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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

Revised 15 April 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval the Final Engineering Report for the Tarrytown Former Manufactured Gas Plant (MGP) Site, dated 30 March 2005. The report provides a description of the remediation that has been completed and presents record drawings of the work that has been performed.

The scope of remediation was based on the 22 July 2003 Revised Conceptual Remediation Plan prepared by Haley & Aldrich, which will be referred to in this report as the Decision Document. The Decision Document was approved by NYSDEC on 3 September 2003. The remediation was performed under the provisions of the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program. The parties to the Brownfield Cleanup Agreement for the remediation were NYSDEC and, as volunteers, Ferry Landings, LLC, Ferry Investments, LLC and Consolidated Edison Company of New York, Inc. The remediation was performed by D.A. Collins Environmental Services under an agreement with Ferry Landings, LLC. Engineering services during remediation were performed by Haley and Aldrich of New York under an agreement with Ferry Landings, LLC.

WORK PLANS

Following approval of the Decision Document, a number of Work Plans (Remedial Design Reports) and work plan modifications were submitted to and accepted by the NYSDEC. The remediation activities described in the Report were performed in accordance with the following:

1. "Tarrytown Former MGP Site, Revised Conceptual Remediation Plan," prepared by Haley & Aldrich of New York, latest revision dated 22 July 2003.

2. Approval letter for Conceptual Remedial Action Work Plan and Supplemental Site Investigation Report, prepared by New York State Department of Environmental Conservation, dated 3 September 2003.

3. "Tarrytown Former MGP Site, Holder and Tar Well Remedial Design Report," prepared by Haley & Aldrich of New York, latest revision dated 29 September 2003.

4. Approval Letter for Holder and Tar Well Remedial Design Report, prepared by New York State Department of Environmental Conservation, dated 28 October 2003.

5. "Tarrytown Former MGP Site, LNAPL Remedial Design Report," prepared by Haley & Aldrich of New York, dated 18 December 2003.

6. Approval Letter for Northern DNAPL Barrier and Collection Trench and LNAPL Collection Trench Design Reports, prepared by New York State Department of Environmental Conservation, dated 30 January 2004.

7. "Tarrytown Former MGP Site, Northern DNAPL Barrier and Collection Trench, Remedial Design Report," prepared by Haley & Aldrich of New York, latest revision dated 23 December 2003.

8. Approval letter for Northern DNAPL Area Design Report and LNAPL Area Design Report, prepared by New York State Department of Environmental Conservation, dated 30 January 2004.

9. "Tarrytown Former MGP Site, Northern DNAPL Supplemental Investigation," prepared by Haley & Aldrich of New York, dated 23 November 2004.

10. "Tarrytown Former MGP Site, Addendum to the Northern DNAPL Supplemental Investigation Report," memorandum from Haley & Aldrich of New York to NYSDEC, dated 8 December 2004.

11. Approval letter for Northern DNAPL Area Supplemental Investigation, prepared by New York State Department of Environmental Conservation, dated 13 December 2004.

12. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Wet Alternative Removal Remedial Design Report," prepared by Haley & Aldrich of New York, dated 27 February 2004.

13. Conditional Approval letter for Revised Western DNAPL Barrier and Sediment Removal Design Report, prepared by New York State Department of Environmental Conservation, dated 10 March 2004.

14. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Remedial Design Response to 10 March 2004 Comments," prepared by Haley & Aldrich of New York, dated 25 June 2004.

15. Approval Letter for Items 1 and 2 in Response to 10 March 2004 Comments, prepared by New York State Department of Environmental Conservation, dated 10 August 2004.

16. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Remedial Design Request for Work Plan Modification," prepared by Haley & Aldrich of New York, dated 16 September 2004.

17. Approval letter for Work Plan Modification, prepared by New York State Department of Environmental Conservation, dated 8 October 2004.

Haley & Aldrich of New York was the firm responsible for preparing the Work Plans and making observations as the work was performed. Deviations from the Work Plans identified by Haley & Aldrich of New York are listed within the Report.

REPORT ORGANIZATION

The Report is divided into five sections, as follows:

- Section 1 Holder and Tar Well Area
- Section 2 LNAPL Area
- Section 3 Northern DNAPL Area
- Section 4 Western DNAPL and Sediment Removal Area
- Section 5 Final Engineering Report Appendices

The Report is organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

Each section of the report describes the Work Plan for the area of interest, summarizes the remedial activities performed, describes approved deviations from the Work Plan and the reasons for them, and provides record drawings of the remedial construction. A certification that the work was performed in accordance with the Work Plan (and approved deviations), signed by the professional engineer responsible for oversight of the work, is provided with this cover letter.

CLOSURE

Your acceptance of the Final Engineering Report is requested. Please do not hesitate to contact us if you require additional information.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:
Certification Document
Section 1 – Holder and Tar Well Area
Section 2 – LNAPL Area
Section 3 – Northern DNAPL Area
Section 4 – Western DNAPL and Sediment Removal Area
Section 5 – Final Engineering Report Appendices

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

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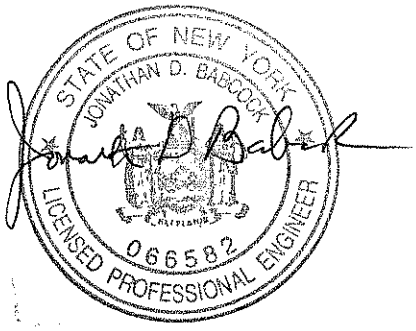
CERTIFICATION

I certify that the Tarrytown Former MGP Site (Brownfield Agreement No. C360069) Remedial Work Plans were implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Work Plans, and were personally witnessed by me or by a person under my direct supervision.



Jonathan D. Babcock, P.E.
Haley & Aldrich of New York

4/15/05
Date

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY&
ALDRICH

30 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Remedial Action Report – Response to Comments
Tarrytown Former MGP Site
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

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Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review these responses to the comments received from your office dated 25 March 2005. The comments received were provided subsequent to your office's review of the Remedial Action Report for the Tarrytown Former Manufactured Gas Plant (MGP) Site, dated 24 January 2005.

For continuity of presentation, your comments have been assimilated into this document, along with our corresponding responses.

General

1. *Consistent with DER 10, please rename this document to read "FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE".*
   Response: The title of the main document and supporting documents have been changed to reflect this comment.

2. *Page 3, please provide construction start dates for all parts of the project reported on.*
   Response: Construction start dates for the LNAPL Area, Northern DNAPL Area, and Western DNAPL and Sediment Removal Area were previously incorporated in each respective document. The construction start date for the Holder and Tar Well Area has been added.

3. *CERTIFICATION PAGE, for all certifications, please delete the language in the first line that reads "to the best of its knowledge".*
   Response: The requested language was deleted from the certification text.

4. *Please provide a location and values of permanent survey markers as required under DER-10, Sect. 5.8, subsection (b) 8(iv).*
Response: A revised 'As-Built' drawing, prepared by The Chazen Companies, has been included in the Final Engineering Report (FER). The drawing shows the locations of the requested survey markers.

Western DNAPL and Sediment Area

5. *Page 1, Section 4, paragraph 2, second sentence, TYPO: "....PERFORMED IN THE Northern DNAPL Area". This Section refers to the work that was performed in the "Western DNAPL Area" of the site.*
Response: The noted typo has been revised.

6. *Page 4, Section 4, paragraph 1, second sentence, TYPO: "...trench will be approximately 360 feet long..." The Western DNAPL trench only extended approximately 60 feet long (north-south).*
Response: The noted typo has been revised.

7. *Page 7, Section 4, paragraph 4, the solidification process for dredged spoils was amended to reflect that instead of "powdered lime" was to be applied to the dredged river sediments in the scow prior to its being loaded in trucks for further solidification and stockpiling in the eastern portion of the property pre-offsite transportation.*
Response: The noted paragraph has been revised to indicate that the pelletized lime was used.

8. *Page 7, Section 4, paragraph 5, backfill was not performed using the environmental clamshell. Upon DA Collin's (DAC) first attempt at using the clamshell, it was deemed unsuccessful. The clamshell was unable to close properly, therefore not able to hold the required backfill material (stone). DAC was able to append a standard dredge bucket with the Cable Arm Vision equipment to successfully perform the river backfill activity.*
Response: The noted paragraph has been revised to indicate that the alternative equipment was used during the backfill operation.

9. *Page 7, Section C, River Sediment Dredging and Backfill, please provide information on solids resuspension protection, turbidity monitoring, turbidity monitors locations, turbidity readings, water quality monitoring results with explanations whenever water quality standards were exceeded and what was done to correct the problem.*
Response: The requested materials were provided in submission made to NYSDEC on 17 March 2005 by Haley & Aldrich, and are included as Appendix A of the FER.

10. *Page 8, Section 4, paragraph 2, as per a modified and approved work plan amendment, the final cap that was placed on the excavated area beneath the relieving platform consisted of a cement-soil-bentonite mixture. Not the soil-bentonite mixture as stated by H&A.*
Response: The text of the FER has been modified to state that the underwater cap was constructed using a soil-cement-bentonite mixture. The mixture used during construction was the same as specified in the 27 February 2004 Western DNAPL

Barrier and Sediment Removal Remedial Design Report, which was approved by NYSDEC in its letter dated 10 March 2004.

11. *Page 8, Section E, Western DNAPL Recovery Trench, please describe construction generated water management and disposal, provide water quality monitoring results with explanations whenever water quality standards were exceeded and what was done to correct the problem.*
Response: The requested materials were provided in submission made to NYSDEC on 17 March 2005 by Haley & Aldrich, and are included as Appendix B of the FER.

12. *Page 9, Section 4, paragraph 2, the two samples that were obtained by the divers were "grab samples" taken by digging the laboratory supplied jars into the river substrate. They were not obtained by "using hand tools to push the thin walled tubes" as stated by H&A.*
Response: The identified paragraph was edited to reflect this comment.

13. *Page 11, Section 4, paragraph 2, it should be clarified that the backfill used overtop the cap and underneath the relieving platform consisted of a mix of ¾ inch stone and some riprap to further support the transition from shoreline to river.*
Response: The identified paragraph was edited to reflect this comment.

14. *Please provide "as built" drawings for the Relieving Platform, backfill, and cap underneath the Platform.*
Response: The requested materials were provided in submission made to NYSDEC on 17 March 2005 by Haley & Aldrich, and are included as Appendix C and Appendix D to the FER.

15. *Please provide the results of backfill sampling under the Relieving Platform.*
Response: Results of the backfill sampling laboratory testing were added to Figure 4.11.

16. *Figure 4.11, please provide the results of post construction testing for total PAHs and BTEX superimposed on the sample location map.*
Response: The approved Work plan called for testing of total PAHs only, not BTEX. Results of the backfill sampling laboratory testing for total PAHS were added to Figure 4.11.

LNAPL Area

17. *Page 4, Section 2, last paragraph, it should be specified that during the Supplemental Northern DNAPL work, excavation activities were performed "in the wet". Groundwater that infiltrated and pooled in the open excavation was not extracted and treated in the on-site wastewater treatment system.*
Response: In response to this comment, a description of the Supplemental Northern DNAPL excavation 'in the wet' was added to Section 3 (Northern DNAPL Area) of the FER, rather than included in Section 2 (LNAPL Area). In Section 3, a statement is made that construction water was not extracted or treated on site during the supplemental excavation.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

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Section 1

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

Revised 28 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Section 1 - Holder and Tar Well Area
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval this Final Engineering Report for Tarrytown Former MGP Site, Section 1 for the Holder and Tar Well Area at the Tarrytown Former Manufactured Gas Plant (MGP) Site. This report provides a description of the remediation that has been performed in the Holder and Tar Well Area of the site, and presents record drawings of the work that has been performed.

The scope of remediation was based on the 22 July 2003 Revised Conceptual Remediation Plan prepared by Haley & Aldrich, which will be referred to in this report as the Decision Document (Reference 1). The Decision Document was approved by NYSDEC on 3 September 2003 (Reference 2). The remediation was performed under the provisions of the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program. The parties to the Voluntary Cleanup Agreement for the remediation were NYSDEC and, as volunteers, Ferry Landings, LLC, Ferry Investments, LLC and Consolidated Edison Company of New York, Inc. The remediation was performed by D.A. Collins Environmental Services under an agreement with Ferry Landings, LLC. Engineering services during remediation were performed by Haley and Aldrich of New York under an agreement with Ferry Landings, LLC.

This is the first section of the Final Engineering Report for Tarrytown Former MGP Site. The other areas of the site for which separate sections of the Final Engineering Report will be prepared are:

- Section 2 LNAPL Area
- Section 3 Northern DNAPL Area
- Section 4 Western DNAPL and Sediment Removal Area
- Section 5 Final Engineering Report Appendices

The reports are organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

SUMMARY OF REMEDY FROM THE DECISION DOCUMENT

The site is located on the east side of the Hudson River, north of the Tappan Zee Bridge, in the Village of Tarrytown, New York. The site locus is shown on Figure 1.1, and a plan view of the site is shown on Figure 1.2. The site encompasses approximately 20 acres, and currently is primarily industrial-commercial in use.

As described in a number of previous reports (see References), the site exhibits contamination in several areas that are associated either with the former MGP or from former fuel storage and handling operations. This remedial action report addresses contamination associated with DNAPL generally located within the south central portions of the site. This area is referred to as the Holder and Tar Well Area. The planned work area is shown on Figure 1.3. The area contains the locations of four former structures, labeled Holder A, B, C and D. It also contains a zone of DNAPL contaminated soil adjacent to and south-southwest of Holder A, called the Tar Well Area.

During site investigations, some flowing MGP DNAPL (dense non-aqueous phase liquid) was present in Holders A, B, and C, but not in Holder D (See *Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York*, 12 September 2003, Reference 6). Consequently, Holders A, B, C, and the Tar Well Area were proposed to be remediated, and a plan for the remediation (Reference 3) was submitted to and approved by NYSDEC on 28 October 2003 (Reference 4).

The purpose of the remedial action in the Holder and Tar Well Area was to remove and treat the soils and holder contents and structures that are heavily contaminated with DNAPL. The remedial action primarily consisted of excavating the contaminated soils in the Tar Well Areas and removing the holder contents, walls and floors and transporting contaminated materials off site to a permitted facility for disposal. The remedial action is described in detail in the report "Tarrytown Former MGP Site, Holder and Tar Well Remedial Design Report," dated 29 September 2003 (Reference 3). This report is also referred to herein as the Work Plan.

The planned limits of the remedial excavation at the Holder and Tar Well Area are shown in plan view on Figure 1.3, and are generally described below, as excerpted from the Work Plan:

> *At all the Holders, the soil above the tops of the holder walls is uncontaminated and will be excavated and stockpiled. The contents of the holders will be removed and taken off site for treatment and/or disposal...*
>
> *Contaminated holder walls and floors will be removed and the masonry debris will be sent off site for treatment and/or disposal. Any connecting pipes 6-inches or larger in diameter will be identified and inspected to determine if they contained significant residual MGP waste. The pipes containing significant amounts of MGP waste will be removed and sent off site for disposal. If free flowing MGP DNAPL is encountered in the soils beneath the holders, then the contaminated soils will be excavated and taken off site for disposal.*

In the Tar Well Area, the bottom dimensions of the excavation are expected to be limited to the area shown on Figure 1.3, based on the elevation of top of natural soils in the area and the depth and area of DNAPL contamination identified by previous investigations. The top 6 feet of soil is uncontaminated and will be excavated and stockpiled for backfill. The contaminated soil will be excavated and sent off site for treatment and/or disposal. The goal of the source area removal will be to excavate coal tar and DNAPL saturated soils.

Samples taken from the limit of excavation will be compared to a total PAH criterion of 1000 ppm to ensure that no significant source material remains.

The uncontaminated spoil materials will be backfilled first, followed by treated or imported clean soil. Backfilled soil will meet a criteria of 10 ppm total BTEX and 500 ppm total PAH...The backfill will be completed to the original lines and grades, with the final one-inch surface layer consisting of crushed stone, for erosion control.

Uncontaminated soil and structural debris will be stockpiled for later use (soil) or managed as solid waste (debris).

Excavation dewatering water and drainage or runoff from the contaminated spoils stockpile area will be managed by a water treatment system. Effluent water will be tested prior to discharge to either the Hudson River or to the local water pollution control facility.

SUMMARY OF REMEDIAL ACTIONS COMPLETED

Actions Completed

Excavation of the contents and removal of the walls and floors of Holders A, B, and C were completed in accordance with the Work Plan. Holder B was discovered to have no floor remaining in place at the time of the remedial action. Miscellaneous pipes were removed from within the excavation. Pipe stubs were plugged with concrete after verification that they did not contain product, per the Work Plan.

Excavation and backfill of the Tar Well Area adjacent to Holder A was completed in accordance with the Work Plan. The overburden soils were excavated and stockpiled for characterization. The remediation of the Holder and Tar Well Area was accomplished from Mid- June to Mid-July 2004.

Confirmation samples were taken from the side walls and bottom of the excavations. Locations where confirmation samples were taken are shown on Figure 1.4. Table 1.1 summarizes the confirmation sampling results. Laboratory data reports for these samples were submitted previously in the June 2004 (Holders) and July 2004 (Tar Well) monthly progress reports, and are available upon request. The sample results satisfied the requirements of the Work Plan, and backfilling of the excavations was completed. Subsequent to the backfilling, the Holder B and C area was used to stockpile clean imported soil.

Problems Encountered During Construction and Resolutions

No significant problems that required deviations from or additions to the Work Plan were encountered during construction.

Changes to Design Documents

The limits of Tar Well excavation deviated somewhat from those presented in the Work Plan. One deviation was due to encountering an approximate 6-in. diameter wooden pipe running east to west through the excavation at a depth of about 5 to 6 ft. Soil that appeared to be potentially contaminated based on visual observation was excavated from around the pipe to a distance of approximately 30 feet east from the tar well area excavation.

A second deviation from the Work Plan was at the northwest corner of the tar well excavation. This area needed to be extended west and north a few feet further than shown on the Work Plan drawings, in order to remove soils that appeared to be contaminated based on visual observation.

A third and final deviation from the Work Plan was in the southeast portion of the tar well excavation, where visual observations in the field indicated that the extent of the saturated zone of coal tar did not extend as far southwest as shown in the Work Plan. The approximate limits of the actual excavations are shown on the record drawing, Figure 1.5, prepared by Chazen Engineering & Land Survey Co., P.C.

Quantities and Concentration of Contaminants Removed or Treated

Results of laboratory testing for waste characterization of materials to be transported offsite for disposal are summarized on Table 1.2. The laboratory data sheets are available upon request.

Materials Disposed

The following table represents materials disposed for the entire project. Based on conversations with NYSDEC, it was determined unnecessary to categorize the disposed materials according to the place of origin on the project site.

Materials Disposed During Remediation at the Tarrytown Former MGP Site

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton

DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton
Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

REMEDIATION STANDARDS APPLIED TO REMEDIAL ACTIONS

The site cleanup target level for samples taken from the limit of excavation was 1,000 ppm for total PAH. The target for use of on-site soil for backfill was 10 ppm total BTEX and 500 ppm total PAH. These levels were previously established in the approved Work Plan.

PRE- AND POST-REMEDIAL DATA

Pre-remediation data was discussed and summarized in several previously-submitted reports (Reference 6). Please refer to the referenced reports for the pre-remediation data.

As described previously, post-remediation data was obtained by acquiring confirmation samples from the excavation sides and bottoms. Analytical results were compared to the site cleanup target levels. A summary of the analytical results is provided on Table 1.1. The confirmation samples met the target levels at all sampled locations except one. For the Tar Well area, one confirmation sample (B037), which was taken from the pipe excavation at the pipe invert elevation, failed to meet the site cleanup criteria. The area around the failed sample was further excavated and a second confirmation sample was taken. The second sample (B042) satisfied the cleanup criteria.

The laboratory analytical testing data reports were submitted with monthly status reports and are available upon request.

SITE RESTORATION ACTIVITIES

The excavations in the Holder and Tar Well Areas were backfilled upon completion. A marker layer, consisting of orange geotextile, was placed on top of the backfill subgrade and covered by approximately 12 in. of ¾-in. gravel. The purpose of the marker is to indicate the interface between onsite fill below and imported fill above. Final grade will be about 1 ft higher, yielding a final depth to the marker layer of approximately 2 ft.

SOURCE AND QUALITY OF FILL

On-site overburden soils from the Holder and Tar Well Area excavation that met the site cleanup criteria were used as backfill. Table 1.3 shows laboratory results of testing for the overburden soils, indicating that they satisfied the site criteria for re-use of on-site soils of 10 ppm Total BTEX and 500 ppm Total PAH. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

In addition, clean fill was brought to the site from three locations:

- Bronx, NY location operated by Tilcon
- Elmsford, NY location operated by Jaz Mar
- Yonkers, NY location managed by National RE/sources

Testing was performed to verify the chemical composition of the imported fill. Results of the laboratory testing are summarized in Table 1.4. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

RECORD DRAWINGS

A plan, prepared by Chazen Engineering & Land Survey Co., P.C., showing the excavation limits as completed for the Holder and Tar Well Areas is included (see Figure 1.5).

MANIFESTS

Manifests documenting contaminated soils that were removed from the site during the duration of remedial activities were maintained during remedial construction. The manifests are available upon request.

