will identify requirements for maintenance and monitoring of these engineering controls that they remain in place and continue to be protective of human health and the environment through contaminant isolation below cover systems. Because comparison criteria for groundwater are not exceeded and contaminant plumes have not been identified, a Site wide groundwater monitoring will not be proposed as part of the monitoring program under the SMP. The SMP will identify conditions under which future groundwater monitoring may be considered.

4. *Management of Demolition Debris* – Removal of the existing cover system will be necessary to allow for future Site development. To the extent existing concrete is removed the excavation, processing/sizing and testing of concrete debris will be conducted as necessary for off-site disposal at a permitted solid waste management facility or for re-use as fill on-site in conjunction with the planned future Site development. The SMP will specify that any other uses of concrete debris will not be permitted without prior approval of the NYSDEC. The SMP will also specify that reuse of concrete on the Site will be subject to appropriate sampling and analysis as reviewed with NYSDEC as documentation of the suitability of this materials for on-site reuse.

5. *Stormwater Management* – The existing operating waste water treatment plant will remain in service for management of stormwater at the Site until a new stormwater management system is constructed and becomes functional as part of the future development. The SMP will describe the use and operation of the existing waste water treatment plant to manage stormwater/wastewater in accordance with applicable SPDES Permit #NY-0003981 requirements and the nature and characteristics of substances that could be present in water to be generated at the Site.

6. *Closure of the Waste Water Treatment Plant (WWTP)* – The SMP will specify that the existing WWTP and SPDES Permit #NY-0003981will eventually be closed and terminated when a new storm water management system for the Site becomes operational. Any activity regarding the regulated facility, including closure will be coordinated and completed in accordance with the regulatory requirements administered by the NYSDEC Division of Water.

7. *Assessment of Vapor Intrusion* – The SMP will address measures to evaluate soil vapor to the extent that future development were to ever involve the construction of occupied buildings on the Site (construction of occupied buildings is not planned or foreseen as part of the future development).

8. *Area of Petroleum "Nuisance"* - The SMP will define the area of the Site where weathered petroleum substances may be present in the subsurface as shown on Figure 4 and will include discussion of procedures for future intrusive activity below cover systems within this area to mitigate impact from exposure to "nuisance" conditions to the extent they may be encountered. These procedures will consider worker health and safety, handling and proper management of media to the extent it is required to be excavated/removed as part of Site development, and odor controls as may be relevant to the extent that any new building construction were to be planned within this area.

9. *Health & Safety and Community Air Monitoring Planning* – The SMP will contain Site-specific Health & Safety and Community Air Monitoring Plans (HASP and CAMP). The HASP will be developed in accordance with relevant regulatory requirements (OSHA 40 CFR 1910.120) and those of Corning Incorporated for protection of Site occupants/workers whenever there is a breach of a cover system that creates the potential for exposure to Site contaminants. Similarly, the CAMP will also be developed so that appropriate controls are in effect to control fugitive emissions

during any ground intrusive activity involving excavation of the Site cover system. The CAMP for this Site will be developed in accordance with the generic NYSDOH CAMP and the Fugitive Dust and Particulate Monitoring guidelines as contained in Appendix 1A and Appendix 1B of the NYSDEC DER-10 Guidance Document.

6.2 Environmental Easement

As described above, an Environmental Easement (EE) will be prepared and recorded to document and preserve the engineering and institutional controls that are placed on the Site. The Environmental Easement will be executed and filed with Steuben County. The Environmental Easement runs with the land in favor of the State, subject to the provisions of ECL Article 71, Title 36, and contains a survey of the brownfield limits, listing of institutional and engineering controls established for the Site, and identification of any restrictions on the use of the land. The Site Management Plan described above will be an integral part of the Environmental Easement. The placement of an Environmental Easement provides an effective and enforceable means of encouraging the reuse and redevelopment of a controlled property, at a level that has been determined to be safe for a specific use, while ensuring the performance of operation, maintenance, and/or monitoring requirements.

7. TRACK 4 REMEDY

The Track 4 remedy utilizes the existing Site cover to preclude inadvertent contact with residual historic fill containing levels of arsenic and lead in excess of SCOs for Restricted Commercial Use. These measures "eliminate potential exposure pathways to Site COCs" and thus constitute acceptable engineering controls as defined in the relevant BCP regulations and guidance.

A systematic inventory of the existing engineering controls on the Site was completed by Haley & Aldrich on August 4, 2011 with representatives of Corning. The inventory proceeded from east to west by walking the Site in a north to south or south to north direction to evaluate the nature and integrity of ground cover systems. Expanded views of recent aerial photography were checked by the field observations and the observed cover types were noted on the photographs. The results of the inventory are shown on Figure 12.

Results of this inventory indicated that approximately 96 percent of the Site was covered by low permeable surfaces that preclude physical contact with the ground surface comprised of asphalt, concrete (building floor slabs), and compacted gravel. Small portions of the Site (0.6 acres or 4% of the Site surface) were identified to be comprised of lawn/landscaped areas adjacent to former building locations as are shown on Figure 12. All of these areas are contained within perimeter fencing (with a guarded security gate) that fully encompasses the Site except for the paved parking area in the southeastern corner of the Site.

Results of the inventory process were used in development of plans and procedures for the addition of approved cover materials over the small portions of the Site not currently covered by approved cover materials such that the entire Site would contain approved cover systems for a Track 4 remedy. These physical changes to the Site are documented in the Participant's Change of Use notification submitted to the Department on September 30, 2011, approved by the NYSDEC on October 4, 2011, and implemented in late October/early November 2011. Copies of the Change of Use Notification and Department approval letter are provided in Appendix B. Implementation of these physical changes will be documented in a certification report by a NYS Professional Engineer to be submitted to the NYSDEC.

In addition to the Site cover, the Track 4 remedy includes institutional controls which restrict the long term usage of the Site to restricted commercial or industrial uses as set forth in Part 375 and DER-10. The institutional controls will include the SMP described in Section 6.1 above, which presents the procedures for excavations at the Site, including Health & Safety, Community Air Monitoring, and soil management requirements to mitigate any of the defined current or future potential exposure risks.

The Track 4 remedy includes existing Site cover types, and a NYSDEC-approved Site Management Plan that are protective of human health and the environment. These engineering controls will remain in place and maintained until future development is undertaken at the Site, at which time these engineering controls may be modified or replaced with equally protective engineering controls.

REFERENCES

1. "Brownfield Cleanup Program Application" - Tioga Avenue Site, Corning, New York, Corning Property Management Corporation and Corning Incorporated, July 2007.

2. Letter of Acceptance into the BCP Program for Parcel #1 (but not Parcel #2) Tioga Avenue Site, Corning, New York, New York State Department of Environmental Conservation, November 21, 2007.

3. "Brownfield Cleanup Agreement - Tioga Avenue Site" (as signed by NYSDEC), Corning, New York, Corning Property Management Corporation and Corning Incorporated and New York State Department of Environmental Conservation, August 22, 2008.

4. "Environmental Site Assessment Report," Tioga Avenue Site, Corning, New York, Haley & Aldrich of New York, July 2007.

5. "Project Documentation Report - Tioga Avenue Demolition," Corning, New York, Haley & Aldrich of New York, February 22, 2008.

6. "Remedial Investigation Work Plan - Tioga Avenue Site, BCP Site #C851031," Corning, New York, Haley & Aldrich of New York, Revised April 2009.

7. "Remedial Investigation Work Plan Addendum - Tioga Avenue Site, BCP Site #C851031," Corning, New York, Haley & Aldrich of New York, Revised September 14, 2009.

8. Program Guidance TAGM 4015, "Policy Regarding Alteration Of Groundwater Samples Collected For Metals Analysis," New York State Department of Environmental Conservation, September 30, 1988.

9. Program Guidance, TOGS 1.1.1, "Ambient Water Quality Standards," New York State Department of Environmental Conservation, June 1998 with amendments.

10. Program Guidance, "Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports (DUSR)," New York State Department of Environmental Conservation, September 2007.

11. Program Policy DER-10, "Technical Guidance for Site Investigation and Remediation," New York State Department of Environmental Conservation, May 2010.

12. 6 NYCRR Part 375, "Environmental Remediation Program Regulations Subparts 375-1 to 375-4 & 375-6," New York State Department of Environmental Conservation, December 2006.

13. "Report on Remedial Investigations & Recommended Remedial Actions, Tioga Avenue Property, BCP Site #C851031," Corning, New York, April 2010, Haley & Aldrich of New York. Program Policy DER-33, "Institutional Controls: A Guide to Drafting and Recording Institutional Controls," New York State Department of Environmental Conservation, December 3, 2010 and Related Reference *Model Environmental Easement* (PDF).

14. Program Policy DER-31, “Green Remediation,” New York State Department of Environmental Conservation, August 11, 2010.

15. Commissioner Policy CP-51, “Soil Cleanup Guidance,” New York State Department of Environmental Conservation, October 21, 2010.

16. Acceptance Letter, “Brownfield Site Cleanup Agreement, Index#B8-0767-08-01, Site #C851031,” New York State Department of Environmental Conservation, September 17, 2008.

17. Program Policy DER-23, “Citizen Participation Handbook for Remedial Programs,” New York State Department of Environmental Conservation, January 21, 2010.

18. Brownfield Cleanup Program, “Citizen Participation Plan for the Tioga Avenue Site – BCP Site No.C851031,” by Haley & Aldrich of New York for New York State Department of Environmental Conservation, June 2009.

19. Commissioner Policy CP-43, “Groundwater Monitoring Well Decommissioning Policy,” New York State Department of Environmental Conservation, November 3, 2009.

20. Document Template, “Site Management Plan with Instructions,” New York State Department of Environmental Conservation, March 2010.

21. “City of Corning Comprehensive Plan (Master Plan),” River Street Planning & Development, Troy, New York, June 6, 2002.

22. “City of Corning Zoning Resolution, Chapter 240,” City of Corning, New York, May 15, 2007.

23. “The Health and Environmental Impacts of Lead and an Assessment of a Need for Limitations”, Office of Toxic Substances, US Environmental Protection Agency, April 1979.

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TABLE I

SUMMARY OF SOIL SAMPLES HIGHER THAN RESTRICTED COMMERCIAL SCOs - ARSENIC & LEAD
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

LEAD Restricted Commercial SCO for Protection of Human Health = 1,000 ppm

Soil Boring Location		Results (ppm)	Sample Depth	Sample Date
1	B-135	1280	1 - 3 ft.	9/17/2007
2	B-224	1300	0 - 1 ft.	10/2/2009
3	B-214	1400	0 - 1 ft.	10/8/2009
4	B-235	2700	0 - 1 ft.	10/6/2009
5	B-236	1100	1 - 7.5 ft.	10/5/2009
6	B-241	3100	0 - 1 ft.	10/6/2009
7	B-243	1100	0 - 1 ft.	10/6/2009

ARSENIC Restricted Commercial SCO for Protection of Human Health = 16 ppm

Soil Boring Location		Results (ppm)	Sample Depth	Sample Date
1	B-100	28.6	0 - 4 ft.	9/10/2007
2	B-102	16.8	0 - 1.5 ft.	9/10/2007
3	B-107	17.4	0 - 4 ft.	9/11/2007
4	B-108	23.9	0 - 4 ft.	9/11/2007
5	B-119	39.6	1 - 3 ft.	9/12/2007
6	B123	25.6	0 - 2 ft.	9/12/2007
7	B-124	16.9	0 - 4 ft.	9/13/2007
8	B-127	30.2	1 - 3 ft.	9/13/2007
9	B-128	121	1 - 3 ft.	9/13/2007
10	B-132	215	5 - 7 ft.	9/14/2007
11	B-201	17	0 - 1 ft.	9/30/2009
12	B-202	21	1 - 3.8 ft.	9/30/2009
13	B-207	23	0 - 1 ft.	10/1/2009
14	B-207	20	1 - 4.2 ft.	10/1/2009
15	B-212	35	0 - 1 ft.	10/1/2009
16	B-213	20	0 - 1 ft.	10/2/2009
17	B-214	36	0 - 1 ft.	10/8/2009
18	B-215	38	0 - 1 ft.	10/2/2009
19	B-218	18	0 - 1 ft.	10/9/2009
20	B-220	180	0 - 1 ft.	10/6/2009
21	B-224	88	0 - 1 ft.	10/2/2009
22	B-225 DUP	26	0 - 1 ft.	10/2/2009
	B-225	14	0 - 1 ft.	10/2/2009
23	B-226	87	0 - 1 ft.	10/2/2009
24	B-230	95	0 - 1 ft.	10/6/2009
25	B-230	250	1 - 12 ft.	10/6/2009
26	B-231	18	0 - 1 ft.	10/15/2009
27	B-235	18	0 - 1 ft.	10/6/2009
28	B-237	21	0 - 1 ft.	10/5/2009
29	B-241	23	0 - 1 ft.	10/6/2009
30	B-242	19	0 - 1 ft.	10/6/2009
31	B-243	29	0 - 1 ft.	10/6/2009
32	B-259	29	0 - 2 ft.	10/21/2009

TABLE II - SUMMARY OF WEATHERED PETROLEUM EVIDENCE
TIOGA AVENUE BCP - ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

Boring ID	Analytical (Y/N)		PID (ppm)		Odors (Y/N)		Staining (Y/N)		Sheen (Y/N)		Diluted VOC Sample (Y/N)		Notes
	Noted	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	
B-100	N	-	ND	-	N	-	N	-	N	-	N	-	
B-101	N	-	ND	-	Y	8-10 ft	N	-	N	-	Y	8-12 ft	
B-102	N	-	10.7	0 ft	Y	0-2 ft	N	-	N	-	N	-	
B-103	N	-	>5	-	N	-	N	-	N	-	N	-	
B-104	N	-	ND	-	N	-	N	-	N	-	N	-	
B-105	N	-	>5	-	N	-	N	-	N	-	N	-	
B-106	N	-	ND	-	N	-	N	-	N	-	N	-	
B-107	N	-	ND	-	N	-	N	-	N	-	N	-	
B-108	N	-	NR	-	N	-	N	-	N	-	N	-	
B-109	N	-	NR	-	N	-	N	-	N	-	N	-	
B-110	N	-	NR	-	N	-	N	-	N	-	N	-	
B-111	N	-	ND	-	N	-	N	-	N	-	N	-	
B-112	N	-	NR	-	N	-	N	-	N	-	N	-	
B-113	N	-	NR	-	N	-	N	-	N	-	N	-	
B-115	N	-	15.2	24 ft	Y	20-24 ft	N	-	N	-	Y	12-16 ft	
B-116	Y (U, C)	6-10 ft	113	8-10 ft	Y	6-14 ft, 22-24 ft	N	-	N	-	N	-	
B-117	N	-	ND	-	N	-	N	-	N	-	N	-	
B-118	N	-	ND	-	N	-	N	-	N	-	N	-	
B-119	N	-	>5	-	Y	20-24 ft	N	-	N	-	N	-	
B-120	N	-	ND	-	N	-	N	-	N	-	N	-	
B-121	N	-	ND	-	N	-	N	-	N	-	N	-	
B-122	N	-	ND	-	N	-	N	-	N	-	N	-	
B-123	N	-	ND	-	N	-	N	-	N	-	N	-	
B-124	N	-	>5	-	N	-	N	-	N	-	N	-	
B-125	N	-	NR	-	Y	0-4 ft, 16-24 ft	N	-	N	-	N	-	
B-126	N	-	ND	-	Y	0-11 ft	N	-	N	-	N	-	
B-127	N	-	143	24 ft	Y	20-24 ft	N	-	N	-	Y	21-23 ft	
B-128	N	-	15.3	10-12 ft	Y	21-22 ft	N	-	N	-	Y	20-22 ft	
B-129-MW	N	-	32.2	22-23 ft	Y	23-32 ft	N	-	N	-	Y	21-23 ft	
B-130	N	-	NR	-	Y	23-24 ft	N	-	N	-	Y	21-23 ft	
B-131	N	-	NR	-	N	-	N	-	N	-	N	-	
B-132	N	-	ND	-	N	-	N	-	N	-	N	-	
B-133	N	-	6.7	23 ft	N	-	N	-	N	-	N	-	
B-134	N	-	ND	-	N	-	N	-	N	-	N	-	
B-135	N	-	ND	-	N	-	N	-	N	-	N	-	
B-136	N	-	59.8	23 ft	Y	23-24 ft	N	-	N	-	Y	22-24 ft	
B-137	N	-	37.1	22 ft	Y	4-24 ft	N	-	N	-	Y	12-16 ft	
B-138	N	-	>5	-	Y	22-23 ft	N	-	N	-	N	-	
B-139	N	-	13.7	24 ft	Y	22-24 ft	N	-	N	-	Y	22-24 ft	
B-140	N	-	12	4-5 ft	N	-	N	-	N	-	N	-	
B-141	N	-	NR	-	N	-	N	-	N	-	N	-	
B-142	N	-	12.7	11 ft	N	-	N	-	N	-	N	-	

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Boring ID	Analytical (Y/N)		PID (ppm)		Odors (Y/N)		Staining (Y/N)		Sheen (Y/N)		Diluted VOC Sample (Y/N)		Notes
	Noted	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	
B-143-MW	N	-	87.3 - 131	23-28 ft	Y	21-28 ft	N	-	N	-	Y	26-28 ft	PID = >5 above 21 ft. Bottom of
B-144-MW	N	-	>5	-	Y	0-28 ft	N	-	N	-	N	-	
B-145-MW	N	-	>5	-	Y	24-28 ft	N	-	N	-	N	-	
B-201	N	-	ND	-	N	-	N	-	N	-	N	-	
B-202	N	-	ND	-	N	-	N	-	N	-	N	-	
B-203	N	-	ND	-	N	-	N	-	N	-	N	-	
B-204	N	-	ND	-	N	-	N	-	N	-	N	-	
B-205	N	-	>5	-	N	-	N	-	N	-	N	-	
B-206	N	-	ND	-	N	-	N	-	N	-	N	-	
B-207	N	-	ND	-	N	-	N	-	N	-	N	-	
B-208	N	-	ND	-	N	-	N	-	N	-	N	-	
B-209	N	-	ND	-	N	-	N	-	N	-	N	-	
B-210	N	-	ND	-	N	-	N	-	N	-	N	-	
B-211	N	-	ND	-	N	-	N	-	N	-	N	-	
B-212	N	-	ND	-	N	-	N	-	N	-	N	-	
B-213	N	-	ND	-	N	-	N	-	N	-	N	-	
B-214	N	-	ND	-	N	-	N	-	N	-	N	-	
B-215	N	-	ND	-	N	-	N	-	N	-	N	-	
B-216	N	-	ND	-	N	-	N	-	N	-	N	-	
B-217	N	-	ND	-	N	-	N	-	N	-	N	-	
B-218	N	-	ND	-	N	-	N	-	N	-	N	-	
B-219	N	-	ND	-	N	-	N	-	N	-	N	-	
B-220	N	-	22	26 ft	Y	25-27 ft	N	-	N	-	N	-	
B-221	N	-	105	26 ft	Y	23-28 ft	N	-	N	-	N	-	
B-222	N	-	63	24 ft	Y	20-25 ft	N	-	N	-	N	-	
B-223	N	-	151	24 ft	Y	21-24 ft	N	-	N	-	N	-	
B-224	N	-	ND	-	N	-	N	-	N	-	N	-	
B-225	N	-	ND	-	N	-	N	-	N	-	N	-	
B-226	N	-	ND	-	N	-	N	-	N	-	N	-	
B-227	N	-	ND	-	N	-	N	-	N	-	N	-	
B-228	N	-	ND	-	N	-	N	-	N	-	N	-	
B-229	N	-	ND	-	N	-	N	-	N	-	N	-	
B-230	N	-	56.6	22 ft	Y	24-25 ft	N	-	N	-	Y	23-24 ft	
B-231	N	-	155	24 ft	Y	22-26 ft	N	-	N	-	N	-	
B-232	N	-	ND	-	N	-	N	-	N	-	N	-	
B-233	N	-	ND	-	N	-	N	-	N	-	N	-	
B-234	N	-	ND	-	N	-	N	-	N	-	N	-	
B-235	N	-	ND	-	N	-	N	-	N	-	N	-	
B-236	N	-	ND	-	N	-	N	-	N	-	N	-	

TABLE II - SUMMARY OF WEATHERED PETROLEUM EVIDENCE
TIOGA AVENUE BCP - ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

Boring ID	Analytical (Y/N)		PID (ppm)		Odors (Y/N)		Staining (Y/N)		Sheen (Y/N)		Diluted VOC Sample (Y/N)		Notes
	Noted	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	*Noted*	*Depth*	
B-237	N	-	ND	-	N	-	N	-	N	-	N	-	
B-238	N	-	ND	-	N	-	N	-	N	-	N	-	
B-239	N	-	ND	-	N	-	N	-	N	-	N	-	
B-240	N	-	ND	-	N	-	N	-	N	-	N	-	
B-241	N	-	ND	-	N	-	N	-	N	-	N	-	
B-242	N	-	ND	-	N	-	N	-	N	-	N	-	
B-243	N	-	ND	-	N	-	N	-	N	-	N	-	
B-244	N	-	ND	-	N	-	N	-	N	-	N	-	
B-245	N	-	ND	-	N	-	N	-	N	-	N	-	
B-246-MW	N	-	ND	-	N	-	N	-	N	-	N	-	
B-247-MW	N	-	ND	-	N	-	N	-	N	-	N	-	
B-248-MW	N	-	12.6	5 ft	N	-	N	-	N	-	N	-	
B-249-MW	N	-	67	24 ft	Y	24-60 ft	N	-	Y	24 ft	N	-	PID >5 28-70 ft
B-250-MW	N	-	23.6	12 ft	Y	12-28 ft	N	-	Y	purge water	N	-	
B-251-MW	N	-	75	22 ft	Y	20-28 ft	N	-	Y	purge water	N	-	
B-252-MW	Y (U)	10-10.5'	70	23 ft	Y	9-11 ft (tar like) 21-28 ft	Y	9-11 ft	Y	purge water	N	-	
B-253	N	-	90	22 ft	Y	21-24 ft	N	-	N	-	N	-	
B-254	N	-	153	24 ft	Y	17-24 ft	N	-	N	-	N	-	
B-255	N	-	ND	-	N	-	N	-	N	-	N	-	
B-256	N	-	35	22 ft	Y	22-25 ft	N	-	N	-	N	-	
B-257	N	-	>5	-	Y	24-25 ft	N	-	N	-	N	-	
B-258	N	-	169	8 ft	Y	2-25 ft	Y	3 ft, 18-19	N	-	N	-	
B-259	N	-	ND	-	N	-	N	-	N	-	N	-	
B-260	N	-	55	21 ft	Y	20-27 ft	N	-	Y	24 ft	N	-	
B-261	N	-	68	23 ft	Y	22-25 ft	N	-	N	-	N	-	

Notes & Abbreviations
U = exceeds Unrestricted Use SCOs
C = exceeds Commercial Use SCOs
- = Not Applicable
ND = Not Detected
NR = No Reading
= Evidence of Weathered Petroleum (include PID detections > 5ppm and/or laboratory detections)
= Odor/diluted sample noted only
1. VOCs were diluted to interference from TICs. Laboratory detection limits were not noted above commercial use criteria.
2. PID detections less than 5 ppm considered background.