ENGINEERING OR INSTITUTIONAL CONTROLS REQUIRED

The Voluntary Cleanup Agreement under which this remedial action was performed includes, at a minimum, the following controls:

- No future use of onsite groundwater
- Future development must be in accordance with the Site Management Plan
- Condition of onsite engineering controls must be reported to the NYSDEC on an annual basis. NOTE: There are no engineering controls in place for the Holder and Tar Well Area.

Details on restrictions and/or requirements for the future development of the site are provided in "Tarrytown Former MGP Site, Site Management Plan, dated 1 December 2004 (Reference 5). Section 5 of this document (Final Engineering Report Appendices) contains an environmental easement map (sheet no. SP1) as prepared by The Chazen Companies and dated 7 February 2005. Reference should also be made to the approved Institutional and Engineering Controls Plan for the Tarrytown Former MGP Site.

OPERATION, MAINTENANCE, AND MONITORING (OM&M)

The remedial actions associated with the Holder and Tar Well Area contamination consisted of excavations performed to permanently remove the targeted contaminated materials. Soils remaining in this remediation area satisfy the site cleanup criteria and so do not require long-term monitoring. Therefore, the remedial actions described in this report do not require post-construction monitoring and maintenance. Refer to the Site Management Plan for a discussion of requirements regarding treatment of the soils during design and construction of future developments at the site. Reference should also be made to the approved Operation, Maintenance, and Monitoring Plan for the Tarrytown Former MGP Site.

CLOSURE

This report described the Work Plan for the Holder and Tar Well Area, summarized the remedial activities performed, described approved deviations from the Work Plan and the reasons for them, and provided record drawings of the remedial construction. A certification that the work was performed in accordance with the Work Plan (and approved deviations) signed by the professional engineer responsible for oversight of the work is included with the cover letter to the Final Engineering Report.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

Table 1.1 - Summary of Analytical Laboratory Results – Confirmation Samples
Table 1.2 - Summary of Analytical Laboratory Results – Waste Characterization for Materials Disposed Off-Site
Table 1.3 - Summary of Analytical Laboratory Results – On-Site Soils Re-Used as Backfill
Table 1.4 - Summary of Analytical Laboratory Results – Verification Testing for Imported Fill
Figure 1.1 - Site Locus
Figure 1.2 - Site Plan
Figure 1.3 – Excavation Plan
Figure 1.4 – Confirmation Soil Sample Locations
Figure 1.5 - Record Drawing of Holder and Tar Well Area

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

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REFERENCES

1. "Tarrytown Former MGP Site, Revised Conceptual Remediation Plan," prepared by Haley & Aldrich of New York, latest revision dated 22 July 2003.

2. Approval letter for Conceptual Remedial Action Work Plan and Supplemental Site Investigation Report, prepared by New York State Department of Environmental Conservation, dated 3 September 2003.

3. "Tarrytown Former MGP Site, Holder and Tar Well Remedial Design Report," prepared by Haley & Aldrich of New York, latest revision dated 29 September 2003.

4. Approval Letter for Holder and Tar Well Remedial Design Report, prepared by New York State Department of Environmental Conservation, dated 28 October 2003.

5. "Tarrytown Former MGP Site, Site Management Plan," prepared by Haley & Aldrich of New York, dated 1 December 2004.

6. List of Reports Containing Pre-Remediation Site Characterization Data:

1990	Metcalf & Eddy	Preliminary Soil Gas Survey Results, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1991	Metcalf & Eddy	Site Assessment for Anchor Motor Freight, Inc., Tarrytown, New York.
1991	Metcalf & Eddy	Underground Storage Tank Removal, Valente Industries, Tarrytown, New York.
1994	Metcalf & Eddy	Geoprobe Subsurface Investigations, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1994	Woodward-Clyde	Results of Geophysical Survey, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1995	Rust	Site Environmental History, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	RETEC	Site Investigation, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	Rust	Underground Storage Tank Field Observation Report, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1997	Parsons Engineering Science	Site Investigation Report for the Tarrytown Site, ConEdison, Tarrytown, New York.
2000	Parsons Engineering Science	Supplemental Site Investigation Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2000	Handex	Site Status Report, Penske Truck Leasing, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Sediment Sampling Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Site Investigation Report, Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.

2003	Haley & Aldrich	Supplemental Site Investigation – Spring 2003, Tarrytown Former MGP Site, Tarrytown, New York
2003	Haley & Aldrich	Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York
2004	Haley & Aldrich	Northern DNAPL Supplemental Investigation, Tarrytown Former MGP Site Remediation, Tarrytown, New York

TABLE 1.1
HOLDER AND TAR WELL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Confirmation Samples
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Field/Laboratory ID	Total PAH (ppm)
B014(G) Holder B/C Conf North	642
B015(G) Holder B/C Conf East	1.5
B016(G) Holder B/C Conf West	830
B017(G) Holder B/C Conf B	781
B018(G) Holder A	516
B019(G) Holder A	120
B020(G) Holder A	460
B030(G) Tar Well Southern 3Rd Conf Bottom	ND
B031(G) Tar Well Southern 3Rd Conf South Wall	ND
B032G) Tar Well Southern 3Rd Conf West Wall	1
B035(G) Tar Well Southern 3Rd Conf East Wall 1	ND
B036(G) Tar Well Conf Bottom North East Wall 2	ND
B037(G) Tar Well Conf Wood Pipe East (see B042(G))	1,359
B039(G) Tar Well Conf East Wall 3	463
B040(G) Tar Well Conf North Wall 1	36
B041(G) Tar Well Conf East Wall 2	15
B042(G) TW Conf Wood Pipe East 2 (Resample of B037)	6
B043(G) TW Mid3rd Conf Bottom	21
B044(G) TW Mid3rd Conf East Wall	51
B047(G) TW Mid3rd Conf West Wall	143
B048(G) TW N3 Conf West Wall	670
BO49(G) TW N3 Conf Bottom 2	164
Site Clean-up Criteria per Work Plan	**1,000**

Note: ND = Not Detected. See Figure 4 for sample locations.

TABLE 1.2
HOLDER AND TAR WELL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Waste Characterization for Materials Disposed Off-Site
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Sample ID	STP2-Holder B/C-B001	STP2-Holder B/C-B002	STP3-Holder A-B003	STP3-Holder A-B004	STP3-Holder A-B005	STP4-Holder A-B006	STP4-Holder A-B007	STP5-Holder B-B008	STP5-Holder B-B009	STP6-Holder C-B010	STP6-Holder C-B011	STP7-Holder A-B012	STP7-Holder A-B013
Sample Location	Stockpile 2	Stockpile 2	Stockpile 3	Stockpile 3	Stockpile 3	Stockpile 4	Stockpile 4	Stockpile 5	Stockpile 5	Stockpile 6	Stockpile 6	Stockpile 7	Stockpile 7
Lab Sample Number	AF59674	AF59675	AF59676	AF59677	AF59678	AF61046	AF61047	AF61048	AF61049	AF61050	AF61051	AF61052	AF61053
Sampling Date	6/1/04	6/1/04	6/1/04	6/1/04	6/1/04	6/8/04	6/8/04	6/8/04	6/8/04	6/8/04	6/8/04	6/8/04	6/8/04
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Detected Compounds (mg/Kg or ppm)													
Volatile Organic Compounds (VOs)		NR		NR	NR								
1,2,4-Trimethylbenzene	3.6		0.7			ND	ND	97	100	ND	ND	ND	ND
Benzene	4.4		1.2			ND	ND	ND	ND	ND	ND	ND	3.3
Ethylbenzene	6.8		1.2			ND	ND	120	92	310	ND	ND	ND
m,p-Xylene	ND		0.55			ND	ND	110	88	280	ND	ND	ND
n-Propylbenzene	ND		ND			ND	ND	ND	ND	350	ND	ND	ND
Naphthalene	57		8.7			ND	35	2,180	2,170	4,220	1,810	63	32
o-Xylene	ND		0.32			ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND		ND			ND	ND	ND	ND	270	ND	ND	ND
Total Detected VO Concentration	71.8	NR	12.67	NR	NR	ND	35	2,507	2,450	5,430	1,810	63	35
Semi-Volatile Organic Compounds (SVOs)		NR		NR	NR								
2-Methylnaphthalene	52		7			10	5.6	600	1,430	520	310	53	18
Acenaphthene	ND		3.5			34	9.7	220	410	120	95	60	30
Acenaphthylene	ND		8.7			25	3.2	130	230	150	65	ND	7.8
Anthracene	ND		4.5			29	7.1	140	260	120	68	26	19
Benzo(a)anthracene	ND		8.1			14	4.1	58	110	65	36	18	16
Benzo(a)pyrene	ND		13			11	3.7	46	83	55	31	22	17
Benzo(b)fluoranthene	ND		9			6.8	2.2	24	55	33	17	16	13
Benzo(ghi)perylene	ND		8.6			ND	ND	7.7	12	11	6.7	ND	4.5
Benzo(k)fluoranthene	ND		11			7.2	2.5	32	31	31	22	16	12
Benzoic Acid	ND		ND			ND	18	ND	ND	ND	ND	ND	ND
Chrysene	ND		10			14	3.9	55	110	63	35	18	15
Dibenz(a,h)anthracene	ND		ND			ND	ND	5.6	9.8	7.7	ND	ND	ND
Dibenzofuran	ND		ND			4	ND	16	26	15	9.3	ND	3.3
Fluoranthene	ND		10			24	7.8	110	190	120	66	32	32
Fluorene	ND		3.8			48	8.9	230	440	200	110	38	25
Indeno(1,2,3-cd)pyrene	ND		7.7			ND	ND	8	13	11	6.1	ND	4.6
Naphthalene	71		15			4.6	9.1	1,160	2,240	790	480	40	24
Phenanthrene	35		13			89	13	460	1,030	430	260	82	63
Pyrene	23		14			38	13	170	290	170	97	45	40
Total Detected BNA Concentration	181	NR	146.9	NR	NR	358.6	111.8	3,472.3	6,969.8	2,911.7	1,714.1	466	344
Metals	NR	NR	NR	NR	NR								
Arsenic						3.75	4.53	10.8	9.78	2.55	2.92	35.7	8.77
Barium						68.2	75.1	75.4	80.5	63.6	61.2	466	116
Cadmium						ND	ND	ND	ND	ND	ND	6.05	1.44
Chromium						14.2	14.4	17.9	18.7	14.1	12.9	40.4	20.1
Lead						16	23	165	139	12.3	8.55	1,590	540
Mercury						ND	0.16	0.73	0.86	ND	ND	0.68	12.4
Selenium						ND	ND	ND	ND	ND	ND	ND	ND
Silver						ND	ND	ND	ND	ND	ND	0.596	ND
Total Cyanide						8.57	30.7	165	36.8	10.5	8.79	13.9	14.3
TCLP Lead						NR	NR	0.045	0.023	NR	NR	4.59	8.75
TCLP Barium						NR	NR	NR	NR	NR	NR	NR	NR
PCB	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND
TPH	NR	13,000	7,200	9,100	11,000	3,000	5,000	29,000	27,000	34,000	11,000	8,600	2,400

Notes:
NR = not analyzed
ND = not detected

TABLE 1.2
HOLDER AND TAR WELL AREA
SUMMARY OF ANALYTICAL LABORATORY RI
Waste Characterization for Materials Disposed Off-S
Final Engineering Report for Tarrytown Former MGP S
Tarrytown, New York

Sample ID	STP7S-Holder A-B021	STP7N-Holder A-B022	STP7M-Holder A-B023	STP4-Holder A-B024	STP4/6-Holder A/B-B025	STP10-Holder A-B026	Comp STP7S,M,N	STP14-B033	STP14-B034	STP15-B038	STP17-B045	STP17-B046	STP17A/B-B050	STP19-B051
Sample Location	Stockpile 7	Stockpile 7	Stockpile 7	Stockpile 4	Stockpile 4/6	Stockpile 10	Stockpile 7	Stockpile 14	Stockpile 14	Stockpile 15	Stockpile 17	Stockpile 17	Stockpile 17	Stockpile 19
Lab Sample Number	AF64043	AF64045	AF64044	AF64046	AF64047	AF64048	AF66528	AF68526	AF68527	AF69093	AF71720	AF71721	AF72953	AF79671
Sampling Date	6/18/04	6/18/04	6/18/04	6/17/04	6/17/04	6/18/04	6/18/04	7/7/04	7/7/04	7/9/04	7/19/04	7/19/04	7/21/04	8/19/04
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Detected Compounds (mg/Kg or ppm)														
Volatile Organic Compounds (VOs)	NR	NR	NR			NR	NR							
1,2,4-Trimethylbenzene				ND	14			1.6	ND	7.9	ND	ND	ND	ND
Benzene				0.62	ND			ND	ND	4	ND	ND	ND	ND
Ethylbenzene				ND	22			ND	ND	13	ND	ND	ND	1.8
m,p-Xylene				ND	17			ND	ND	11	ND	ND	ND	0.78
n-Propylbenzene				ND	ND			ND	ND	ND	ND	ND	ND	ND
Naphthalene				6.6	380			31	28	140	40	93	330	28
o-Xylene				ND	ND			ND	ND	5	ND	ND	ND	0.69
Toluene				ND	ND			ND	ND	7.6	ND	ND	ND	ND
Total Detected VO Concentration	NR	NR	NR	7.2	433	NR	NR	33	28	189	40	93	330	31
Semi-Volatile Organic Compounds (SVOs)	NR	NR	NR			NR	NR							
2-Methylnaphthalene				21	260			7.9	2.1	250	24	42	1,000	8.7
Acenaphthene				25	57			7.5	5.5	72	20	34	990	7.1
Acenaphthylene				12	110			1.3	1	55	5.5	9	230	0.98
Anthracene				19	68			5.7	4.6	69	15	26	780	3.3
Benzo(a)anthracene				10	42			3.1	2.8	39	14	24	510	2.2
Benzo(a)pyrene				9.2	39			2.2	2.1	25	12	23	430	1.5
Benzo(b)fluoranthene				5.1	19			1.2	1.3	18	10	18	310	1.3
Benzo(ghi)perylene				ND	ND			0.42	0.47	ND	ND	3.3	190	ND
Benzo(k)fluoranthene				5.7	25			1.4	1.6	ND	11	19	310	ND
Benzoic Acid				ND	ND			ND	ND	ND	ND	ND	ND	ND
Chrysene				9.4	40			3	2.6	34	13	23	470	1.6
Dibenz(a,h)anthracene				ND	ND			ND	ND	ND	ND	ND	ND	ND
Dibenzofuran				ND	ND			1.1	0.84	ND	3.3	7.2	290	ND
Fluoranthene				17	80			5.1	4.9	63	24	44	1,080	4.3
Fluorene				27	120			6.7	5	72	15	27	910	3.7
Indeno(1,2,3-cd)pyrene				ND	ND			0.45	0.5	ND	ND	4.5	200	ND
Naphthalene				15	350			8.5	1.9	430	43	97	2,230	16
Phenanthrene				60	290			17	12	260	35	63	3,090	14
Pyrene				26	110			6.3	5.9	96	29	52	1,090	6.1
Total Detected BNA Concentration	NR	NR	NR	261	1,610	NR	NR	78.9	55.1	1,483	274	516	14,110	70.8
Metals														
Arsenic	NR	NR	NR	4.06	6.35	NR	NR	1.12	ND	3.53	3.98	2.33	5.58	1.44
Barium	NR	NR	NR	62.9	94.4	NR	NR	52.4	65.2	76	82.4	80.6	82.6	57.7
Cadmium	NR	NR	NR	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Chromium	NR	NR	NR	12.9	13.4	NR	NR	11.5	12.7	12.9	13.8	14.5	13.7	11.8
Lead	717	308	296	28.7	170	36.1	NR	20.2	15.7	59.6	104	78.6	135	31.4
Mercury	NR	NR	NR	0.21	0.7	NR	NR	0.35	0.32	ND	0.58	0.44	1.62	0.69
Selenium	NR	NR	NR	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Silver	NR	NR	NR	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Total Cyanide	NR	NR	NR	35.8	15.8	NR	NR	0.61	1.44	17.3	5.46	4.51	16	ND
TCLP Lead	0.973	ND	0.09	NR	NR	0.069	ND	NR	NR	NR	NR	NR	NR	NR
TCLP Barium	NR	NR	NR	NR	NR	NR	0.946	NR	NR	NR	NR	NR	NR	NR
PCB	NR	NR	NR	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
TPH	NR	NR	NR	14,000	8,400	NR	NR	760	1,100	6,700	1,900	1,800	9,200	1,400

Notes:
NR = not analyzed
ND = not detected

TABLE 1.3
HOLDER AND TAR WELL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
On-Site Soils Re-Used as Backfill
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

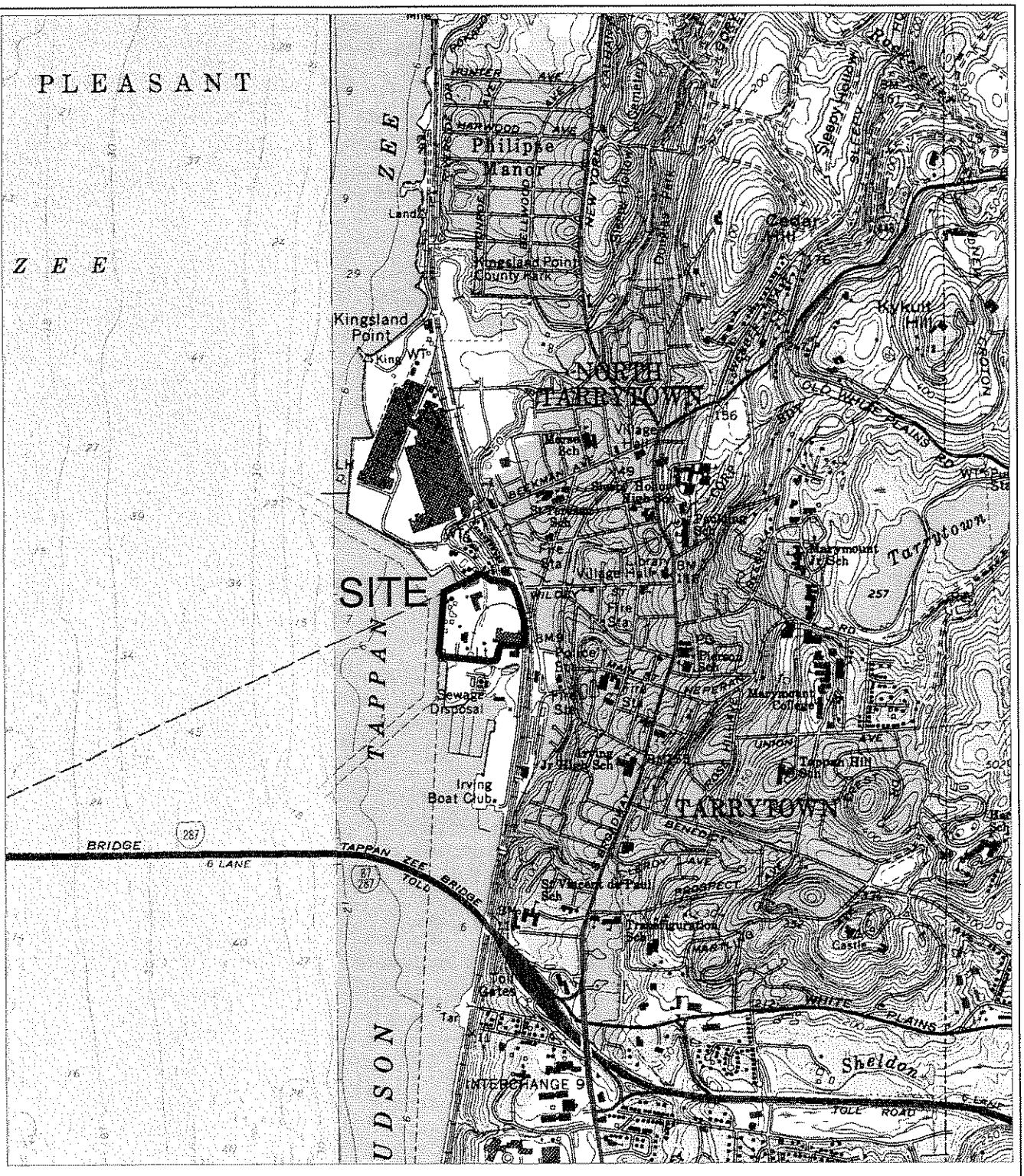
Field/Laboratory ID	Total PAH (ppm)	Total BTEX (ppm)
STP13-Soil Verify-B027	198	ND
STP13-Soil Verify-B028	246	ND
STP13A-Soil Verify-B029	117	0.5
Site Criteria per Work Plan	**500**	**10**

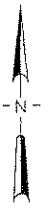
Note: ND = Not Detected.

TABLE 1.4
HOLDER AND TAR WELL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Analysis of Borrow Source Soil
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Compound	NYSDEC TAGM 4046 Cleanup Criteria	Eastern USA Background (mg/kg)	National RE/sources Yonkers, NY (mg/kg)	Jaz Mar Elmsford, NY (mg/kg)	Tilcon Bronx, NY (mg/kg)	Comment
Aluminum	SB	33,000	3	11,800	10,100	OK, Eastern Background
Antimony	SB	N/A	5	25	ND < 0.549	OK, ND
Arsenic	7.5 or SB	3 - 12	1.0	2.2	6.52	OK < 7.5
Barium	300 or SB	15 - 600	0.5	64.5	107	OK < 300
Berylium	0.16 or SB	0 - 1.75	0.4	BDL	ND < 0.439	OK, Eastern Background
Cadmium	1 or SB	0.1 - 1	0.5	BDL	ND < 0.220	OK, ND
Calcium	SB	130 - 35,000	1.0	12,800	11,500	OK, Eastern Background
Chromium	10 or SB	1.5 - 40	0.5	12.2	18.6	OK, Eastern Background
Cobalt	30 or SB	2.5 - 60	0.5	10.1	11.6	OK < 30
Copper	25 or SB	1 - 50	0.5	24.4	31.5	OK, Eastern Background
Cyanide	N/A	N/A	N/A	0.2	ND < 0.115	OK, SB: Site-specific Cyanide values range from ND-41 mg/kg (Parsons data)
Iron	2,000 or SB	2,000 - 550,000	0.5	2.5	10,600	OK, Eastern Background
Lead	SB	200 - 500	0.5	0.5	47.4	OK, Eastern Background
Magnesium	SB	100 - 5,000	0.5	2.5	5,420	OK, Eastern Background
Manganese	SB	50 - 5,000	0.5	0.5	238	OK, Eastern Background
Mercury	0.1	0.001 - 0.2	0.1	0.1	0.0564	OK < 0.1
Nickel	13 or SB	0.5 - 25	0.5	0.5	14	OK, Eastern Background
Potassium	SB	8,500 - 43,000	1.0	1.0	4,200	OK, Eastern Background
Selenium	2 or SB	0.1 - 3.9	2.5	2.5	ND < 0.549	OK, Eastern Background
Silver	SB	N/A	0.5	0.5	ND < 0.439	OK, Background N/A
Sodium	SB	6,000 - 8,000	1.0	1.0	302	OK, Eastern Background
Thalium	SB	N/A	5.0	5.0	ND < 0.320	OK, Background N/A
Vanadium	150 or SB	1 - 300	0.5	0.5	27.9	OK < 150
Zinc	20 or SB	9 - 50	0.5	0.5	93	OK, SB: Site-specific Zinc values range from 28-1540 mg/kg (Parsons data)

Notes:
1) Soil cleanup criteria from NYSDEC Technical and Administrative Guidance Memorandum #4046, dated 24 January 1994.
2) SB = site background.
3) ND = Not detected
4) Results presented as milligrams per kilogram, dry weight.
5) Analysis performed for Target Compound List Volatile and Semi-volatile compounds had results indicating Non-Detect for all analytes.
6) BDL = below detection limit





QUADRANGLE LOCATION: WHITE PLAINS, N.Y.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

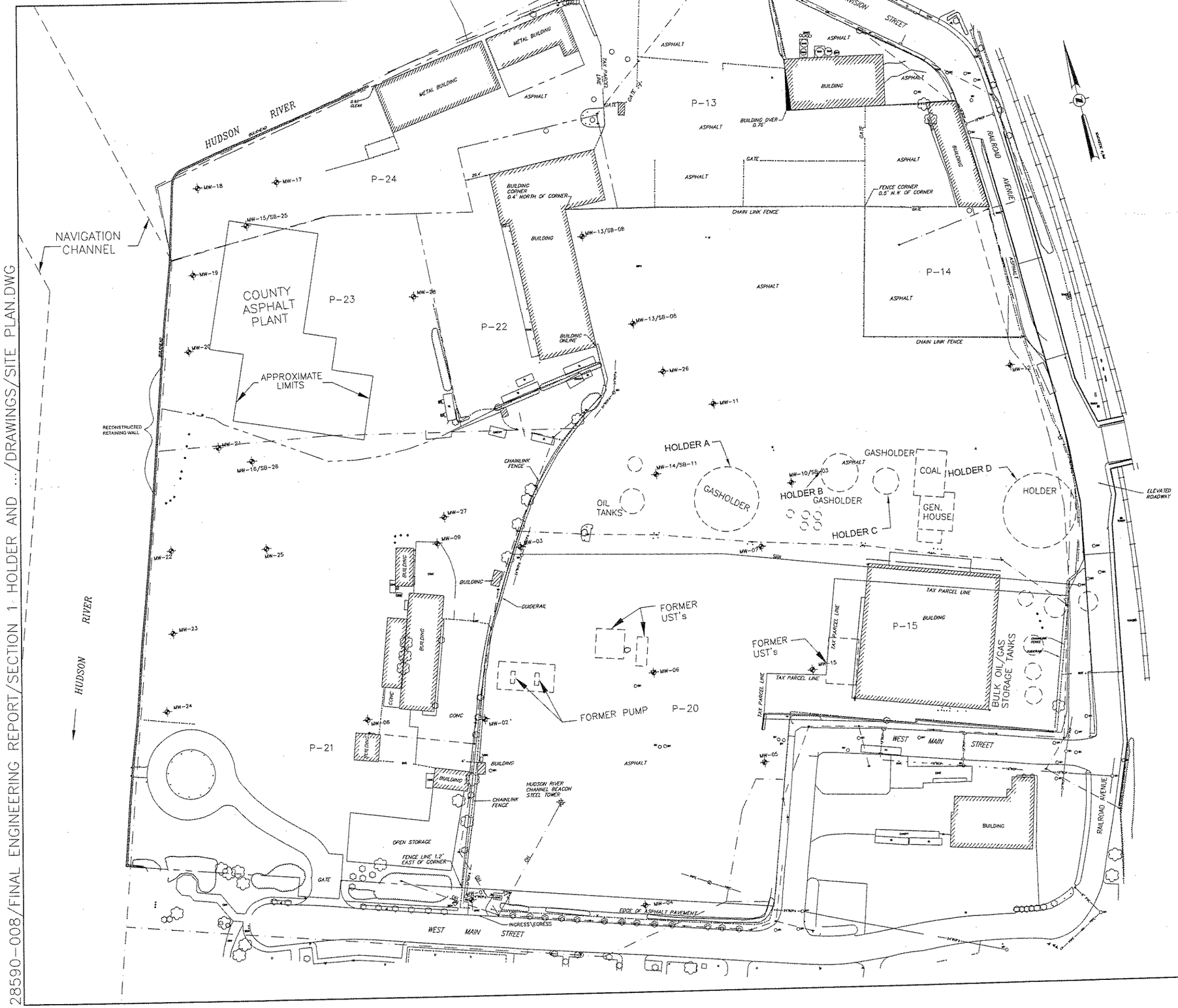
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

HOLDER AND TAR WELL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
SITE LOCUS

SCALE: 1 = APPROX. 24000

MARCH 2005

FIGURE 1.1



BASE MAP LEGEND

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- DEED PARCEL & TAX LINE
- TAX PARCEL LINE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING OVERHEAD WIRES
- EXISTING UNDERGROUND WATER LINE
- EXISTING UNDERGROUND GAS LINE
- EXISTING UNDERGROUND SEWER LINE
- EXISTING UNDERGROUND STORM LINE
- EXISTING HYDRANT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN
- LIGHT POLE
- MONITORING WELL LOCATION
- FORMER STRUCTURES

NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.
2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.
3. THE LOCATIONS OF BORINGS OBSERVED BY HALEY & ALDRICH WERE APPROXIMATELY DETERMINED IN THE FIELD WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE BORINGS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

0 60 120 180 240
SCALE IN FEET

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

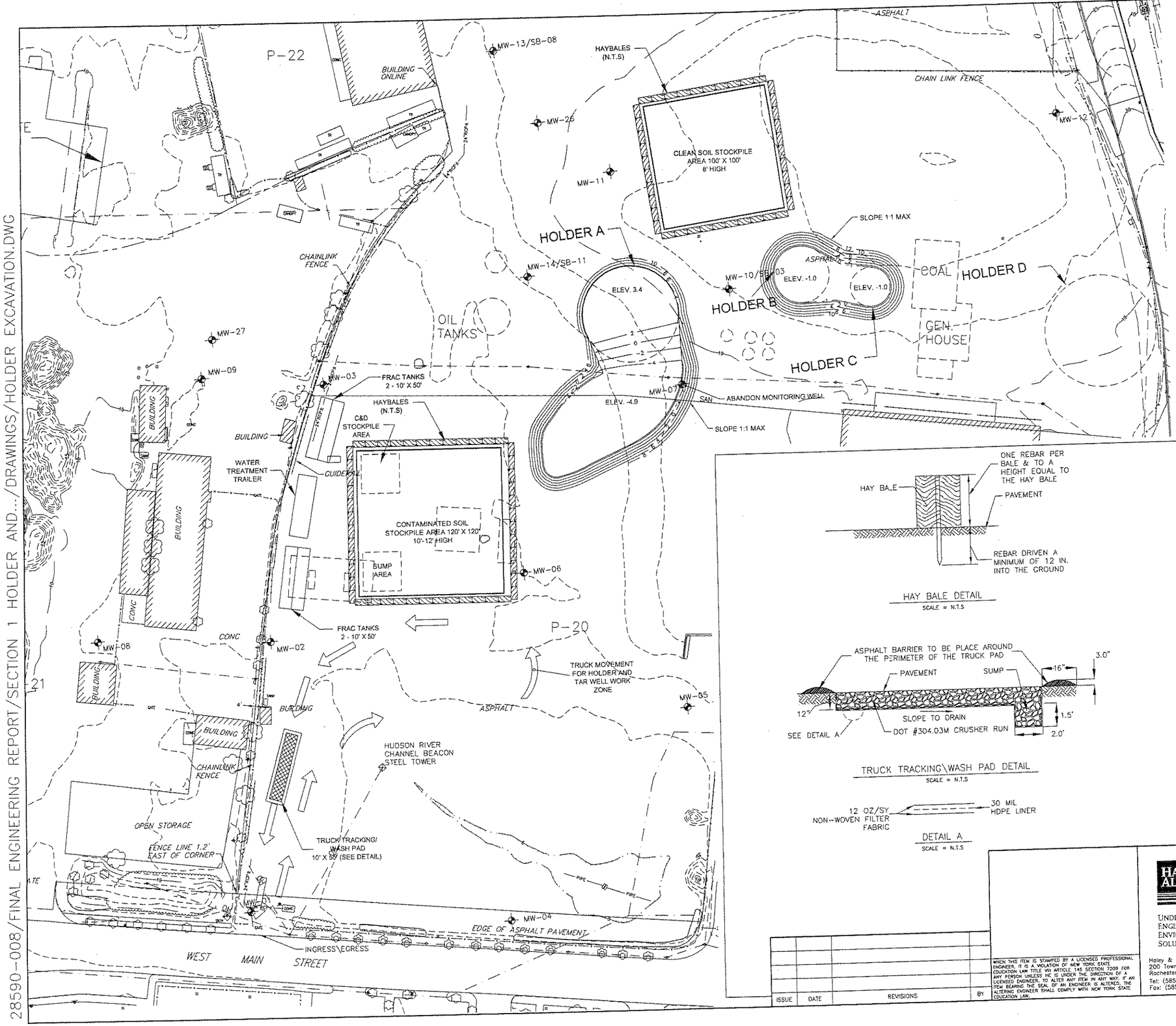
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

HOLDER AND TAR WELL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
SITE PLAN

SCALE: AS SHOWN
MARCH 2005

FIGURE 1.2

28590-008/FINAL ENGINEERING REPORT/SECTION 1 HOLDER AND .../DRAWINGS/SITE PLAN.DWG



HAY BALE DETAIL
SCALE = N.T.S

TRUCK TRACKING\WASH PAD DETAIL
SCALE = N.T.S

DETAIL A
SCALE = N.T.S

BASE MAP LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- DEED PARCEL & TAX LINE
- TAX PARCEL LINE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING OVERHEAD WIRES
- EXISTING UNDERGROUND WATER LINE
- EXISTING UNDERGROUND GAS LINE
- EXISTING UNDERGROUND SEWER LINE
- EXISTING UNDERGROUND STORM LINE
- EXISTING HYDRANT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN
- LIGHT POLE
- MW-28 MONITORING WELL LOCATION
- FORMER STRUCTURES
- HAY BALE

NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.
2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.
3. THE LOCATIONS OF BORINGS OBSERVED BY HALEY & ALDRICH WERE APPROXIMATELY DETERMINED IN THE FIELD WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE BORINGS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

CONSTRUCTION NOTES:

1. LINE CONTAMINATED SOIL STOCKPILE AREA WITH 10 MIL MIN PLASTIC SHEETS.
2. DRAINAGE FROM CONTAMINATED SOIL AND EXCAVATION DEWATERING WATER SHALL BE TREATED WITH CARBON FILTRATION ON-SITE PRIOR TO DISCHARGE.
3. CONTAMINATED SOIL STOCKPILE SHALL BE COVERED WITH BLACK PLASTIC SHEETS (6 MIL MIN). EXCEPT FOR WORKING FACE.
4. ABANDON MW-07 BY FILLING CASING WITH BENTONITE GROUT TO 10 FT. BELOW GROUND SURFACE. CUT OFF CASING FLUSH WITH BOTTOM OF EXCAVATION.
5. BACKFILL EXCAVATIONS TO PRECONSTRUCTION LINES AND GRADES.
6. INITIAL BACKFILL OF EXCAVATION SHALL UTILIZE ON-SITE UNCONTAMINATED EXCAVATION SPOILS AND SOIL. SUBSEQUENT BACKFILL SHALL UTILIZE UNCONTAMINATED OFF-SITE SOIL MATERIALS ACCEPTABLE TO NYSDEC.
7. EXCAVATION AND BACKFILL OPERATIONS SHALL BE IN COMPLIANCE WITH OSHA REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR TRENCH SAFETY, INCLUDING CHOICE OF SHORING AND BRACING METHODS AND MATERIALS, AND CLASSIFICATION OF SITE MATERIALS IN ACCORDANCE WITH OSHA REGULATIONS.
8. ACTUAL LIMITS OF EXCAVATION FOR CONTAMINATED SOIL AND MGP PRODUCT SHALL BE DETERMINED IN THE FIELD, IN CONSULTATION WITH NYSDEC, AND SHALL BE BASED ON SITE CLEAN-UP GUIDELINES IN THE SPECIFICATIONS.
9. TRUCK TRACKING/WASH PAD SHALL BE EQUIPPED WITH SUMP PUMP TO DELIVER WATER TO THE ONSITE WATER TREATMENT SYSTEM.
10. ASPHALT PAVEMENT WITHIN THE TRACKING/WASH PAD BERMS SHALL BE MAINTAINED FREE OF CRACKS, HOLES OR OTHER PATHWAYS FROM SURFACE TO SUBGRADE.

NOT FOR CONSTRUCTION

ISSUE	DATE	REVISIONS	BY

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS
Haley & Aldrich of New York
200 Town Centre Drive
Rochester, NY 14623
Tel: (585) 359-9000
Fax: (585) 359-4650

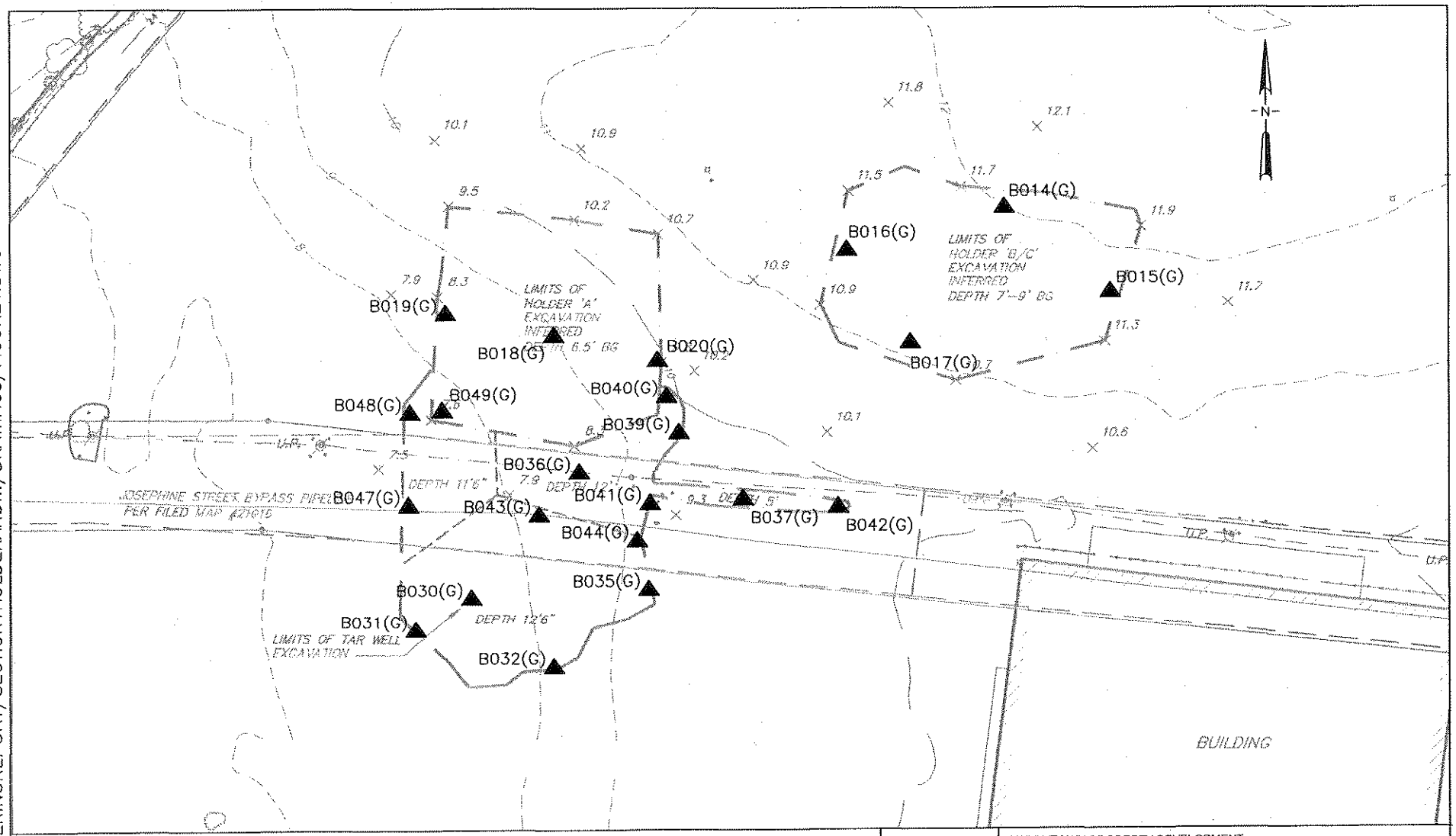
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

HOLDER AND TAR WELL AREA FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE EXCAVATION PLAN

Project Engineer:	JDB
Designed By:	JDB
Drawn By:	WCA
Checked By:	JDB
Sheet No.:	1 of 1
Date:	MARCH 2005
Scale:	AS SHOWN
File No.	28590-002
FIGURE	1.3
Issue	A

0 40 80
SCALE IN FEET

28590-008/FINAL ENGINEERING REPORT/SECTION 1 HOLDER AND.../DRAWINGS/HOLDER EXCAVATION.DWG



NOTE:

1. BASE PLAN ADAPTED FROM CHAZEN ENGINEERING & LAND SURVEYING CO.,P.C. DRAWING ENTITLED "AS-BUILT SURVEY LNAPL & DNAPL REMEDIATION AREAS" DATED 10/11/04.

▲ Approximate Soil Sample Locations
B019(G)

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

HOLDER AND TAR WELL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
CONFIRMATION SOIL SAMPLE LOCATIONS

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 1.4

28590-008/FINALENGINEERINGREPORT/SECTION1HOLDERAND.../DRAWINGS/FIGURE4.DWG

28590-008/FINALENGINEERINGREPORT/SECTION1HOLDERAND.../DRAWINGS/FIGURE4.DWG

SEE DRAWING "AS-BUILT SURVEY GAS HOLDERS & TAR WELL, LNAPL, DNAPL & WDNAPL REMEDIATION AREAS", DRAWING SP1, 3/24/05, BY CHAZEN ENGINEERING AND LAND SURVEYING CO. P.C., SEE APPENDIX G

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

HOLDER AND TAR WELL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
RECORD DRAWING OF HOLDER
AND TAR WELL AREA

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 1.5

Section 2

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

Revised 30 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Section 2 - LNAPL Area
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval this Final Engineering Report for Tarrytown Former MGP Site, Section 2 for the LNAPL Area at the Tarrytown Former Manufactured Gas Plant (MGP) Site. This report provides a description of the remediation that has been performed in the LNAPL Area of the site, and presents record drawings of the work that has been performed.

The scope of remediation was based on the 22 July 2003 Revised Conceptual Remediation Plan prepared by Haley & Aldrich, which will be referred to in this report as the Decision Document (Reference 1). The Decision Document was approved by NYSDEC on 3 September 2003 (Reference 2). The remediation was performed under the provisions of the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program. The parties to the Brownfield Cleanup Agreement for the remediation were NYSDEC and, as volunteers, Ferry Landings, LLC, Ferry Investments, LLC and Consolidated Edison Company of New York, Inc. The remediation was performed by D.A. Collins Environmental Services under an agreement with Ferry Landings, LLC. Engineering services during remediation were performed by Haley & Aldrich of New York under an agreement with Ferry Landings, LLC.