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTRICTED LAND USE CRITERIA
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-100	B-102	B-103	B-104	B-105	B-106	B-107	B-108	B-109	B-110	B-111
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 4 ft	0 - 1.5 ft	6 - 8 ft	4.5 - 5.5 ft	0 - 4 ft	0 - 4 ft	0 - 4 ft	0 - 4 ft	1 - 1.5 ft	0 - 3 ft	1.5 - 5 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/10/2007	9/10/2007	9/10/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B-100-1_091007	B-102-1_091007	B-103-2_091007	B-104-2_091107	B-105-1_091107	B-106-1_091107	B-107-1_091107	B-108-1_091107	B-109-1_091107	B-110-1_091107	B-111-1_091107
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	-	-	2480	260	-	-
Antimony	-	-	-	1.5 J	1.6 J	7 UJ	6.6 UJ	0.9 J	-	0.47 J	2.2 J	6.6 UJ	5.6 J	7.5 UJ
Arsenic	13	16	16	**28.6** [B]	**16.8** [B]	6.5	4.9	13.7	-	**17.4** [B]	**23.9** [B]	3.4	13.7	6.4
Barium	350	400	10000	37.8	43.8	74.5	18.2 J	76.8	-	66.9	103	8.8 J	83.9	71.7
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	0.33 J	0.55	-	-
Cadmium	2.5	9.3	60	0.34 J	0.26 J	0.053 J	0.55 U	0.27 J	-	0.58 U	0.51	0.55 U	0.62 U	0.13 J
Calcium	-	-	-	-	-	-	-	-	-	-	5240 J	696	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	15.9	3.5	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	5.9	1 J	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	63.2 J	3.1	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	0.12 J	-	0.51 U	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	46100	1280	-	-
Lead	63	1000	3900	116 J	133 J	34.8 J	6.1 J	254 J	-	108 J	302 J	17.1 J	378 J	97.9 J
Magnesium	-	-	-	-	-	-	-	-	-	-	681	105 J	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	656	5.6	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	0.15 J	0.12	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	15.2	2.8 J	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	580	552 U	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	2.5	1.6	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	1 U	1.1 U	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	65.8 J	552 U	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	1 J	0.83 J	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	8.3	4.7 J	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	96.3	8.2	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-112	B-112	B-115	B-116	B-117	B-119	B-119	B-119	B-121	B-121	B-123
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 6 ft	20.5 - 22.5 ft	12 - 16 ft	6 - 10 ft	3 - 4 ft	1 - 3 ft	16 - 20 ft	21 - 23 ft	1 - 3 ft	21 - 25 ft	0 - 2 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/11/2007	9/11/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B-112-1_091107	B-114-2_091107	B-115-4_091207	B-116-2_091207	B-117-1_091207	B-119-1_091207	B-119-5_091207	B-119-6_091207	B-121-1_091207	B-121-5_091207	B-123-1_091207
Metals (mg/kg)														
Aluminum	-	-	-	-	-	967	9020	-	-	-	-	-	-	-
Antimony	-	-	-	1.8 J	7 UJ	6.7 UJ	0.43 J	0.94 J	8.2 J	2.9 J	1 J	1.3 J	6.4 UJ	5.8 J
Arsenic	13	16	16	10.2	1.8	1.1	4.5	1.1 J	**39.6 [B]**	15.3	6.8	11.9	3.4	**25.6 [B]**
Barium	350	400	10000	60.6 J	12.7 J	11.4 J	62.4 J	61.8 J	64.8 J	81 J	46.2 J	47.2 J	102 J	60.5 J
Beryllium	7.2	590	2700	-	-	0.089 J	0.43 J	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.29 J	0.59 U	0.063 J	0.62 U	0.28 J	0.29 J	0.7	0.34 J	0.2 J	0.16 J	0.13 J
Calcium	-	-	-	-	-	249000	860	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	2	10.3	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	0.84 J	7.5	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	4.6 J	9 J	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	2540	17800	-	-	-	-	-	-	-
Lead	63	1000	3900	76.4	2.9	1.5	30.4	55.7	954	348	139	85.2	5.1	351
Magnesium	-	-	-	-	-	4040 J	2320 J	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	258	576	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	0.11 U	0.12 U	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	2.2 J	14.7	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	314 J	1020	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	0.55 U	0.62 U	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	1.1 U	1.2 U	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	129 J	169 J	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	1.1 U	1.2 U	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	2.3 J	11.2	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	14.6 J	40.9 J	-	-	-	-	-	-	-

Notes and Abbreviations:

1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
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   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
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3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-124	B-124	B-125	B-125	B-127	B-127	B-128	B-128	B-129-MW	B-129-MW	B-130
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 4 ft	21 - 23 ft	6 - 8 ft	21 - 23 ft	1 - 3 ft	21 - 23 ft	1 - 3 ft	20 - 22 ft	21 - 23 ft	25 - 27 ft	21 - 23 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B-124-1_091307	B-124-6FD_091307	B-125-2_091307	B-125-6_091307	B-127-1_091307	B-127-6_091307	B-128-1_091307	B-128-6_091307	B-129-6_091307	B-129-7_091307	B-130-6_091407
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	5.7 J	6.7 UJ	7.5 UJ	6.3 UJ	24.4 J	6.3 UJ	4.2 J	6.3 UJ	6.7 UJ	6.6 UJ	6.7 UJ
Arsenic	13	16	16	**16.9** [B]	2.2	8.1	2.2	**30.2** [B]	3.2	**121** [B]	4.2	3.1	4	2
Barium	350	400	10000	85.2 J	26 J	30.6 J	33.3 J	71 J	21.3 J	75.4 J	30.2 J	28.6	52.4	13.7 J
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.56 J	0.066 J	0.63 U	0.081 J	0.4 J	0.13 J	0.46 J	0.13 J	0.56 U	0.18 J	0.3 J
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	632	2.9	9.2	2.7	712	2.8	397	4	3.4	6.2	2.8
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-	-

Notes and Abbreviations:

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3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-131	B-132	B-133	B-133	B-134	B-135	B-136	B-136	B-137	B-138	B-139
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 3 ft	5 - 7 ft	1 - 3 ft	22 - 24 ft	0 - 3 ft	1 - 3 ft	1 - 3 ft	22 - 24 ft	12 - 16 ft	20 - 23 ft	22 - 24 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/14/2007	9/14/2007	9/17/2007	9/17/2007	9/17/2007	9/17/2007	9/17/2007	9/17/2007	9/17/2007	9/17/2007	9/18/2007
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B-131-1_091407	B-132-2_091407	B-133-1_091707	B-133-6_091707	B-134-1_091707	B-135-1_091707	B-136-1_091707	B-136-6_091707	B-137-4_091707	B-138-5_091707	B-139-6_091807
Metals (mg/kg)														
Aluminum	-	-	-	-	-	6630	2850	-	-	-	-	-	-	-
Antimony	-	-	-	0.57 J	4.3 J	1.9 J	6.7 U	1.7 J	2.7 J	1.3 J	6.5 U	0.85 J	6.6 U	0.53 J
Arsenic	13	16	16	1.3 U	**215 [B]**	9.5	2.6	10.9	11.3	13.4	2.3	9.3	3.7	2.9
Barium	350	400	10000	10.4 J	94.5	71.1	16.9 J	58.5	133	41.4	36.4	56	19.3 J	19 J
Beryllium	7.2	590	2700	-	-	0.27 J	0.066 J	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.63 U	0.036 J	0.69	0.17 J	0.1 J	2.1	0.18 J	0.07 J	0.089 J	0.075 J	0.091 J
Calcium	-	-	-	-	-	5210	33200	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	9.3	3.6	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	6.5	2.6 J	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	83.4	14.4	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	0.14 J	0.56 U	-	-	-	-	-	-	-
Iron	-	-	-	-	-	17000	7340	-	-	-	-	-	-	-
Lead	63	1000	3900	0.96	35.4	178	3.4	235	**1280**	9.9	3.8	27.8	5.2	3.9
Magnesium	-	-	-	-	-	2310	4820	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	298	295	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	0.04 J	0.11 U	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	13.3	6.5	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	772	267 J	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	0.62 U	0.56 U	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	1.2 U	1.1 U	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	207 J	83.8 J	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	5.6	1.1 U	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	10.6	4.4 J	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	70.9	62.9	-	-	-	-	-	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-140	B-141	B-141	B-144-MW	B-144-MW	B-145-MW	B-201	B-201	B-201	B-202
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			4 - 8 ft	0 - 4 ft	0 - 4 ft	0 - 2 ft	20 - 24 ft	2 - 4 ft	0 - 1 ft	1 - 4.5 ft	5 - 6 ft	0 - 1 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/18/2007	9/18/2007	9/18/2007	9/20/2007	9/20/2007	9/20/2007	9/30/2009	9/30/2009	9/30/2009	9/30/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	FD	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B-140-1_091807	B-141-FD_091807	B-141-1_091807	B-144-MW-1_092007	B-144-MW-6_092007	B-145-MW-1_092007	B201-1 0-1 FT	B201-2 1-4.5 FT	B201-3 5-6 FT	B202-1 0-1 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	4210	2670	-	-	-	-	-	-	-
Antimony	-	-	-	0.89 J	3.3 J	2.4 J	-	-	-	2.3	1.1 U	1.2 U	1.2
Arsenic	13	16	16	3.9	13.7	7.8	-	-	-	**17 [B]**	2.2	4.8	6.3
Barium	350	400	10000	19.9 J	65.3	46.5	-	-	-	250	28	67 J	42 J
Beryllium	7.2	590	2700	-	0.18 J	0.24 J	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.057 J	0.2 J	0.11 J	-	-	-	0.91	0.29	0.29 U	0.31
Calcium	-	-	-	-	1880	1480	-	-	-	-	-	-	-
Chromium	1	400	800	-	16.7	11.7	-	-	-	-	-	-	-
Cobalt	-	-	-	-	15.8	18.6	-	-	-	-	-	-	-
Copper	50	270	10000	-	**447**	**269**	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	0.58 U	-	-	0.53 U	0.53 U	0.25 J	-	-	-	-
Iron	-	-	-	-	70300	71700	-	-	-	-	-	-	-
Lead	63	1000	3900	15.2	197	143	-	-	-	380	14	8.8	58
Magnesium	-	-	-	-	624	335 J	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	236	125	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	**39.9 [B]**	**3.1**	-	-	-	-	-	-	-
Nickel	30	310	10000	-	27.4	27.8	-	-	-	-	-	-	-
Potassium	-	-	-	-	892	828	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	2.4	2.4	-	-	-	-	-	-	-
Silver	2	1500	6800	-	1.2 U	1.3 U	-	-	-	-	-	-	-
Sodium	-	-	-	-	178 J	202 J	-	-	-	-	-	-	-
Thallium	-	-	-	-	1.2 U	1.3 U	-	-	-	-	-	-	-
Vanadium	-	-	-	-	35.9	17.5	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	117	87.3	-	-	-	-	-	-	-

Notes and Abbreviations:

1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-202	B-202	B-203	B-203	B-203	B-204	B-204	B-204	B-205	B-205
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 3.8 ft	4.5 - 5.5 ft	0 - 1 ft	1 - 12 ft	12.5 - 13 ft	0 - 1 ft	1 - 3.9 ft	4.5 - 5.5 ft	0 - 1 ft	1 - 4.3 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009	9/30/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B202-2 1-3.8 FT	B202-3 4.5-5.5 FT	B203-1 0-1 FT	B203-2 1-12 FT	B203-3 12.5-13 FT	B204-1 0-1 FT	B204-2 1-3.9 FT	B204-3 4.5-5.5 FT	B205-1 0-1 FT	B205-2 1-4.3 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	4.6	1.2 U	1.9	1.2 U	1.3 U	1.1 U	1.7	1.1 U	1.1 U	1.2
Arsenic	13	16	16	**21** [B]	6.5	14	5.2	8.4	8.4	12	4.1	4.2	5
Barium	350	400	10000	100 J	32 J	87 J	75 J	66 J	61 J	76 J	52 J	36 J	56 J
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.86	0.29 U	0.61	0.3 U	0.32 U	0.32	0.5	0.27 U	0.32	0.39
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	400	11	1000	86	14	120	240	6.2	6.8	20
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-

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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-205	B-206	B-206	B-206	B-207	B-207	B-207	B-208	B-208	B-208
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			4.8 - 5.8 ft	0 - 1 ft	1.5 - 3 ft	4 - 5 ft	0 - 1 ft	1 - 4.2 ft	4.5 - 5.5 ft	0 - 1 ft	1 - 8.5 ft	10.5 - 12.5 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	9/30/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/8/2009	10/8/2009	10/8/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B205-3 4.8-5.8 FT	B206-1 0-1 FT	B206-2 1.5-3.0 FT	B206-3 4.0-5.0 FT	B207-1 0-1 FT	B207-2 1-4.2 FT	B207-3 4.5-5.5 FT	B208-1 0-1 FT	B208-2 1-8.5 FT	B208-3 10.5-12.5 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	-	-	10000	-	-
Antimony	-	-	-	1.1 U	1.2 U	1.1 U	1 U	1.6	1.8	1.1 U	1 U	1.2 U	1.1 U
Arsenic	13	16	16	5.9	6.1	4.4	4	**23** [B]	**20** [B]	5.5 U	10	10	2.1
Barium	350	400	10000	77 J	100 J	61 J	43 J	55 J	73 J	34 J	53	100	42
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	0.45	-	-
Cadmium	2.5	9.3	60	0.28 U	0.41	0.29 U	0.26 U	0.4	0.4	0.27 U	0.45	0.47	0.27 U
Calcium	-	-	-	-	-	-	-	-	-	-	48000	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	11	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	8.5	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	26	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	19000	-	-
Lead	63	1000	3900	12	54	8.4	8.5	110	220	4.1	13	66	8.5
Magnesium	-	-	-	-	-	-	-	-	-	-	11000	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	590	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	0.021 U	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	21	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	1300	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	5.2 U	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	0.52 U	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	470	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	1 U	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	19	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	100	-	-

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CORNING INCORPORATED
CORNING, NEW YORK

LOCATION	NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives			B-209	B-209	B-209	B-210	B-210	B-210	B-211	B-211	B-211	B-212
DEPTH				0 - 1 ft	1 - 5.6 ft	7 - 8 ft	0 - 1 ft	1 - 4.8 ft	5.5 - 6.5 ft	0 - 1 ft	1 - 5 ft	6 - 7 ft	0 - 1 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009	10/1/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B209-1 0-1 FT	B209-2 1-5.6 FT	B209-3 7-8 FT	B210-1 0-1 FT	B210-2 1-4.8 FT	B210-3 5.5-6.5 FT	B211-1 0-1 FT	B211-2 1-5.0 FT	B211-3 6.0-7.0 FT	B212-1 0-1 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	1.2 U	1.1 U	1 U	2.2	1.1 U	1.1 U	1.1 U	1.2	1.1 U	1.5
Arsenic	13	16	16	7.9	6.4	3.2	5.3 U	6.8	4.3	5.5	6	7.5	**35** [B]
Barium	350	400	10000	94	78	95	230	260	52	63	58	89	76
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.65	0.28 U	0.26 U	0.64	0.27 U	0.28 U	0.38	7.5	0.27 U	0.61
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	190	100	5.1	130	36	8.9 J	29	98	13	95
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-

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CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-212	B-212	B-213	B-213	B-213	B-214	B-214	B-214	B-215	B-215
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 5.7 ft	6.5 - 7.5 ft	0 - 1 ft	1 - 1.5 ft	2 - 3 ft	0 - 1 ft	1 - 5.2 ft	7.5 - 9.5 ft	0 - 1 ft	1.2 - 2.7 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/1/2009	10/1/2009	10/2/2009	10/2/2009	10/2/2009	10/8/2009	10/8/2009	10/8/2009	10/2/2009	10/2/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B212-2 1-5.7 FT	B212-3 6.5-7.5 FT	B213-1 0-1 FT	B213-2 1-1.5 FT	B213-3 2.0-3.0 FT	B214-1 0-1 FT	B214-2 1-5.2 FT	B214-3 7.5-9.5 FT	B215-1 0-1 FT	B215-2 1.2-2.7 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	5600	-	-	-	-
Antimony	-	-	-	1.2 U	1.1 U	3.9	1.2 U	1.3	14	1.3 U	1.1 U	1.4	1.2 U
Arsenic	13	16	16	13	10	**20 [B]**	4.5	4.7	**36 [B]**	11	4.7	**38 [B]**	4.5
Barium	350	400	10000	81	52	110	93	71	360	100	48	83	120
Beryllium	7.2	590	2700	-	-	-	-	-	0.71	-	-	-	-
Cadmium	2.5	9.3	60	0.47	0.28 U	2.6	0.31 U	0.3 U	1.5	1.7	0.27 U	0.31 U	0.3 U
Calcium	-	-	-	-	-	-	-	-	6200	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	6.3	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	9.3	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	260	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	48000	-	-	-	-
Lead	63	1000	3900	12	17	190	18	8.3	**1400**	150	18	86	20
Magnesium	-	-	-	-	-	-	-	-	1900	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	350	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	0.43	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	16	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	880	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	6.3 U	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	0.94	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	240	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	1.2 U	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	19	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	270	-	-	-	-

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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
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LOCATION	NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives			B-215	B-216	B-216	B-216	B-217	B-217	B-217	B-218	B-218	B-218
DEPTH				3.5 - 4.5 ft	0 - 1 ft	1 - 3 ft	4 - 5 ft	0 - 1 ft	1 - 5.5 ft	6.5 - 7.5 ft	0 - 1 ft	1 - 7.9 ft	1 - 7.9 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/9/2009	10/9/2009	10/9/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	FD	N
SAMPLE NAME		**Criteria**	**Criteria**	B215-3 3.5-4.5 FT	B216-1 0-1 FT	B216-2 1-3 FT	B216-3 4-5 FT	B217-1 0-1 FT	B217-2 1.0-5.5 FT	B217-3 6.5-7.5 FT	B218-1 0-1 FT	DUP-5-100909	B218-2 1-7.9 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	-	-	8500	-	-
Antimony	-	-	-	1.2 U	1.2	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	5.4 U	1.2 U	1.2 U
Arsenic	13	16	16	7.9	5.1	8	5.4	7.7	11	6.1	**18 [B]**	8.3	6
Barium	350	400	10000	47	60	92	56	58	110	72	84	71	68
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	0.48	-	-
Cadmium	2.5	9.3	60	0.29 U	0.29	2.8	0.85	0.73	0.99	1.5	1.4 U	0.3 U	0.3 U
Calcium	-	-	-	-	-	-	-	-	-	-	1500	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	5.7	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	9.7	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	71	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	71000	-	-
Lead	63	1000	3900	13	9.2	180	13	120	220	20	150	61	36 J
Magnesium	-	-	-	-	-	-	-	-	-	-	2000	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	520	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	0.26	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	21	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	990	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	11 U	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	2.7 U	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	98	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	1.1 U	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	21	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	100	-	-

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   Bold - Exceeds Restricted Commercial Criteria
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SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION	NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives			B-218	B-219	B-219	B-219	B-220	B-220	B-220	B-221	B-221	B-221	B-221
DEPTH				10 - 12 ft	0 - 1 ft	1 - 4 ft	5 - 6 ft	0 - 1 ft	1 - 7.8 ft	10 - 12 ft	0 - 1 ft	1 - 4 ft	7 - 8 ft	7 - 8 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/9/2009	10/2/2009	10/2/2009	10/2/2009	10/6/2009	10/6/2009	10/6/2009	10/14/2009	10/14/2009	10/14/2009	10/14/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	FD	N
SAMPLE NAME		**Criteria**	**Criteria**	B218-3 10-12 FT	B219-1 0-1 FT	B219-2 1-4 FT	B219-3 5-6 FT	B220-1 0-1 FT	B220-2 1-7.8 FT	B220-3 10-12 FT	B221-1 0-1FT	B221-2 1-4FT	DUP-7-101409	B221-3 7-8FT
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	3700	-	-	-	-	-	-
Antimony	-	-	-	1.1 U	3.4	1.2 U	1.2 U	14	1.2 U	1.1 U	5.5	1.2 U	1.1 U	1.1 U
Arsenic	13	16	16	4.3	16	2.2	4	**180** [B]	12	6.3	11 J	6.5 J	5.5 U	3.3 J
Barium	350	400	10000	25	69	110	70	100	100	41	57 J	58 J	22 J	43 J
Beryllium	7.2	590	2700	-	-	-	-	0.69	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.27 U	1.4	1.2	1.5	0.64	0.34	1.2	0.96	0.3 U	0.28 U	0.26 U
Calcium	-	-	-	-	-	-	-	21000	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	5.4	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	9.8	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	150	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	39000	-	-	-	-	-	-
Lead	63	1000	3900	5.3	210	18	19	290	91	14	900 J	10 J	3.6 J	4.2 J
Magnesium	-	-	-	-	-	-	-	1600	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	250	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	0.1	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	10	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	640	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	6.7 U	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	0.67 U	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	78	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	1.3 U	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	17	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	85	-	-	-	-	-	-

Notes and Abbreviations:

1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-222	B-222	B-222	B-223	B-223	B-223	B-224	B-224	B-224	B-225	B-225
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 1 ft	1 - 5 ft	7 - 9 ft	0 - 1 ft	1 - 7 ft	9 - 10 ft	0 - 1 ft	1 - 6 ft	7 - 8 ft	0 - 1 ft	0 - 1 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/15/2009	10/15/2009	10/15/2009	10/15/2009	10/15/2009	10/15/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	FD	N
SAMPLE NAME		**Criteria**	**Criteria**	B222-1 0-1FT	B222-2 1-5FT	B222-3 7-9FT	B223-1 0-1FT	B223-2 1-7FT	B223-3 9-10FT	B224-1 0-1 FT	B224-2 1-6 FT	B224-3 7-8 FT	DUP-1-100209	B225-1 0-1 FT
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	4700 J	-	-	-	-	-	-	-
Antimony	-	-	-	2.9	1.2 U	1.1 U	9.5	1.2	1.1 U	63	2.4	1.1 U	2.8	1.1 U
Arsenic	13	16	16	9.7 J	5.1 J	4.4 J	9.6 J	7 J	4.5	**88** [B]	5.8	3.4	**26** [B]	14 J
Barium	350	400	10000	110 J	110 J	34 J	76 J	82 J	26	220	76	48	32	22
Beryllium	7.2	590	2700	-	-	-	0.3	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	1.5	0.31 U	0.27 U	0.76	0.35	0.27 U	2.7	1.3	1.1	5.6	1.1
Calcium	-	-	-	-	-	-	9100 J	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	8.2	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	4.1	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	66	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	14000 J	-	-	-	-	-	-	-
Lead	63	1000	3900	800 J	10 J	5.8 J	510 J	170 J	5.3	**1300**	27	19	210	68 J
Magnesium	-	-	-	-	-	-	1500 J	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	250 J	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	0.056	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	8.2	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	760	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	10	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	0.72 U	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	70 J	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	1.4 U	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	10	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	53 J	-	-	-	-	-	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
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   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
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   J - Estimated result
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TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-225	B-225	B-226	B-226	B-226	B-226	B-227	B-227	B-227	B-227	B-228
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 5.1 ft	6 - 7 ft	0 - 1 ft	1 - 3 ft	1 - 3 ft	4 - 5 ft	0 - 1 ft	1 - 5 ft	10 - 11 ft	6 - 8 ft	0 - 1 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/2/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/2/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	FD	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B225-2 1-5.1 FT	B225-3 6-7 FT	B226-1 0-1 FT	DUP-2-100209	B226-2 1-3 FT	B226-3 4-5 FT	B227-1 0-1 FT	B227-2 1-5 T	B227-3 10-11 FT	B227-4 6-8 FT	B228-1 0-1 FT
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	1.2 U	1.2 U	2.1	1.2 U	1.2 U	1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.2 U
Arsenic	13	16	16	1.3	5.3	**87** [B]	4.8	7	4.7	2.8	5.9	3.7	5.7	7.2
Barium	350	400	10000	97	36	170	93	99	32	80	140	36	62	110
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	1.2	1.5	7.4	1.8	1.6	0.26 U	1.5	1.7	0.39	2.3	0.39
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	23	19	490	90	120	8	61	150	11	21	180
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
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TABLE III
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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-228	B-228	B-229	B-229	B-229	B-230	B-230	B-230	B-231	B-231	B-231
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 2.5 ft	3.5 - 4.5 ft	0 - 1 ft	1 - 9 ft	11 - 12 ft	0 - 1 ft	1 - 12 ft	15 - 17 ft	0 - 1 ft	1 - 12.8 ft	14 - 15 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/2/2009	10/2/2009	10/5/2009	10/5/2009	10/5/2009	10/6/2009	10/6/2009	10/6/2009	10/15/2009	10/15/2009	10/15/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B228-2 1-2.5 FT	B228-3 3.5-4.5 FT	B229-1 0-1 FT	B229-2 1-9 FT	B229-3 11-12 FT	B230-1 0-1 FT	B230-2 1-12 FT	B230-3 15-17 FT	B231-1 0-1FT	B231-2 1-12.8FT	B231-3 14-15FT
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	6200	-	-	-	-	-
Antimony	-	-	-	3	1.2	1.2 U	1.2 U	1.2 U	17	13	1.1 U	1.2 U	1.1 U	1 U
Arsenic	13	16	16	14	9.7	7.5	6.7	3.6	**95 [B]**	**250 [B]**	6.6	**18 [B]**	8.2	3.2
Barium	350	400	10000	140	43	82	92	47	130	95	43	270	60	33 J
Beryllium	7.2	590	2700	-	-	-	-	-	0.62	-	-	-	-	-
Cadmium	2.5	9.3	60	0.57	0.29 U	2.2	1.8	1.7	0.69	0.29 U	0.28 U	0.6	0.28 U	0.26 U
Calcium	-	-	-	-	-	-	-	-	12000	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	11	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	8.6	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	150	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	34000	-	-	-	-	-
Lead	63	1000	3900	120	12	190	240	19	570	21	6.9	280	490	13
Magnesium	-	-	-	-	-	-	-	-	3500	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	340	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	0.5	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	15	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	1700	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	5.9 U	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	0.59 U	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	220	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	1.2 U	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	21	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	160	-	-	-	-	-

Notes and Abbreviations:

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   Yellow Shading - Exceeds Unrestricted Criteria
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2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-232	B-232	B-232	B-233	B-233	B-233	B-233	B-234	B-234	B-234	B-234
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 1 ft	1 - 9.7 ft	10 - 12 ft	0 - 1 ft	0 - 1 ft	1 - 9.7 ft	12 - 13 ft	0 - 1 ft	1 - 9.4 ft	12 - 13 ft	12 - 13 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/9/2009	10/9/2009	10/9/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/9/2009	10/9/2009	10/9/2009	10/9/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	FD	N	N	N	N	N	FD	N
SAMPLE NAME		**Criteria**	**Criteria**	B232-1 0-1 FT	B232-2 1-9.7 FT	B232-3 10-12 FT	DUP-3-100509	B233-1 0-1 FT	B233-2 1-9.7 FT	B233-3 12-13 FT	B234-1 0-1 FT	B234-2 1-9.4 FT	DUP-6-100909	B234-3 12-13 FT
Metals (mg/kg)														
Aluminum	-	-	-	15000	-	-	-	-	-	-	7100	-	-	-
Antimony	-	-	-	1.2 U	1.2 U	1.2 U	6 U	6.6 U	6 U	1 U	1.1 U	1.2 U	1.1 U	1.2 U
Arsenic	13	16	16	16	3.5	5.1	8.8	5.8	6.9	2	16	5	2.9	3.8
Barium	350	400	10000	200	140	54	64	97	47	19	150	130	61	68
Beryllium	7.2	590	2700	0.72	-	-	-	-	-	-	0.8	-	-	-
Cadmium	2.5	9.3	60	2	2.3	1.1	0.84	0.75	0.62	0.26 U	0.46	1.6	1.8	1.8
Calcium	-	-	-	2000	-	-	-	-	-	-	4500	-	-	-
Chromium	1	400	800	14	-	-	-	-	-	-	7.7	-	-	-
Cobalt	-	-	-	13	-	-	-	-	-	-	8.9	-	-	-
Copper	50	270	10000	20	-	-	-	-	-	-	190	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	27000	-	-	-	-	-	-	24000	-	-	-
Lead	63	1000	3900	22	22	23	64	150 J	110	3.2	200	120	19	20
Magnesium	-	-	-	4200	-	-	-	-	-	-	2200	-	-	-
Manganese	1600	10000	10000	530	-	-	-	-	-	-	290	-	-	-
Mercury	0.18	2.8	5.7	0.033	-	-	-	-	-	-	0.21	-	-	-
Nickel	30	310	10000	24	-	-	-	-	-	-	14	-	-	-
Potassium	-	-	-	1700	-	-	-	-	-	-	1100	-	-	-
Selenium	3.9	1500	6800	5.9 U	-	-	-	-	-	-	1.1 U	-	-	-
Silver	2	1500	6800	0.59 U	-	-	-	-	-	-	0.56 U	-	-	-
Sodium	-	-	-	81	-	-	-	-	-	-	170	-	-	-
Thallium	-	-	-	1.2 U	-	-	-	-	-	-	1.1 U	-	-	-
Vanadium	-	-	-	24	-	-	-	-	-	-	20	-	-	-
Zinc	109	10000	10000	89	-	-	-	-	-	-	80	-	-	-

Notes and Abbreviations:

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TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
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LOCATION				B-235	B-235	B-235	B-236	B-236	B-236	B-237	B-237	B-237	B-238	B-238
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 1 ft	1 - 7.9 ft	11 - 12 ft	0 - 1 ft	1 - 7.5 ft	10 - 12 ft	0 - 1 ft	1 - 6.2 ft	8.5 - 9.5 ft	0 - 1 ft	1 - 5.3 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/6/2009	10/6/2009	10/6/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/16/2009	10/15/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N	FD
SAMPLE NAME		**Criteria**	**Criteria**	B235-1 0-1 FT	B235-2 1-7.9 FT	B235-3 11-12 FT	B236-1 0-1 FT	B236-2 1-7.5 FT	B236-3 10-12 FT	B237-1 0-1 FT	B237-2 1-6.2 FT	B237-3 8.5-9.5 FT	B238-1 0-1FT	DUP-8-101509
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	1.1 U	5.9 U	1.1 U	5.2 U	5.6 U	6 U	1.2 U	6.6 U	5.6 U	3.3	1.1 U
Arsenic	13	16	16	**18** [B]	5.8	2.2	5.2 U	4.8	5.6	**21** [B]	5.3	6.4	10 J	2.2
Barium	350	400	10000	120	57	42	46	57	53	96	110	52	61 J	20
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.27 U	0.72	0.27 U	1.2	1.3	0.66	1.5	0.7	0.61	0.3	0.28 U
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	**2700**	160	3.8	83	**1100**	3.6	310	11	4.7	300 J	3.3
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-238	B-238	B-239	B-239	B-239	B-240	B-240	B-240	B-240	B-241	B-241
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			1 - 5.3 ft	8 - 9 ft	0 - 1 ft	1 - 4.5 ft	6.5 - 7.5 ft	0 - 1 ft	1 - 5 ft	8 - 10 ft	8 - 10 ft	0 - 1 ft	1 - 5.3 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/16/2009	10/16/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/5/2009	10/6/2009	10/6/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	FD	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B238-2 1-5.3FT	B238-3 8-9FT	B239-1 0-1 FT	B239-2 1-4.5 FT	B239-3 6.5-7.5 FT	B240-1 0-1 FT	B240-2 1-5 FT	DUP-4-100509	B240-3 8-10 FT	B241-1 0-1 FT	B241-2 1-5_3 FT
Metals (mg/kg)														
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	5600	-
Antimony	-	-	-	2	10	5.8 U	5.8 U	5.6 U	6 U	6.1	1.1 U	1.1 U	16	6.4 U
Arsenic	13	16	16	11 J	9.7 J	1.2	3.4	5.5	4	4.2	2.8	2.6 J	**23** [B]	6.1
Barium	350	400	10000	50 J	120 J	52	80	35	73	140 J	27	30 J	110	78
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	0.54	-
Cadmium	2.5	9.3	60	0.61	0.38	1.7	0.43	0.54	0.51	0.58	0.27 U	2.7 U	1.7	1.7
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	2400	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	0.57 U	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	10	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	**20000** [B]	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	26000	-
Lead	63	1000	3900	120 J	17 J	320	34	3.2	2.7	3.1	3.7	10 J	**3100**	280
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	1500	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	250	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	0.052	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	15	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	620	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	5.7 U	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	14	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	54	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	1.1 U	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	24	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	5500	-

Notes and Abbreviations:

1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
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   Green Shading - Detection Limit Exceeds Unrestricted Criteria
2. U - Indicates chemical was not detected above the reporting limit.
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TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-241	B-242	B-242	B-242	B-243	B-243	B-243	B-244	B-244	B-244
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			8 - 9 ft	0 - 1 ft	1 - 4.5 ft	8 - 10 ft	0 - 1 ft	1 - 6 ft	8 - 10 ft	0.5 - 1.5 ft	1.5 - 5 ft	10 - 11 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/6/2009	10/6/2009	10/6/2009	10/6/2009	10/6/2009	10/6/2009	10/6/2009	10/5/2009	10/5/2009	10/5/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N	N	N	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B241-3 8-9 FT	B242-1 0-1 FT	B242-2 1-4.5 FT	B242-3 8-10 FT	B243-1 0-1 FT	B243-2 1-6 FT	B243-3 8-10 FT	B244-1 0.5-1.5 FT	B244-2 1.5-5.0 FT	B244-3 10-11 FT
Metals (mg/kg)													
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	1.1 U	6 U	6.2 U	5.5 U	1.4 U	6.2 U	1.1 U	6.1	6.2 U	1.1 U
Arsenic	13	16	16	2.7	**19** [B]	11	3.6	**29** [B]	6.7	2	14	3.8	3.9
Barium	350	400	10000	34	71	150	45	140	120	42	180	140	29
Beryllium	7.2	590	2700	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5	9.3	60	0.27 U	1.6	0.63	0.28 U	4.3	0.63	0.27 U	2.3	0.68	0.67
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	400	800	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	50	270	10000	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	27	27	10000	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	1000	3900	5.1	1000	530	3	**1100**	75	4	500	9	9.7
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600	10000	10000	-	-	-	-	-	-	-	-	-	-
Mercury	0.18	2.8	5.7	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10000	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9	1500	6800	-	-	-	-	-	-	-	-	-	-
Silver	2	1500	6800	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109	10000	10000	-	-	-	-	-	-	-	-	-	-

Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
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2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

TABLE III
SUMMARY OF SOIL ANALYTICAL RESULTS - COMPARED WITH RESTRICTED & UNRESTR
TIOGA AVENUE BCP SITE - ALTERNATIVES ANALYSIS REPORT
CORNING INCORPORATED
CORNING, NEW YORK

LOCATION				B-245	B-245	B-245	B-259
DEPTH	**NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives**			0 - 1 ft	1 - 6.5 ft	9 - 10 ft	0 - 2 ft
DATE	**Unrestricted**	**Restricted**	**Restricted**	10/16/2009	10/16/2009	10/16/2009	10/21/2009
SAMPLE TYPE	**Criteria**	**Commercial**	**Industrial**	N	N	N	N
SAMPLE NAME		**Criteria**	**Criteria**	B245-1 0-1FT	B245-2 1-6.5FT	B245-3 9-10FT	B259-1 0-2 FT
Metals (mg/kg)							
Aluminum	-	-	-	-	-	-	6000
Antimony	-	-	-	1.1 U	1.2 U	1.1 U	6 U
Arsenic	13	16	16	3.2	5.2	10	**29** [B]
Barium	350	400	10000	22	85	76	200
Beryllium	7.2	590	2700	-	-	-	0.75
Cadmium	2.5	9.3	60	0.28 U	0.3 U	0.29	2.9
Calcium	-	-	-	-	-	-	6400
Chromium	1	400	800	-	-	-	12
Cobalt	-	-	-	-	-	-	11
Copper	50	270	10000	-	-	-	130
Cyanide (total)	27	27	10000	-	-	-	-
Iron	-	-	-	-	-	-	80000 J
Lead	63	1000	3900	10	33	220	550 J
Magnesium	-	-	-	-	-	-	1600
Manganese	1600	10000	10000	-	-	-	660
Mercury	0.18	2.8	5.7	-	-	-	0.074
Nickel	30	310	10000	-	-	-	24 J
Potassium	-	-	-	-	-	-	1200
Selenium	3.9	1500	6800	-	-	-	6 U
Silver	2	1500	6800	-	-	-	3 U
Sodium	-	-	-	-	-	-	310
Thallium	-	-	-	-	-	-	6 U
Vanadium	-	-	-	-	-	-	20
Zinc	109	10000	10000	-	-	-	460

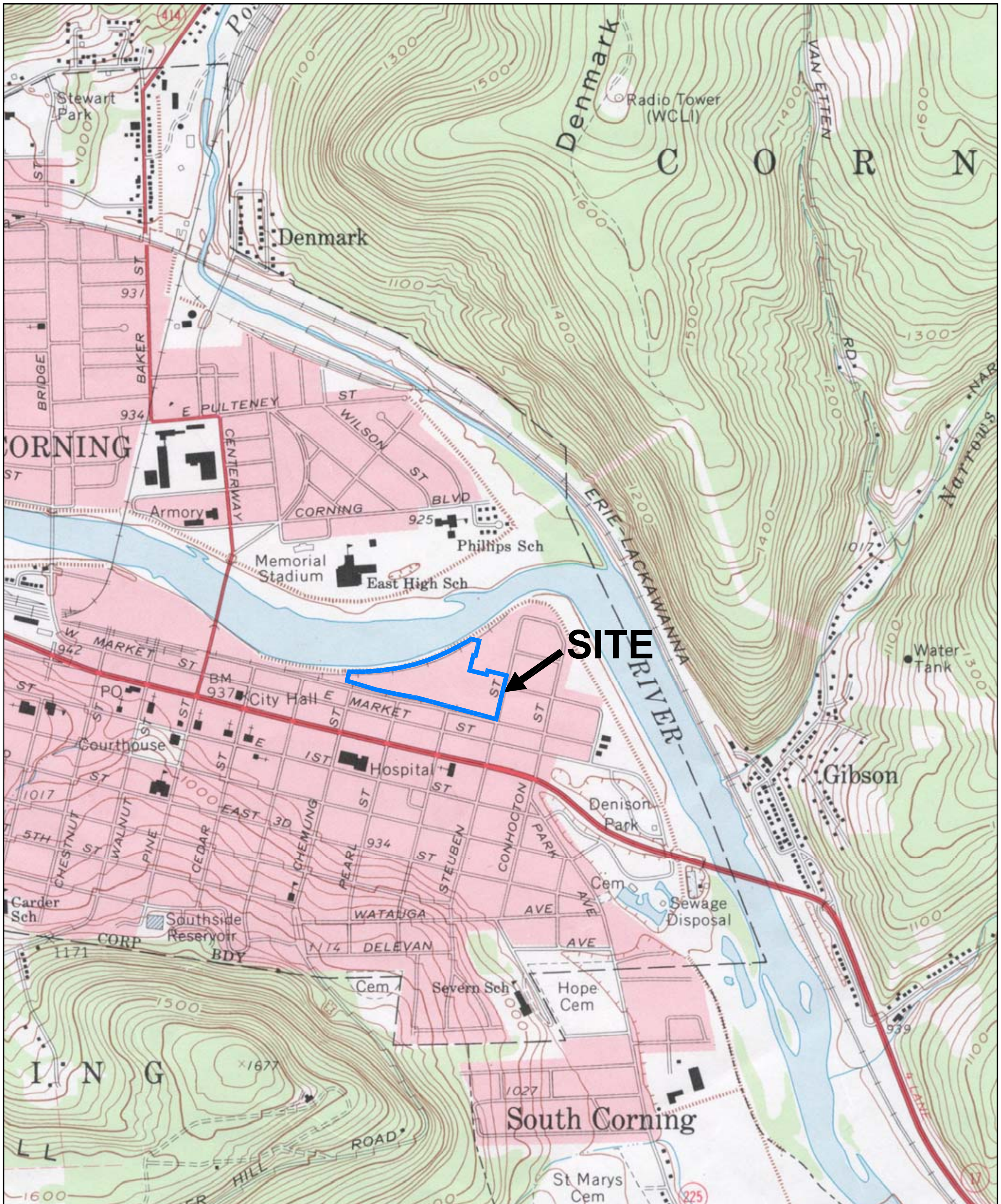
Notes and Abbreviations:
1. Criteria based on NYSDEC Brownfield Cleanup Program Soil Cleanup Objectives.
   Bold - Exceeds Restricted Commercial Criteria
   [B] - Exceeds Restricted Industrial Criteria.
   Yellow Shading - Exceeds Unrestricted Criteria
   Green Shading - Detection Limit Exceeds Unrestricted Criteria
2. U - Indicates chemical was not detected above the reporting limit.
   J - Estimated result
3. Sample Types: N - Normal Samples, FD - Field Duplicate

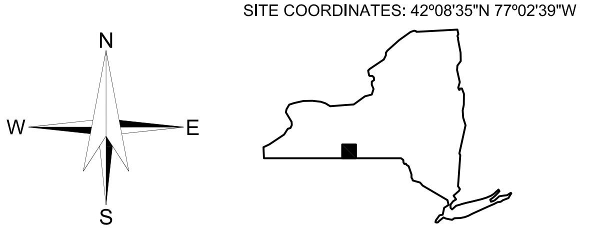
TABLE IV - SUMMARY OF REMEDIAL ALTERNATIVES ANALYSIS
TIOGA AVENUE BCP – ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

Balancing Criteria		Relative Ability to Achieve Criteria		Comments
		Track 1 Remedy	**Track 4 Remedy**	
Threshold Criteria	1. Protection of Human Health & the Environment	X	X	Overall the remedies considered would be equally protective.
	2. Compliance with Standards, Criteria, and Guidance	X	X	Overall the remedies considered would comply with SCGS.
Balancing Criteria	3. Short and Long-Term Effectiveness		X	Track 1 is not effective in the short term considering short term disturbance from a large scale removal action.
	4. Reduction of Toxicity, Mobility or Volume		X	Neither Track will significantly reduce the overall toxicity/volume of COCs in the environment. A Track 4 remedy further reduces COC mobility with lower level of site disturbance; Track 1 involves significant site disturbance and high level of management to mitigate COC mobilization.
	5. Implementability		X	Track 4 is consistent with the BCP program & is a remedy that is commonly applied to BCP sites. Conversely, implementation of Track 1 is not as easily or practically implementable.
	6. Cost Effectiveness		X	Track 1 is not cost effective.
	7. Community Acceptance	X	X	Community interaction will be provided under the CPP.
	8. Land Use	X	X	Conformance with land use criteria are equivalent for both remedies.
	9. Green Remediation & Sustainability		X	A large scale removal project under the Track 1 remedy creates a high/unnecessary use of resources and potential for short term impacts.

Notes:

1. Reference text of RAWP for more detailed explanation of balancing criteria evaluation as are summarized on this table.
2. This table identifies an “X” mark to indicate the relative degree to which the balancing criteria will be met by comparison of a Track 1 versus Track 4 cleanup remedies. In cases where both cleanup tracks are determined to equally achieve the criterion, both alternatives are marked with an “X”.
3. Criterion 9 (Green Remediation & Sustainability) is considered an additional balancing criterion in accordance with DER-31 as explained in the text of the accompanying RAWP.





SITE COORDINATES: 42º08'35"N 77º02'39"W

U.S.G.S. QUADRANGLE: CORNING, NEW YORK

HALEY & ALDRICH

CORNING INCORPORATED
CORNING PROPERTY MANAGEMENT CORPORATION
TIOGA AVENUE PROPERTY BCP SITE #C851031
ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

PROJECT LOCUS

SCALE: 1:24000
AUGUST 2011 REV 0

FIGURE 1

G:\PROJECTS\33123\016 AAR-RAWP DELIVERABLE\RAWP FIGURES\33123-016-LMT-LOCUS_D2.DWG

G:\PROJECTS\33123\016 AAR-RAWP DELIVERABLE\RAWP FIGURES\33123-016-002B_FORMER FACILITY LAYOUT_D2.DWG

LEGEND:

- APPROXIMATE BCP SITE BOUNDARY
- FENCE
- APPROXIMATE LOCATION OF FORMER BUILDING

NOTES:

1. SITE FEATURES AND BASEMAP FROM SITE SURVEY PLAN BY WEILER ASSOCIATES, "TIOGA AVENUE SITE PARCEL, CORNING PROPERTY MANAGEMENT CORP., (FALLBROOK PLANT)," JOB NO. 13989, DATED JULY 26, 2007. AERIAL PHOTOGRAPH FROM PICTOMETRY, APRIL 2009.

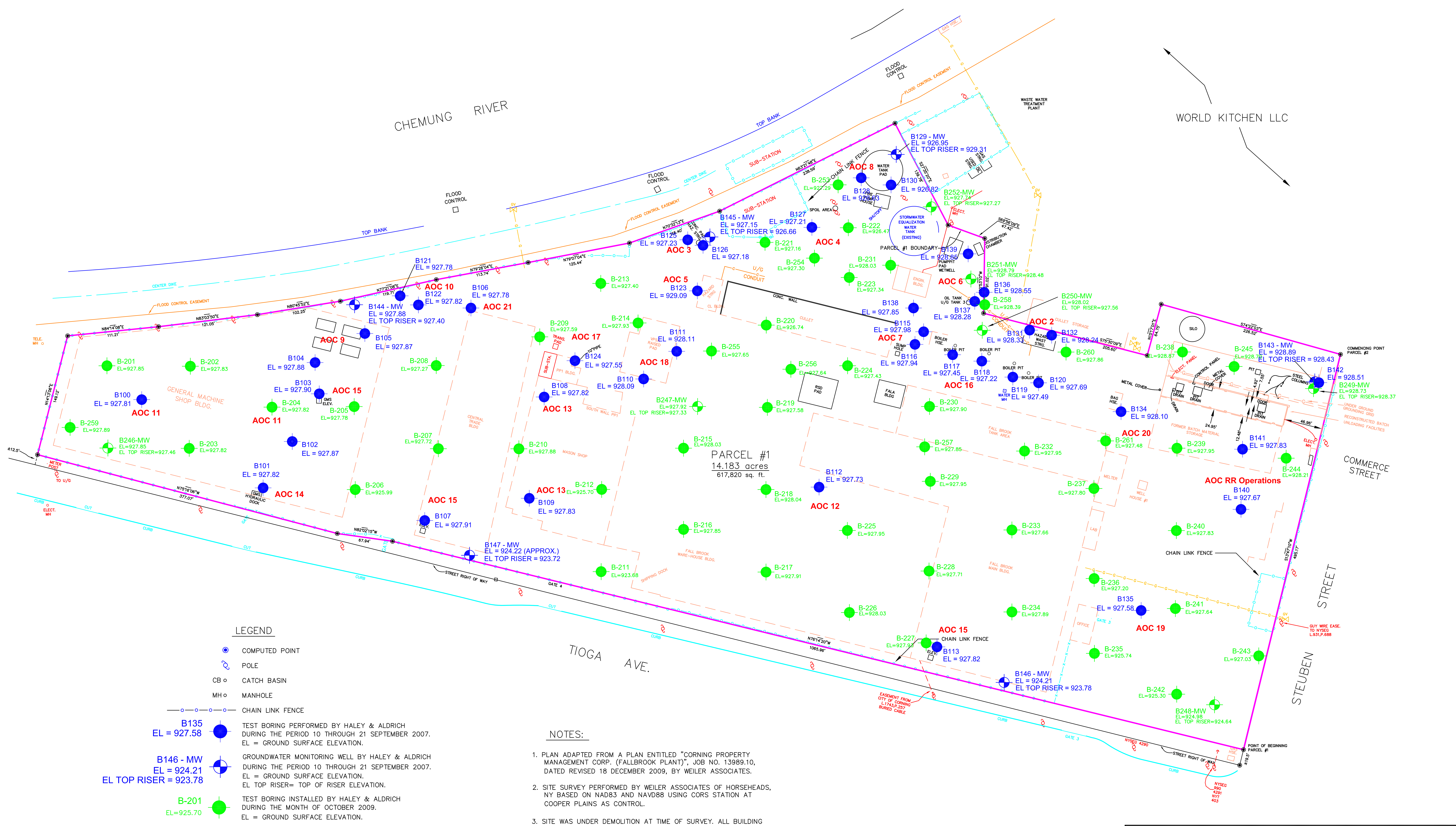
HALEY & ALDRICH

CORNING INCORPORATED
CORNING PROPERTY MANAGEMENT CORPORATION
TIOGA AVENUE PROPERTY BCP SITE #C851031
ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

FORMER FACILITY LAYOUT

SCALE: AS SHOWN
AUGUST 2011 REV 0

FIGURE 2



LEGEND

COMPUTED POINT

POLE

CB ○ CATCH BASIN

MH ○ MANHOLE

CHAIN LINK FENCE

B135
EL = 927.58
TEST BORING PERFORMED BY HALEY & ALDRICH DURING THE PERIOD 10 THROUGH 21 SEPTEMBER 2007.
EL = GROUND SURFACE ELEVATION.

B146 - MW
EL = 924.21
EL TOP RISER = 923.78
GROUNDWATER MONITORING WELL BY HALEY & ALDRICH DURING THE PERIOD 10 THROUGH 21 SEPTEMBER 2007.
EL = GROUND SURFACE ELEVATION.
EL TOP RISER= TOP OF RISER ELEVATION.

B-201
EL=925.70
TEST BORING INSTALLED BY HALEY & ALDRICH DURING THE MONTH OF OCTOBER 2009.
EL = GROUND SURFACE ELEVATION.

B246-MW
EL=924.98
EL TOP RISER=924.64
BCP REMEDIAL INVESTIGATION MONITORING WELL INSTALLED BY HALEY & ALDRICH DURING THE MONTH OF OCTOBER 2009.
EL = GROUND SURFACE ELEVATION.
EL TOP RISER= TOP OF RISER ELEVATION.

TIOGA AVENUE BCP SITE BOUNDARY

NOTES:

1. PLAN ADAPTED FROM A PLAN ENTITLED "CORNING PROPERTY MANAGEMENT CORP. (FALLBROOK PLANT)", JOB NO. 13989.10, DATED REVISED 18 DECEMBER 2009, BY WEILER ASSOCIATES.
2. SITE SURVEY PERFORMED BY WEILER ASSOCIATES OF HORSEHEADS, NY BASED ON NAD83 AND NAVD88 USING CORS STATION AT COOPER PLAINS AS CONTROL.
3. SITE WAS UNDER DEMOLITION AT TIME OF SURVEY. ALL BUILDING LOCATIONS AND OTHER FEATURES SHOULD BE CONSIDERED APPROXIMATE AND MAY NO LONGER EXIST.

N W E S

0 60 120 180 240
SCALE IN FEET

HALEY & ALDRICH

CORNING INCORPORATED
CORNING PROPERTY MANAGEMENT CORPORATION
TIOGA AVENUE PROPERTY BCP SITE #C851031
ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

SITE PLAN

SCALE: AS SHOWN
AUGUST 2011 REV 0

FIGURE 3

G:\PROJECTS\33123\016 AAR-RAWP DELIVERABLE\RAWP FIGURES\33123-011_FIGURE 3_SITE PLAN_TJV_D2.DWG

NOTES:

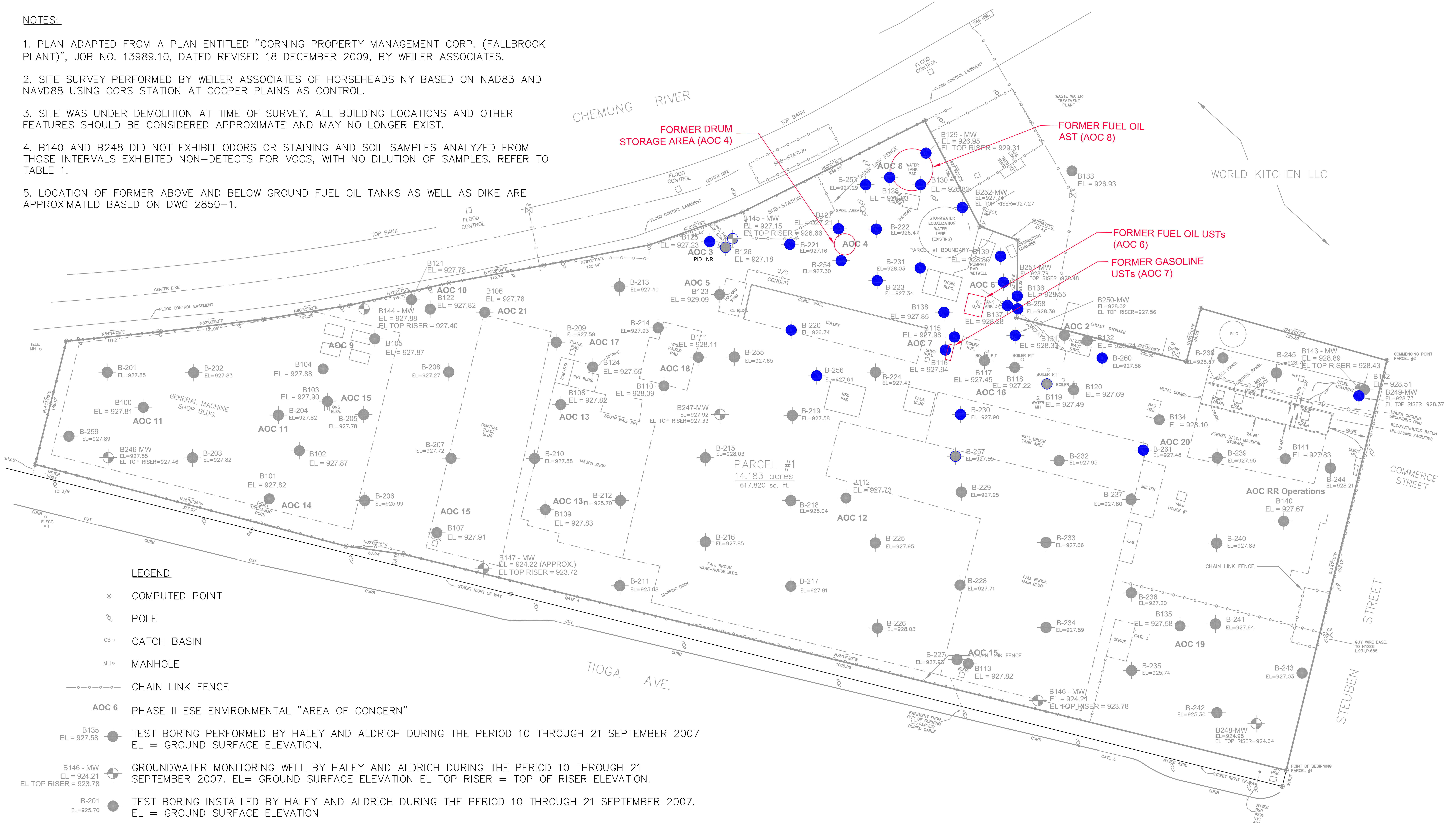
1. PLAN ADAPTED FROM A PLAN ENTITLED "CORNING PROPERTY MANAGEMENT CORP. (FALLBROOK PLANT)", JOB NO. 13989.10, DATED REVISED 18 DECEMBER 2009, BY WEILER ASSOCIATES.

2. SITE SURVEY PERFORMED BY WEILER ASSOCIATES OF HORSEHEADS NY BASED ON NAD83 AND NAVD88 USING CORS STATION AT COOPER PLAINS AS CONTROL.

3. SITE WAS UNDER DEMOLITION AT TIME OF SURVEY. ALL BUILDING LOCATIONS AND OTHER FEATURES SHOULD BE CONSIDERED APPROXIMATE AND MAY NO LONGER EXIST.

4. B140 AND B248 DID NOT EXHIBIT ODORS OR STAINING AND SOIL SAMPLES ANALYZED FROM THOSE INTERVALS EXHIBITED NON-DETECTS FOR VOCS, WITH NO DILUTION OF SAMPLES. REFER TO TABLE 1.

5. LOCATION OF FORMER ABOVE AND BELOW GROUND FUEL OIL TANKS AS WELL AS DIKE ARE APPROXIMATED BASED ON DWG 2850-1.



LEGEND

- COMPUTED POINT
- POLE
- CB CATCH BASIN
- MH MANHOLE
- CHAIN LINK FENCE
- AOC 6 — PHASE II ESE ENVIRONMENTAL "AREA OF CONCERN"
- B135 EL = 927.58 — TEST BORING PERFORMED BY HALEY AND ALDRICH DURING THE PERIOD 10 THROUGH 21 SEPTEMBER 2007 EL = GROUND SURFACE ELEVATION.
- B146 - MW EL = 924.21 EL TOP RISER = 923.78 — GROUNDWATER MONITORING WELL BY HALEY AND ALDRICH DURING THE PERIOD 10 THROUGH 21 SEPTEMBER 2007. EL= GROUND SURFACE ELEVATION EL TOP RISER = TOP OF RISER ELEVATION.
- B-201 EL=925.70 — TEST BORING INSTALLED BY HALEY AND ALDRICH DURING THE PERIOD 10 THROUGH 21 SEPTEMBER 2007. EL = GROUND SURFACE ELEVATION
- B246-MW EL=924.98 EL TOP RISER=924.64 — BCP REMEDIAL INVESTIGATION MONITORING WELL INSTALLED BY HALEY AND ALDRICH DURING HTE MONTH OF OCTOBER 2009. EL = GROUND SURFACE ELEVATION. EL TOP RISER = TOP OF RISER ELEVATION
- TIOGA AVENUE BCP SITE BOUNDARY SUBSURFACE PROFILE LINE.
- ONLY ODORS AND/OR DILUTED SAMPLE NOTED
- ANALYTICAL DATA, PID >5 PPM AND/OR OTHER WEATHERED PETROLEUM EVIDENCE NOTES

HALEY & ALDRICH

CORNING INCORPORATED
CORNING PROPERTY MANAGEMENT CORPORATION
TIOGA AVENUE PROPERTY BCP SITE #C851031
ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

LOCATIONS EXHIBITING RESIDUAL PETROLEUM IMPACT

SCALE: AS SHOWN
AUGUST 2011 REV 0

FIGURE 4

G:\PROJECTS\33123\011 RI PROGRAM\FIGURES\33123-011_FIGURE 3_SITE PLAN_TJV.DWG

ARSENIC CONCENTRATIONS GREATER THAN 40 PPM		
BORING	INTERVAL (FT)	VALUE (PPM)
B-220	0-1	180
B-224	0-1	88
B-226	0-1	87
B-230	0-1	95

G:\Projects\33123\017\Figures\GIS\2011_1027_TJV_As Dot Maps 0-1_D6.mxd

ARSENIC

- <13 PPM
- 13 - 16 PPM
- 16 - 40 PPM
- 40 - 250 PPM

UNRESTRICTED SCO = 13 PPM
GROUNDWATER PROTECTION SCO = 16 PPM
RESTRICTED COMMERCIAL SCO = 16 PPM
RESTRICTED INDUSTRIAL SCO = 16 PPM
UPPER LIMIT OF CONCENTRATIONS TYPICAL FOR SITE = 40 PPM

NOTE: 1) BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

N
W E
S

0 120 240
SCALE IN FEET

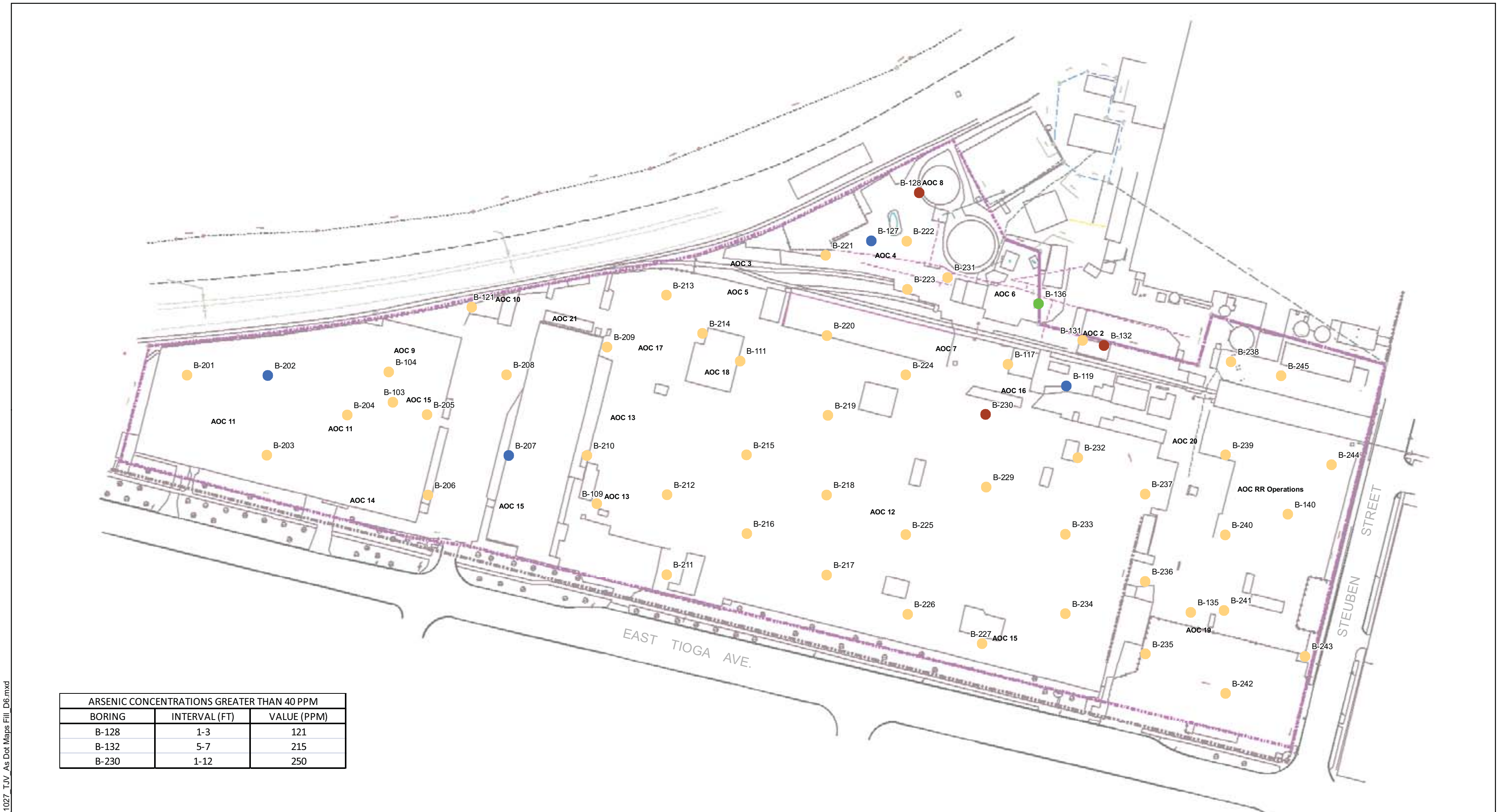
HALEY & ALDRICH

CORNING INCORPORATED
CORNING PROPERTY MANAGEMENT CORPORATION
TIOGA AVENUE PROPERTY BCP SITE #C851031
ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

POSTING MAP OF
ARSENIC CONCENTRATIONS
WITHIN 0-1 FOOT INTERVAL

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 5



ARSENIC CONCENTRATIONS GREATER THAN 40 PPM		
BORING	INTERVAL (FT)	VALUE (PPM)
B-128	1-3	121
B-132	5-7	215
B-230	1-12	250

G:\Projects\33123\017\Figures\GIS\2011_1027_TJV_As Dot Maps Fill_D6.mxd

ARSENIC

- <13 PPM
- 13 - 16 PPM
- 16 - 40 PPM
- 40 - 250 PPM

UNRESTRICTED SCO = 13 PPM
GROUNDWATER PROTECTION SCO = 16 PPM
RESTRICTED COMMERCIAL SCO = 16 PPM
RESTRICTED INDUSTRIAL SCO = 16 PPM
UPPER LIMIT OF CONCENTRATIONS TYPICAL FOR SITE = 40 PPM

NOTE: 1) BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

N W E S

0 120 240
SCALE IN FEET

HALEY & ALDRICH

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ALTERNATIVES ANALYSIS REPORT
CORNING, NEW YORK

POSTING MAP OF
ARSENIC CONCENTRATIONS
WITHIN FILL BELOW 1 FT

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 6

LEAD CONCENTRATIONS GREATER THAN 1000 PPM		
BORING	INTERVAL (FT)	VALUE (PPM)
B-214	0-1	1400
B-224	0-1	1300
B-235	0-1	2700
B-241	0-1	3100
B-243	0-1	1100

G:\Projects\33123\017\Figures\GIS\2011_1027_TJV_Pb Dot Maps 0-1_D6.mxd

LEAD

- <63 PPM
- 63 - 450 PPM
- 450 - 1000 PPM
- 1000 - 3900 PPM

UNRESTRICTED SCO = 63 PPM
GROUNDWATER PROTECTION SCO = 450 PPM
RESTRICTED COMMERCIAL SCO = 1,000 PPM
RESTRICTED INDUSTRIAL SCO = 3,900 PPM

NOTE: 1) BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

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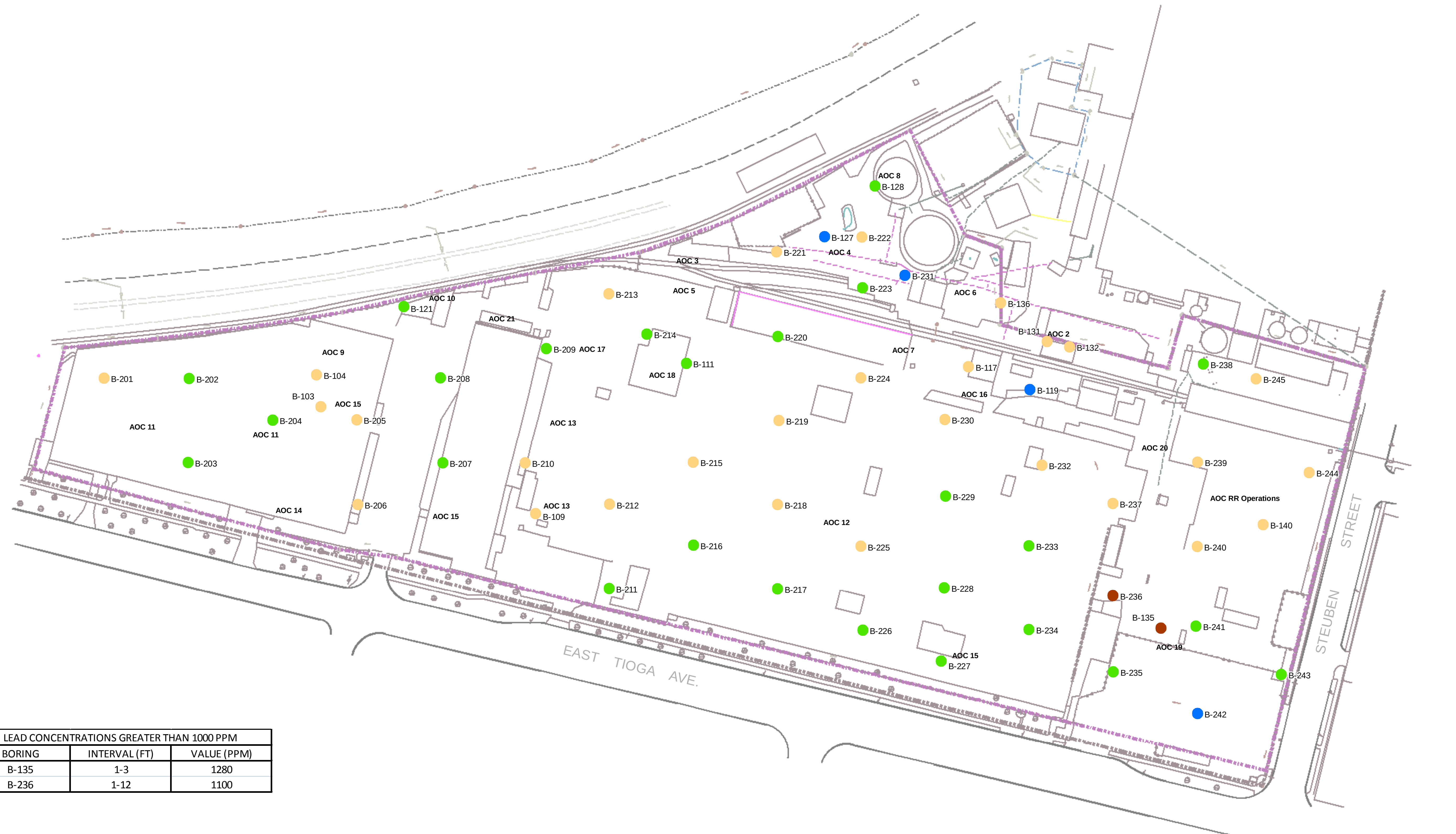
POSTING MAP OF
LEAD CONCENTRATIONS
WITHIN 0-1 FT INTERVAL

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 7



LEAD CONCENTRATIONS GREATER THAN 1000 PPM		
BORING	INTERVAL (FT)	VALUE (PPM)
B-135	1-3	1280
B-236	1-12	1100

LEAD

- <63 PPM
- 63 - 450 PPM
- 450 - 1000 PPM
- 1000 - 3900 PPM

UNRESTRICTED SCO = 63 PPM
GROUNDWATER PROTECTION SCO = 450 PPM
RESTRICTED COMMERCIAL SCO = 1,000 PPM
RESTRICTED INDUSTRIAL SCO = 3,900 PPM

NOTE: 1) BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

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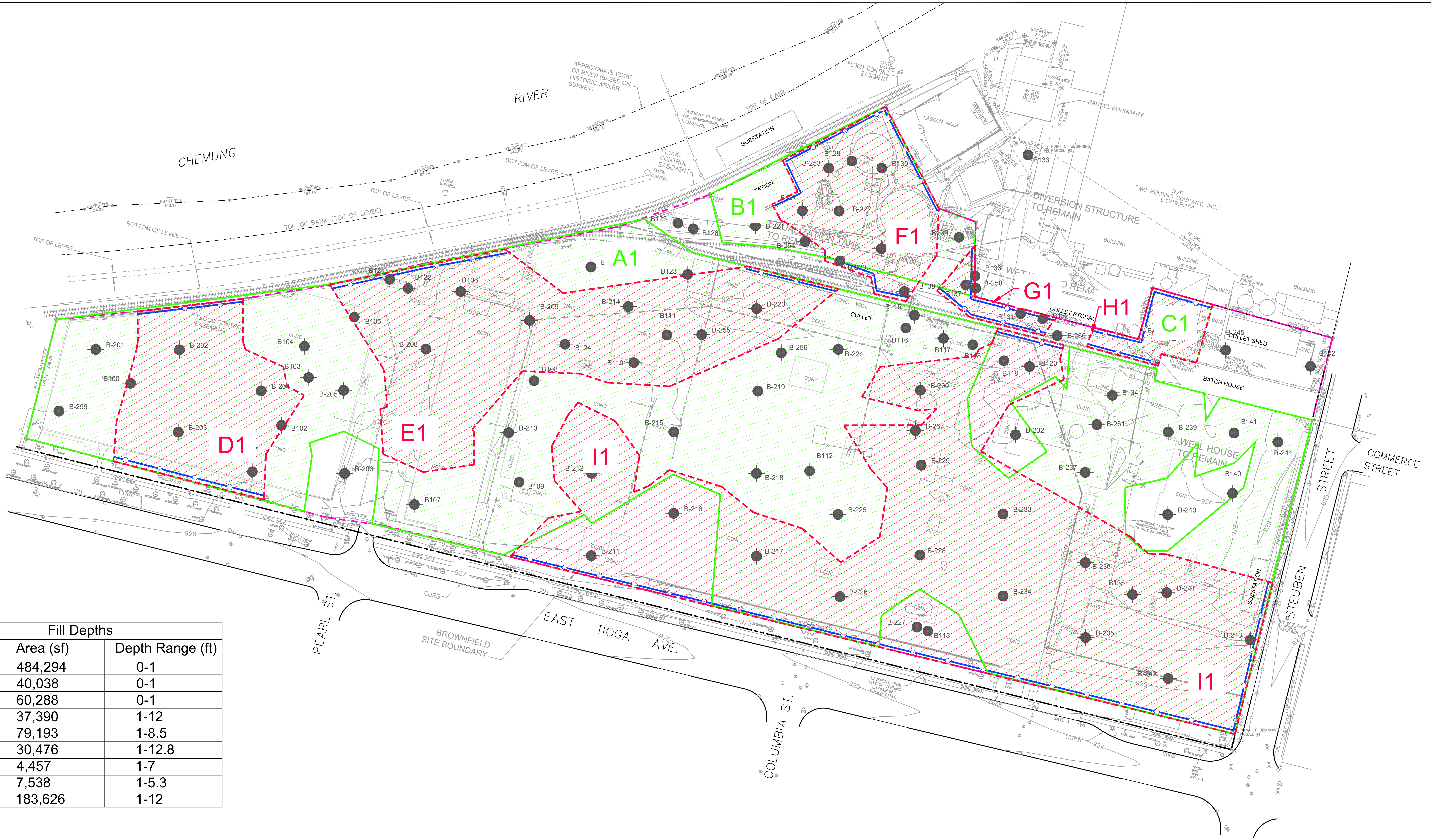
POSTING MAP OF
LEAD CONCENTRATIONS
WITHIN FILL BELOW 1 FT

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 8

G:\Projects\33123\017\Figures\GIS\2011_1027_TJV_Pb Dot Maps Fill_D6.mxd



Fill Depths		
Area	Area (sf)	Depth Range (ft)
A1	484,294	0-1
B1	40,038	0-1
C1	60,288	0-1
D1	37,390	1-12
E1	79,193	1-8.5
F1	30,476	1-12.8
G1	4,457	1-7
H1	7,538	1-5.3
I1	183,626	1-12

SHEET PILE LOCATIONS

EXCAVATION 0-1 FT

EXCAVATION BELOW 1FT

UNRESTRICTED SCOs

ARSENIC - 13 PPM
LEAD - 63 PPM

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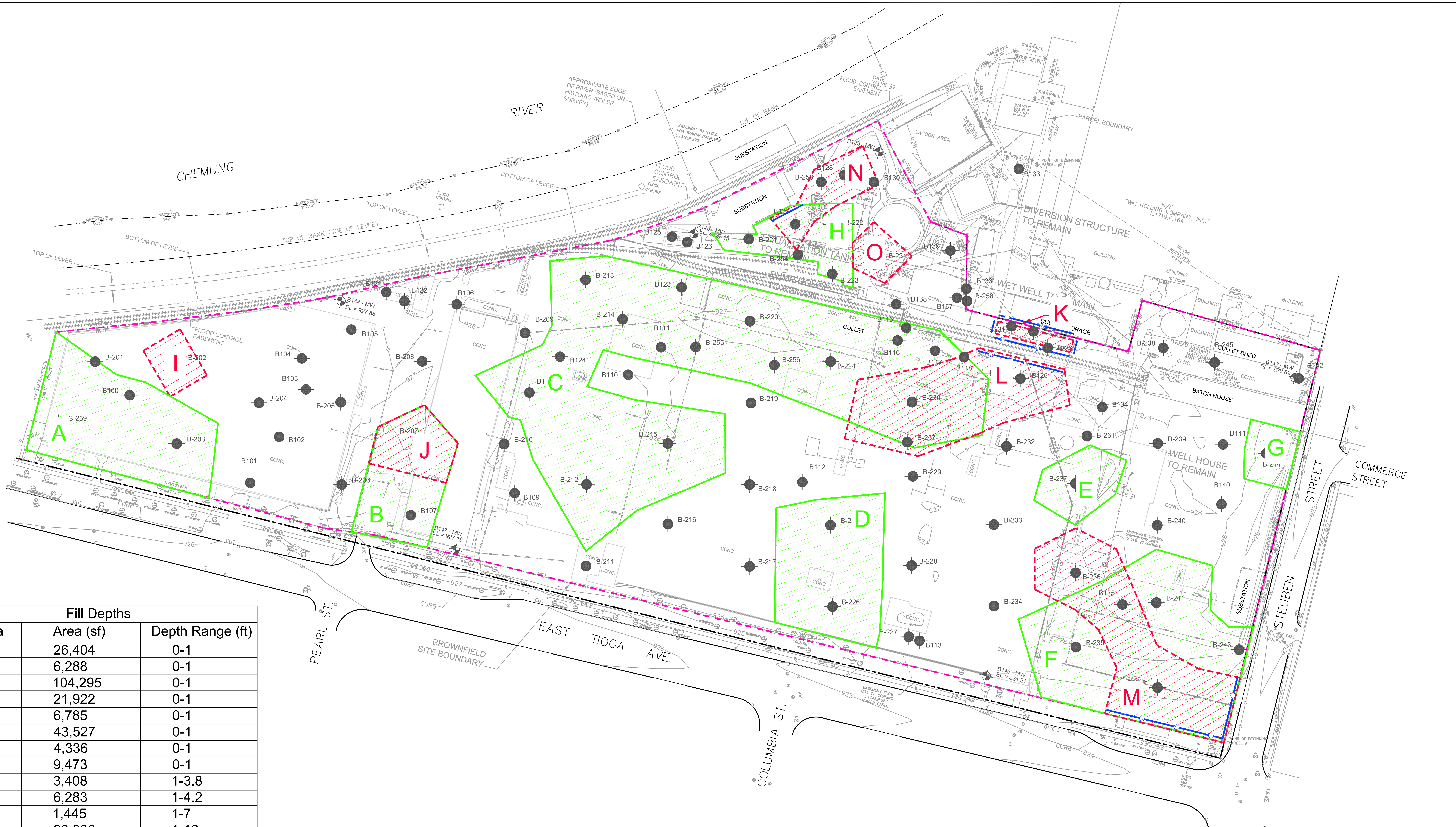
TRACK 1
CONCEPTUAL EXCAVATION PLAN

SCALE: AS SHOWN
AUGUST 2011 REV 0

FIGURE 9

G:\PROJECTS\33123\017\FIGURES\EXCAVATION AREAS.DWG



Fill Depths		
Area	Area (sf)	Depth Range (ft)
A	26,404	0-1
B	6,288	0-1
C	104,295	0-1
D	21,922	0-1
E	6,785	0-1
F	43,527	0-1
G	4,336	0-1
H	9,473	0-1
I	3,408	1-3.8
J	6,283	1-4.2
K	1,445	1-7
L	23,036	1-12
M	25,583	1-7.5
N	6,246	1-3
O	3,209	1-12.8

SHEET PILE LOCATION

EXCAVATION WITHIN 0-1FT

EXCAVATION BELOW 1FT

RESTRICTED COMMERCIAL SCOs

ARSENIC - 16 PPM

LEAD - 450 PPM (PROTECTION OF GROUNDWATER)

N W E S

0 60 120 180 240

SCALE IN FEET

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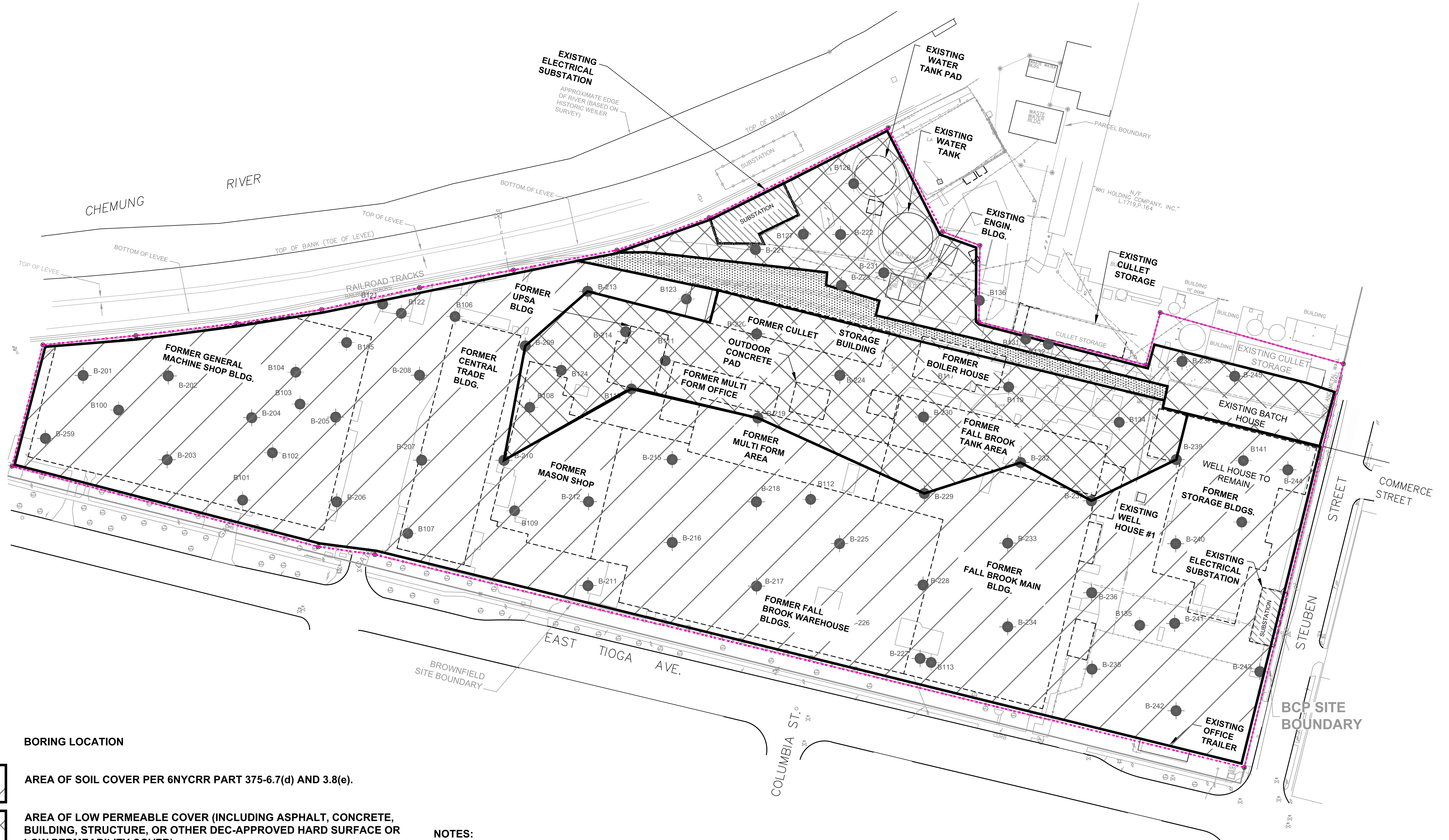
CORNING, NEW YORK

TRACK 2
CONCEPTUAL EXCAVATION PLAN

SCALE: AS SHOWN
AUGUST 2011 REV 0

FIGURE 10

G:\PROJECTS\33123\017\FIGURES\EXCAVATION AREAS.DWG



LEGEND

- BORING LOCATION
- AREA OF SOIL COVER PER 6NYCRR PART 375-6.7(d) AND 3.8(e).
- AREA OF LOW PERMEABLE COVER (INCLUDING ASPHALT, CONCRETE, BUILDING, STRUCTURE, OR OTHER DEC-APPROVED HARD SURFACE OR LOW PERMEABILITY COVER).
- ELECTRICAL SUBSTATION - EMPLOYEE ACCESS ONLY - NO ADDITIONAL ENGINEERING CONTROLS REQUIRED.
- AREA OF RAILROAD - NO ADDITIONAL ENGINEERING CONTROLS REQUIRED.
- OUTLINE OF FORMER BUILDING (EXISTING FLOOR SLAB)
- BCP SITE BOUNDARY

NOTES:

1. THE BOUNDARIES IN THIS FIGURE SHOWING THE AREAS OF LOW PERMEABILITY COVER ARE BASED ON THE GROUNDWATER PROTECTION OBJECTIVES FOR LEAD GIVEN IN PART 375 TABLE 375-6.8(b).
2. BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