This is the second section of the Final Engineering Report for Tarrytown Former MGP Site. The other areas of the site for which separate sections of the Final Engineering Report will be prepared are:

- Section 1 Holder and Tar Well Area
- Section 3 Northern DNAPL Area
- Section 4 Western DNAPL and Sediment Removal Area
- Section 5 Final Engineering Report Appendices

The reports are organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

SUMMARY OF REMEDY FROM DECISION DOCUMENT

The site is located on the east side of the Hudson River, north of the Tappan Zee Bridge, in the Village of Tarrytown, New York. The site locus is shown on Figure 2.1, and a plan view of the site is shown on Figure 2.2. The site encompasses approximately 20 acres, and currently is primarily industrial-commercial in use.

As described in a number of previous reports (see References), the site exhibits contamination in several areas that are derived either from the former MGP or from former fuel storage and handling operations. This Final Engineering Report addresses contamination associated with LNAPL generally located within the south central portion of the site. The work area is shown on Figure 2.3.

Measurements in 1998 and 1999 by Handex Group, Inc. identified a zone of measurable free floating LNAPL (primarily diesel fuel) in a triangular area defined by MW-2, MW-3, and MW-6 (Reference 6).

Additionally, residual contamination due to historic LNAPL releases was evident between the triangular area of free-floating LNAPL and West Main Street (see Figure 2.3). April 2003 and July 2003 investigations confirmed previous data regarding residual contamination in that area. No contamination was observed in the top 4 ft of soil. Some odors, staining, and PID readings greater than 100 ppm were observed between 4 and 8 ft depth. Of thirteen soil samples obtained, only one exhibited a soil contaminant concentration that exceeded TAGM clean up target levels for total BTEX, and none exceeded the target cleanup concentration for total PAH.

The purpose of the remedial action in this area was to remove, to the extent practical, the floating free LNAPL and to remove and treat the contaminated soils in the smear zone between the high and low water table, in areas where they would be expected to potentially cause unacceptable concentrations of contaminants in soil vapor. The remedial action is described in detail in the report "Tarrytown Former MGP Site LNAPL Area Design Report," dated 18 December 2003 (Reference 3). This report is also referred to herein as the Work Plan. The Work Plan was approved by NYSDEC on 30 January 2004 (Reference 4).

The two main components of the approved remedial design for the LNAPL Area were installation of a recovery trench and excavation of contaminated soils. A summary of the remediation, as described in the Work Plan, is presented below.

Recovery Trench

A recovery trench, including three lines of 4-in. diameter perforated polyethylene plastic pipe, was proposed to be installed parallel to and about 80 ft north of the West Main Street right-of-way in a location down gradient from the zone where remnants of floating LNAPL were previously identified. The new trench would be connected to the existing recovery trench. The proposed recovery trench location is identified on Figure 2.3. The proposed bottom of the

trench excavation would be approximately 7 ft below ground surface. The three pipes would be set at elevations 0.0, 1.5 and 3.0 ft above mean sea level to account for the fluctuation in ground water table elevation in this part of the site. An extraction manhole would be installed to collect remaining free product during the remedial construction project. The trench would be backfilled with crushed stone to approximately one foot above high water table elevation. The balance of the trench would be backfilled with on-site soils meeting requirements for use as common fill.

A 4-in. diameter floating head oil skimmer and pneumatic bladder pump would be installed in both the new manhole and the existing recovery trench manhole. Free floating LNAPL would be actively skimmed and pumped to a 500-gallon, double-walled storage tank located in an adjacent pre-engineered storage enclosure. The tank would be equipped with a high-water sensor which would automatically turn off the skimmer pumps to prevent pumping of product to an already full tank. Recovered oil would be recycled or disposed of offsite. Given the limited amount of remaining floating product, it was expected that the system would need to be operated from the time of installation throughout the period of site remedial construction.

Soil Excavation

The second part of the proposed remedial action consisted of excavating contaminated soil from the area between the free floating LNAPL and West Main Street, where residual soil contamination was found to exceed site clean-up target levels. Excavation would be performed by conventional methods.

At the lowest point, the excavation was not expected to exceed 8 ft below ground surface. The excavation would be backfilled using the uncontaminated on-site soils taken from the excavation. The balance of backfill would be either treated soil or other imported clean fill meeting established requirements for use as backfill on the site.

Water that collected in the excavation and required management would be pumped from the excavation, and sent to the on-site water treatment system, prior to discharge. Discharge would comply with the Construction Water Management Plan, prepared by D.A. Collins Environmental Services, dated 8 September 2003, and approved by NYSDEC 26 September 2003. An oil skimmer would be operated in the excavation to remove any free product that may collect. The recovered LNAPL would be sent off site for recycling or disposal at a permitted facility.

SUMMARY OF REMEDIAL ACTIONS COMPLETED

Actions Completed

Excavation was completed in accordance with the Work Plan. Skimming of the water in the LNAPL Area excavation was completed, and confirmation samples were taken from the excavation side walls and bottom. See Figure 2.4 for confirmation sample locations. Table 2.1 summarizes the confirmation sampling results. The samples satisfied the requirements of the Work Plan. The approximate limits of the excavation are shown on the record drawing, Figure 2.5, prepared by Chazen Engineering & Land Survey Co., P.C. Backfill of the LNAPL Area was completed according to the Work Plan. The excavation and backfill of the

LNAPL Area took place in the seven weeks between 27 May 2004 and 13 July 2004.

Excavation of the LNAPL recovery trench, placement of perforated recovery pipes, backfill, and installation of the new manhole were completed according to the Work Plan. The new LNAPL pump station and appurtenances were installed according to the Work Plan. The limits of trench excavation, location of the new manhole, and location of the new pump station are shown on Figure 2.5. The new manhole and LNAPL recovery trench were completed during the period from 13 to 31 July 2004. The LNAPL pump station was completed and made operational on 17 December 2004.

Problems Encountered During Construction and Resolutions

No significant problems were encountered during construction. Management of water entering the excavation was difficult because the rate of groundwater intrusion tended to exceed the rate at which the water could be practically and economically pumped and treated. Consequently, most of the excavation below the water table was performed with water in the excavation. After the excavation was completed, absorbent booms were used to remove residual floating LNAPL from the water surface prior to backfill.

Changes to Design Documents

At approximately 90 ft east of the manhole, the depth to bedrock was insufficient to allow installation of the bottom two collection pipes. Based on pre-design investigations, and on the Work Plan, this condition was expected but was to be handled when confirmed by direct observation once the excavation was open. The bottom two pipes were ended at approximately 90 ft east of the manhole. The top pipe ended approximately 145 ft east of the manhole, as planned.

The following major pieces of equipment were installed for LNAPL recovery:

- 8 X 10 X 8'4" high Steel Framed Vinyl Sided Enclosure with Shed Roof – Fliteway Technologies
- Dual Wall Vertical 500-gal Steel Tank - Mass Tank and Engineering Corp.
- Model 4TW29 2hp air compressor - Westward Tools
- Selective Oil Skimmers (2) – SOS-4-003 – Clean Environment Equipment
- Bladder Pumps (2) – PP2-24-56 - Clean Environment Equipment

This specific equipment was not listed in the design documents, but Haley & Aldrich determined that these items satisfied the project specifications during review of Contractor submittals.

Quantities and Concentration of Contaminants Removed or Treated

Results of laboratory testing for waste characterization of materials to be transported offsite for disposal are summarized on Table 2.2. The laboratory data sheets were previously submitted to NYSDEC by D.A. Collins Environmental Services and, as requested by NYSDEC, are not re-copied with this submittal, but are available upon request.

Approximately 140,000 gallons of construction water was pumped from the excavations in the LNAPL Area, Holder and Tar Well Area, and Northern DNAPL Area, treated, and

discharged, per the Work Plan. Treated water was stored in frac tanks and tested prior to discharge. The test results are summarized in Table 2.3. The laboratory data sheets were previously submitted by D.A. Collins Environmental Services and are available upon request.

Materials Disposed

The following table represents materials disposed for the entire project. Based on conversations with NYSDEC, it was determined unnecessary to categorize the disposed materials according to the place of origin on the project site.

Materials Disposed During Remediation at the Tarrytown Former MGP Site

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton
DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton
Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

REMEDIATION STANDARDS APPLIED TO REMEDIAL ACTIONS

The site cleanup target level for samples taken from the limit of excavation was 10 ppm total BTEX and 500 ppm for total PAH in the area designated for future residential use. Similarly, the target for backfilled on-site soil was 10 ppm total BTEX and 500 ppm total PAH. These levels were previously established in the NYSDEC-approved Work Plan. The Work Plan also noted that strict conformance with site cleanup levels was not necessary on the north side where the recovery trench will provide separation between the soil excavation area and the limited use area to the north. Regardless of this caveat, the confirmation samples met the target levels on all sides of the excavation.

PRE- AND POST-REMEDIAL DATA

Pre-remedial data was discussed and summarized in several previously-submitted reports (Reference 7). Please refer to the referenced reports for the pre-remedial data.

As described previously, post-remedial data was obtained by acquiring confirmation samples from the excavation sides and bottoms. Analytical results were compared to the site cleanup target levels. A summary of the analytical results is provided on Table 2.1. All confirmation samples met the target levels at all locations.

The laboratory analytical testing data was previously submitted in monthly progress reports and is available upon request.

SITE RESTORATION ACTIVITIES

The excavations in the LNAPL Area were backfilled upon completion in accordance with the Work Plan. A marker layer, consisting of orange geotextile, was placed on top of the backfill subgrade and covered by approximately 6 in. of ¾-in. gravel. The purpose of the marker is to

indicate the interface between onsite fill below and imported clean fill above. NYDEC requested that the marker layer be placed a minimum of 2 ft below the final grade for future development. The future grade in this area will be at least 1.5 ft higher than the existing, yielding a final total depth of clean fill to the marker layer of more than 2 ft.

SOURCE AND QUALITY OF FILL

On-site overburden soils from the LNAPL Area excavation that met the site cleanup criteria were used as backfill. Table 2.4 shows laboratory results of testing for the overburden soils, indicating that they satisfied the site criteria for re-use of on-site soils of 10 ppm Total BTEX and 500 ppm Total PAH. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

In addition, clean fill was brought to the site from three locations:

- Bronx, NY location operated by Tilcon
- Elmsford, NY location operated by Jaz Mar
- Yonkers, NY location managed by National RE/sources

Testing was performed to verify the chemical composition of the imported fill. Results of the laboratory testing are summarized in Table 2.5. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

RECORD DRAWINGS

A plan showing the excavation limits for the LNAPL Area was prepared by Chazen Engineering & Land Survey Co., P.C. is included (see Figure 2.5). A plan showing the equipment layout in the pump station, prepared by D.A. Collins Environmental Services is provided (see Figure 2.6).

MANIFESTS

Manifests documenting contaminated soils that were removed from the site through the duration of remedial activities were maintained during remedial construction. The manifests are available upon request.

ENGINEERING OR INSTITUTIONAL CONTROLS REQUIRED

The Brownfield Cleanup Agreement under which this remedial action was performed includes, at a minimum, the following controls:

- No future use of onsite groundwater
- Future development must be in accordance with the Site Management Plan
- Condition of onsite engineering controls must be reported to NYSDEC on an annual basis

Details on requirements for the future development of the site are provided in the Site Management Plan. While the LNAPL recovery system is in operation, annual reports on the condition of the recovery system, including quantities of product recovered, will be required

and will be submitted in the annual engineering controls report. Section 5 of this document (Final Engineering Report Appendices) contains an environmental easement map (sheet no. SP1) as prepared by The Chazen Companies and dated 7 February 2005. Reference should also be made to the approved Institutional and Engineering Controls Plan for the Tarrytown Former MGP Site.

OPERATION, MAINTENANCE, AND MONITORING (OM&M)

The remedial actions associated with the LNAPL contamination were excavation and a recovery trench. The purpose of the excavation portion of the remediation was to permanently remove the subject LNAPL contaminated soils that exceeded the site cleanup criteria, as presented in the Work Plan. In this area, no soils are left to require long-term monitoring, therefore no Operations & Maintenance, other than the LNAPL recovery system described above, is needed.

The purpose of the recovery trench portion of the remediation was to remove the remnants of LNAPL product from the water table. The LNAPL recovery system was planned to be operated during remedial construction activities at the site only, and discontinued at the completion of construction activities. However, due to the overall project schedule and sequence, the recovery system was not activated until near the end of the remedial construction. The system will operate for a minimum of six months, and thereafter until it is shown that product can no longer be practically recovered. During operation, the system will be checked once per week to ensure that it is functioning properly. The oil storage tank is being and will continue to be probed weekly to determine the quantity of product collected during that time period.

Refer to the Site Management Plan for a discussion of requirements regarding management of the site soils in this area of the overall site during design and construction of future developments at the site. Reference should also be made to the approved Operation, Maintenance, and Monitoring Plan for the Tarrytown former MGP Site, for description for the operation and maintenance requirements for the LNAPL recover system.

CLOSURE

This report described the Work Plan for the LNAPL Area, summarized the remedial activities performed, described approved deviations from the Work Plan and the reasons for them, and provided record drawings of the remedial construction. A certification that the work was performed in accordance with the Work Plan (and approved deviations) signed by the professional engineer responsible for oversight of the work is included with the cover letter to the Final Engineering Report.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

Table 2.1 - Summary of Analytical Laboratory Results – Confirmation Samples
Table 2.2 - Summary of Analytical Laboratory Results – Waste Characterization for Materials Disposed Off-Site
Table 2.3 - Summary of Analytical Laboratory Results – Treated Water Discharge
Table 2.4 - Summary of Analytical Laboratory Results – On-Site Backfill Verification Testing
Table 2.5 - Summary of Analytical Laboratory Results – Clean Fill Verification Testing
Figure 2.1 - Site Locus
Figure 2.2 - Site Plan
Figure 2.3 - Plan of LNAPL Area showing Proposed Remedial Action
Figure 2.4 - LNAPL Area Location of Confirmation Samples
Figure 2.5 - Record Drawing of LNAPL Area
Figure 2.6 – Record Drawing of Pump Station Layout

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

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REFERENCES

1. "Tarrytown Former MGP Site, Revised Conceptual Remediation Plan," prepared by Haley & Aldrich of New York, latest revision dated 22 July 2003.

2. Approval letter for Conceptual Remedial Action Work Plan and Supplemental Site Investigation Report, prepared by New York State Department of Environmental Conservation, dated 3 September 2003.

3. "Tarrytown Former MGP Site, LNAPL Remedial Design Report," prepared by Haley & Aldrich of New York, dated 18 December 2003.

4. Approval letter for Northern DNAPL Area Design Report and LNAPL Area Design Report, prepared by New York State Department of Environmental Conservation, dated 30 January 2004.

5. "Tarrytown Former MGP Site, Site Management Plan," prepared by Haley & Aldrich of New York, dated 15 December 2003.

6. Letter from Haley & Aldrich to NYS Department of Environmental Conservation, 13 March 2003.

7. List of Reports Containing Pre-Remediation Site Characterization Data:

1990	Metcalf & Eddy	Preliminary Soil Gas Survey Results, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1991	Metcalf & Eddy	Site Assessment for Anchor Motor Freight, Inc., Tarrytown, New York.
1991	Metcalf & Eddy	Underground Storage Tank Removal, Valente Industries, Tarrytown, New York.
1994	Metcalf & Eddy	Geoprobe Subsurface Investigations, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1994	Woodward-Clyde	Results of Geophysical Survey, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1995	Rust	Site Environmental History, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	RETEC	Site Investigation, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	Rust	Underground Storage Tank Field Observation Report, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1997	Parsons Engineering Science	Site Investigation Report for the Tarrytown Site, ConEdison, Tarrytown, New York.
2000	Parsons Engineering Science	Supplemental Site Investigation Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2000	Handex	Site Status Report, Penske Truck Leasing, Tarrytown, New York.

2002	Parsons Engineering Science	Supplemental Sediment Sampling Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Site Investigation Report, Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2003	Haley & Aldrich	Supplemental Site Investigation – Spring 2003, Tarrytown Former MGP Site, Tarrytown, New York
2003	Haley & Aldrich	Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York
2004	Haley & Aldrich	Northern DNAPL Supplemental Investigation, Tarrytown Former MGP Site Remediation, Tarrytown, New York

TABLE 2.1
LNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Confirmation Samples
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Field ID	Laboratory ID	Total PAH (ppm)	Total BTEX (ppm)
LNAPL11-E-N1	FRMR MGP SITE UNAPL 11	117	ND
LNAPL12-E-N2	FRMR MGP SITE UNAPL 12	35	ND
LNAPL13-E-S1	FRMR MGP SITE UNAPL 13	19	ND
LNAPL14-E-S2	FRMR MGP SITE UNAPL 14	64	ND
LNAPL15-W-N1	FRMR MGP SITE UNAPL 15	118	ND
LNAPL16-W-N2	FRMR MGP SITE UNAPL 16	345	2.1
LNAPL17-W-S1	FRMR MGP SITE UNAPL 17	ND	ND
LNAPL18-W-S2	FRMR MGP SITE UNAPL 18	54	ND
LNAPL19-S1	FRMR MGP SITE UNAPL 19	ND	ND
LNAPL20-S1	FRMR MGP SITE UNAPL 20	28	ND
LNAPL21-BOTTOM	FRMR MGP SITE UNAPL 21	170.6	ND
Site Clean-up Criteria per Work Plan		**500**	**10**

Notes: ND = Not Detected.
See Figure 4 for sample locations.

TABLE 2.2
LNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Waste Characterization for Materials Disposed Off-Site
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Sample ID	LNAPL2	LNAPL3	LNAPL4	LNAPL7	LNAPL8	LNAPL9	LNAPL10
Sample Location				Tent NE	Tent SE	Tent SW	Tent NW
Lab Sample Number	AF57825	AF57826	AF57827	AF58901	AF58902	AF58903	AF58904
Sampling Date	5/27/04	5/27/04	5/27/04	5/27/04	5/27/04	5/27/04	5/27/04
Sample Depth (feet bgs)							
	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL
Detected Compounds (mg/Kg or ppm)							
Metals	NR	NR	NR	NR		NR	NR
Arsenic					9.46		
Barium					187		
Cadmium					0.562		
Chromium					20.8		
Lead					1,160		
Mercury					2.13		
Selenium					ND 2.5		
Silver					ND 0.5		
TPH	3,400	960	14,000	8,100	9,500	7,000	2,400

NR = not analyzed
ND = not detected

TABLE 2.3
LNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Treated Water Discharge
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Analyte	Discharge Limitations	Discharge 1	Discharge 2	Discharge 3	Discharge 4
Daily Maximum Flow	140,000 gal	20,000 gal	20,000 gal	20,000 gal	0 gal
pH Range	6.5 to 8.5	<1.0	7.3	NR	NR
Total Suspended Solids	20 mg/l	ND	3.0	6.0	23
Oil & Grease	15 mg/l	<1.0	2.5	<1.0	1.7
Visible Foam	None	None	None	None	None
Individual PAHs	10 ug/l	<10	<11 (or Below PQL)	<10 (or Below PQL)	12, Phenanthrene, only
Benzene	0.8 ug/l	<0.5	<0.5	<0.5	100
Ethylbenzene	5 ug/l	<5.0	<5.0	<5.0	<5.0
Toluene	5 ug/l	<5.0	<5.0	<5.0	16
o-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0
m-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0
p-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0

Analyte	Discharge Limitations	Discharge 5	Discharge 6	Discharge 7	Discharge 8
Daily Maximum Flow	140,000 gal	20,000 gal	20,000 gal	20,000 gal	20,000 gal
pH Range	6.5 to 8.5	NR	NR	NR	NR
Total Suspended Solids	20 mg/l	4.0	5.0	4.0	9.5
Oil & Grease	15 mg/l	<1.0	<1.0	<1.0	<1.0
Visible Foam	None	None	None	None	None
Individual PAHs	10 ug/l	<10 (or Below PQL)	<10 (or Below PQL)	<10 (or Below PQL)	<10 (or Below PQL)
Benzene	0.8 ug/l	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	5 ug/l	<5.0	<5.0	<5.0	<5.0
Toluene	5 ug/l	<5.0	<5.0	<5.0	<5.0
o-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0
m-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0
p-Xylene	5 ug/l	<5.0	<5.0	<5.0	<5.0

Notes:

ND = Not Detected. NR = Not Recorded.

Discharge 4 was not discharged; it was re-treated, tested and discharged as Discharge 5.