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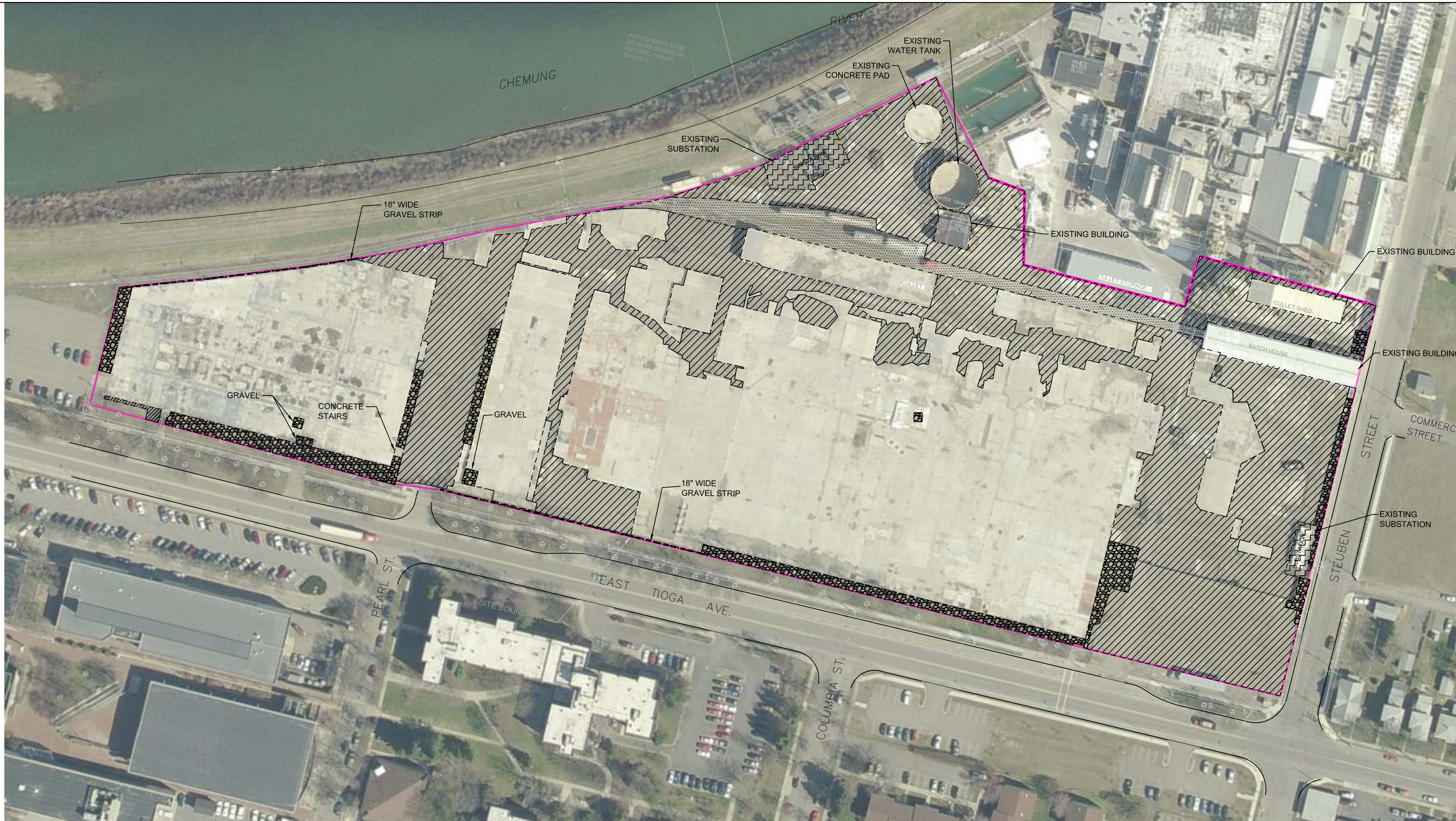
CORNING, NEW YORK

PROPSED REMEDIAL COVER SYSTEM (TRACK 4)

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 11

G:\PROJECTS\33123\017\FIGURES\33123-017_TRACK 4 REV 2.DWG



(diagonal hatch)	ASPHALT
(blank)	CONCRETE
(gravel pattern)	GRAVEL COVER
(stipple)	RAILROAD AREA
(zigzag pattern)	SUBSTATION AREA

NOTE:

1) BASE MAPPING PROVIDED BY SURVEY MAP ENTITLED "CORNING PROPERTY MANAGEMENT CORP, (FALLBROOK PLANT), CITY OF CORNING, STEUBEN COUNTY, NEW YORK", DATED NOVEMBER 2010, JOB NO. 13989.05 MAP PREPARED BY WEILER ASSOCIATES LICENSED LAND SURVEYORS, LOCATED AT 206 GARDNER ROAD, HORSEHEADS, NY 14845.

N W E S

0 60 120 180 240

SCALE IN FEET

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CORNING, NEW YORK

SITE COVER TYPES

SCALE: AS SHOWN
OCTOBER 2011 REV 2

FIGURE 12

G:\PROJECTS\33123\017\FIGURES\33123-017_RAWP EXISTING CONDTIONS REV 2.DWG

APPENDIX A

Assessment of the Potential for Migration of Lead and Arsenic at the Tioga Avenue Site

ASSESSMENT OF THE POTENTIAL FOR MIGRATION OF LEAD AND ARSENIC IN HISTORIC FILL AT THE TIOGA AVENUE SITE CORNING, NEW YORK

by

Haley & Aldrich of New York
Rochester, New York

Corning Property Management Corporation and
Corning Incorporated
Corning, New York

File No. 33123-016
4 May 2011

TABLE OF CONTENTS

1. INTRODUCTION

This evaluation provides an analysis of information on the fate and transport of arsenic and lead in soil and has been developed in support of the Alternatives Assessment Report (AAR) for the Tioga Avenue BCP Site #C851031 ("Tioga Avenue Site"). This evaluation was prepared by Dr. Stephen Clough, a board-certified Environmental Toxicologist with Haley & Aldrich in Manchester, NH. Dr. Clough's expertise is on the sources, disposition, fate and transport of heavy metals in the environment and the risks that they pose to ecological and human receptors following exposure. He has a M.S. in Water Quality and a Ph.D. in Toxicology from the University of Michigan. Dr. Clough has served as a diplomat on the American Board of Toxicology for more than 10 years whose sole purpose is advancement of the science of toxicology of environmental contaminants. The credentials of Dr. Clough are appended to this report.

This evaluation is provided in response to comments provided by the New York State Department of Environmental Conservation (NYSDEC) on its review of the Draft AAR as documented in the NYSDEC letter dated March 17, 2011, and the subsequent meeting of representatives of the NYSDEC and Corning Incorporated, and the letter of response to the comments dated March 22 and 28, respectively. Among other topics, the NYSDEC requested analysis of historical leach testing data as a measure of the fate and transport of arsenic and lead within historical fill on the Tioga Avenue Site, and whether these substances could behave as a "source" of contamination to other media such as groundwater as defined by the BCP regulations (6 NYCRR 375-1.2[au]). Accordingly this evaluation provides additional documentation on the fate and transport of arsenic and lead within the environment and consideration of these factors to the remedial planning process for the Tioga Avenue Site. This evaluation provides:

- Technical analysis of the TCLP test method and its utility/limitations as an indicator of contaminant mobility under ambient conditions on the Tioga Avenue Site.
- Review of the state of scientific knowledge that substantiate the environmental conditions that would cause arsenic and lead to become mobile in the environment, and assessment of these conditions in relation to conditions that exist on the Tioga Avenue Site. (Bibliographic references used for this review are identified in this report.)
- Assessment of case studies where arsenic and lead have been evaluated and remediated as environmental contaminants at other state and federal remedial program sites including under the NYSDEC BCP program.

This information provides a technical basis in support of the alternatives analysis process that identify the use of engineering controls as a component of the Tioga Avenue Site remedy involving a ground cover system as described by 6 NYCRR 375-3.8 (e)(4). These controls would be implemented during future redevelopment of the property as described in the AAR. The remedial investigation program provides extensive sampling and analysis information that clearly demonstrate that arsenic and lead are not mobile under current conditions on the Tioga Avenue Site, which are that the Tioga Avenue Site has a ground cover system comprised mainly of concrete and asphalt. This evaluation provides the technical basis demonstrating that arsenic and lead will not become any more mobile, or behave as a source of contamination, in the future as a consequence of replacing the existing ground cover system with a new ground cover system comprised mainly of a soil-based cover system as defined in the BCP Regulations.

1.1 Background on Remedial Investigation Program Findings

The remedial investigation process has been completed for the Tioga Avenue Site as documented in the Report on Remedial Investigations and Recommended Remedial Actions by Haley & Aldrich of New York, as revised April 2010. The findings of that report document that remedial actions involving application of engineering and institutional controls are appropriate for the Tioga Avenue Site to mitigate the potential for adverse exposure to human health or the environment, and provide the technical basis on site conditions used for development of the AAR for the Tioga Avenue Site. The AAR, to which this document is appended, identifies and compares the remedial actions that may be potentially applicable to the Tioga Avenue Site. The outcome of the Alternatives Analysis process is selection of a remedial action program for the Tioga Avenue Site that best satisfies the screening criteria specified by the NYSDEC regulations (6 NYCRR 375-1.8[f]), conforms to the requirements of the BCA, and achieves the basic cleanup requirement of being protective of human health and the environment.

The remedial investigation process identifies that lead and arsenic in historic fill soils are elevated as compared to relevant NYSDEC soil cleanup criteria. This condition was identified in a small percentage of historic fill samples obtained from borings conducted across the Tioga Avenue Site and is primarily the result of historical land development and above ground industrial activities on the Tioga Avenue Site. Activities at the Tioga Avenue Site date back more than 150 years. Elevated concentrations of these substances that exceed the relevant Soil Cleanup Objectives (SCOs) for commercially or industrially used property are primarily confined to the surface strata (0-4 feet below existing ground surface). The elevated concentrations of arsenic and lead are identified as compounds of concern (COCs) within historic fill on the Tioga Avenue Site and these COCs are addressed by the AAR in deriving a remedial action that achieves the fundamental goal of being protective of human health and the environment.

Remedial investigations have demonstrated that arsenic and lead have not migrated to native soil or to groundwater under current site conditions. Consistent with the relevant requirements of the BCP program (6 NYCRR Part 375 and DER 10) and the approved Work Plan, the remedial investigation program specifically assessed the mobility of COCs within historic fill and determined that inorganic substances, including arsenic and lead, are not mobile or leachable because there are no indications that any elevated levels of these substances are present in natural overburden soil or in groundwater that underlie the historic fill throughout the Tioga Avenue Site. These conditions have demonstrated that inorganic COCs have not been mobile in the past nor are they mobile or leachable under current conditions on the property (i.e. that the site ground surface is largely covered by concrete and asphalt remaining from prior development and of low permeability).

The remaining sections of this paper assess the potential for mobilizing lead and arsenic under the assumption that future conditions will include a significant percentage of soil cover instead of a low permeability (concrete or asphalt) surface.

2. DESCRIPTION OF THE TCLP TEST METHOD AND ITS RELEVANCE TO AMBIENT SITE CONDITIONS

TCLP tests of Tioga Avenue Site soil samples were conducted in 2007 approximately one year before the Tioga Avenue Site was entered into the NYSDEC Brownfield Cleanup Program (BCP). This data was obtained solely for classification purposes in anticipation of the future possibility that excess historic fill could be generated and require off-site disposal during completion of the site demolition (e.g. additional material removed during excavation of the sub-grade building elements associated with concrete floors slabs and foundations) or during redevelopment of the Tioga Avenue Site.

This testing involved a limited number of grab samples obtained from in-place historic fill soil on the property and was not reflective of actual waste material. A small population of samples analyzed for lead and arsenic by this test method produced results which indicated that some samples (4 of 8) had detectable levels of lead in sample extractions; arsenic was not detected. The TCLP test data was not otherwise required or obtained as part of the Remedial Investigation Program for the Tioga Avenue Site.

The TCLP test method (USEPA Method 1311) is specifically intended to assess the leaching potential of waste material when exposed to a simulated landfill leachate. The testing procedure is based on the premise that landfill leachate has a strongly acidic pH and therefore the samples analyzed by this test method undergo an aggressive extraction process to cause constituents that are normally bound to the sample matrix to dissolve. The test involves placing a small amount of the sampled material in a vessel, adding a strongly acidic TCLP extraction fluid, agitating the mixture over an 18 hour period, removing the extraction fluid, and testing the extraction fluid for constituents of interest. This process is intended to dissolve any of the constituents of interest that may have the potential to leach from the sample. TCLP extraction fluid has pH that is orders of magnitude lower than the pH of water that is ever expected to infiltrate the Tioga Avenue Site fill soils in the future.

TCLP test data is obtained for a specific purpose and the TCLP data obtained to date (as well as in the future) at the Tioga Avenue Site will be used to the extent appropriate during ground disturbing activities for the characterization of materials that may be generated and require off-site management. Such testing will be conducted in accordance with relevant NYSDEC regulations, the requirements of the receiving waste management facility and other applicable procedures including the Site Management Plan that will be developed for the BCP Site.

Based on the purpose and process for TCLP analysis, the theoretical data produced by this test method does not provide a meaningful basis for analysis of fate and transport mechanisms (e.g. potential mobility) of COCs that may be present within the historic fill on the Tioga Avenue Site. This test method provides results that significantly over estimate the potential for COCs at the Tioga Avenue Site to become mobilized because of the unrealistic environmental/exposure conditions simulated by the test. These conditions are in no way reasonable considerations for the historic fill on the Tioga Avenue Site because the historic fill is not a waste and the exposure conditions of the test method are simply not applicable to the Tioga Avenue Site.

The balance of this report provides a detailed summary of the documented technical information and basis of the fate and transport of arsenic and lead in the environment in the context of how these factors relate to the actual historic fill conditions on the Tioga Avenue Site as determined during the remedial investigation program. This information identifies the conditions under which arsenic and lead in soil or fill may become mobilized in the environment. The report also shows that these conditions do not or will not exist at the Tioga Avenue Site. The information also shows that the COCs remaining at the Tioga Avenue Site do not represent a "source" of contamination as defined in 6 NYCRR 375-1.1(au).

3. FACTORS AFFECTING MIGRATION OF METALS IN SOILS

The factors affecting the migration of metals in soils are complex, but it is widely documented and accepted that the chemical form (speciation) of the metal is a key factor determining mobility (Allen, 1991; USEPA, 1992). This, in turn, is affected by a host of site-specific variables which include soil acidity (pH), redox potential (Eh), complexation and/or precipitation with natural electrolytes (e.g. phosphate, sulfate, carbonate), co-precipitation with abundantly occurring hydrous oxides (e.g. Al, Fe, Mn), the type and amount of organic matter and the cation exchange capacity (CEC) of the soil. The cation exchange capacity or CEC is simply the total capacity of soil for ion exchange of cations between the soil and the soil solution. CEC is often used as a measure of soil fertility and nutrient retention capacity, and, in the field of environmental chemistry, provides a basic measure of the capacity of the soil to protect groundwater from cation contamination.

The surfaces of fine-grained soil particles are very active chemically; surface sites are negatively or positively charged or they are electrically neutral. Oppositely charged metal ions from solutions in soils are attracted to these charged surfaces. The relative proportions of ions attracted to binding sites depends on the degree of acidity or alkalinity of the soil, on its mineral composition, and on the type and amount of organic matter (Evans, 1989). For example, soils with high clay content or containing large fractions of organic matter will exhibit high sorption capacity for metals. Similarly, peat bogs, though acidic, contain plants that tolerate low levels of essential elements because metals, such as copper, are 'bound up' by very high levels of total and dissolved organic matter (humic and fulvic acids).

Natural soil pH generally ranges between 4.0 and 8.5 with buffering by aluminum at lower pH levels and by calcium carbonate at neutral or higher pH. Metal cations that are "free" (e.g., Cd^{2+}, Pb^{2+}, Zn^{2+}) would be the most mobile form under acidic conditions while anions (e.g. AsO_4^{3-}) tend to sorb to oxide minerals in this pH range. At above neutral pH levels, cations precipitate or adsorb to mineral surfaces and metal anions are mobilized (GWRTAC, 1997).
As is true for most sites, groundwater pH is a direct reflection of the soil in which it resides. The neutral range of groundwater pH across the Tioga Avenue Site indicates that the chemistry of the vadose zone soils is within the normal ranges for acidity and alkalinity. Based on the soil analytical results for the Tioga Avenue Site, the levels of calcium, iron, magnesium and manganese are well within the normal ranges for these elements that are documented to exist at in soils and loams throughout the U.S. (Shacklette and Boerngen, 1984). These elements are naturally abundant and form a significant percentage of the mineral content of the Tioga Avenue Site soil with the overall averages as follows:

- Aluminum: 0.57%
- Iron: 3.5%
- Magnesium: 2.2%
- Potassium: 1.0%
- Manganese: 0.4%

By comparison, arsenic and lead have been detected at trace levels being present only as a fraction of a percent within the in the Tioga Avenue Site soil (0.0014% and 0.01%, respectively). This relative difference in mineral content provides an overwhelming capacity for immobilization of trace levels of arsenic and lead at the Tioga Avenue Site because of the excess adsorptive capacity, documented in the scientific literature, in the soil matrix.

3.1 Binding Affinity of Metals of Different Soils

The relative affinity of a soil for a free metal cation increases with the intrinsic tendency of the cation to form strong bonds with the surface of the soil particles. McClean and Bledsoe (USEPA, 1992) identified studies that documented the relative affinity of several soil types and constituents for cations, which is presented in Table 1 below. As documented during the remedial investigation program, the Tioga Avenue Site contains variable depths of historic fill across the Tioga Avenue Site property. The historic fill on the Tioga Avenue Site is characterized as a mineral soil (i.e. a soil which lacks upper soil horizons and which typically has less than 20% organic carbon content).

Table 1. Relative affinity of metals for soils and soil constituents

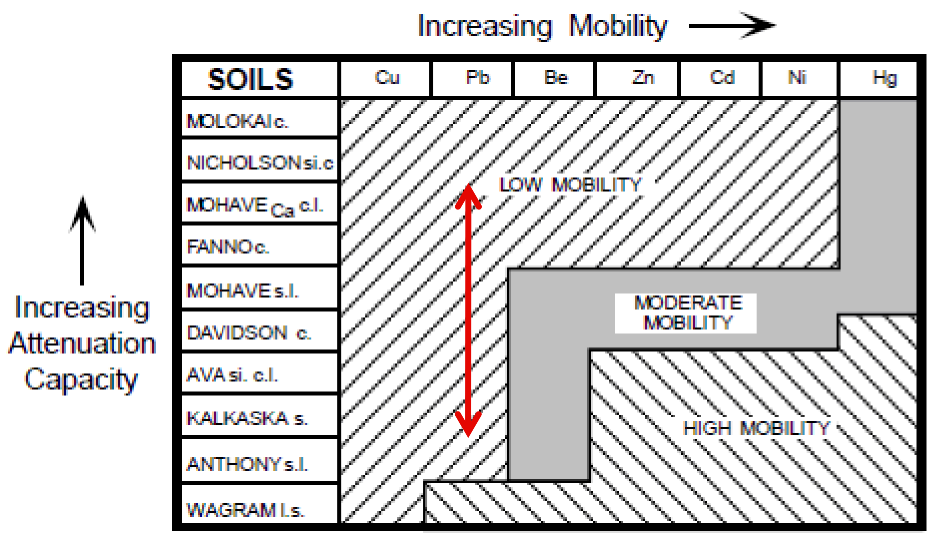
Soil or Soil Constituent	*Relative Order of Sorption*	*Reference*
goethite	Cu>Pb>Zn>Co>Cd	Forbes et al., 1976
Fe oxide	Pb>Cu>Zn>Cd	Benjamin and Leckie, 1981
montmorillonite	Cd=Zn>Ni	Puls and Bohn, 1988
kaolinite	Cd>Zn>Ni	Puls and Bohn, 1988
soils	Pb>Cu>Zn>Cd>Ni	Biddappa et al., 1981
soils	Zn>Ni>Cd	Tiller et al., 1984
mineral soils	Pb>Cu>Zn>Cd	Elliott et al., 1986
organic soils	Pb>Cu>Cd>Zn	Elliott et al., 1986
soil	Pb>Cu>Zn>Ni	Harter, 1983

[from McLean and Bledsoe, USEPA, 1992]

It can be clearly observed from these relative affinities of the different types of soils that, of all the metals tested, the weight-of-evidence for cationic metals binding to soil components are strongest for lead.

In a study that is relevant to the Tioga Avenue Site, Fuller (USEPA, 1978) assessed the relative mobility of metal cations that were spiked into an acidic leachate generated from municipal landfill waste. Eleven soils types that were representative of 7 major orders were collected throughout the United States (at depth to avoid organic matter in surface layers which would not be typical of soils below landfills). The results of the mobility of cations by soil type in this leachate are presented in Figure 1 below relative to the soil type that is characteristic of the Tioga Avenue Site.

Figure 1. Relative mobility of cations through soil.



"SOILS" indicates the category of soil obtained from a preselected region of the United States; the red double arrow indicates the range of soils with similar physical and chemical properties that exist in soils at the Tioga Site
From Fuller, USEPA, 1978.

It is clear from this figure that, with the exception of one soil (which was a sandy Southwestern soil with a very low CEC), lead has "low mobility" in every soil tested using an acidic landfill leachate. Once solubilized by the acidic leachate, retention of the metals on the soils were found to be dependent on the individual soil properties, i.e. the permeability of the soil and the amounts of clay, lime, and hydrous iron oxides present in the soil, which increase the CEC. In practical terms, these data show that elements in a wide range of soil types are essentially immobile in the environment after being exposed to an acid leachate intended to solubilize these substances.

The soil/fill conditions at the the Tioga Avenue Site are generally represented within the range of soil types included in this investigation as is generally depicted on Figure 1. Relevant considerations are that the fill and soils at the Tioga Avenue Site contain components (e.g. loam, silt, ash, coal noted in the boring logs) that are known to increase the CEC and to effectively bind lead (Fuller *et al.*, 1996; Davis *et al.*, 2000; Malakootian *et al.*, 2008) and that near neutral pH conditions are present throughout the Tioga Avenue Site. The Fuller study is illustrative of the conditions that could induce some, albeit very low, evidence of contaminant mobility in a broad range of soil types. Extrapolating this information to the Tioga Avenue Site show that conditions that would cause arsenic and lead to become soluble and then to mobilize any appreciable distance in the subsurface do not exist currently or would reasonably expected to exist in the future.

3.2 Background on Lead in the Environment

Although lead is one of the most abundant naturally occurring heavy metals, it is considered "rare" in the earth's crust (~15 g/ton; normal soil range 2 - 200 mg/kg). Lead is one of the oldest known metals and is ubiquitous in soils. Sources of lead include old paint, automobile exhaust, lead acid storage batteries, mining, smelting, lead alloys (e.g. solder), combustion of fossil fuels, and sewage residuals. Lead is currently used in various chemical, electronic and metallurgical industries and is a contaminant of waste incineration (ATSDR, 2007b; Beak, 2008). A large portion of the lead in urban soils can be attributed to airborne deposition as a result of the introduction of tetraethyl lead in gasoline formulations, which was banned by the USEPA in the 1970's (ATSDR, 2007b). Many studies have shown that lead concentrations in soils decrease in proportion to the distance from a source, such as heavily trafficked roadways (Lagerwerff and Specht, 1970; Howard and Sova, 1993) or metal smelting operations (Buchauer, 1973).

Many anthropogenic sources of lead, such as leaded gasoline, lead paint, solder in food cans, lead-arsenate pesticide, and lead bullets, shot and sinkers have been banned or stringently regulated due to the element's persistence and toxicity. Because lead is persistent in the general environment, these former uses have left a legacy of elevated lead in various media, particularly urban surface soil and sediment (ATSDR, 2007b).

3.2.1 Vertical Mobility of Lead in Soils

In most respects, soil can be considered as a near-total sink for lead received by it (EPA, 1979). The downward migration of lead in soil by leaching is very slow under most natural conditions (NSF, 1977). The mobility of lead in soil is affected by both specific (e.g. CEC) or nonspecific (e.g. adsorption to hydroxides) factors at soil particle interfaces, precipitation of sparingly soluble solid phases, and the formation of very stable organo-metal complexes with soil organic matter (EPA, 1986; NSF, 1977). In general, lead deposited on or in the top soil horizon(s) is retained near the surface, and its concentration drops off rapidly with depth of the soil (Lagerwerff and Specht, 1970; Howard and Sova, 1993; Peryea and Creger, 1994; USACOE, 1998).

The natural mobility of lead in soil-water systems is negligible primarily due to the low solubility of lead hydroxy carbonates and lead phosphate (Evans, 1989; Hem, 1989; McBride, 1994). The adsorption of lead on organic and inorganic surfaces and the co-precipitation of lead with hydrous oxides (aluminum and iron oxides) also tend to maintain very low concentration levels of potentially mobile lead in surface and groundwater (Hem, 1980; Hayes and Traina, 1998; Beak et al., 2008). Most soils range in pH between 5.5 and 7.5, where the solubility of lead is controlled by phosphate or carbonate precipitates (Clausen *et al.*, 2007). The maximum activity of Pb^{2+} in soil solutions within this pH range is approximately 0.6 ug/L (Lindsay, 1979). This low solubility of the natural forms of lead combined with the strong binding and storage capacity of soils will preclude any significant migration of lead in soils. Lead will thus be concentrated in the surface horizons of soils where it poses little threat to groundwater.

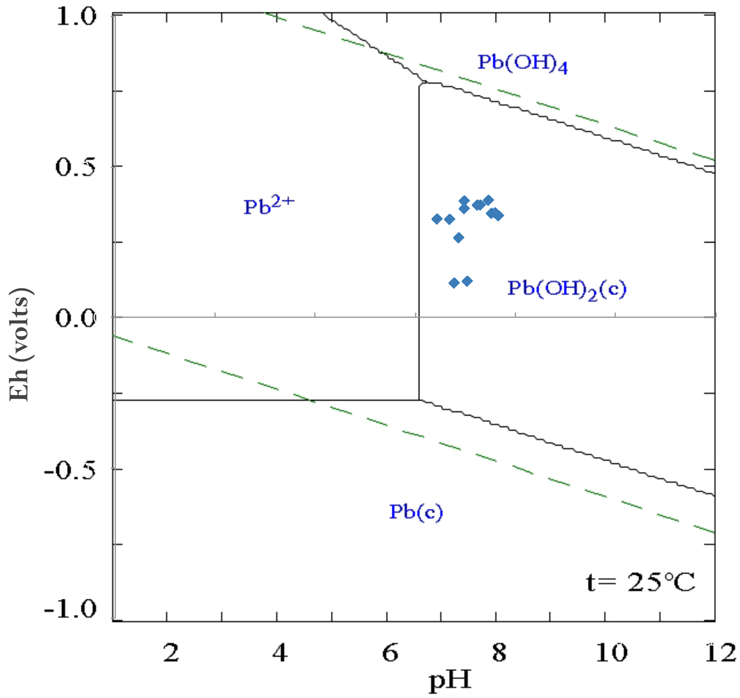
The reported mechanisms for sorption of lead onto soils and sediments include ion exchange, specific adsorption, and incorporation into cationic lattice sites (Bodek et al., 1988). The adsorption capacity (both exchange and specific adsorption) of a soil is generally determined by the number and types of binding sites available. Lead binding to soils has been ascribed to pH, redox potential, clay, organic matter, iron and manganese oxides and calcium carbonate content (McClean & Bledsoe, 1992).

Davies (1990) cites numerous studies performed over a wide geographic range which document that lead accumulates naturally in the surface horizons of soil and the scientific literature supports that the mechanism for the rapid attenuation of lead by soils (i.e. both specific and non-specific binding) would be consistent at any depth. It is also universally accepted that urban soils, some of which are used in urban gardens, have significant levels of lead and that these levels decline with the depth (<40 mg/kg below 0.5 m) of the soil (CAES, 2008). This is indicative that lead will form strong complexes with the organic matrix and clay minerals (where such components are in soil) which limit its mobility, and thus its vertical profile, in soil. Research in Britain used the ratio of lead in topsoil (0-15 cm) to that in subsoil (30-45 cm) as a "relative topsoil enhancement" index to classify levels of lead pollution (Colburn and Thornton, 1978). The normal agricultural soil index ranged from 1.2 – 2, whereas polluted soils ranged between 4 and 20. Another study (Dayton et al., 2006) showed the most important factors affecting the availability of lead in soils to plants are the amount and/or types of organic matter (negatively charged functional groups that bind positively charged lead ions) and/or the cation exchange capacity (CEC) of the soil. As mentioned above, the CEC, in turn, may be affected by both pH and the amount of naturally occurring amorphous metal oxides (e.g. iron and aluminum oxides).

3.2.2 Site-Related Factors that are Indicative of Low Mobility of Lead at Tioga Avenue

The dissolved (or toxic) form of lead is immobile in the environment (Clausen et al., 2007). As discussed above, the presence of naturally occurring anions in soils limit the solubility of lead in pore water to a concentration that is close to the detection limit. Also discussed is that the pH and the redox potential of the groundwater at the Tioga Avenue Site will generally determine the form or "species" of lead. At the Tioga Avenue Site, oxidation-reduction potential (Eh) and pH were measured in all of the monitoring wells at the Tioga Avenue Site using low flow sampling methodology. These data points were plotted on a phase diagram (Figure 2, below) to determine if lead would be available as either the free cationic species (Pb^{2+}) or bound up as the less soluble hydroxide.

Figure 2. Lead Eh vs. pH Diagram for Groundwater Data – No Soil Electrolytes Present

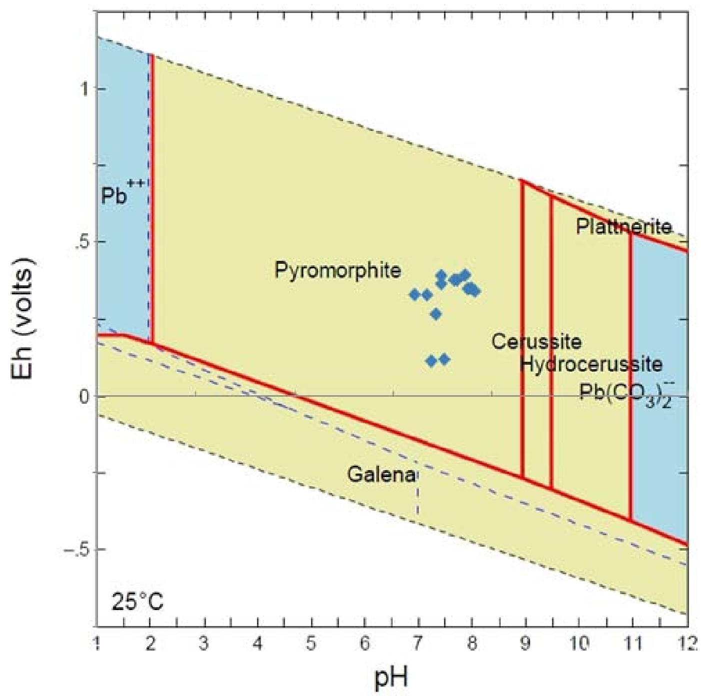


[Assumes no other soil electrolytes present]

It should be noted that this phase diagram is very conservative in that it assumes carbonate or sulfate species are not present in the soil/water system, which is highly unlikely as calcium levels (which normally appear as calcium carbonate, Ca^{2+} and CO_3^{2-}) observed in the soils were within a normal range (median = 5,225 mg/kg) typically cited as normal soil background levels (Schacklette and Boerngen, 1984) and sulfate is present in most groundwaters. As can be seen in Figure 2 all of the data points for the Tioga Avenue Site groundwater monitoring wells fall within the portion of the phase diagram that favor the less soluble form of lead (lead hydroxide).

In a terrestrial soil-water system, additional electrolytes (i.e. carbonate and sulfate) would certainly be expected in soil and soil pore water. In Figure 3, the Eh vs. pH phase diagram presents the insoluble species of Pb (yellow shading) that would be expected (Clausen *et al.*, 2007) given normal levels of soil pore water electrolytes (i.e. sulfate, bicarbonate, chloride and phosphate). This diagram assumes an initial lead concentration of ~200 ug/L in a normal soil environment, so the Pb would be expected to be in some type of insoluble mineral (precipitated) form (such as pyromorphite).

Figure 3. Lead Eh vs. pH Diagram for Groundwater Data – Soil Electrolytes Present



[Assumes: [Pb] = 10^{-6} M; [SO_4] = 10^{-3} M; [HCO_3^-] = 10^{-2} M; [Cl^-] = 10^{-6} M; [HPO_4^{-2}] = 10^{-6} M.]

Clausen et al. (2007) exhaustively examines the geochemistry of lead in soils in both low (<1000 mg/kg) and high (>1000 mg/kg) terrestrial environments and concludes that "lead migration is minimal in most environments due to adsorption or the formation of sparingly soluble mineral phases". Altogether, the weight-of-evidence in the literature overwhelmingly favors the in-place binding of lead within the soil matrix and that migration is negligible over a span of <2 meters from the source.

Clausen's observations at Camp Edwards' military small arms ranges (2007) include studies which add strong support that even the most mobile forms of lead injected into an aquifer will be sequestered. Davies et al. (2000) injected 10,000 liters of water containing 52 mg/L of lead (and other divalent cations) that was solubilized using an chelating agent (ethylene diamine tetraacetic acid or EDTA). After 100 days post-injection, during which Pb tracers had moved laterally in groundwater by approximately 40 meters, Pb concentrations had decreased to below the limit of detection. The disappearance of the dissolved Pb EDTA complexes was "probably due to metal exchange reactions with Fe and adsorbed Zn". Another study at the Massachusetts Military Reservation examining groundwater downgradient from a wastewater infiltration bed that had received 6-29 ug/L Pb for a period of ~60 years. Groundwater sampling locations were chosen where other metals had been detected consistently over a decade. Concentrations of Pb were at or below the limit of detection (0.08 ug/L) in all samples.

3.3 Background on Arsenic in the Environment

Arsenic (As) is a "metalloid" that occurs in a wide variety of minerals, mainly as As_2O_3, and can be recovered from processing of ores containing mostly copper, lead, zinc, silver and gold. It is also present in ash from coal combustion. Arsenate (As(V)) is about ten times less toxic than arsenite (As(III)). Lead arsenate was a very popular pesticide to control budworm in the 19th and 20th century, so soils of many former or existing orchards contain elevated levels of arsenic. A full review of the various sources, forms, exposure pathways and environmental effects of arsenic is provided in ATSDR's Toxicity Profile on Arsenic (ATSDR, 2007a).

Arsenic exhibits a fairly complex chemistry and, depending on the environs, can exist as several oxidation states (-III, 0, III, V). In aerobic soil environments As(V) is dominant, usually in the form of arsenate (AsO_4^{3-}) and its protonated forms. Arsenate, and other anionic forms of arsenic, behave as chelates and can precipitate when metal cations are present (Bodek et al., 1988).

3.3.1 Vertical Mobility of Arsenic in Soils

Both pH and the oxidation-reduction potential are important in assessing the form (and transport) of arsenic in soil. Attenuation of As in soils is largely controlled by the properties that influence its adsorption to mineral and colloid surfaces (e.g. presence of iron, aluminum, and manganese (oxy)hydroxides and clay minerals) and other ions competing for sorption sites. Thermodynamic data and experiments on impacted soils indicate that arsenate [As(V)] dominates in the oxidizing conditions (pH $>$ 7) of typical well-drained surface soil solutions, while arsenite [As(III)] is expected only in soil solutions where pH $<$ 7 (Beaulieu and Savage, 2005). At high redox levels, therefore, As(V) predominates and arsenic mobility is low (USEPA, 1992). Because concentrations of iron and manganese in soil are normally thousands of times higher than trace levels of arsenic, the binding capacity of soils for arsenic is nearly infinite.

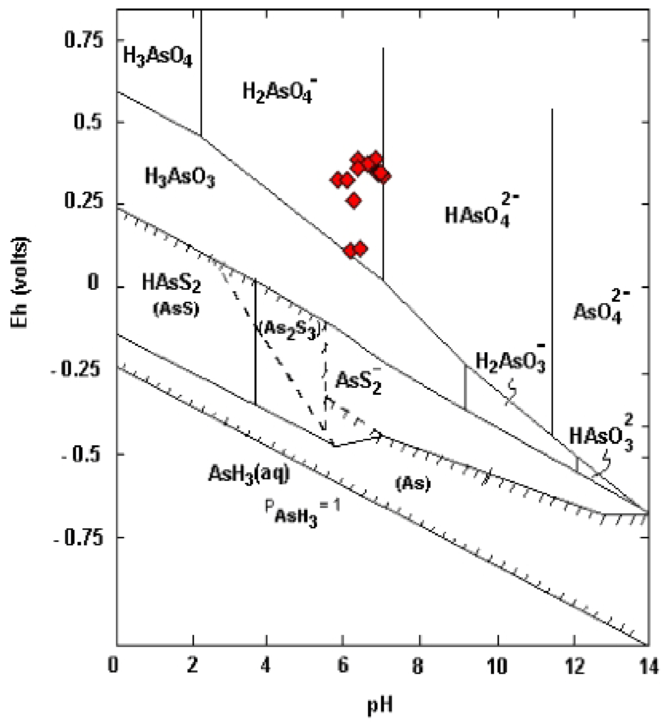
As(V) can also co-precipitate with or adsorb onto iron oxyhydroxides under acidic and moderately reducing conditions. Co-precipitates are also immobile under acidic conditions (Smith *et al.*, 1995). Under reducing conditions As(III) dominates, existing as arsenite (AsO_3^{3-}) and its protonated forms. Arsenite can adsorb or co-precipitate with metal sulfides and has a high affinity for other sulfur compounds. Since arsenic is often present in anionic form, it does not form complexes with simple anions such as Cl^- and SO_4^{2-}. Many arsenic compounds sorb strongly to soils and are therefore transported only over short distances in groundwater and surface water. Sorption and co-precipitation with hydrous oxides of iron is the primary mechanism of immobilization of arsenate in soils.

Arsenic in soil may be transported by wind or in runoff or may leach into the subsurface soil. However, as stated above, arsenate tends to partition to soil under oxidizing conditions so arsenic will not migrate via leaching to any great depth (ATSDR, 2007a). Arsenic is largely immobile in agricultural soils; therefore, it tends to concentrate and remain in upper soil layers indefinitely. Downward migration has been shown to be greater in a sandy soil than in a clay loam. The effect of soil characteristics, namely pH, organic matter content, clay content, iron oxide content, aluminum oxide content, and (CEC), on the adsorption of various metals, including the metalloid arsenic, to 20 Dutch surface soils was assessed by regression analysis (Janssen *et al*. 1997). As anticipated, the most influential parameter affecting arsenic adsorption was the iron content of the soil. The average concentration of aluminum and iron in the Tioga Avenue Site soils are approximately 0.5% and 3.5%, respectively. In contrast, the average concentration of arsenic is approximately 0.0014% (14 mg/kg). It is thus apparent that the ratio of potential arsenic binding elements (i.e. aluminum and iron oxides) to the amount of arsenic is approximately two to three orders of magnitude. This is more than sufficient capacity for retention of arsenic with the vadose zone.

3.3.2 Site-Related Factors that are Indicative of Low Mobility of Arsenic at Tioga Avenue

Arsenate is the form of arsenic that is anticipated to be present in neutral pH environments that is, at the same time, oxidizing. As discussed above, the most appropriate way to determine the form (species) of arsenic that would reside in soil water at the Tioga Avenue Site would be to develop a pH vs. Eh phase diagram. The groundwater data for the Tioga Avenue Site were superimposed on such a phase diagram and is shown in Figure 4 below:

Figure 4. Arsenic Eh vs. pH Diagram for Groundwater Data



[Assumes: [As] = 10^{-5} M; [SO_4] = 10^{-3} M. Cross hatched areas are solid species.]

As can be seen in this figure, arsenate is clearly the predominant form in the soil pore-water at the Tioga Avenue Site, and would thus not migrate vertically to any appreciable extent because the levels of iron in the soils at the Tioga Avenue Site (median = 2.7%) are within the normal range for background levels (Schacklette and Boerngen, 1984).

4. CASE STUDIES: LEAD AND ARSENIC ARE NOT MOBIL IN SOIL OR INDICATIVE OF SOURCE CONTAMINATION

Because lead and arsenic are common environmental contaminants, these substances have been well studied. Many examples exist that provide the connection between the scientific aspects on fate and transport mechanisms with the practical application of this information for development of remediation programs for these substances. Review of particular examples are presented as case studies on management of these substances as environmental contaminants and which provide a basis of information for assessment of remedial alternatives for arsenic and lead in soil. Understanding of contaminant mobility is fundamental to identification of human or environmental exposure pathways and to the development of remedial alternatives to mitigate those exposures. These examples show that the presence of lead and arsenic at very high concentrations, including some sites where these substances are significantly greater and more concentrated than what has been detected in historic fill at the Tioga Avenue Site, have been demonstrated to be immobile in the environment including at a similar site under the BCP program.

4.1 Lead at Small Arms Firing Ranges

Dermatas et al. (2004) studied the vertical migration of lead and copper in soils in and below berms at a firing range at Fort Irwin National Training Center in California. They found that lead concentrations in berms at firing ranges "appeared to concentrate at the berm surface with contamination levels rapidly decreasing with depth". Despite percent levels of lead at the surface (< 10" depth), concentrations dropped off to background below 20" of soil depth. In many cases, TCLP-Pb was higher than the USEPA regulatory concentration level of 5 mg/L when characterizing the material for off-site disposal.

A similar but much more comprehensive study was conducted by Bricka *et al*. (USACOE, 1998) at Camp Edwards Military Reservation on Cape Cod, MA. They examined vertical migration in soil cores below berms at three separate firing ranges because the berms would act as a "point source" and "vertical contaminant migration near the berms constitutes a worst-case scenario for transport of the metals into the soil". Soil conditions consisted mainly of a sandy loam and the soil pH was acidic (3.5 – 6.0). Even under these extreme-case conditions (sandy, acidic soil), the authors had a great deal of confidence that lead had "not migrated deep into the soil".

A follow-up study at the same military reservation by Clausen et al. (2007) provides a very thorough literature review of the geochemistry of lead. Again, despite sandy soils with an acidic pH, lead did not contaminate the groundwater based on the absence of lead plumes. The conclusion is supported by a careful analysis of the geochemistry of lead and conditions under which lead is mobile. More specifically, they suggest that CampEdwards soil conditions are not sufficiently acidic to readily dissolve metallic lead, nor were the high soil permeability, low chloride and soil resistivity of surface soils favorable for the corrosion of lead. They also found a high degree of lead adsorption based on non-site specific column studies as well as site-specific soil profiles, unsaturated zone monitoring, and aquifer studies. Their study appears confident that the depth to groundwater (more than 30 m) is sufficient to resume training in the areas that were studied, with confidence that there would be no future impact to groundwater quality.

All of these studies relate to sites with very extreme conditions with documented levels of lead contamination in very high percent levels (up to pure lead) and within environments that are sandy and low in pH. These case studies show that vertical migration of lead is negligible even under conditions that are much more extreme (and conducive to mobility) than would ever exist at the Tioga Avenue Site.

4.2 Apple Orchards Sprayed with Concentrated Lead Arsenate

Merwin *et al*. (1994) conducted a survey to determine the concentrations of lead and arsenic residuals that persisted in soil samples that had been previously treated with lead arsenate for pest control (13 older and newer orchards in New York State). Concentrations of arsenic and lead in the upper horizon ranged, respectively, from 1.60 to 141 mg/kg and from 1.48 to 720 mg/kg. Arsenic did not migrate downward below 20 cm in one fruit orchard; in another orchard, 15 years after sludge amendments and deep plowing, essentially all arsenic residues remained in the upper 40 cm of soil.

In a similar type of study, Peryea and Creger (1994) examined the vertical distribution of lead and arsenic in six contaminated orchard soils in the State of Washington. Most of the Pb and As was restricted to the upper 40 cm of soil, with Pb concentration maxima ranging from 445 to 2,220 mg/kg and As maxima ranging from 58 to 354 mg/kg. Although they conclude that migration of Pb and As is "relatively deep" compared to other orchard studies, it is clear from the data in the graphs that most of the lead and arsenic levels had decreased to near background concentrations at ~1.2 meters of soil depth. They attribute this comparatively deeper migration to this site's unique circumstances, including, "higher loading rates of lead arsenate (from repeated applications of concentrated pesticides), coarse soil texture, low organic matter content, and use of irrigation".

4.3 Hazardous Waste Sites with Lead Arsenate

IndustriPlex - The IndustriPlex Superfund Site in Woburn, MA was once the nation's leading producer of lead arsenate pesticide, which contaminated most of the soils with percent levels of lead and arsenic near the central portion of the site. In the 1970's, spent animal hides from a former tannery operation were consolidated into massive "hide piles". In the process, much of the contaminated soils were inadvertently incorporated into these hide piles. Additionally, an "arsenic pit" that was used to dry spent processing liquor was present at the site that was virtually barren of all vegetation.

Despite extremely high concentrations of these two contaminants in soils (percent levels of contamination), dissolved lead was detected in only a very small percentage of groundwater wells, and two separate risk assessments (conducted at least 20 years apart) concluded that lead did not pose a substantial risk to human and ecological receptors from groundwater. Lead was not found in any groundwater "plumes", nor was it identified as a COC in groundwater when the Record of Decision was finalized. This is a significant finding given that lead arsenate was one of the most abundant site contaminants in surface soils.

With respect to arsenic, the initial Conceptual Site Model determined that, similar to what occurs under municipal landfills, the extremely reducing conditions in and below the animal hide piles was mobilizing both iron and arsenic, as well as generating high levels of ammonia. Arsenic migration was limited and confined only within the groundwater zone that exhibited the strongly reducing conditions.

Former Henry Woods Sons Paint Factory - Between the mid-1800s and early 1900s, the former Henry Woods Sons Paint Factory operated on a portion of the current property owned by Wellesley College. As a result of the Paint factory operations approximately 235,000 cubic yards of upland soils were impacted as well as sediments in surrounding water bodies (Lake Waban, Paintshop Pond and Lower Waban Brook) with lead oxide and lead chromate (relatively insoluble paint pigments). In 2001, over 250,000 cu. yds. of soils and sediment were consolidated on site and covered with an engineered barrier.

As part of the site investigation, over 130 groundwater wells were installed and, between 1987 and 2007, over 486 shallow, intermediate or deep groundwater samples were analyzed. Despite percent levels of lead in surface soils, only shallow wells within the immediate paint source area had detections of lead, which was attributed to fine paint pigment particles that could pass through a 0.45 micron filter. For the intermediate and deep wells, only two samples (<0.5%) had detectable levels of lead in groundwater, and neither of these samples exceeded the current drinking water standard for lead. Lead would only be detected in shallow saturated zones that were located directly below concentrated sources of lead chromate paint pigments (i.e. colloidal particles of pure lead chromate), an indication that lead will only migrate short distances even under conditions of a concentrated source. Currently, MADEP has approved that groundwater only be monitored for lead at a single monitoring well, as all other locations exhibit non-detect results.

The former IndustriPlex and Henry Woods hazardous waste sites are two examples with extremely high arsenic and lead contaminated soils. The environmental impairment of land at these sites has been documented to be well beyond that which exists at the Tioga Site. The volume and levels of contamination, along with the geochemistry of the environment in which the contamination resides, makes these sites truly representative of "worst case" conditions. While the conditions at these sites are not comparable to the Tioga Site in terms of level of impact and site conditions, they are illustrative of the overall behavior of arsenic and lead as a contaminants in soils. Evaluation of these sites indicate that highly concentrated arsenic and lead (up to many thousands of times more concentrated than the Tioga Site) within a soil matrix is not soluble nor mobile within this matrix unless unusual conditions exist that would cause these substances to either become more soluble or to move in colloidal form in cases where the contaminated soil media lies within the saturated zone (which is not the case at the Tioga Site). Studies at these sites go on to demonstrate that even egregious concentrations, the soluble or colloidal forms of these contaminants will not migrate outside of the immediate high concentration area. The observed attenuation of these contaminants within a limited area is a direct result of the near infinite buffering capacity of the soil media by chemical processes (rapid precipitation, complexation, and adsorption). These chemical properties measured in groundwater the Tioga Site (pH and Eh) are in the same range observed in the literature that are known to rapidly attenuate these COCs in historic fill.

4.4 Other BCP Site with Lead and Arsenic Contamination

Former Endicott Johnson-Ranger Paracord Southern Parcel-BCP Site #C704048

The Former Endicott-Johnson Ranger Paracord property is an approximately 28-acre parcel located in a residential/commercial area of Johnson City, New York. The property was formerly used for a variety of industrial operations including shoe manufacturing, fiber mill processing, leather re-tanning, and a rubber reclamation and recycling facility. The southern 17 acre portion of the Ranger Paracord property is known as the "Southern Parcel," which was remediated under the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP) in the mid-late 2000s.

Prior to entering into the BCP, the previous property owner investigated the property under the NYSDEC Voluntary Cleanup Program in the late 1990's through 2001. Additional remedial investigations as part of the BCP were conducted in December 2006 and November 2007. Results of the remedial investigation process identified that metals and polycyclic aromatic hydrocarbons (PAHs) were the primary contaminants present above the BCP Soil Cleanup Objectives for commercial or industrially used property. These substances were identified in variable concentrations within historic fill material present across the site property. The contaminants of concern found onsite were associated with historic fill materials (primarily cinders and fly-ash) that were widely distributed at the surface of the site with variable thickness. The compounds of concern and approximate concentration ranges identified are as follows:

- PAHs: not detected – 505 mg/kg
- Arsenic: 0.6 mg/kg – 541 mg/kg
- Lead: not detected – 2,950 mg/kg
- Copper: 5.4 mg/kg – 2,590 mg/kg

By comparison, the highest levels of arsenic and lead detected at the Tioga Avenue Site are 250 mg/kg and 3,100 mg/kg, respectively.

Based on the results of groundwater sampling, groundwater was not shown to have been impacted by the compounds present in the fill.

The selected remedy for the site was implemented in 2008 and consisted of an in-place cover system over most of the site, which included placing a demarcation layer and at least 1 foot of clean NYSDEC-approved cover soil or an impervious surface (e.g. building) over the site, and/or installing other restrictive measures in selected locations where a ground cover system could not practically be placed (e.g. access control by fencing in areas with no ground cover system). Some amount of soil removal and offsite disposal was also conducted, but only to the extent that excess soil from excavations during utility and other in-ground infrastructure installations occurred during site development. Remedial activities were completed in November 2008 and require no on-going environmental monitoring. An Environmental Easement was executed with the State of New York for the site property to enable enforcement of the Engineering and Institutional Controls that have been placed on the property. These controls are placed with the Broome County Clerk and require ongoing maintenance of cover systems on the site, deed notices on allowable land uses and restrictions on potable groundwater use. A Site Management Plan is in effect for the site property for the long-term maintenance of site cover systems, retention of access controls in areas of the site with ground cover systems and prevention of exposure to the underlying historic fill that is present across the site.

This site can be considered a model for the Tioga Avenue Site as both locations contain historic fill with ash and the general range of concentrations of lead and arsenic are near a similar range. The remedy selected for this other BCP site included application of engineering controls (i.e. cover systems) combined with institutional controls (i.e. groundwater restrictions) as a reasonable means for protection of human health and the environment in accordance with the requirements of the BCP.

5. CONCLUSIONS

Remedial investigations at the Tioga Avenue Site have identified that historic fill is present throughout the Site and that some of this media contains elemental impact (arsenic and lead) higher than the NYSDEC SCOs. These substances are identified as contaminants of concern (COCs). The remedial investigation process has not identified any current risk of adverse exposure to human health or the environment posed by these COCs based on their immobility in the environment and the existing conditions on the property that further precludes such exposure by ground coverings. Recommendations are made that remedial actions are implemented in accordance with the BCP to mitigate the potential that adverse risk to human health or the environment could occur in the future by the removal of the existing ground cover system as will be necessary for the redevelopment of the property.

Development and analysis of potential remedial actions for the Tioga Avenue Site are addressed by the AAR that follows the evaluation criteria specified by the BCP regulations and related DER 10 guidance to derive a recommended remedial action for the Tioga Avenue Site. As required and consistent with the BCP, remedial alternatives are assessed for mitigation of COC exposure pathways with and without the use of engineering and institutional controls on the Tioga Avenue Site property. Fundamental to the alternatives assessment process is understanding of the fate and transport mechanisms of the Tioga Avenue Site COCs (e.g. contaminant mobility). This understanding is necessary to determine how these mechanisms influence the movement of these substances in the environment and thereby their potential to create impact or adverse exposure currently and in the future. This document provides the technical basis on the fate and transport mechanisms of arsenic and lead in the environment in support of the AAR.

From a general perspective, arsenic and lead exist naturally in soils, are ubiquitous in the environment and are known to occur at moderately elevated levels in suburban soils and are considered high in most urban soils. These substances have been widely used in industry (including in manufacturing on the Tioga Avenue Site) and are present in commonly used products. As a result of past use and the inherent toxicity of these substances, arsenic and lead are frequently identified as environmental contaminants and, thus, the behavior of these substances is well studied and thoroughly documented. This knowledge base provides a substantial technical and scientific basis on the behavior of these substances as environmental contaminants which is supported by several case studies that have also been analyzed as part of this evaluation. Taken together, this information provides substantial basis for assessing remedial alternatives for these substances that are protective of human health and the environment consistent with the BCA for the Tioga Avenue Site.

Results of the remedial investigations have defined the nature and extent of arsenic and lead in historic fill at the Tioga Avenue Site and analysis of information on the characteristics of these substances in the environment enables the following conclusions to be made.

- The data produced by remedial investigations at the Tioga Avenue Site demonstrate that arsenic and lead are immobile based on a lack of evidence, i.e. there is no indication that elevated levels of these substances have mobilized beyond the historic fill media they are contained within, nor have they impacted underlying natural soils or groundwater at the Tioga Avenue Site.