TABLE 2.4
LNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
On-Site Soils Re-Used as Backfill
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

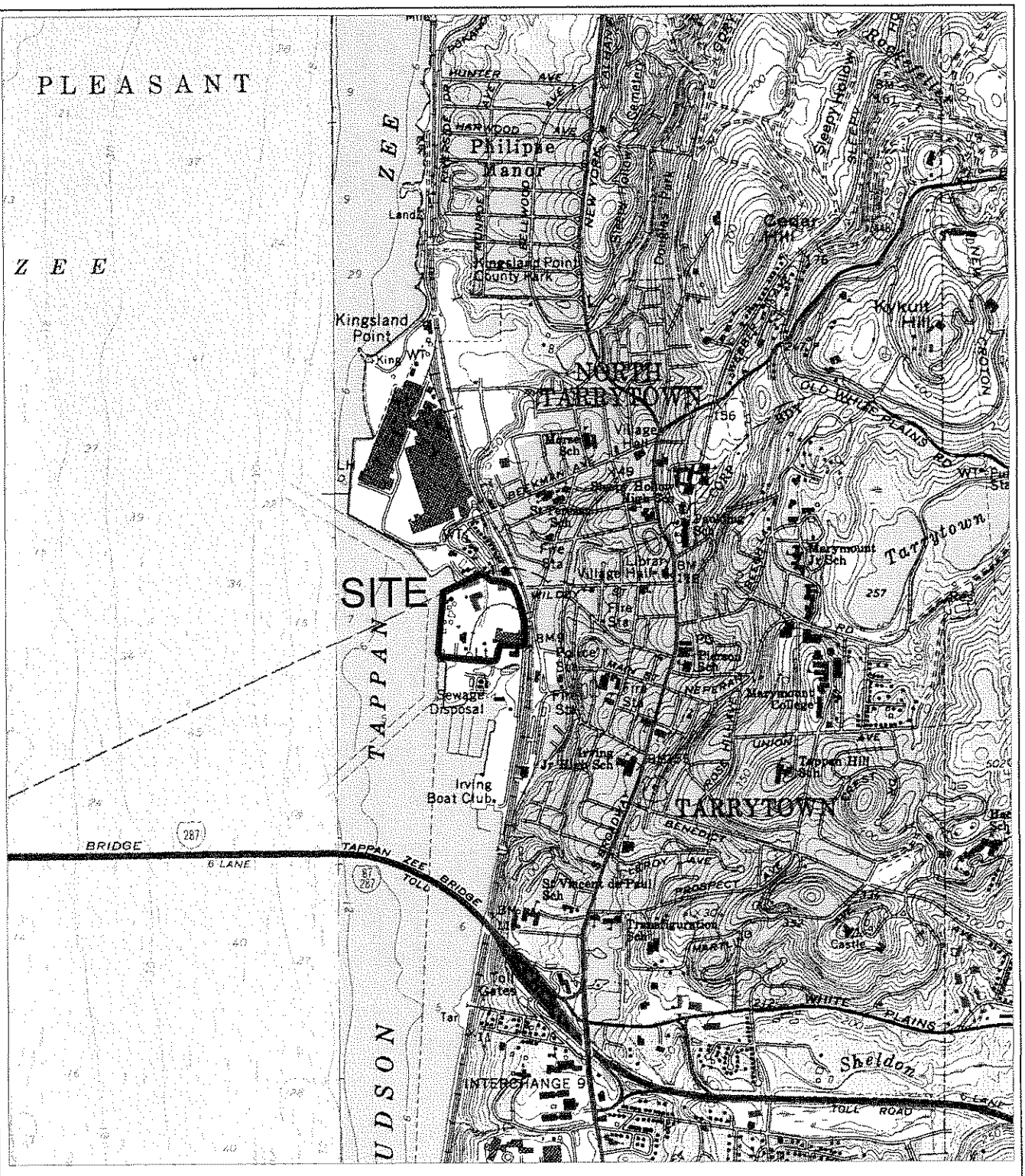
Field/Laboratory ID	Total PAH (ppm)	Total BTEX (ppm)
LNAPL1-Composite	ND	0.066
LNAPL5-Verification Comp	105	4.4
LNAPL6-Verification Comp	154	ND
Site Criteria per Work Plan	**500**	**10**

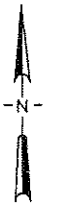
Note: ND = Not Detected.

TABLE 2.5
LNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Analysis of Borrow Source Soil
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Compound	NYSDEC TAGM 4046 Cleanup Criteria	Eastern USA Background (mg/kg)	National RE/sources Yonkers, NY (mg/kg)	Jaz Mar Elmsford, NY (mg/kg)	Tilcon Bronx, NY (mg/kg)	Comment
Aluminum	SB	33,000	3	11,800	10,100	OK, Eastern Background
Antimony	SB	N/A	5	25	ND < 0.549	OK, ND
Arsenic	7.5 or SB	3 - 12	1.0	2.2	6.52	OK < 7.5
Barium	300 or SB	15 - 600	0.5	64.5	107	OK < 300
Berylium	0.16 or SB	0 - 1.75	0.4	BDL	ND < 0.439	OK, Eastern Background
Cadmium	1 or SB	0.1 - 1	0.5	BDL	ND < 0.220	OK, ND
Calcium	SB	130 - 35,000	1.0	12,800	11,500	OK, Eastern Background
Chromium	10 or SB	1.5 - 40	0.5	12.2	18.6	OK, Eastern Background
Cobalt	30 or SB	2.5 - 60	0.5	10.1	11.6	OK < 30
Copper	25 or SB	1 - 50	0.5	24.4	31.5	OK, Eastern Background
Cyanide	N/A	N/A	N/A	0.2	ND < 0.115	OK, SB: Site-specific Cyanide values range from ND-41 mg/kg (Parsons data)
Iron	2,000 or SB	2,000 - 550,000	0.5	2.5	10,600	OK, Eastern Background
Lead	SB	200 - 500	0.5	0.5	47.4	OK, Eastern Background
Magnesium	SB	100 - 5,000	0.5	2.5	5,420	OK, Eastern Background
Manganese	SB	50 - 5,000	0.5	0.5	238	OK, Eastern Background
Mercury	0.1	0.001 - 0.2	0.1	0.1	0.0564	OK < 0.1
Nickel	13 or SB	0.5 - 25	0.5	0.5	14	OK, Eastern Background
Potassium	SB	8,500 - 43,000	1.0	1.0	4,200	OK, Eastern Background
Selenium	2 or SB	0.1 - 3.9	2.5	2.5	ND < 0.549	OK, Eastern Background
Silver	SB	N/A	0.5	0.5	ND < 0.439	OK, Background N/A
Sodium	SB	6,000 - 8,000	1.0	1.0	302	OK, Eastern Background
Thalium	SB	N/A	5.0	5.0	ND < 0.320	OK, Background N/A
Vanadium	150 or SB	1 - 300	0.5	0.5	27.9	OK < 150
Zinc	20 or SB	9 - 50	0.5	0.5	93	OK, SB: Site-specific Zinc values range from 28-1540 mg/kg (Parsons data)

Notes:
1) Soil cleanup criteria from NYSDEC Technical and Administrative Guidance Memorandum #4046, dated 24 January 1994.
2) SB = site background.
3) ND = Not detected
4) Results presented as milligrams per kilogram, dry weight.
5) Analysis performed for Target Compound List Volatile and Semi-volatile compounds had results indicating Non-Detect for all analytes.
6) BDL = below detection limit





QUADRANGLE LOCATION: WHITE PLAINS, N.Y.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

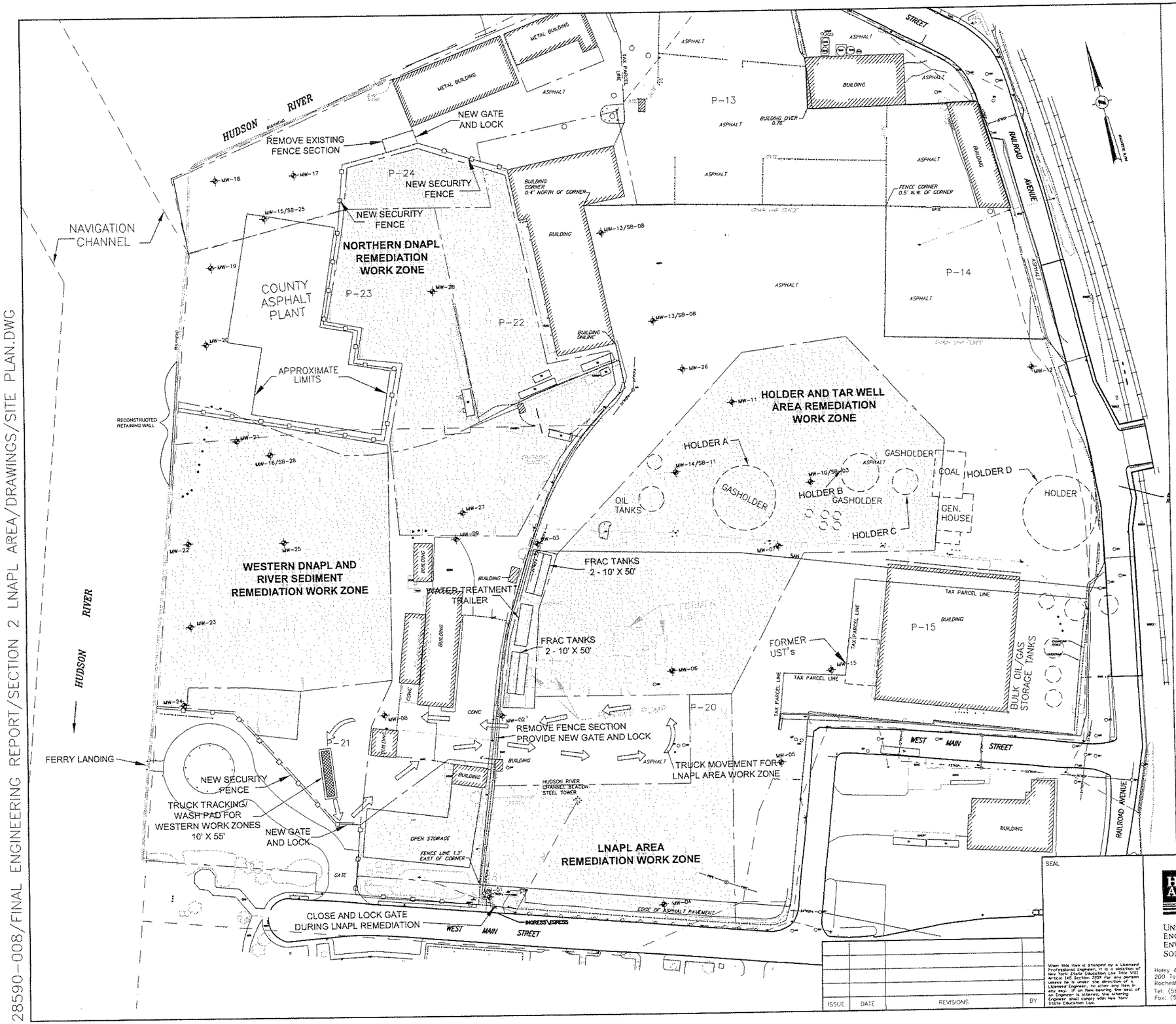
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

LNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
SITE LOCUS

SCALE: 1 = APPROX. 24000

MARCH 2005

FIGURE 2.1



BASE MAP LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- DEED PARCEL & TAX LINE
- TAX PARCEL LINE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING OVERHEAD WIRES
- EXISTING UNDERGROUND WATER LINE
- EXISTING UNDERGROUND GAS LINE
- EXISTING UNDERGROUND SEWER LINE
- EXISTING UNDERGROUND STORM LINE
- EXISTING HYDRANT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN
- LIGHT POLE
- MW-28 MONITORING WELL LOCATION
- FORMER STRUCTURES
- NEW FENCE
- WORK ZONE LIMITS

GENERAL NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.
2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.
3. THE LOCATIONS OF BORINGS OBSERVED BY HALEY & ALDRICH WERE APPROXIMATELY DETERMINED IN THE FIELD WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE BORINGS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. VERTICAL DATUM: NAVD 88.
5. HORIZONTAL DATUM: NYS PLANE EAST ZONE NAD 83.

ISSUE	DATE	REVISIONS	BY

SEAL

When this item is stamped by a Licensed Professional Engineer, it is a violation of New York State Education Law Title VIII Article 145 Section 7209 for any person unless he is under the direction of a Licensed Engineer, to alter any item in any way. If an item bearing the seal of an Engineer is altered, the altering Engineer shall comply with New York State Education Law.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

Haley & Aldrich of New York
200 Town Centre Drive
Rochester, NY 14623
Tel: (585) 359-9000
Fax: (585) 359-4650

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

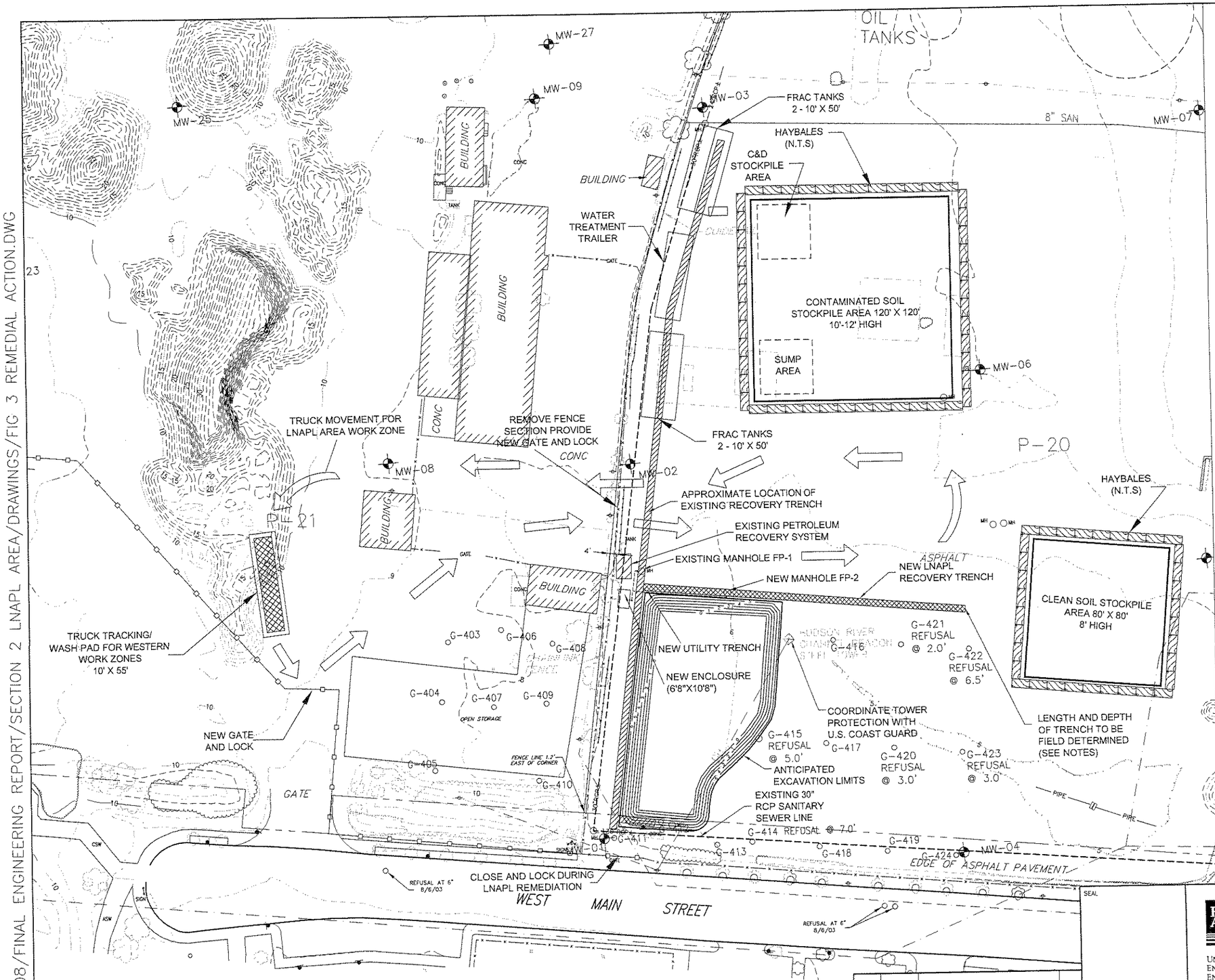
LNAPL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
SITE PLAN

Date	Scale	File No.
MARCH 2005	AS SHOWN	28590-002

0 60 120
SCALE IN FEET

Project Engineer:	JDB
Designed By:	JDB
Drawn By:	WCA
Checked By:	JDB
Sheet No.:	1 of 1
FIGURE NO.	2.2
Issue	

28590-008/FINAL ENGINEERING REPORT/SECTION 2 LNAPL AREA/DRAWINGS/SITE PLAN.DWG



LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- DEED PARCEL & TAX LINE
- TAX PARCEL LINE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING OVERHEAD WIRES
- EXISTING UNDERGROUND WATER LINE
- EXISTING UNDERGROUND GAS LINE
- EXISTING UNDERGROUND SEWER LINE
- EXISTING UNDERGROUND STORM LINE
- EXISTING HYDRANT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN
- LIGHT POLE
- MW-28 MONITORING WELL LOCATION
- FORMER STRUCTURES
- G-401 DIRECT PUSH SOIL BORING LOCATIONS PERFORMED BY GEOLOGIC NY UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK JULY, 2003
- EXISTING CONTOUR LINES
- PROPOSED EXCAVATION CONTOUR LINES, ELEVATION GIVEN IN FEET ABOVE MEAN SEA LEVEL
- NEW CONSTRUCTION FENCE
- TRUCK MOVEMENT FOR LNAPL AREA WORK ZONE

NOTES:

1. BASE MAP ILLUSTRATING EXISTING SITE STRUCTURES, GROUND ELEVATIONS AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/8/98.
2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.
3. EXPLORATION LOCATIONS OF BORINGS WERE APPROXIMATELY DETERMINED IN THE FIELD BY HALEY & ALDRICH OF NEW YORK PERSONNEL WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE EXPLORATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. MONITORING WELLS DESIGNATED MW-1 THROUGH MW-27 INSTALLED BY OTHERS, PRIOR TO 2003. MW-28 INSTALLED BY GEOLOGIC NY UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK, APRIL 2003.
5. FIELD VERIFY EXACT LOCATION OF EXISTING MANHOLE FP-1 AND TRENCH.
6. TIE-IN NEW TRENCH TO EXISTING.
7. SET TEMPORARY ENCLOSURE FOR LNAPL RECOVERY SYSTEM. MOUNT ENCLOSURE ON SKIDS OR TRAILER. PROVIDE POWER IN ACCORDANCE WITH LOCAL CODES.
8. NEW LNAPL RECOVERY TRENCH TO BE CONSTRUCTED ONLY IN OVERBURDEN SOILS, NOT IN BEDROCK. TRENCH SHOWN DEPICTS MAXIMUM EASTWARD EXTENT OF TRENCH. SHALLOW BEDROCK MAY BE ENCOUNTERED AT EASTERN END OF TRENCH. BOTTOM PROFILE OF TRENCH SHALL FOLLOW TOP OF BEDROCK ELEVATIONS IN LOCATIONS WHERE BEDROCK IS LESS THAN 8 FEET BELOW GROUND SURFACE. TRENCH MAY BE TERMINATED AT LOCATION WHERE BEDROCK ELEVATIONS EXTEND ABOVE THE HIGH GROUNDWATER TABLE.
9. LIMITS OF EXCAVATION TO BE DETERMINED IN FIELD BASED ON PRESENCE OF LNAPL CONTAMINATION IN EXCESS OF SITE CLEANUP TARGET LEVELS.
10. EXCAVATION TO BE BACKFILLED WITH ONSITE SPOILS AND/OR IMPORTED SOILS MEETING PROJECT SPECIFICATIONS.
11. NOTWITHSTANDING GENERAL DIRECTIVE TO RESTORE SURFACE FEATURES, THE BACKFILL SHALL BE COMPLETED WITH SIX INCHES OF NYSDOT 304.03M CRUSHER RUN. ASPHALT PAVEMENT NOT REQUIRED.

ISSUE	DATE	REVISIONS	BY

SEAL

When this item is stamped by a Licensed Professional Engineer, it is a violation of New York State Education Law Title VIII Article 145 Section 7209 for any person unless he is under the direction of a Licensed Engineer, to alter any item in any way. If the item bearing the seal of an Engineer is altered, the altering Engineer shall comply with New York State Education Law.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

Haley & Aldrich of New York
200 Town Centre Drive
Rochester, NY 14623
Tel: (585) 359-9060
Fax: (585) 359-4650

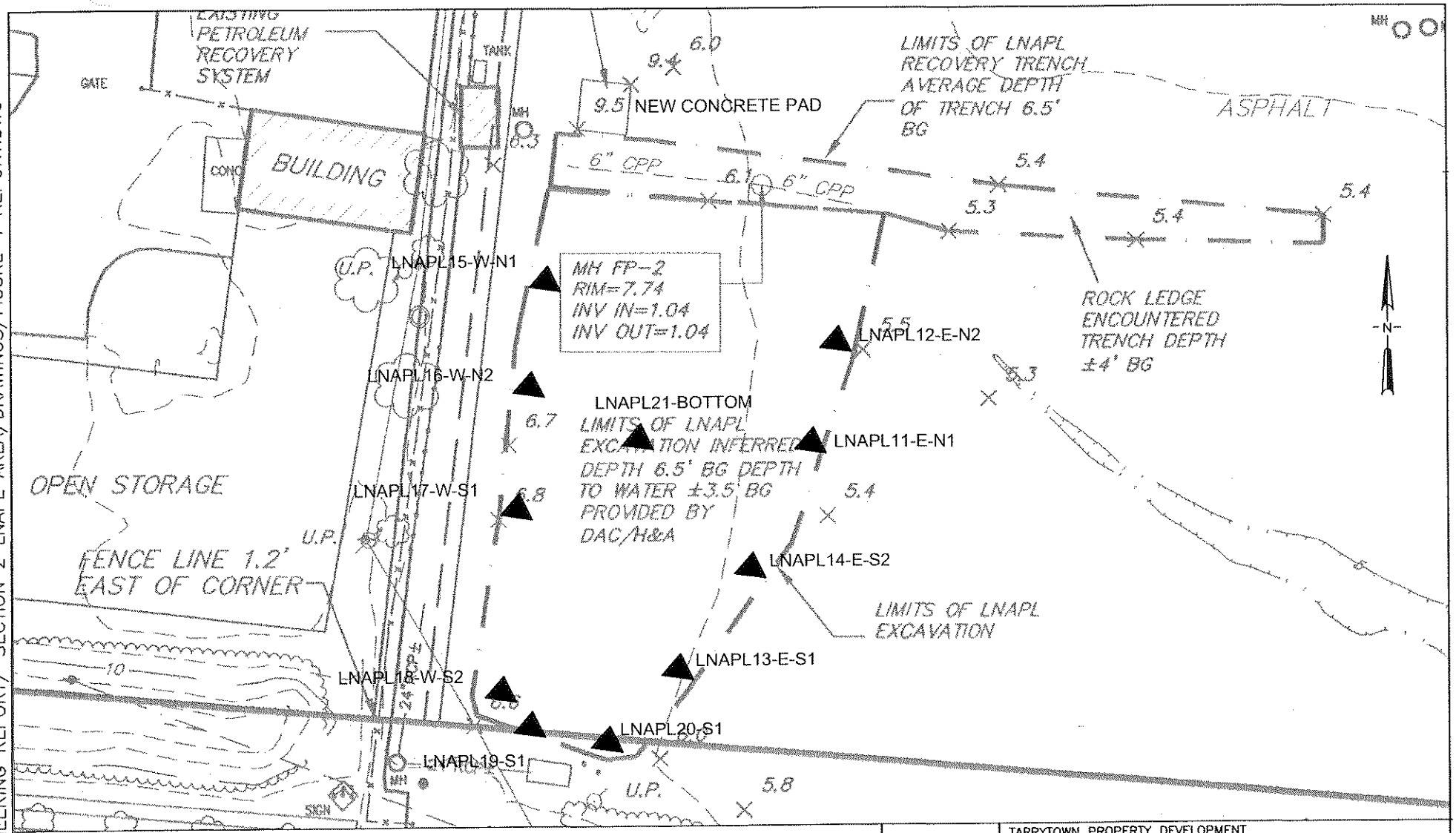
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

LNAPL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
PROPOSED REMEDIAL ACTION

Date: JANUARY 2005	Scale: AS SHOWN	File No. 28590-002	
0 30 60 SCALE IN FEET			

Project Engineer:	JDB
Designed By:	JDB
Drawn By:	WCA
Checked By:	JDB
Sheet No.:	1 of 1
FIGURE NO.	2.3
Issue	

28590-008/FINAL ENGINEERING REPORT/SECTION 2 LNAPL AREA/DRAWINGS/FIG 3 REMEDIAL ACTION.DWG



NOTE:

1. BASE PLAN ADAPTED FROM CHAZEN ENGINEERING & LAND SURVEYING CO.,P.C. DRAWING ENTITLED "AS-BUILT SURVEY LNAPL & DNAPL REMEDIATION AREAS" DATED 10/11/04.

▲ Approximate Soil Sample Locations
LNAPL13-E-S2

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

LNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
LOCATION OF CONFIRMATION SAMPLES

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 2.4

28590-008/FINAL ENGINEERING REPORT/ SECTION 2 LNAPL AREA/DRAWINGS/FIGURE 4 REPORT.DWG

SEE DRAWING "AS-BUILT SURVEY GAS HOLDERS & TAR WELL, LNAPL, DNAPL & WDNAPL REMEDIATION AREAS", DRAWING SP1, 3/24/05, BY CHAZEN ENGINEERING AND LAND SURVEYING CO. P.C.,
SEE APPENDIX G

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

LNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
RECORD DRAWING OF LNAPL AREA

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 2.5

SEE "LNAPL COLLECTION SYSTEM - SYSTEM CONTROLS - AS-BUILT DIAGRAM (15010/16010)," BY D.A. COLLINS ENVIRONMENTAL SERVICES, DATED 6 DECEMBER 2004
SEE APPENDIX E

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

LNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
RECORD DRAWING OF PUMP
STATION LAYOUT

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 2.6

Section 3

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

Revised 30 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Section 3 - Northern DNAPL Area
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval this Final Engineering Report for Tarrytown MGP Site, Section 3 for the Northern DNAPL Area at the Tarrytown Former Manufactured Gas Plant (MGP) Site. This report provides a description of the remediation that has been performed in the Northern DNAPL Area of the site, and presents record drawings of the work that has been performed.

The scope of remediation was based on the 22 July 2003 Revised Conceptual Remediation Plan prepared by Haley & Aldrich, which will be referred to in this report as the Decision Document (Reference 1). The Decision Document was approved by NYSDEC on 3 September 2003 (Reference 2). The remediation was performed under the provisions of the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program. The parties to the Voluntary Cleanup Agreement for the remediation were NYSDEC and, as volunteers, Ferry Landings, LLC, Ferry Investments, LLC and Consolidated Edison Company of New York, Inc. The remediation was performed by D.A. Collins Environmental Services under an agreement with Ferry Landings, LLC. Engineering services during remediation were performed by Haley and Aldrich of New York under an agreement with Ferry Landings, LLC.

This is the third section of the Final Engineering Report for Tarrytown Former MGP Site. The other areas of the site for which separate sections of the Final Engineering Report will be prepared are:

- Section 1 Holder and Tar Well Area
- Section 2 LNAPL Area
- Section 4 Western DNAPL and Sediment Removal Area
- Section 5 Final Engineering Report Appendices

The reports are organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

SUMMARY OF REMEDY FROM DECISION DOCUMENT

The site is located on the east side of the Hudson River, north of the Tappan Zee Bridge, in the Village of Tarrytown, New York. The site locus is shown on Figure 3.1, and a plan view of the site is shown on Figure 3.2. The site encompasses approximately 20 acres, and currently is primarily industrial-commercial in use.

As described in a number of previous reports (see References), the site exhibits contamination in several areas that are associated either with the former MGP or from former fuel storage and handling operations. This Final Engineering Report addresses contamination associated with DNAPL generally located within the northern portion of the site. The work area is shown on Figure 3.3.

The Northern DNAPL Area, as shown on Figure 3.3, is located underneath the existing County Asphalt office building, and is depicted to be about 500 ft long and 200 ft wide (Parsons, 2000, Reference 6). The primary environmental concern in this area is soil affected by discrete zones containing DNAPL (apparently derived from coal tar), as observed in soil borings SB-7, SB-10, SB-16, and SB-19 and in monitoring wells MW-11, MW-13, and MW-26. The subject zones are located between 12 and 15 ft below ground surface (b.g.s.) on the west side of the building and between 9 and 13 ft b.g.s. on the east side. (See *Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York*, 12 September 2003, Reference 10 for details.)

Consequently, the Northern DNAPL Area was proposed to be remediated, and a plan for the remediation (Reference 3) was submitted to and approved by NYSDEC on 30 January 2004. The remediation objective in the Northern DNAPL Area is to prevent potential westward migration by installing a barrier and to facilitate DNAPL recovery capability up-gradient from the barrier (Reference 4). The affected zone of DNAPL is well below grade (deeper than 9 ft) and therefore isolated from surface activities.

The remedial action is described in detail in the report *Tarrytown Former MGP Site, Northern DNAPL Remedial Design Report*, dated 23 December 2003 (Reference 3). This report is also referred to herein as the Work Plan. The proposed remediation consisted of two main components: a barrier and a recovery trench. The planned limits of the remediation in the Northern DNAPL Area are shown in plan view on Figure 3.3, and are generally described below, as excerpted from the Work Plan:

Barrier

> *A maximum 360-foot long barrier, located to the west of the depicted limits of the Northern DNAPL Area is proposed. Soil borings SB-14, SB-15, SB-20, SB-21, SB-22 and SB-23 indicate that there are no zones of soil saturated with DNAPL crossed by the proposed barrier. The barrier will consist of watertight sheeting, driven approximately five feet into the lower permeability silty clay. Slots will be cut into the portion of the sheets extending from a point one foot above the top of the recovery trench drainage*

stone to the high groundwater level. Slots will be cut approximately 8.26 ft center-to-center. This will allow groundwater to pass the barrier. The barrier will be cut off at least three feet below the ground surface.

Recovery Trench

A recovery trench will be installed on the up-gradient side of the barrier wall. The trench will be approximately 360 feet long and reach depths ranging from 17 to 18.5 feet below ground surface. The collection media will extend from the bottom of the trench to approximately 10 feet below ground surface. From that depth to the surface the recovery trench will be backfilled with ordinary fill.

The recovery trench will be constructed after the barrier is in place using biopolymer slurry methods. After drainage stone placement, the trench will be developed, similar to a well. A minimum of three pore volumes will be pumped from the trench.

The recovery trench will extend one to two feet into the silty clay layer. Six recovery wells will be installed, spaced evenly along the trench alignment. The bottom of the recovery trench will be sloped at five percent toward each well, with high points at the midpoint between each well. The backfill will be permeable stone from the bottom to about 10 feet b.g.s., and excavated soils thereafter. A geotextile will separate the permeable stone from the subsequently placed fill soils.

Two observation wells will be installed. One will be located 10 to 15-feet from each end of the recovery trench (pending clearance of site obstructions) to enable detection of mobile DNAPL that may possibly migrate around the ends of the recovery trench.

In the Northern DNAPL area, the soil above the high water table is uncontaminated. It will be stockpiled and used later as backfill. The soil below may or may not exhibit some low level of MGP contamination (odor, sheen, and blebs) and will be field screened to determine if it needs to be disposed at a permitted facility off site.

Water that collects and needs management in the excavation will be pumped from the excavation, and sent to the on-site water treatment system, prior to discharge. Discharge will comply with the NYSDEC-approved Construction Water Management Plan, prepared by D.A. Collins Environmental Services, dated September 8, 2003.

SUMMARY OF REMEDIAL ACTIONS COMPLETED

Actions Completed

The Northern DNAPL Barrier and Recovery Trench were completed in general accordance with the Work Plan.

The recovery trench was constructed prior to the sheet pile barrier, during the period from 8 June 2004 through 18 June 2004. This enabled the contractor to clear subsurface obstructions that would have been obstacles to driving the sheet pile. At the northern end of the recovery trench, north of RW-06N, a large buried concrete obstruction was encountered. Its size and

depth made it impractical to remove from the trench alignment. Therefore, the alignment of the recovery trench was adjusted to the east to avoid the obstacle. The constructed alignment is shown on Figure 3.2. The breaking and flushing of the biopolymer slurry and hydraulic conductivity testing for the recovery trench were successfully completed between 18 June 2004 and 25 June 2004. The barrier sheeting was driven at the western sidewall of the recovery trench between 25 June 2004 and 1 July 2004.

The trench was lined with filter fabric and backfilled with imported stone to approximately 6 feet below ground surface, corresponding to the top of the water table. The filter fabric was wrapped over the top of the imported stone and the trench backfill completed to within 8 inches of ground surface with on-site soils. Then an orange textile marker layer was placed and covered with approximately 8 inches of milled asphalt. Final grade at the location of the recovery trench will be at least 1.3 feet higher than existing grade, so the marker layer will ultimately be at least 2 feet below finished grade.

Problems Encountered During Construction and Resolutions

An obstruction was encountered while driving the barrier sheets approximately 12 ft from the southern end of the barrier. A cylindrical steel vessel, approximately 4feet diameter and 9feet long, was excavated and removed from the west side of the sheeting alignment. The vessel was subsequently identified as a boiler. The excavation was backfilled and sheeting completed. Based on its observations of the boiler excavation, NYSDEC requested an investigation to determine the limits of possible soil contamination that may exceed site clean up guidelines at the boiler excavation.

As a first step in the investigation, an 18-ft long by 6-ft wide by 8.5-ft deep test pit was excavated, starting at the western edge of the boiler excavation and extending to the west, as shown on Figure 3.3. Soil samples were taken from the bottom of the test pit near the eastern end, from the western wall near the bottom and from the northern wall near the bottom. The test pit was backfilled with soils meeting site backfill criteria pending sample test results. Excavated soils were segregated for characterization in accordance with existing site work plan procedures. The sample locations are shown on Figure 3.4. The sample taken at the eastern end of the test pit did not meet site soil cleanup criteria. These results indicated that the boiler excavation may not have sufficiently removed contaminated soils west of the former boiler location.

Consequently, an expanded investigation to evaluate contamination at the boiler excavation was initiated. The subsurface investigation consisted of 18 direct-push borings. After completion of this investigation, Haley & Aldrich submitted a report to NYSDEC to describe the findings of the investigation and to propose a plan to remediate the unexpected contaminated soils encountered during excavation. This report, entitled "Northern DNAPL Supplemental Investigation, Tarrytown Former MGP Site Remediation", dated 23 November 2004 (Reference 5), was amended on 8 December 2004 (Reference 6) in response to comments from NYSDEC. Results of the investigation were summarized in and laboratory analytical reports were appended to the 23 November 2004 report

After receiving approval by NYSDEC (Reference 7), the supplemental remedial work was completed in accordance with the report. The excavation and backfill to top of the water table

was completed during the period from 16 to 23 December 2004 and the backfill was completed during the period from 3 to 7 January 2005. An orange textile marker layer was placed at approximately 8 inches below ground surface.

After remedial excavation in this area was completed, a memorandum (Reference 8) was submitted to NYSDEC to present results of confirmation sampling and to describe a minor deviation to the approved plan. The deviation was due to a hard, concrete-like layer encountered at approximately 13.8-14.3 feet below ground surface in the vicinity of borings BG-7 and BG-13 (see Figure 3.4). It was determined that the concrete-like layer had a relatively uniform surface and that it was a practical obstruction to deeper excavation, as well as to downward migration of DNAPL contaminants. Additionally, the depth of the concrete barrier was nearly the same as the depth of river alluvium in adjacent excavations. Excavation was discontinued at the top of this barrier, and did not continue further downward to the river alluvium as planned. Details on the supplemental excavation performed in the boiler area were presented in *Tarrytown Former MGP Site, Northern DNAPL Supplemental Excavation Confirmation Samples*, memorandum Haley & Aldrich to NYSDEC, dated 28 December 2004 (Reference 8). The report included copies of laboratory analytical data reports for confirmation samples.

Changes to Design Documents

As described in the previous section, there were two notable changes to the design documents, the change in alignment of the barrier and recovery trench at the northern end and excavation of a zone of contaminated soils at the southern end. Both modifications were discussed with and approved by NYSDEC in advance of the work.

Quantities and Concentration of Contaminants Removed or Treated

Casie ProTank, the disposal facility for contaminated soil, did not require soil testing for waste characterization in the Northern DNAPL Area. Testing performed on contaminated site soils excavated from the Holder and Tar Well Area was accepted by Casie Pro Tank. Those testing results were reported in Section 1 of this Final Engineering Report. The Northern DNAPL Area excavation activities were performed in the wet. Groundwater that infiltrated and pooled in the open excavation was not extracted and treated in the on-site wastewater treatment system.

Materials Disposed

The following table represents materials disposed for the entire project. Based on conversations with NYSDEC, it was determined unnecessary to categorize the disposed materials according to the place of origin on the project site.

Table 3.1 Materials Disposed During Remediation at the Tarrytown Former MGP Site

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton
DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton

Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

REMEDIATION STANDARDS APPLIED TO REMEDIAL ACTIONS

The site cleanup target level for the Northern DNAPL area was 10 ppm total BTEX and 500 ppm total PAH. These levels were previously established in the approved Work Plan.

PRE- AND POST-REMEDIAL DATA

Pre-remediation data was discussed and summarized in several previously-submitted reports (Reference 10). Please refer to the referenced reports for the pre-remediation data.

No confirmation samples were required for the installation of the barrier and recovery trench. Confirmation samples were taken from the excavation of contaminated soils in the vicinity of the buried boiler. As described previously, post-remediation data was obtained by acquiring confirmation samples from the excavation sides and bottoms. Analytical results were compared to the site cleanup target levels. A summary of the analytical results is provided in Table 3.2, showing that the site cleanup criteria were satisfied for all samples and analytes required.

The laboratory analytical testing data reports for confirmation samples were previously submitted to and accepted by NYSDEC (References 5, 6, 7, and 8) and are available upon request.

SITE RESTORATION ACTIVITIES

The recovery trench excavation in the Northern DNAPL Area was backfilled upon completion. A marker layer, consisting of orange textile, was placed on top of the backfill subgrade and covered by approximately 8 inches of milled asphalt. In the boiler excavation area, the marker layer was placed at 2 feet below existing ground and the backfill was completed with imported stone (crusher run). The future grades along the Northern DNAPL trench and in the boiler excavation area will be approximately 1.5 feet higher than the existing grades, yielding a final depth to the marker layer of at least 2 feet.

SOURCE AND QUALITY OF FILL

On-site overburden soils from the Northern DNAPL Area excavation that met the site cleanup criteria were used as backfill. Table 3.3 shows laboratory results of testing for the overburden soils, indicating that they satisfied the site criteria for re-use of on-site soils of 10 ppm Total BTEX and 500 ppm Total PAH. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

In addition, clean fill was brought to the site from three locations:

- Bronx, NY location operated by Tilcon
- Elmsford, NY location operated by Jaz Mar
- Yonkers, NY location managed by National RE/sources

Testing was performed to verify the chemical composition of the imported fill. Results of the laboratory testing are summarized in Table 3.4. The laboratory analytical data reports were submitted to and accepted by NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

RECORD DRAWINGS

A plan, prepared by Chazen Engineering & Land Survey Co., P.C., showing the Northern DNAPL recovery trench, observation wells, recovery wells and the excavation limits as completed for contaminated soils at the southern end of the recovery trench is attached (see Figure 3.5).

MANIFESTS

Manifests documenting contaminated soils that were removed from the site during the duration of remedial activities were maintained during remedial construction. The manifests are available upon request.

ENGINEERING OR INSTITUTIONAL CONTROLS REQUIRED

The Voluntary Cleanup Agreement under which this remedial action was performed includes, at a minimum, the following controls:

- No future use of onsite groundwater
- Future development must be in accordance with the Site Management Plan
- Condition of onsite engineering controls must be reported to the NYSDEC on an annual basis.

Details on restrictions and/or requirements for the future development of the site are provided in *Tarrytown Former MGP Site, Site Management Plan,* dated 1 December 2004 (Reference 9). Section 5 of this document (Final Engineering Report Appendices) contains an environmental easement map (sheet no. SP1) as prepared by The Chazen Companies and dated 7 February 2005. Reference should also be made to the approved Institutional and Engineering Controls Plan for the Tarrytown former MGP Site.

OPERATION, MAINTENANCE, AND MONITORING (OM&M)

Monitoring of the DNAPL recovery trench will be required. The plan for system operation involves two phases: start-up and long-term operation. The start up phase will begin after system installation and is expected to continue through the first year of operation. The long term phase will begin after one complete year of operation.

Monitoring will include measurement of water and DNAPL levels in all observation and recovery wells. During the start-up period, the frequency of monitoring will vary from weekly to monthly as needed, to collect information to optimize the recovery operations. Monitoring in the long term will be at a frequency established during the start-up period. Monitoring results will determine the frequency of DNAPL removal.

DNAPL will be removed from the recovery trenches on a periodic basis, using vacuum trucks, removable submersible pumps, or equivalent means. Recovered DNAPL will be placed in New York State Department of Transportation approved containers and then will be transported to permitted facilities for recycling, treatment, or disposal. The frequency of extraction will be determined during the start-up phase. During the start-up phase, the rate of DNAPL recovery in the recovery wells will be monitored. The removal frequency will be adjusted accordingly. By the end of the start-up phase, the frequency of required DNAPL extraction will be established. Extraction of DNAPL will be discontinued if the evidence demonstrates that no further significant quantities can be removed.

Refer to the Site Management Plan (Reference 9) for a discussion of requirements regarding treatment of the soils during design and construction of future developments at the site. Reference should also be made to the approved Operation, Maintenance, and Monitoring Plan for the Tarrytown former MGP Site.

CLOSURE

This report described the Work Plan for the Northern DNAPL Area, summarized the remedial activities performed, described approved deviations from the Work Plan and the reasons for them, and provided record drawings of the remedial construction. A certification that the work was performed in accordance with the Work Plan (and approved deviations) signed by the professional engineer responsible for oversight of the work is included with the cover letter to the Final Engineering Report.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

Table 3.1 - Materials Disposed During Remediation at the Tarrytown Former MGP Site
Table 3.2 – Confirmation Sample Results for Northern DNAPL Supplemental Excavation
Table 3.3 - Summary of Analytical Laboratory Results – On-Site Soils Re-Used as Backfill
Table 3.4 - Summary of Analytical Laboratory Results – Analysis of Borrow Source Soil
Figure 3.1 – Site Locus
Figure 3.2 – Site Plan
Figure 3.3 – Excavation Plan
Figure 3.4 – Confirmation Soil Sample Locations
Figure 3.5 - Record Drawing of Northern DNAPL Area

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

\\ROC\common\Projects\28590\008 Resp to FER Comments\Final Engineering Report\Section 3 Northern DNAPL Area\Final Engineering Report Section 3 30Mar05.doc

REFERENCES

1. "Tarrytown Former MGP Site, Revised Conceptual Remediation Plan," prepared by Haley & Aldrich of New York, latest revision dated 22 July 2003.

2. Approval letter for Conceptual Remedial Action Work Plan and Supplemental Site Investigation Report, prepared by New York State Department of Environmental Conservation, dated 3 September 2003.

3. "Tarrytown Former MGP Site, Northern DNAPL Barrier and Recovery Trench Remedial Design Report," prepared by Haley & Aldrich of New York, latest revision dated 23 December 2003.