- The transport of arsenic and lead in the environment is a function of the aqueous solubility of these substances (e.g. higher solubility is equated with higher mobility in the subsurface).

Under normal subsurface conditions, both arsenic and lead are practically insoluble and therefore will not become mobile. These substances will only become soluble and potentially mobile in the environment under extreme pH and redox (Eh) conditions that are outside normal range that currently exists at the Tioga Avenue Site. For lead to become mobile, pH values must generally be less than 2 or greater than 10 *and* Eh must generally be within the oxidizing range. For arsenic to become appreciably mobile, pH values must be greater than 9 *and* strongly reducing Eh conditions must exist (a condition typically only observed under saturated conditions). Investigations do not indicate that conditions that could cause arsenic or lead to become soluble exist at the Tioga Avenue Site, as evidenced by the near neutral pH and oxidizing Eh conditions, and the fact that historic fill is not saturated and documented to be present at a minimum of several feet above the seasonal high water table at the Tioga Avenue Site.

- These conditions (immobility) will not change in the future because the conditions that would cause arsenic or lead to become mobile in the environment (e.g. very low or high pH, reducing conditions) do not currently exist at the Tioga Avenue Site nor would these conditions ever be expected to exist at the Tioga Avenue Site in the future. It is also apparent that the concentrations of arsenic and lead in soil at the Tioga Avenue Site are many orders of magnitude below levels where these substances could become mobile and potentially represent a source of contamination to other media, most notably groundwater. These low levels are also controlled by an excess of naturally occurring metal oxides that would completely attenuate any trace levels of arsenic and lead in soils.

- Case studies further document the relative immobility of arsenic and lead in the environment, even at sites that have thousands of times greater concentrations of these substances than what are documented at the Tioga Avenue Site. These case studies show that even under "extreme-case" conditions that are known to enhance mobility (e.g. sandy, highly acidic soils or extremely reducing conditions, or saturated conditions) that highly concentrated levels of arsenic and lead in surface soil are only leachable in soil on the order of one to two feet.

Based on the above analysis, it appears that the only potential for mobilization of the COCs contained with some of the historic fill on the Tioga Avenue Site would include direct exposure/contact mechanisms present at the ground surface such as those that may be created by uncontrolled emissions of fugitive dust or erosion of soils caused by storm water discharges from the Tioga Avenue Site. These other exposure pathways would need to be addressed by the alternatives considered in the AAR. Potential exposure to these conditions can be readily mitigated with property institutional and engineering controls in accordance with the BCP regulations and consistent with precedent at other remedial sites.

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STEPHEN R. CLOUGH, PHD, DABT

Senior Toxicologist

Over 23 years of experience in environmental consulting

Education

- Diplomat, American Board of Toxicology (Recertified, 1996, 2001, 2006)
- Ph.D., Toxicology, University of Michigan, School of Public Health, 1988
- M.S., Water Quality, University of Michigan, School of Public Health, 1985
- B.S., Pathobiology, School of Agriculture, University of Connecticut, 1976

Professional Societies

- Society of Toxicology, Associate Member, 1981 – 2005
- Society of Environmental Chemistry and Toxicology (SETAC), Member, 1985 – Present
- Journal of Environmental Toxicology and Chemistry, Reviewer (Aquatic Toxicology), 1991 - Present
- Society of Risk Analysis, Northeast Chapter, Member, 1993 – Present
- 40-hour Hazardous Waste Operations Training (OSHA Regulation 29 CFR 1910.120 and 1926.65)
- Diplomat, American Board of Toxicology, 1995 – Present

Dr. Clough has 23 years of experience as a Sr. Ecological Risk Assessor addressing contaminated property requiring innovative strategies to address various phases of scoping, investigation, risk assessment, remediation and site closure. Areas of expertise include aquatic bioassessments, comprehensive evaluation of large sediment sites, performing and managing ecological and human health risk assessments, stable isotope forensics, geochemistry and environmental models/QSARs. Strong organizational skills and ability to work with complex data sets and interpret and present them effectively. Have cost-effectively worked for a diverse client base (pharmaceutical, real estate, energy, pulp/paper/forestry, oil & gas, mining, Armed Forces) designing novel studies to reduce both genuine risks and environmental liability imposed by State and/or Federal regulators.

Relevant Project Experience

Ecological Risk Assessment and Remedial Design/Remedial Action, Confidential Clients, IndustriPlex Superfund Site, Woburn, MA. First to design and conduct field studies and evaluate human health and ecological risk (aquatic impacts) for No. 5 ranked, 245-acre NPL Site. USEPA Rapid Bioassessment Protocol used to assess habitat and environmental stressors to wetlands and headwaters of the Aberjona River. Determined both *in situ* and *in vitro* effects of landfill related waste (lead arsenate) on surface water, sediment, freshwater benthic invertebrate and fish community of on-site water bodies. Identified and assisted in the validation of a Conceptual Site Model (CSM) for the mobilization and transport of arsenic, lead, and chromium in groundwater. Currently managing three pre-design investigations to evaluate remediation of groundwater containing percent levels of ammonia and arsenic migrating into Hall's Brook Holding Area.

Ecological Risk Characterization, Camp Edwards, Massachusetts Military Reservation. Evaluated the nature, extent and ecological risk of munitions-based chemical contamination (e.g. perchlorate, dioxins/furans, nitroaromatics) to ecological receptors within Demolition 1 Operable Unit. Chemicals of potential ecological concern were derived through a Stage I screening evaluation. Ecological receptors examined in a Stage II evaluation included omnivorous, herbivorous and carnivorous birds and mammals. Endpoints compared predicted average daily doses of chemicals to avian and mammalian receptors to toxicity reference values (TRVs) and risks estimated using hazard quotients. Results found a condition of "No Significant Risk" for ecological receptors residing in Demo 1.

Recovery of Lake Waban Fishery, Wellesley, MA. Designed and conducted a survey of recreational fish in Lake Waban using gill netting, electroshocking and fish tagging techniques. Measurement and analysis of fish meristics, relative to annual data collected from regional lakes, showed a marked improvement of fish condition factors and populations. Data use successfully used to argue that active remediation of sediment containing high levels of lead and chromium was not necessary, leading to a Class C Response Action Outcome (RAO) of "No Action with Monitoring".

Ecological Assessment for the Darling Hill Landfill, Superfund Site, Lyndonville, VT. Conducted ecological studies evaluating the impact of constituents migrating from a municipal landfill to adjacent wetlands. Assisted in the preparation of a human health risk assessment, which included exposure via ingestion of groundwater, inhalation, and contact with contaminated soil. Identified contribution of leachate and discharge area to Passumpsic River. Concluded that site-related contaminants (chlorinated solvents and toluene) did not pose ecological risk. Contributed to the development of a No-Action ROD. Managed post-ROD wetlands/ecological monitoring program.

Ecological Assessment for the Parker Landfill, Superfund Site, Lyndonville, VT. Evaluated perturbation of wetlands surrounding the eastern and southern boundaries of the Parker Landfill. Conducted an assessment of groundwater/surface water interaction, water quality, and biological community. Contributed field data (bioassessment using artificial substrates) for EPA subcontractor performing ecological risk assessment. Performed interim hazard identification for the human health risk assessment. Conducted WET II functional analysis for reference vs. impacted wetlands.

Ecological Assessment for the Southington Landfill, Superfund Site, Southington, CT. Managed a wetlands delineation and functional assessment (WET II) of kettlehole pond, which was in intimate contact with the landfill material. Developed ecological risk assessment for Black Pond and surrounding wetlands (receptor inventory, hazard evaluation, sediment quality, risk characterization). Interaction of groundwater and surface water was also evaluated to determine potential for contaminant migration.

Aquatic Ecological Risk Assessment, Confidential Client, San Francisco, CA. The current decommissioning of a large electrical utility on San Francisco Bay requires the evaluation of sediment, surface water and porewater to be protective of native fish and wildlife. Using DTSC guidance, a former Ecological Screening Assessment (ESA) is being revised, the results of which will be used to complete a Predictive Ecological Risk Assessment (PERA). The study is unique in that metals from native serpentine fill are elevated, so the bioavailability of the metals are being assessed using EPA's Equilibrium Partitioning Sediment Benchmarks for metals mixtures. The presence of very high concentrations of acid volatile sulfide in sediments suggests that the site may not pose a risk to benthic invertebrates, fish or wildlife. The submission of the ESA and the PERA is scheduled for the fall of 2012.

EIS Monitoring Program Audit, URENCO, USA. Reviewed 7 years of data and environmental reports conducted to support an existing environmental permit for a uranium processing facility in New Mexico. Evaluated need for monitoring requirements of radionuclides in vegetation, birds, amphibians, reptiles and mammals. Compared to a 'control' site, all biological monitoring reports showed no significant risk to local biota (no endangered species or habitat existed on site). Recommended retaining only the vegetation monitoring component as a potential bioindicator for radionuclides, as there was no technical or regulatory basis to continue monitoring higher trophic levels of the food web. Elimination of monitoring program saved client approximately $300K per year.

Expert Panel, Atomic Energy of Canada, Ltd. Served as an expert in aquatic ecotoxicology in reviewing both past and current environmental studies and providing insight into their current studies on the Ottawa River adjacent to their Chalk River, Ontario facility. AECL is unique in that this legacy site is surrounded by an environment that contains many 'pollution sensitive' species that are thriving in a cold deep water habitat. Also enhanced their aquatic bioassay Standard Operating Procedures for the native mayfly larvae (*Hexagenia limbata*), one of the first facilities to attempt to culture this insect for use in a sediment toxicity test.

QSAR Screening Assessment, U.S. Navy, NAVSEA, Indian Head, MD. Conducted a screening level assessment of the fate, transport, and toxicity of four oxidizers anticipated to replace perchlorate as a component of munitions. Objective was to minimize potential environmental liability associated with the use of energetic compounds as propellants. Propellants were evaluated against the toxicity of perchlorate, with similarly structured "surrogate compounds" included for the evaluation of polar constituents. Quantitative Structure Activity Analysis (QSAR) modeling data were used to assess the environmental disposition of the chemicals of interest. A QSAR analysis conducted using USEPA EPISuite™ and the Bio-Rad ADME/Tox™ software was used to estimate likely surrogate behavior in the environment. Results included output for environmental fate parameters (e.g., photodegradation, hydrolysis, lipid solubility) and human toxicity (e.g., mutagenicity, immunotoxicity, teratogenicity).

Biouptake Factors for Perchlorate, Camp Edwards, Massachusetts Military Reservation. Designed and implemented a year-long field study to develop biouptake factors for perchlorate for the Demolition 1 Operable Unit food web. Employed a randomized sampling program to determine concentrations of perchlorate and other munitions chemicals in water, soil, vegetation, and small mammals. Biouptake factors were used as input to the Ecological Risk Characterization for Demo 1, as well as other applicable units at the Mass Military Reservation.

Sediment Evaluation, Former Manufactured Gas Plant (MGP) Site, Dorchester Bay, MA. Assessed ecological risk to the intertidal shoreline community and addressed potential remedial requirements of sediments in an estuary of Boston Harbor. A Local Conditions evaluation was used to redefine the Disposal Site boundaries and establish potential remedial goals for PAHs. The evaluations recommended a much smaller volume of sediment removal than was previously advised, a finding that resulted in significant cost savings to the client.

Ecological Habitat/Benthic Invertebrate Evaluation, Former Brodhead Creek Superfund Site, Stroudsburg, PA. Assessed sediment quality and the benthic ecology of Brodhead Creek, a high energy cold water stream. Evaluated the impact of site-related constituents to the sediments, benthic community and wetlands immediately adjacent to Brodhead Creek. Upstream/downstream sediment sampling design and a qualitative Rapid Bioassessment Protocol identified pollution-sensitive organisms. Managed electroshocking study to assess population dynamics of juvenile sea lamprey, a bioindicator. No site-related impacts were discerned in sediment quality, stream habitat or benthic ecology. Changes to the benthic community identified in adjacent McMichael Creek were attributed to a local POTW discharge. Successfully negotiated reduced monitoring terms and schedule with USEPA Region 3, PADEP, and BTAG.

Stage II Ecological Risk Characterization, Former MGP Site, Westfield, MA. Conducted a comprehensive upstream/downstream bioassessment to identify the presence of pollution-sensitive benthic invertebrates adjacent to a subsurface MGP coal tar source. Quantitative in-stream evaluation of the benthic habitat and community metrics of the affected reach revealed deep coal tar but no hyporheic or epibenthic exposure. Concluded that MGP residuals in sediment do not adversely affect the benthic environment. In depth knowledge of recent ecological risk technical "updates" led to "No Remedial Action Required" saving the client more than $800k in state-mandated dredging costs.

Ecological Screening Assessment, Former MGP Site, Rutland, VT. Conducted a qualitative assessment of the potential impact of a former MGP facility in intimate contact with East Creek, a high-energy cold water stream. In-stream habitat had a limited canopy and was dominated by boulders and cobble which primarily sustained an autotrophic ecosystem. Concluded that the majority of benthic invertebrates were epiphytic grazers/collectors and therefore any sediment exposure pathway would be incomplete. These findings eliminated ecological risk in the stream which led to "No Action" for the adjacent river and wetlands.

Ecological Screening Assessment, Former MGP Site, Lynn Harbor, Lynn MA. A benthic community evaluation was performed as one facet of a post-remedial OMM Plan for a former MGP located adjacent to a historically industrial urban harbor near the mouth of the Saugus River. Designed study to evaluate natural recovery of infaunal and epifaunal organisms in near-shore marine sediments adjacent to the Site. Improved historical study design by altering reference/impacted station ratio and instituting additional replicates. Results showed PAHs positively correlated with benthic metrics for bulk sediments sampled near the former MGP Site. This observation suggested total PAHs were not bioaccessible to benthic organisms, supporting research indicating pore water is a better predictor of exposure than bulk sediment. Positive data led to lengthening of the period of time between OMM sampling and evaluation.

Evaluation of Indirect Effects To Wildlife/Human Health via Marine Bioaccumulation Pathways, Confidential Client, Former Industrial Basin, San Diego, CA. Evaluated the potential for persistent metals and chlorinated organics to either partition to sediment or bioaccumulate within a region-specific food web. Using acceptable hazard quotients, the parameters of the food web are currently slated to back-calculate a preliminary remediation goal for a relatively small basin that is currently used as a marina.

Long-term Benthic Monitoring, Messer Street MGP Site, Laconia, NH. Evaluation of five years of post-remedial benthic metrics to determine natural recovery of a lake outlet macroinvertebrate community in comparison to pre-remedial data. Temporal analysis of site-wide sublittoral sample data indicted a gradual increase in total organic carbon, abundance, taxa richness and Shannon-Weiner Index. Based on the metrics, natural recovery was deemed complete and all post-remedial Performance Criteria were met.

Risk Assessment for Savage Well Superfund Site, Milford, NH. Contamination of one of the largest aquifers in New Hampshire required a multi-media risk assessment for PRP, focusing on both direct and indirect exposure to groundwater contaminated with TCA and PCE. Considered the health risk to child and adult receptors exposed via drinking of groundwater, wading and fishing in surface water, contact with soil contaminants, and potential air impacts of sprinkler irrigation at a proposed golf course.

Sediment Evaluation, Former MGP Site, Seneca Falls, NY. Performed sediment core sampling along preselected transects spanning ~1000 foot reach of the Seneca River/Canal. Probed sediment to identify thickness of depositional silts within an inlet adjacent to the former MGP lowlands containing densely rooted aquatic vegetation (outside of canal thalweg). Real-time GIS stepout sampling identified normal sediment and the approximate footprint of coal tar impacted substrate within a very short time frame in one field mobilization.

Sediment Evaluation Plan, Former Wood Treatment Site, Major Chemical Company, Nashua, NH. Developed a Sediment Evaluation Plan for a 3,500 foot reach of the Merrimack River impacted by site-related material (creosote/NAPL). Plan included a physical evaluation of the river (bathymetry, hydrology, in-stream sampling grid), assessment of putative chemical impacts (water quality, non-point upstream sources, qualitative evaluation of site-related material in sediment), and evaluation of the native biological community (fish and macroinvertebrate sampling, bioassays, artificial substrates). Results reduced the instream 'footprint' of Site-related material by ~25 acres to ~1 acre, significantly reducing costs by narrowing the overall scope and associated liability.

Field Sampling and Ecological Risk Evaluation, Wood Treatment Facility, Guthrie, KY. Evaluated ecological risk associated with sediments in a creek downstream of an active wood treating facility. Developed study design, oversaw data management, food web modeling, and assessment of exposure/effects. Potential ecological receptors included benthic invertebrates and wildlife(mink and kingfishers). Sampling and analysis of sediment, surface water, benthic invertebrates, fish, and flying insects. Results demonstrated that ecological risks were >1,000 times lower than estimated by a screening ecological evaluation.

MCP Stage II Ecological Risk Assessment for PAHs and Chlorobenzenes, Raynham, MA. Buried drums adjacent to Dam Lot Brook were remediated via an RAO, but residual constituents remained in soil and groundwater and migrated to Dam Lot Brook immediately adjacent to an active automotive repair center. The brook also receives significant nonpoint discharges from urban storm water runoff. Conducted a Stage II ERC via 310 CMR 40.0995, including an evaluation of risk to benthic macroinvertebrates and a risk to wildlife via a simplified food web model. Ecological characterization found "no significant risk" as minor chemical stressors were eclipsed by nonpoint urban impacts (stormwater runoff from impervious surfaces).

MCP Sediment Screening, Whitinsville, MA. Using knowledge of recent ORS Technical Updates, eliminated a former mill site containing parts per million levels of perchloroethylene from inclusion in the MCP Ecological Risk Characterization process. Performed an in-stream evaluation on the applicable surface area of sediment available for colonization by benthic macroinvertebrates (<1000 sq. ft.). This assessment saved the client between $20 – 25k in additional investigation and testing costs that would have been required under a Method 3, Stage II ERC.

MCP Sediment Screening, Whitman, MA. Eliminated a former mill tailrace, containing parts per million levels of nickel in various media, from inclusion in the MCP process using regulatory knowledge of recent ORS Technical Updates. A former LSP had characterized the tailrace substrate as "sediment", but the fill in the tailrace, as well as its unique physical location, obviated the structure from a Stage I Ecological Risk Characterization. An in-stream bioassessment of the adjacent Shumatuscacant River showed pollution-sensitive organisms, adding to the weight-of-evidence that there was "no significant risk". This assessment saved the client between $150 – 175K in additional investigation and testing costs that would have been required under a Method 3, Stage II ERC.

Watershed Assessment, West Virginia Army National Guard, Camp Dawson, West Virginia. Managed a comprehensive Watershed Assessment that included all wetlands on the Camp Dawson Training Area, as well as tributaries draining from the following subwatersheds to the Cheat River: Pringle Tract (2000 acres), Gold Mine Tract (2500 acres), Briery Tract (1,163 acres), Volkstone Tract (500 acres) and a former landing strip on the opposite side of the Cheat River. Identified impacts associated with on-going military activities (e.g. land navigation, artillery ranges, driver training, bivouacs, etc.), former coal mines, timber harvesting and road construction. Recommended additional water quality monitoring stations and implementing several BMPs to control non-point impacts.

Response to USEPA TMDL for Nutrients and Dioxin in the Fenholloway River, Ecofina River Basin, Confidential Client, Tallahassee, FL. Reviewed and provided comments on a USEPA TMDL that asserted waste-water associated noncompliance of phosphorous, nitrogen and dioxin, principally as a result of standards that were, compared to other TMDLs performed for the same constituents in other states, deemed to be "arbitrary and capricious". Currently under negotiation with State and Federal agencies.

Bioaccumulation of Retene and Related Compounds in Aquatic Food Chain, NCASI Experimental Station, New Bern, NC. Performed food web study in experimental freshwater streams to determine the potential of neutral lipophilic compounds, particularly retene, to bioconcentrate in lower trophic level organisms (periphyton, aquatic insects) and subsequently bioaccumulate in higher trophic level organisms (bluegill, golden shiner, bass). Evaluated risks by analyzing actual exposure concentrations, evaluating the effectiveness of food chain transfer coefficients, and calculation of environmental and biological half-lives in both sediment and fish. This study tailored the use of stable isotopes of carbon and nitrogen as tools to study the incorporation of pulp and paper mill residuals and nutrients into higher level organisms.

Aquatic Hazard Assessment, Major Paper Manufacturer, Cantonment, FL. Black flies emerging from wastewater treatment lagoons were fouling pulping operations. Using current process information and known aquatic toxicity endpoints, identified optimal daily dosing of WWTP ponds with pesticide to effectively eliminate sensitive larval stage of insect yet maintain healthy microflora within benthic community.

Post-Land Application Uptake of Dioxins/Furans in Terrestrial Mammals, Confidential Timber Company, Greenville, ME. Trapped small mammals and measured tissue levels of dioxins and furans on clear-cut land (eight years post-treatment) that had received pulp and paper mill residuals containing trace concentrations of TCDD and TCDF. The results indicated the USEPA terrestrial food chain risk model overestimated bioaccumulation by a factor of 10,000. The evidence was consistent with field studies in birds which showed low dioxin levels (<1 ppb) pose no apparent risk to wildlife. These findings renewed confidence in the ability of the pulp and paper industry to reinitiate land-spreading programs.

Development of Ambient Water Quality Criteria for 2- and 4-Chloroaniline, Major Chemical Company, Sauget, IL. Designed and managed a study that conducted eight acute and six chronic bioassays on eight different species of freshwater organisms to identify NOEC, LOECs and, ultimately, the calculation of Ambient Water Quality Criteria values for 2- and 4-chloroaniline. Study was implemented to allow the discharge of treated groundwater emanating from an old Sauget, IL landfill, in compliance with Illinois EPA 35 IAC 302 Subpart F.

Revision of Molybdenum Drinking Water Standard, Major Packaging Company, Ontonagon, MI. Using both USDA (pro) and USEPA (con) health effects databases, successfully negotiated a 20 ppb increase in the current State of Michigan drinking water standard for molybdenum in groundwater. This negotiation was "essential for the continued operation" of the client's landfill, which was only at 50 percent capacity.

Expert Witness, Confidential Client, Rutland, MA. Defending author of a key report addressing the putative ecological impacts of acute storm water erosion events to a freshwater impoundment downgradient of a major construction development. Testimony included results of a past in-situ bioassessment and an opinion on key indicators of water and sediment quality. A decision from the Massachusetts Superior Court is pending.

Litigation Support, Lead Abatement Evaluations, Confidential Client, Milwaukee, WI. Reviewed over 3500 residential lead inspection/abatement reports to the determine adequacy the of City of Milwaukee's claim against major paint manufacturers. Synopsis of the reports included an exposure and risk assessment and the tabulated results formed the foundation for a variety of legal strategies. The case was settled out of court.

Expert Witness, Toxicological Evaluation of Leachate from Artificial Turf Fields, Concord, MA. Performed a comprehensive review of field and lab studies on leaching of zinc oxide from tire crumb used as ballast to support artificial turf on school athletic fields. Provided a written report and a successful oral testimony to the Town of Concord (MA) Natural Resources Committee and the MA Office of Appeals and Dispute Resolution that presented an expert opinion that allowed all parties to fully understand the issues and subsequently make an informed decision. Expert testimony resulted in a positive finding by the court and construction of the athletic field that will reduce conventional environmental impacts (e.g. runoff of pesticides, water and energy use, annual maintenance).

Expert Witness, Confidential Client. Provided expert witness testimony as a DABT board-certified toxicologist. Representing the defendant, an insurance company with global recognition, in three separate cases with similar types of liability associated with past disposal of hazardous waste. Testimony was advantageous to client, leading to a much less costly out-of-court settlement.

Groundwater Contamination Impact, Former Tannery, Major Chemical Company, Merrimack, NH. Differentiation of two separate contaminant plumes, one containing organic tannery leachate and one containing inorganic chromic acid waste, using statistical inference (rank correlation) on both conventional water quality parameters and analytical data.

Water Quality Impact Assessment, Bangor Hydro-Electric Company, Bangor, ME. Statistically evaluated historical and spatial trends of mercury in fish tissue within the Penobscot River to determine the significance of current mercury residues in small mouth bass and eel.

Risk Assessment of a Proposed Incinerator Site for Clean Harbors, Inc., Braintree, MA. Assisted with the development of a complex, multi-media human exposure model (IRISK) for the evaluation of risk from a proposed hazardous waste incinerator. Quantitatively evaluated specific parameters necessary for the development of the model, including bioavailability, uptake of contaminants into the food chain, dose-response assessment, and variables affecting uncertainty.

MSDS (Material Safety Data Sheet) Development, Various Clients. Developed MSDSs for hazardous materials used in the processing of leathers, explosives, and lubricants. All input complied with 29 CFR 1910.1200, including product identification, hazardous ingredients, physical/chemical characteristics, reactivity, health hazards, safety precautions, and control measures.

Publications and Papers

Clausen, J., Cramer, R., Clough, S., Gray, M. and Gwinn, P., 2009. Assessing the Sensitivity of Quantitative Structural Activity Analysis Models for Evaluating New Military Compounds. Water, Air, & Soil Pollution 202(1), 141-147.

S.R. Clough, M. Shupe, M. Avakian and P.G. Bucens, 2008. Development of Two Novel Pore Water Sampling Techniques to Reduce Confounding Field Variables. Poster Presentation, Third International Symposium on the Redevelopment of Manufactured Gas Plant Sites, Mystic, CT. September 23-25, 2008.

Sellers, K., C.E. Mackay, Bergeson, L.L., Clough, S.R., Chen, J., Hoyt, M. and Henry, K. Chapter 8 ("Potential Ecological Risks of Nanomaterials") in <u>Nanotechnology and the Environment</u>, CRC Press, Taylor & Francis Group, Boca Raton, FL. ISBN: 978-1-4200-6019-5

Monitored Natural Recovery of Sediments at Manufactured Gas Plant Sites. EPRI, Palo Alto, CA: 2008. 1014088. Principal Investigators: H.Costa, S. Clough, J.Griswold, A.Peacock, D.Huber, O.Devereux.

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APPENDIX B

Change of Use Notification for Physical Changes to the BCP Site Property

HALEY & ALDRICH

Haley & Aldrich of New York
200 Town Centre Drive
Suite 2
Rochester, NY 14623-4264

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

30 September 2011
File No. 33123-017

New York State Department of Environmental Conservation
Region 8 Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, New York 14414

Attention: Timothy A. Schneider, P.E.

Subject: Change of Use Notification
Tioga Avenue Site - #C851031
City of Corning, Steuben County, New York

Dear Mr. Schneider:

On behalf of Corning Property Management Corporation and Corning Incorporated (collectively referred to as Corning), Haley & Aldrich of New York is submitting the enclosed Change of Use Form in accordance with the 6 NYCRR Part 375-1.11(d)(2) regulations for a proposed physical change at the subject site.

The enclosed submittal includes the NYSDEC form (as available from the NYSDEC website), a description of the proposed physical changes at the facility, construction notes, and drawings showing the locations and details of the proposed physical changes. The proposed physical changes for the site were discussed with you during the 9/23/11 calendar call meeting. The Change of Use Notification is being submitted in accordance with your email to Michael Ford, dated 9/26/11.

Due to the onset of fall weather, and the anticipated seasonal limits for asphalt availability, Corning respectfully requests that NYSDEC concurrence be provided for the proposed physical change at the subject site no later than 10/7/2011. Please do not hesitate to contact the undersigned if you have any questions on this enclosed submittal.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Edward L. Hynes
Vice President

Enclosures
c: Bartholomew Putzig, NYSDEC
Mike Ford, Corning Incorporated

HALEY & ALDRICH

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

60-Day Advance Notification of Site Change of Use, Transfer of Certificate of Completion, and/or Ownership

(to be submitted to the Department at least 60 days prior to any change of use, transfer of a Certificate of Completion, or change in ownership of a site as required by 6NYCRR Part 375-1.11(d) and 375-1.9(f))

I. Site Name: Tioga Avenue Property **DEC Site ID No.** C851031

II. Contact Information of Person Submitting Notification:

Name: Edward Hynes for Corning Incorporated & Corning Property Management Corporation

Address1: Haley & Aldrich of New York

Address2: 200 Town Centre Drive, Suite 2, Rochester, NY 14623

Phone: 585-321-4236 E-mail: EHynes@Haleyaldrich.com

III. Type of Change and Date: Indicate the Type of Change(s) (check all that apply):

☐ Change in Ownership or Change in Remedial Party(ies)

☐ Transfer of Certificate of Completion (CoC)

☑ Other (e.g., any physical alteration or other change of use)

Proposed Date of Change (mm/dd/yyyy): 10/15/2011

IV. Description: Describe proposed change(s) indicated above. Provide maps, drawings, and/or parcel information as applicable. If "Other," explain how such change may affect the site's proposed, ongoing, or completed remedial program (attach additional sheets if needed).

The proposed physical change is described in the attached enclosures, which include:

Description of Physical Change

Figure 1 : Construction Notes, Figure 2 - showing site layout and location of activities,

Figure 3 -Detail Drawing for Gravel Placement, Figure 4 - Detail Drawing for Asphalt Placement

V. Certification Statement: Where the change of use results in a change in ownership or in responsibility for the proposed, ongoing, or completed remedial program for the site, the following certification must be completed (by owner or designated representative; see §375-1.11(d)(3)(i)):

I hereby certify that the prospective purchaser and/or remedial party has been provided a copy of any order, agreement, Site Management Plan, or State Assistance Contract regarding the Site's remedial program as well as a copy of all approved remedial work plans and reports.

Name: ______________________ (Signature) ______________ (Date)

______________________ (Print Name)

Address1: ______________________

Address2: ______________________

Phone: ______________ E-mail: ______________

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VI. Contact Information for New Owner, Remedial Party, or CoC Holder: If the site will be sold or there will be a new remedial party, identify the prospective owner(s) or party(ies) along with contact information. If the site is subject to an Environmental Easement, Deed Restriction, or Site Management Plan requiring periodic certification of institutional controls/engineering controls (IC/ECs), indicate who will be the certifying party (attach additional sheets if needed).

☐ Prospective Owner ☐ Prospective Remedial Party ☐ Prospective Owner Representative

Name: ______________________________

Address1: ______________________________

Address2: ______________________________

Phone: ______________ E-mail: ______________________________

Certifying Party Name: ______________________________

Address1: ______________________________

Address2: ______________________________

Phone: ______________ E-mail: ______________________________

VII. Agreement to Notify DEC after Property Transfer/Sale: If Section VI applies and all or part of the site will be sold, a letter to notify the DEC of the completion of the transfer must be provided. If the current owner is also the holder of a CoC for the site, the CoC should be transferred to the new owner using DEC's form found at http://www.dec.ny.gov/chemical/54736.html. This form has its own filing/recording requirements (see Part 375-1.9(f)).

Signing below indicates that a post transfer letter of notification for the sale of the property will be provided to the DEC within the specified timeframe. If the sale of the site also includes the transfer of a CoC, the DEC agrees to accept the notice given in VII.3 below in satisfaction of the post transfer notice required by VII.1 (to be submitted within 15 days of the sale of the site).

Within 30 days of the sale of the site, I agree to submit to the DEC:

1. the name and contact information for the new owner(s) (see §375-1.11(d)(3)(ii));
2. the name and contact information for any owner representative; and
3. a notice of transfer using the DEC's form found at http://www.dec.ny.gov/chemical/54736.html (see §375-1.9(f)).

Name: ______________________________ ______________
(Signature) (Date)

____
(Print Name)

Address1: ______________________________

Address2: ______________________________

Phone: ______________ E-mail: ______________________________

Reset Page

Continuation Sheet

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ______________________________
Address1: ______________________________
Address2: ______________________________
Phone: ______________ E-mail: ______________________

Reset Page

New York State Department of Environmental Conservation

Instructions for Completing the 60-Day Advance Notification of Site Change of Use, Transfer of Certificate of Completion (CoC), and/or Ownership Form

Section I	**Description**
Site Name	Official DEC site name. (see http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3)
DEC Site ID No.	DEC site identification number.
Section II	**Contact Information of Person Submitting Notification**
Name	Name of person submitting notification of site change of use, transfer of certificate of completion and/or ownership form.
Address1	Street address or P.O. box number of the person submitting notification.
Address2	City, state and zip code of the person submitting notification.
Phone	Phone number of the person submitting notification.
E-mail	E-mail address of the person submitting notification.
Section III	**Type of Change and Date**
Check Boxes	Check the appropriate box(s) for the type(s) of change about which you are notifying the Department. Check all that apply.
Proposed Date of Change	Date on which the change in ownership or remedial party, transfer of CoC, or other change is expected to occur.
Section IV	**Description**
Description	For each change checked in Section III, describe the proposed change. Provide all applicable maps, drawings, and/or parcel information. If “Other” is checked in Section III, explain how the change may affect the site’s proposed, ongoing, or completed remedial program at the site. Please attach additional sheets, if needed.

Section V Certification Statement

This section must be filled out if the change of use results in a change of ownership or responsibility for the proposed, ongoing, or completed remedial program for the site. When completed, it provides DEC with a certification that the prospective purchaser has been provided a copy of any order, agreement, or State assistance contract as well as a copy of all approved remedial work plans and reports.

Name	The owner of the site property or their designated representative must sign and date the certification statement. Print owner or designated representative's name on the line provided below the signature.
Address1	Owner or designated representative's street address or P.O. Box number.
Address2	Owner or designated representative's city, state and zip code.
Phone	Owner or designated representative's phone number.
E-Mail	Owner or designated representative's E-mail.

Section VI Contact Information for New Owner, Remedial Party, and CoC Holder (if a CoC was issued)

Fill out this section only if the site is to be sold or there will be a new remedial party. Check the appropriate box to indicate whether the information being provided is for a Prospective Owner, CoC Holder (if site was ever issued a COC), Prospective Remedial Party, or Prospective Owner Representative. Identify the prospective owner or party and include contact information. A Continuation Sheet is provided at the end of this form for additional owner/party information.

Name	Name of Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.
Address1	Street address or P.O. Box number for the Prospective Owner, Prospective Remedial Party, or Prospective Owner Representative.
Address2	City, state and zip code for the Prospective Owner, Prospective Remedial Party, or Prospective Owner Representative.
Phone	Phone number for the Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.
E-Mail	E-mail address of the Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.

If the site is subject to an Environmental Easement, Deed Restriction, or Site Management Plan requiring periodic certification of institutional controls/engineering controls (IC/EC), indicate who will be the certifying party(ies). Attach additional sheets, if needed.

Certifying Party Name	Name of Certifying Party.
Address1	Certifying Party's street address or P.O. Box number.
Address2	Certifying Party's city, state and zip code.
Phone	Certifying Party's Phone number.
E-Mail	Certifying Party's E-mail address.

Section VII Agreement to Notify DEC After Property Transfer/Sale

This section must be filled out for all property transfers of all or part of the site. If the site also has a CoC, then the CoC shall be transferred using DEC's form found at http://www.dec.ny.gov/chemical/54736.html

Filling out and signing this section of the form indicates you will comply with the post transfer notifications within the required timeframes specified on the form. If a CoC has been issued for the site, the DEC will allow 30 days for the post transfer notification so that the "Notice of CoC Transfer Form" and proof of it's filing can be included. Normally the required post transfer notification must be submitted within 15 day (per 375-1.11(d)(3)(ii)) when no CoC is involved.

Name	Current property owner must sign and date the form on the designated lines. Print owner's name on the line provided.
Address1	Current owner's street address.
Address2	Current owner's city, state and zip code.

Attachment to Change of Use Form

Tioga Avenue Site - #C851031

City of Corning, Steuben County, New York

Description of Physical Change:

Corning Property Management and Corning Incorporated propose to place gravel or asphalt cover at certain locations on the subject site which are not currently covered with existing asphalt and concrete. The locations for the proposed gravel and asphalt covers are shown on the enclosed Figure 2: Existing Site Cover Types. The locations proposed to be covered consist of small strips of lawn and landscaped areas, which constitute less than approximately 4% of the total site area. The proposed physical change to the site will not involve excavation, removal, or any intrusive work; all work will consist of placement of these cover materials over the existing ground surface. There are not negative impacts associated with this change of use. The cover proposed to be installed with this Change of Use notification will be temporary and will be replaced by the final cover that will be constructed in accordance with a NYSDEC approved Site Management Plan.

The site owners are proposing to engage a contractor to install either gravel or asphalt cover at the locations indicated on Figure 2. Construction notes are provided as Figure 1. The gravel or asphalt covers will be consistent with the cover requirements as acceptable for commercial site use as specified in 6 NYCRR Part 375-3.8. Detail for the gravel cover is shown on Figure 3, and detail for the asphalt cover is shown on Figure 4. As shown on the detail figures, the cover will be underlain with geotextile fabric and will be graded to taper to the elevation of the surrounding cover. Where the locations are adjacent to the property fence line along Tioga Avenue, rebar will be driven into the soil and secured to the fence with cable ties to facilitate geotextile placement.

Appropriate documentation of the installation will be collected and a construction certification will be prepared and submitted to the DEC following construction.

HALEY&
ALDRICH

CONSTRUCTION NOTES

1. Excavations or digging of any kind is prohibited, including pulling weeds. New posts, stakes, poles, etc. shall be driven and not placed in pre-excavated holes.
2. Furnish and install 5 oz/sy geotextile per the Figures. Geotextile shall be Skaps GT-160, Skaps W250, Mirafi 140N, Mirafi 500X, or equivalent approved in advance by the Engineer.
3. Prepare vegetated areas for placement of geotextile by cutting or trimming vegetation to a length such that placement of the geotextile is practical. Vegetation shall not be pulled from the ground.
4. The geotextile shall be placed around stakes, poles, rocks, protrusions, etc. Holes shall be filled or leveled with NYSDOT 304.14 Subbase Course, Type 4, or other material approved in advance by the Engineer. Materials must be supplied by a NYSDOT approved source - see also Note 8.
5. Furnish and install 12-inch minimum thickness gravel per the Figures. Material shall be less than 4-inches sieve size. Material shall be: crushed stone or other material approved in advance by the Engineer. Materials must be supplied by a NYSDOT approved source - see also Note 8.
6. Furnish and install 304.14 Subbase Type 4 per NYS Standard Specifications Sections 304-1 through 304-3 and per the Figures. Use Option D installation. Materials must be supplied by a NYSDOT approved source - see also Note 8.
7. Furnish and install 403.1178 Hot Mix Asphalt Type 6F Top Course per NYS Standard Specifications Sections 403-1 through 403-4-3 and per the Figures. Materials must be supplied by a NYSDOT approved source - see also Note 8.
8. Submit documentation to the Engineer in advance stating the following materials are approved by NYSDOT and come from a NYSDOT approved source: NYSDOT 304.14 Subbase Course, Type 4: 403.1178 Hot Mix Asphalt Type 6F Top Course; crushed stone; or other material approved in advance by the Engineer. Bills of lading showing the source and quantity of all of this material used on site shall be given to the Corning, Incorporated representative. Glass, slag, recycled asphalt, and recycled concrete are prohibited materials.
9. Cover types (asphalt or gravel) shall be placed in the areas designated on Figure 2. Conditions in the field may result in changing the cover type. This may be done with prior approval of the Engineer. Areas marked with an asterisk on Figure 2 must have asphalt cover placed.
10. Prices bid shall include all labor, equipment, tools, materials, products, etc. needed to complete the work shown and described on the Figures.
11. Materials and construction details may be modified with approval of the Engineer in advance.

G:\33123\017\CAD\DRAWINGS\33123-017.01 - FIGURE 01.DWG

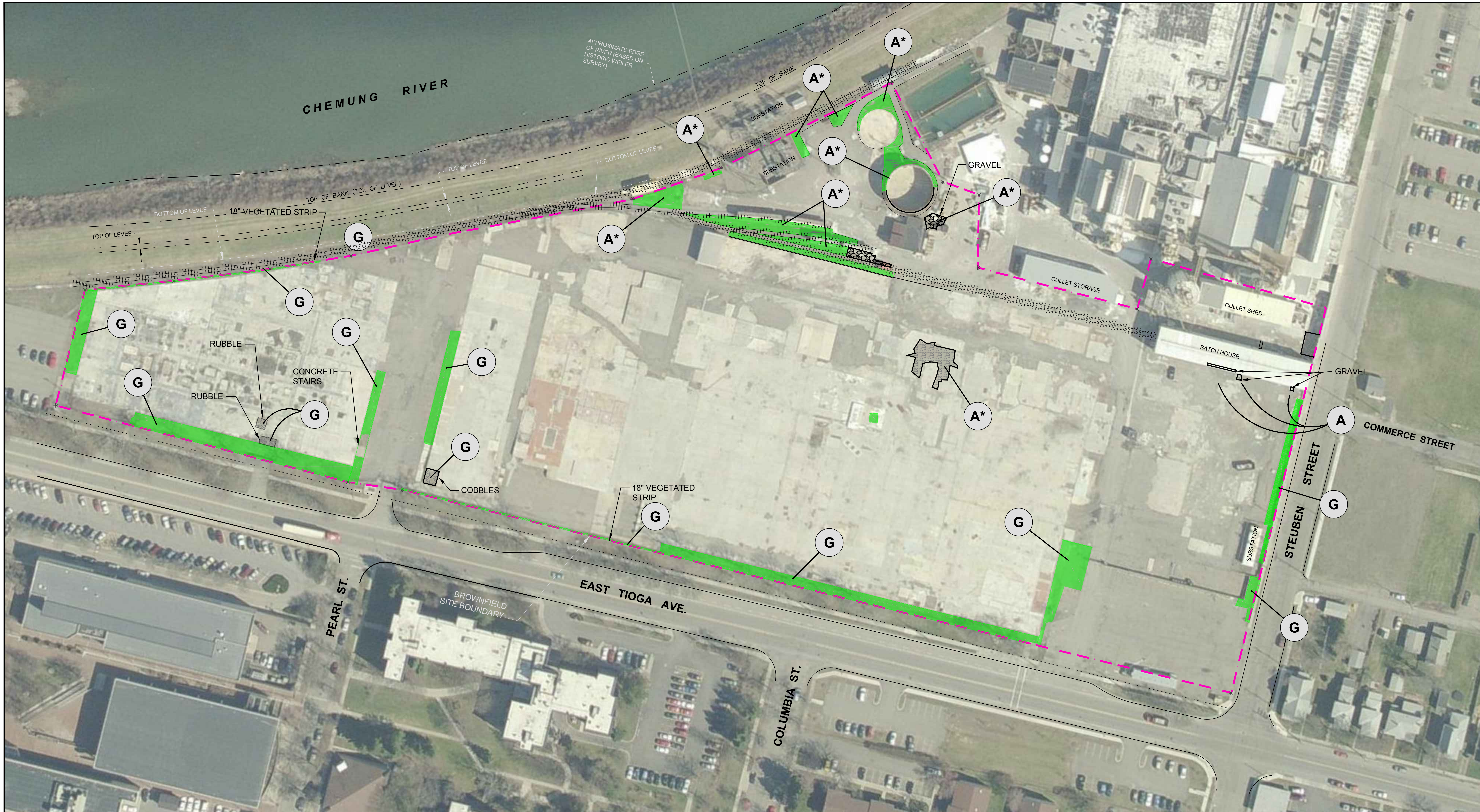
HALEY & ALDRICH

CORNING INCORPORATED
TIOGA AVENUE PROPERTY - COVER PLACEMENT
CORNING, NEW YORK

CONSTRUCTION NOTES

SCALE: NTS
SEPTEMBER 2011

FIGURE 1



LEGEND

VEGETATED AREAS

APPROXIMATE SITE BOUNDARY

NOTES

WITH PRIOR APPROVAL OF THE ENGINEER COVER TYPE MAY BE EXCHANGED FOR COVER TYPE G AND TYPE G FOR TYPE A.

(A) ASPHALT COVER

(G) GRAVEL COVER

(A*) ASPHALT COVER MANDATORY

N W E S

0 60 120 180 240

SCALE IN FEET

HALEY & ALDRICH

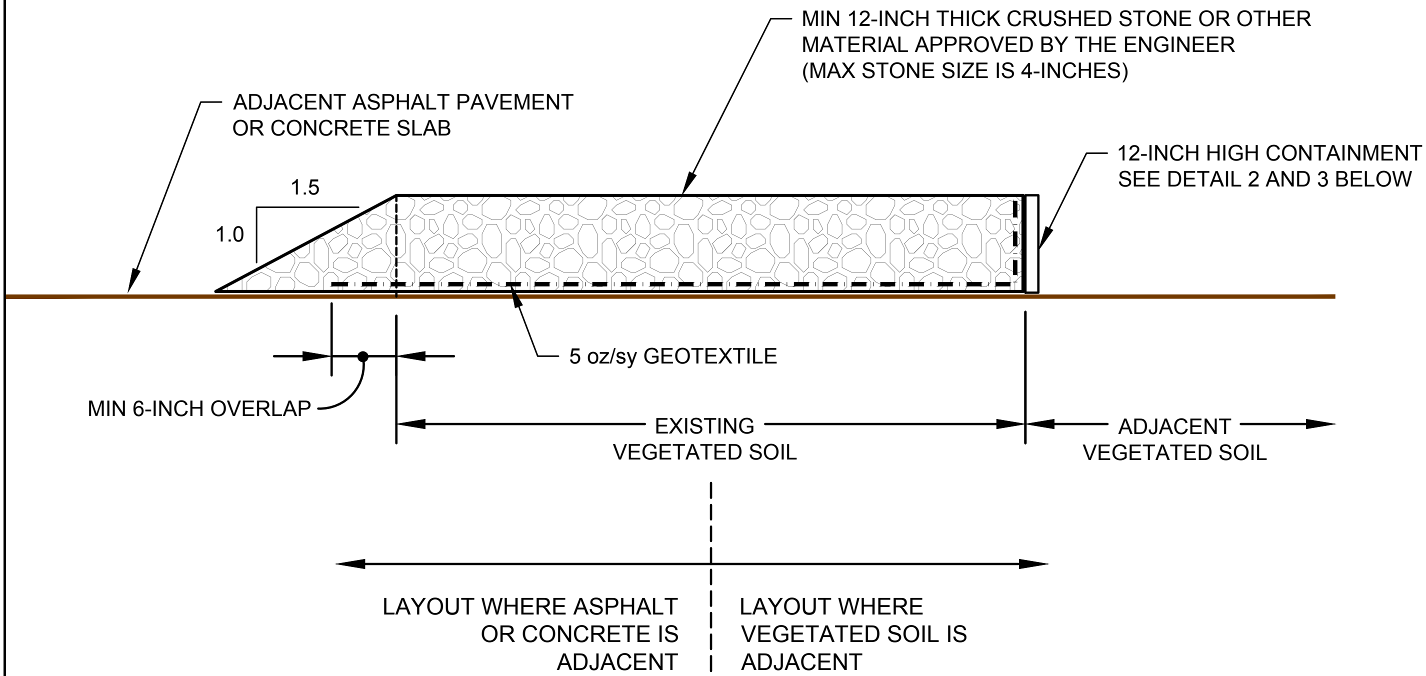
CORNING INCORPORATED
TIOGA AVENUE PROPERTY - COVER PLACEMENT
CORNING, NEW YORK

AREAS TO BE COVERED

SCALE: AS SHOWN
SEPTEMBER 2011

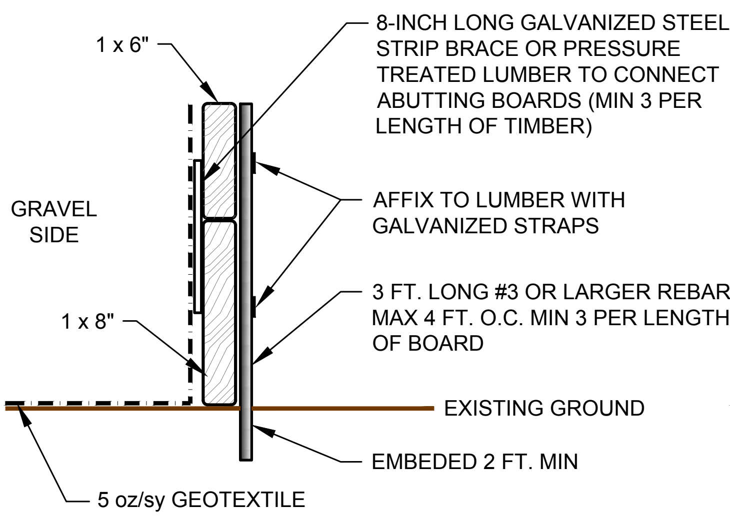
FIGURE 2

G:\33123\017\CAD\DRAWINGS\33123-017.02 - FIGURE 02.DWG



1 12-INCH THICK GRAVEL COVER SECTION

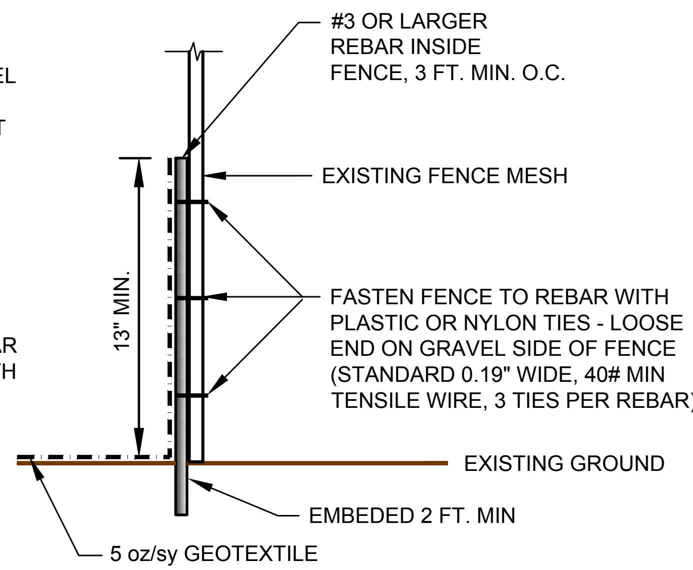
NTS



ELEVATION

2 TIMBER WALL DETAIL

NTS



ELEVATION

3 ABUTTING FENCE DETAIL

NTS

HALEY & ALDRICH

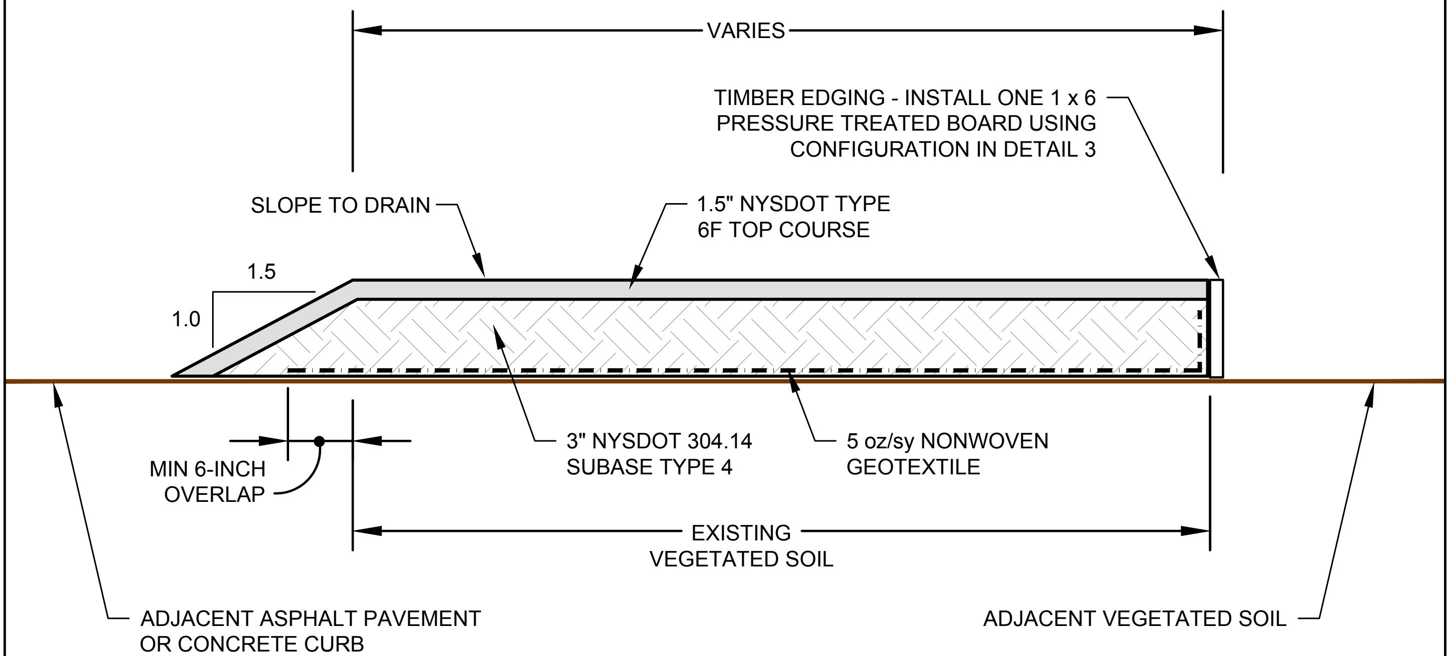
CORNING INCORPORATED
TIOGA AVENUE PROPERTY - COVER PLACEMENT
CORNING, NEW YORK

GRAVEL COVER DETAILS

SCALE: NTS
SEPTEMBER 2011

FIGURE 3

G:\33123\017\CAD\DRAWINGS\33123-017.03 - FIGURE 03.DWG



NOTE: THIS COVER SECTION IS NOT FOR VEHICULAR USE.

4 TYPICAL ASPHALT COVER SECTION

NTS

G:\33123\017\CAD\DRAWINGS\33123-017.04 - FIGURE 04.DWG

HALEY& ALDRICH

CORNING INCORPORATED
TIOGA AVENUE PROPERTY - COVER PLACEMENT
CORNING, NEW YORK

ASPHALT COVER DETAILS

SCALE: NTS
SEPTEMBER 2011

FIGURE 4