4. Approval letter for Northern DNAPL Area Design Report and LNAPL Area Design Report, prepared by New York State Department of Environmental Conservation, dated 30 January 2004.

5. "Tarrytown Former MGP Site, Northern DNAPL Supplemental Investigation," prepared by Haley & Aldrich of New York, dated 23 November 2004.

6. "Tarrytown Former MGP Site, Addendum to the Northern DNAPL Supplemental Investigation Report," memorandum from Haley & Aldrich of New York to NYSDEC, dated 8 December 2004.

7. Approval letter for Northern DNAPL Area Supplemental Investigation, prepared by New York State Department of Environmental Conservation, dated 13 December 2004.

8. "Tarrytown Former MGP Site, Northern DNAPL Supplemental Excavation Confirmation Samples," memorandum from Haley & Aldrich of New York to NYSDEC, dated 28 December 2004.

9. "Tarrytown Former MGP Site, Site Management Plan," prepared by Haley & Aldrich of New York, dated 15 December 2003.

10. List of Reports Containing Pre-Remediation Site Characterization Data:

1990	Metcalf & Eddy	Preliminary Soil Gas Survey Results, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1991	Metcalf & Eddy	Site Assessment for Anchor Motor Freight, Inc., Tarrytown, New York.
1991	Metcalf & Eddy	Underground Storage Tank Removal, Valente Industries, Tarrytown, New York.
1994	Metcalf & Eddy	Geoprobe Subsurface Investigations, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1994	Woodward-Clyde	Results of Geophysical Survey, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1995	Rust	Site Environmental History, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	RETEC	Site Investigation, Anchor Motor Freight, Inc. Tarrytown, New York.

1996	Rust	Underground Storage Tank Field Observation Report, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1997	Parsons Engineering Science	Site Investigation Report for the Tarrytown Site, ConEdison, Tarrytown, New York.
2000	Parsons Engineering Science	Supplemental Site Investigation Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2000	Handex	Site Status Report, Penske Truck Leasing, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Sediment Sampling Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Site Investigation Report, Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2003	Haley & Aldrich	Supplemental Site Investigation – Spring 2003, Tarrytown Former MGP Site, Tarrytown, New York
2003	Haley & Aldrich	Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York
2004	Haley & Aldrich	Northern DNAPL Supplemental Investigation, Tarrytown Former MGP Site Remediation, Tarrytown, New York

TABLE 3.1
NORTHERN DNAPL AREA
Materials Disposed During Remediation
Final Engineer Report for Tarrytown Former MGP Site
Tarrytown, New York

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton
DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton
Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

TABLE 3.2
NORTHERN DNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Confirmation Sample Results for Northern DNAPL Supplemental Excavation
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Sample		Confirmation Sample (Side or Bottom)	Location	Total BTEX (ppm)	Total PAH (ppm)
NDNAPL-	A-B1	Bottom	BG-8 and BG-12 at 17 ft. depth	NA	ND
NDNAPL-	A-West	Side	Main shallow excavation, west of BG-13, 8-10 ft. depth	3.4	9.9
NDNAPL-	A-South	Side	Main shallow excavation, south of BG-8 and BG-12, 8-10 ft. depth	0.78	ND
NDNAPL-	B-North	Side	BG-19, 8-10 ft. depth	ND	105.4
NDNAPL-	B-South	Side	BG-19, 8-10 ft. depth	ND	385
NDNAPL-	B-West	Side	BG-19, 8-10 ft. depth	5.7	323
NDNAPL-	C-B1	Bottom	BG-17, alluvium, 15' depth	NA	ND
NDNAPL-	C-B2	Bottom	BG-18, alluvium, 15'depth	NA	4.2
NDNAPL-	C-South	Side	Between BG-17 and BG-18	ND	34.8
NDNAPL-	C-S1	Bottom	BG-2, alluvium, 16 ft depth	NA	ND
NDNAPL-	C-S2	Bottom	Approx. 5 ft. west of BG-4, alluvium, 16 ft depth	NA	4.34

ND = Not Detected

NA = Not Analyzed

Site Cleanup Criteria: 10 ppm Total BTEX, 500 ppm Total PAH (also see "Tarrytown Former MGP Site, Northern DNAPL Supplemental Excavation Confirmation Samples," memorandum Haley & Aldrich to NYSDEC, dated 28 December 2004.)

TABLE 3.3
NORTHERN DNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
On-Site Soils Re-Used as Backfill
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

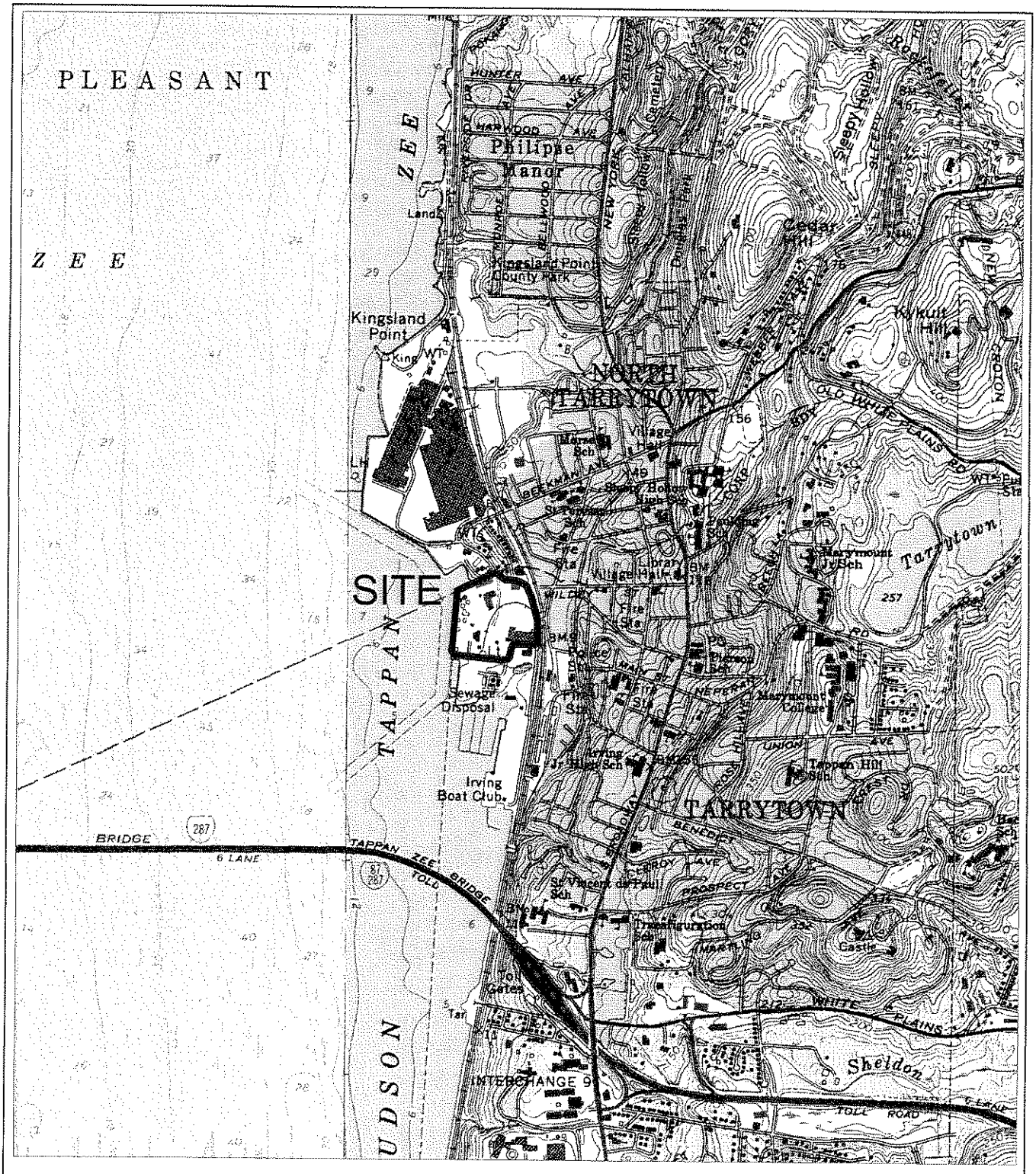
Field/Laboratory ID	Total PAH (ppm)	Total BTEX (ppm)
D001/AF62261	ND	ND
D002/AF64041	241	ND
D003/AF64042	217	ND
H-1/AG09930	ND	ND
H-2/AG11398	17.6	ND
H-3/AG11277	17.0	ND
Site Criteria per Work Plan	**500**	**10**

Note: ND = Not Detected.

TABLE 3.4
NORTHERN DNAPL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Analysis of Borrow Source Soil:
Final Engineering Report for Tarrytown Former MGP Site, Tarrytown, New York

Compound	NYSDEC TAGM 4046 Cleanup Criteria	Eastern USA Background (mg/kg)	National RE/sources Yonkers, NY (mg/kg)	Jaz Mar Elmsford, NY (mg/kg)	Tilcon Bronx, NY (mg/kg)	Comment
Aluminum	SB	33,000	3	11,800	10,100	OK, Eastern Background
Antimony	SB	N/A	5	25	ND < 0.549	OK, ND
Arsenic	7.5 or SB	3 - 12	1.0	2.2	6.52	OK < 7.5
Barium	300 or SB	15 - 600	0.5	64.5	107	OK < 300
Berylium	0.16 or SB	0 - 1.75	0.4	BDL	ND < 0.439	OK, Eastern Background
Cadmium	1 or SB	0.1 - 1	0.5	BDL	ND < 0.220	OK, ND
Calcium	SB	130 - 35,000	1.0	12,800	11,500	OK, Eastern Background
Chromium	10 or SB	1.5 - 40	0.5	12.2	18.6	OK, Eastern Background
Cobalt	30 or SB	2.5 - 60	0.5	10.1	11.6	OK < 30
Copper	25 or SB	1 - 50	0.5	24.4	31.5	OK, Eastern Background
Cyanide	N/A	N/A	N/A	0.2	ND < 0.115	OK, SB: Site-specific Cyanide values range fron ND-41 mg/kg (Parsons dat
Iron	2,000 or SB	2,000 - 550,000	0.5	2.5	10,600	OK, Eastern Background
Lead	SB	200 - 500	0.5	0.5	47.4	OK, Eastern Background
Magnesium	SB	100 - 5,000	0.5	2.5	5,420	OK, Eastern Background
Manganese	SB	50 - 5,000	0.5	0.5	238	OK, Eastern Background
Mercury	0.1	0.001 - 0.2	0.1	0.1	0.0564	OK < 0.1
Nickel	13 or SB	0.5 - 25	0.5	0.5	14	OK, Eastern Background
Potassium	SB	8,500 - 43,000	1.0	1.0	4,200	OK, Eastern Background
Selenium	2 or SB	0.1 - 3.9	2.5	2.5	ND < 0.549	OK, Eastern Background
Silver	SB	N/A	0.5	0.5	ND < 0.439	OK, Background N/A
Sodium	SB	6,000 - 8,000	1.0	1.0	302	OK, Eastern Background
Thalium	SB	N/A	5.0	5.0	ND < 0.320	OK, Background N/A
Vanadium	150 or SB	1 - 300	0.5	0.5	27.9	OK < 150
Zinc	20 or SB	9 - 50	0.5	0.5	93	OK, SB: Site-specific Zin values range from 28-154(mg/kg (Parsons data)

Notes:
1) Soil cleanup criteria from NYSDEC Technical and Administrative Guidance Memorandum #4046, dated 24 January 1994.
2) SB = site background. 3) ND = Not detected 4) BDL = below detection limit
5) Results presented as milligrams per kilogram, dry weight.
6) Analysis performed for Target Compound List Volatile and Semi-volatile compounds had results indicating Non-Detect for all analytes.



-N-

QUADRANGLE LOCATION: WHITE PLAINS, N.Y.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

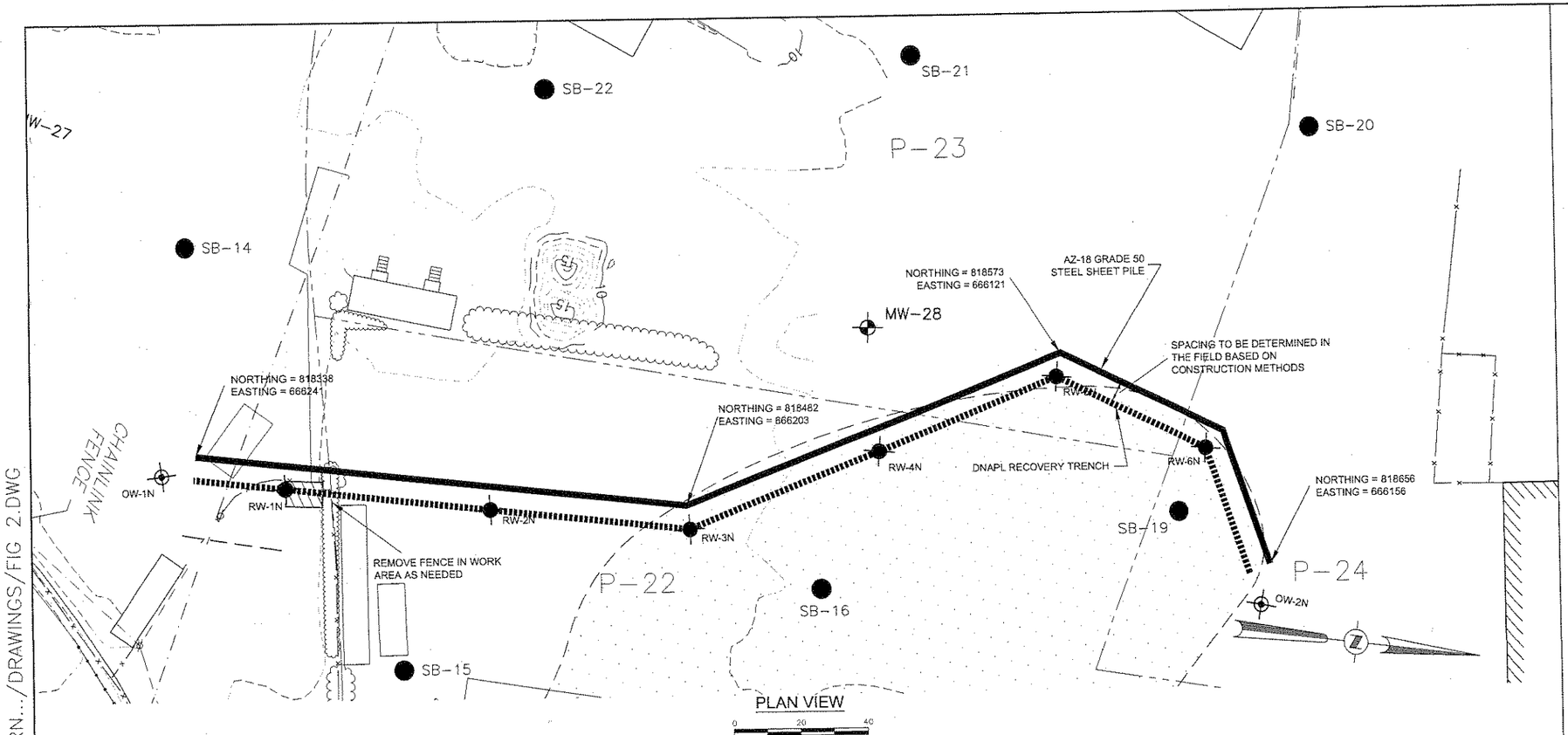
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

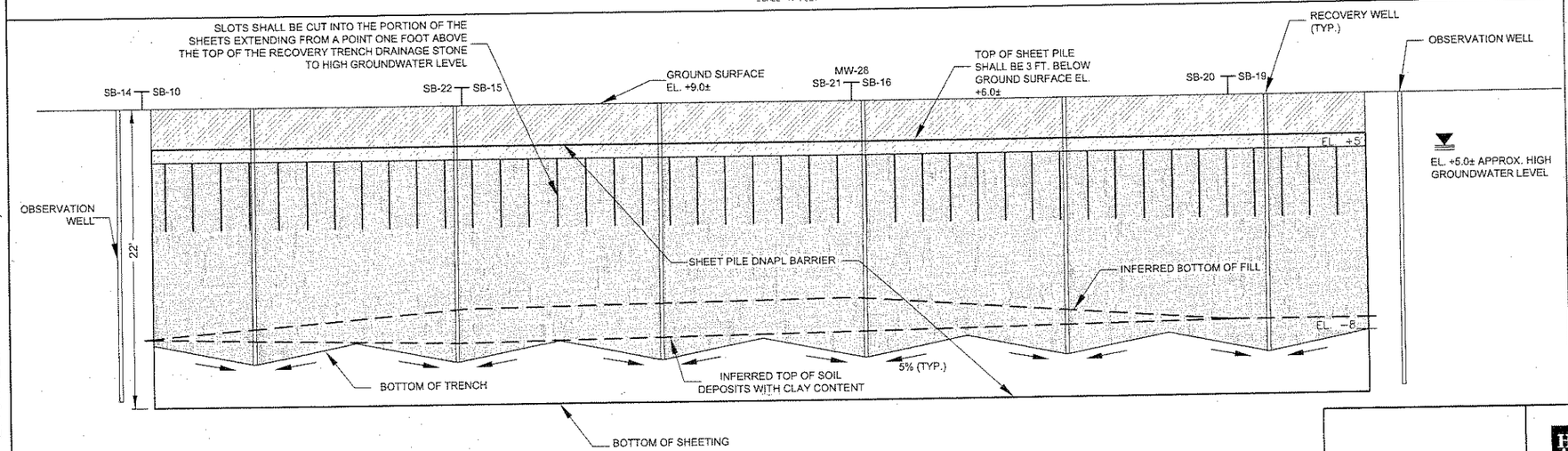
NORTHERN DNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
SITE LOCUS

SCALE: 1 = APPROX. 24000

MARCH 2005

FIGURE 3.1





RECOVERY & BARRIER TRENCH PROFILE

0 20 40
HORIZONTAL SCALE IN FEET
0 5 10
VERTICAL SCALE IN FEET

LEGEND:

- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- EXISTING SITE CONTOURS
- FENCE
- MW-23 — MONITORING WELL LOCATION
- RW-1N — PROPOSED RECOVERY WELLS
- OW-1N — PROPOSED OBSERVATION WELLS
- SB-16 — EXISTING SOIL BORINGS
- ZONES SATURATED WITH MGP DNAPL (SEE NOTE 2)
- ORDINARY FILL
- NYS DOT CRUSHED/WASHED GRAVEL (ITEM # 703-0201-3A)
- SB-20 — SB-19 — AT THIS LOCATION, INFERRED DEPTHS OF BOTTOM OF FILL AND TOP OF SOIL DEPOSITS WITH CLAY CONTENT WERE DERIVED FROM THE INDICATED SOIL BORINGS
- P-24 — PARCEL NUMBER

GENERAL NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98. TOPOGRAPHIC CONTOURS REFLECT TIME OF SURVEY. IDENTIFIED RELIEF NOT ANTICIPATED AT TIME OF CONSTRUCTION.

2. MONITORING WELL LOCATIONS & ZONES SATURATED WITH MGP DNAPL DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.

3. THE LOCATIONS OF BORINGS OBSERVED BY HALEY & ALDRICH WERE APPROXIMATELY DETERMINED IN THE FIELD WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE BORINGS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. SUBSURFACE PROFILES ARE APPROXIMATE ONLY AND ARE INTENDED TO PROVIDE A GENERAL ILLUSTRATION OF SITE CONDITIONS.

5. THE BORING ILLUSTRATIONS DEPICT SUBSURFACE CONDITIONS ONLY AT SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME NOTED ON THE ASSOCIATED BORING REPORTS. SOIL CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THE BORING LOCATIONS. ALSO, THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN SOIL CONDITIONS AT THESE BORING LOCATIONS.

6. THE STRATIFICATION LINES DESIGNATING THE INTERFACE BETWEEN SOIL TYPES AND BEDROCK SURFACE ON THE FIGURES REPRESENT APPROXIMATE BOUNDARIES INFERRED FROM THE SAMPLING AND DRILLING PERFORMANCE. THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.

4. VERTICAL DATUM: NAVD 88.

5. HORIZONTAL DATUM: NYS PLANE EAST ZONE NAD 83.

ISSUE	DATE	REVISIONS	BY

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS
Haley & Aldrich of New York
200 Town Centre Drive
Rochester, NY 14623
Tel: (585) 359-9000
Fax: (585) 359-4650

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

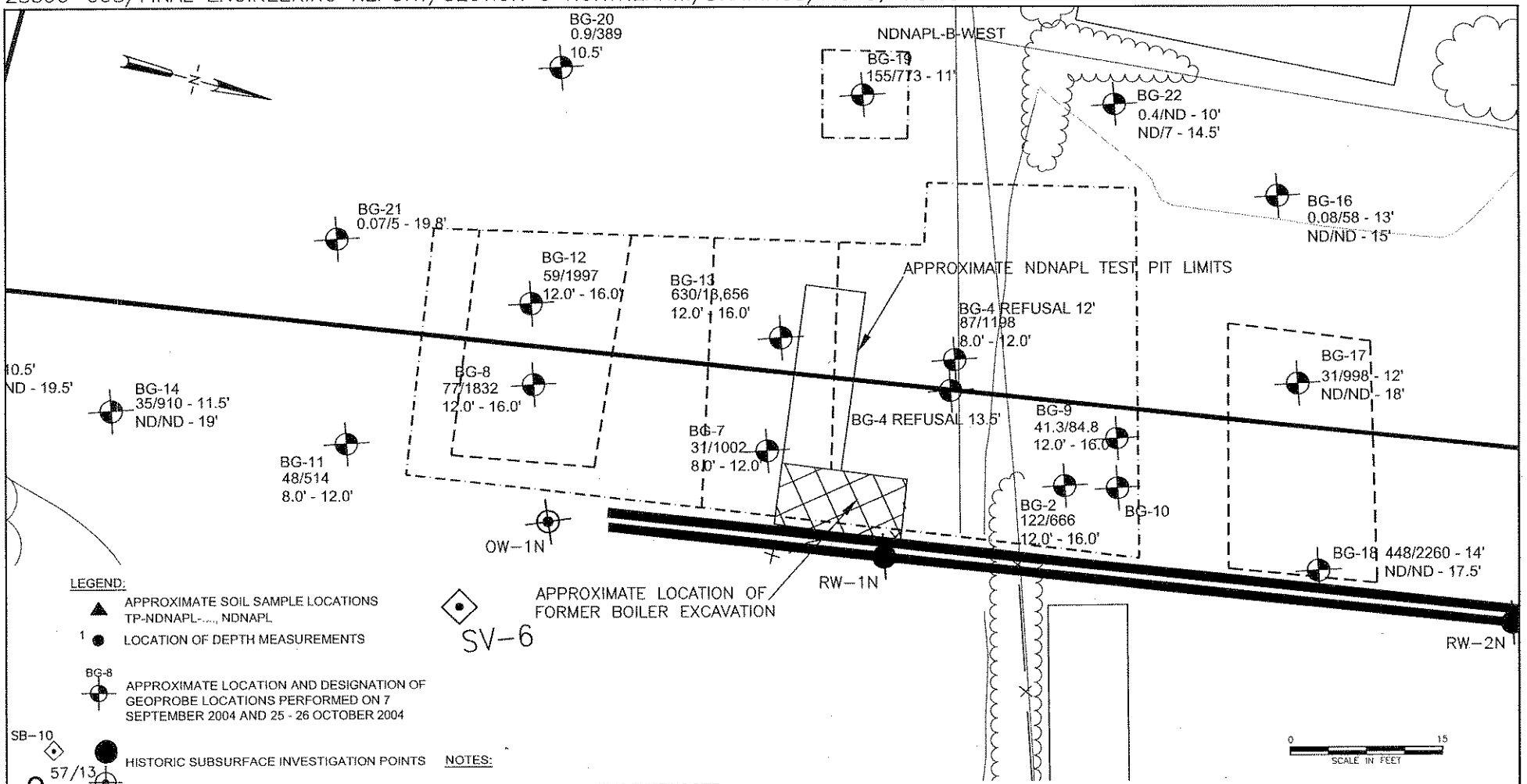
NORTHERN DNAPL AREA ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE

SITE PLAN

Project Engineer:	JDB
Designed By:	BEBA
Drawn By:	WCA
Checked By:	JDB
Sheet No.:	1 of 1
Date:	MARCH 2005
Scale:	AS SHOWN
File No.	28590-002
Figure No.	3.2
Issue	

28590-008/FINAL ENGINEERING REPORT/SECTION 3 NORTHERN.../DRAWINGS/FIG 2.DWG

28590-008/FINAL ENGINEERING REPORT/SECTION 3 NORTHERN.../DRAWINGS/FIG 3, 4.DWG



HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

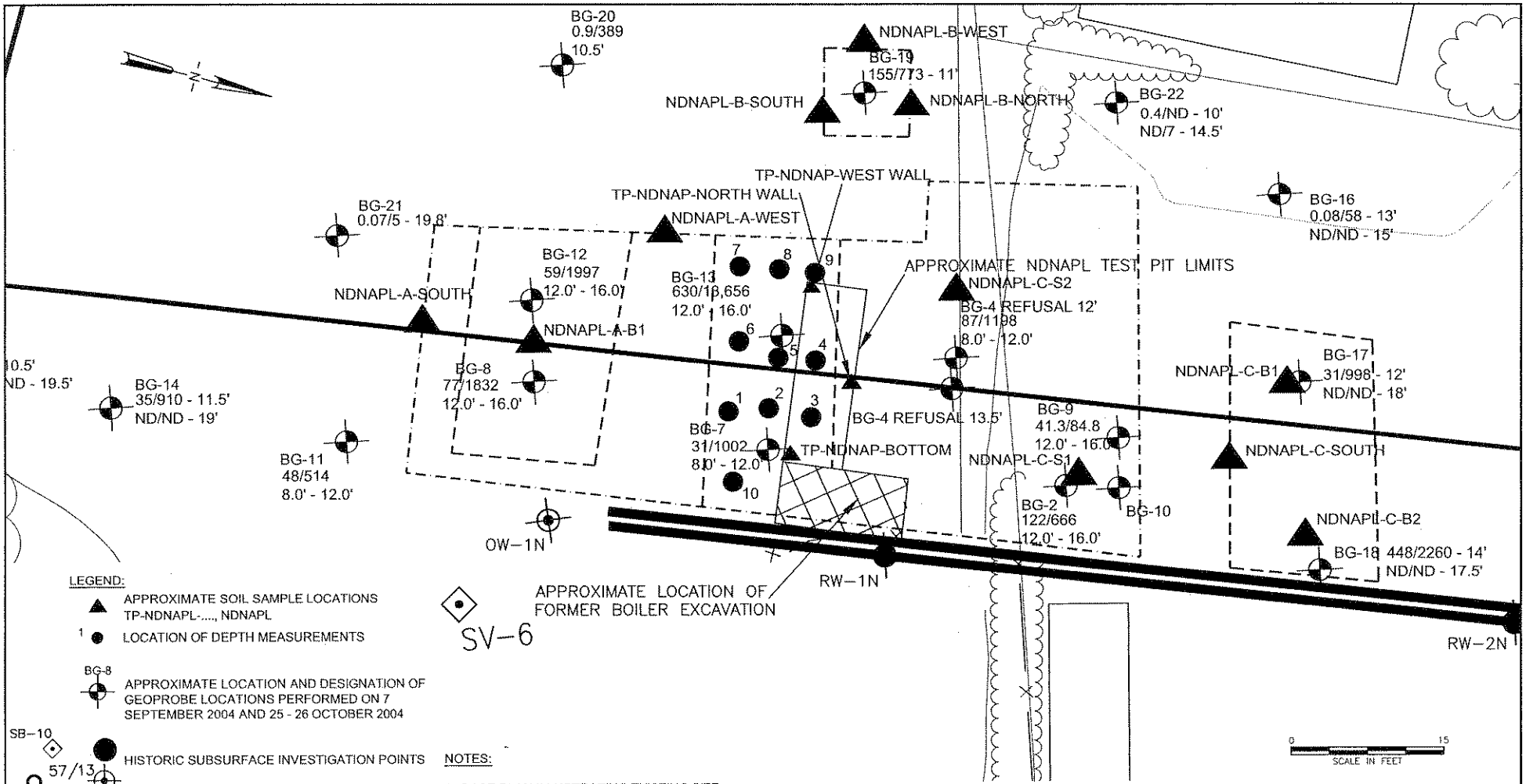
NORTHERN DNAPL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
EXCAVATION PLAN

SCALE: AS SHOWN

MARCH 2005

FIGURE 3.3

28590-008/FINAL ENGINEERING REPORT/SECTION 3 NORTHERN.../DRAWINGS/FIG 3, 4.DWG



HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

NORTHERN DNAPL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
CONFIRMATION SOIL SAMPLE LOCATIONS

SCALE: AS SHOWN

MARCH 2005

FIGURE 3.4

SEE DRAWING "AS-BUILT SURVEY GAS HOLDERS & TAR WELL, LNAPL, DNAPL & WDNAPL REMEDIATION AREAS", DRAWING SP1, 3/24/05, BY CHAZEN ENGINEERING AND LAND SURVEYING CO. P.C., SEE APPENDIX G

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC.
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

NORTHERN DNAPL AREA
FINAL ENGINEERING REPORT FOR
TARRYTOWN FORMER MGP SITE
RECORD DRAWING OF NORTHERN
DNAPL AREA

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 3.5

28590-008/FINAL ENGINEERING REPORT/SECTION 3 NORTHERN.../DRAWINGS/FIG 3, 4.DWG

Section 4

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY&
ALDRICH

Revised 30 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Section 4 - Western DNAPL and Sediment Removal Area
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval this Final Engineering Report for Tarrytown Former MGP Site, Section 4 for the Northern DNAPL Area at the Tarrytown Former Manufactured Gas Plant (MGP) Site. This report provides a description of the remediation that has been performed in the Western DNAPL and Sediment Area of the site, and presents record drawings of the work that has been performed.

The scope of remediation was based on the 22 July 2003 Revised Conceptual Remediation Plan prepared by Haley & Aldrich, which will be referred to in this report as the Decision Document (Reference 1). The Decision Document was approved by NYSDEC on 3 September 2003 (Reference 2). The remediation was performed under the provisions of the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program. The parties to the Voluntary Cleanup Agreement for the remediation were NYSDEC and, as volunteers, Ferry Landings, LLC, Ferry Investments, LLC and Consolidated Edison Company of New York, Inc. The remediation was performed by D.A. Collins Environmental Services under an agreement with Ferry Landings, LLC. Engineering services during remediation were performed by Haley and Aldrich of New York under an agreement with Ferry Landings, LLC.

This is the fourth and last section of the Final Engineering Report for Tarrytown Former MGP Site. The other areas of the site for which separate sections of the Final Engineering Report will be prepared are:

- Section 1 Holder and Tar Well Area
- Section 2 LNAPL Area
- Section 3 Northern DNAPL Area
- Section 5 Final Engineering Report Appendices

The reports are organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

SUMMARY OF REMEDY FROM DECISION DOCUMENT

The site is located on the east side of the Hudson River, north of the Tappan Zee Bridge, in the Village of Tarrytown, New York. The site locus is shown on Figure 4.1, and a plan view of the work area is shown on Figure 4.2. The site encompasses approximately 20 acres, and currently is primarily industrial-commercial in use.

As described in a number of previous reports (see References), the site exhibits contamination in several areas that are associated either with the former MGP or from former fuel storage and handling operations. This Final Engineering Report addresses contamination associated with DNAPL generally located within the northern portion of the site. The work area is shown on Figure 4.3.

The Western DNAPL and Sediment Removal Area, as shown on Figure 4.2, is located approximately 270 feet north of the current ferry landing. The Western DNAPL Area is depicted (Parsons 2000, Reference 14) as having an east-to-west length of about 240 feet. The primary environmental concern in this area is soil found to be saturated with DNAPL (presumably coal tar). The saturated soils are located between 22 and 26 feet below ground surface (bgs). The zone of saturation was observed at the bottom of the fill, and exhibits very limited penetration of the natural soil layer. The natural soil layer consists of a low permeability material and generally exhibits an increase in clay content with depth, thus providing a natural vertical barrier to downward migration of the DNAPL.

In April 2003, borings SB-301, SB-302 and SB-303 were completed to better define the northern and southern limits of the DNAPL that has been extracted from recovery wells RW-1 and RW-2. Based on borings SB-301 and SB-303 made in April 2003, the width of the DNAPL Area that requires migration control and recovery, measured north to south, is less than 40 feet.

DNAPL-contaminated river sediment was identified west of the Western DNAPL Area. The contamination extends about 160 ft along the existing relieving platform, and outward into the river by varying distances, up to about 120 ft. The relieving platform is a 20 ft wide structure, supported by timber piles constructed over the water along the riverfront. It consists of a wooden deck (covered with a concrete layer in some locations) that supports a 6.75 ft high and 2.5 ft wide concrete seawall adjacent to the river and about 6.75 ft of earth fill on the land side of the seawall. The top of the seawall and earth fill is at the same elevation as the land surface immediately to the east. The wooden deck is located at an elevation so that the bottom of the deck and the tops of the timber piles are exposed to the air during low tide.

Sediment contaminated with DNAPL was identified in river borings RB-1, RB-3, RB-6 through RB-9, RB-11, RB-12, RB-15A, and RB-17 through RB-19. Significant DNAPL contamination was also identified in river borings RB-2, RB-13, RB-23, and RB-24. The depth of the observed DNAPL ranges from one foot up to 8 feet below the top of sediment. (See *Western DNAPL Barrier and Sediment Removal - Wet Alternative Removal - Remedial Design Report, Tarrytown Former MGP Site, Tarrytown, New York*, 27 February 2004, Reference 3

for details.)

Consequently, the Western DNAPL and Sediment Removal Area was proposed to be remediated, and a plan for the remediation (Reference 3) was submitted to and conditionally approved by NYSDEC on 10 March 2004. After resolution of two details (described later) regarding the remediation plan, NYSDEC gave final approval for the plan on 8 October 2004 (Reference 10).

One purpose of the remedial action for the Western DNAPL and Sediment Removal Area is to prevent potential westward migration of DNAPL by installing a barrier and to facilitate DNAPL recovery capability up-gradient from the barrier. The other purpose of the remedial action is to remove contaminated sediments from the Hudson River. The remedial action is described in detail in the report *Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal - Wet Alternative Removal - Remedial Design Report*, dated 27 February 2004 (Reference 3). This report is also referred to herein as the Work Plan.

The proposed remediation comprises four main components: a sheet pile DNAPL barrier located parallel to the face of the existing seawall; a DNAPL recovery trench upgradient from the barrier, removal of contaminated river sediments west of the existing sea wall, and capping of river sediments beneath the existing relieving platform and upgradient of the sheet pile DNAPL barrier. The planned remediation in the Western DNAPL Area are shown in plan view on Figure 4.3, and are generally described below, as excerpted from the Work Plan:

Barrier

A 160-foot long barrier is proposed along the Hudson River, beginning at the southern end of the previously constructed sheet pile retaining wall, and extending southward from there. The length of the barrier corresponds to the limits of the greatest DNAPL contamination in the river sediments.

Watertight sheeting, comprised of material suitable for salt water conditions, will be installed on the Hudson River side of the existing retaining wall, extending downward to bedrock, approximately 13-15 ft below the top of the river sediments. The sheeting interlocks will be filled with a watertight sealant prior to driving.

Throughout most of the length of the barrier, relatively low permeability silt and silty clay deposits will act to prevent potential downward migration of DNAPL at the sheet pile barrier. A limited pocket of granular deposits (silt, sand, and gravel) was identified in boring RB03-2, located on the alignment of the planned sheet pile barrier. To create a barrier to potential DNAPL migration downward through the granular deposits and under the barrier, grout will be injected in this area at the contact between the sheet pile and the top of bedrock.

The full height barrier will be left in place during excavation and backfill of river sediments. After the sediment excavation and backfill is completed, the sheet pile would be cut at the preconstruction mudline, consistent with the edge of the backfilled excavation area under the relieving platform.

Recovery Trench

A recovery trench will be installed on the up-gradient side of the barrier wall. The trench will be approximately 60 feet long and reach depths ranging from 17 to 18.5 feet below ground surface. The collection media will extend from the bottom of the trench to approximately 10 feet below ground surface. From that depth to the surface the recovery trench will be backfilled with ordinary fill.

The recovery trench will be constructed after the barrier is in place using biopolymer slurry methods. The 60 ft long recovery trench will be constructed, parallel to and approximately 60 ft inland from the new barrier wall installed in the river. After drainage stone placement, the trench will be developed, similar to a well. A minimum of three pore volumes will be pumped from the trench.

The recovery trench will extend one to two feet into the silty clay layer. Two recovery wells will be installed, spaced evenly along the trench alignment. The bottom of the recovery trench will be sloped at five percent toward each well, with high points at the midpoint between each well. The backfill initially will be permeable stone having a thickness of at least 8 feet and thereafter the backfill will be excavated on-site soils. A geotextile will separate the permeable stone from the subsequently placed fill soils.

Two observation wells will be installed. One will be located 10 to 15-feet from each end of the recovery trench (pending clearance of site obstructions) to enable detection of mobile DNAPL that may possibly migrate around the ends of the recovery trench.

In the Western DNAPL area, the soil above the high water table is uncontaminated. It will be stockpiled and used later as backfill. The soil below may or may not exhibit some low level of MGP contamination (odor, sheen, and blebs) and will be field screened to determine if it needs to be disposed at a permitted facility off site.

Water that collects and needs management in the excavation will be pumped from the excavation, and sent to the on-site water treatment system, prior to discharge. Discharge will comply with the NYSDEC-approved Construction Water Management Plan, prepared by D.A. Collins Environmental Services, dated September 8, 2003.

In the Sediment Removal Area, the remedial action is to excavate the river sediments on the river-side of the driven sheeting where borings have indicated heavy sheen and high concentrations of blebs. These areas and target depths of proposed excavation are shown on Figure 4.2. The excavated sediment will be dewatered and then disposed at a permitted facility off site.

The excavation will take place within a work area defined by a double silt curtain, anchored to the river bottom. In addition, current deflecting curtains are to be installed outside the silt curtain to reduce the impact of river currents on the silt curtains. The curtain will enclose the sediment dredging area, with the new barrier wall for the Western DNAPL Area completing the enclosure.

Two turbidity monitoring stations will be established in the Hudson River, one north and one

south of the work area. Turbidity, suspended solids, and surface sheen will be monitored and corrective actions taken when the difference between upstream and downstream values exceed action levels. If turbidity levels are unacceptable, operations will be suspended or modified, until acceptable ranges can be achieved.

A clamshell excavator mounted on a barge will perform the excavation. A control system will be employed to establish the lines and grades of the excavation. There will be transitional side slopes between areas of deeper excavation (say 8 feet) and adjacent shallower excavation (say 5 feet). The transitional slopes (from 8 feet to 5 feet) will have grades lower than the target elevation of the shallower area, to ensure that the targeted contaminated sediments are removed.

A pre-excavation bathymetric survey will be conducted prior to sediment removal. A post-dredging survey will be conducted to document the actual limits of excavation and to show that the target dredging depths were achieved. Figure 4.2 shows the target dredging depths and the expected limits of excavation needed to achieve them.

The excavated area will be backfilled with imported stone to meet a final grade acceptable to the Corps of Engineers and NYSDEC. After placement, the top 6 inches of backfill material will be sampled on a 50 by 50 foot grid for laboratory analysis of total polycyclic aromatic hydrocarbons (PAHs). The testing results will be compared to a permissible concentration of 4 ppm, as requested by NYSDEC.

One of the issues that resulted in conditional approval of the Work Plan by NYSDEC (Reference 4) was the condition of the river bottom at where the sheet pile would be cut off. NYSDEC requested that the sheet pile barrier not stick up higher than the river bottom and that a smooth transition in river bottom elevation be provided from the east side to the west side of the sheet pile barrier. These requirements were incorporated into the Work plan (Reference 5) and approved by NYSDEC (Reference 6).

The second issue that resulted in conditional approval of the Work Plan was the thickness of the backfill in the river. An average backfill thickness of at least one foot was determined to be acceptable to the Corps of Engineers (Reference 7). This information was presented to NYSDEC (Reference 8) and upon review; NYSDEC approved a minimum two foot thickness for the river backfill (Reference 9). This was incorporated into the Work Plan.

River sediments below the existing relieving platform will be excavated to a depth of 4 feet below the current mudline, with the full height sheet piling barrier in place To access these sediments, the Contractor may perform selective removal of soils on the relieving platform and removal of decking materials, as necessary.

Backfill of the excavated sediment area, below the relieving platform, would include placement of 12 in. of bentonite-soil mixture, using tremie methods, followed by 12 in. of medium stone fill, and then 24 in. of select fill having a gradation and consistency similar to the existing sand and gravel sediments. After the excavation of sediment and backfill is completed, the relieving platform and excavated soils would be replaced in-kind.

SUMMARY OF REMEDIAL ACTIONS COMPLETED

Actions Completed

The Western DNAPL and Sediment Removal remediation was completed in accordance with the Work Plan as summarized above.

A. Sequence of Construction Activities

The general sequence of construction follows:

Dates	Primary Activity
8/23/04 – 9/3/04	Deploy Silt Curtains
8/30/04 – 9/2/04	Install Sheet Pile Barrier
9/10/04 – 9/16/04	Pressure Grout Central Portion of Sheet Pile Barrier
9/15/05 – 11/8/04	Dredge Outside Sheet Pile Barrier
8/31/04 – 10/29/04	Dismantle Relieving Platform, including Sea Wall and Fill Soils
9/27/04 – 10/29/04	Remove Sediment from beneath Relieving Platform
10/18/04 – 10/29/04	Install New Piles and Pile Caps, Replace Relieving Platform
10/28/04 – 11/8/04	Construct Western DNAPL Trench, Install Recovery Wells
11/2/04 - 11/4/04	Place Soil-Bentonite Cap and Stone Fill beneath Relieving Platform
11/11/04 – 11/23/04	Backfill Dredged Area in River
11/30/04 – 12/2/04	Replace Concrete Sea Wall and Backfill on Relieving Platform
12/6/04 – 12/8/04	Remove Silt Curtains
12/15/04 – 1/5/05	Install Observation Wells
12/27/04 – 1/7/05	Demobilization

B. Sheet Pile Barrier Installation

The sheet pile barrier installation followed the Work Plan, with no deviations required. Pressure grouting was performed at 30 locations, via casings located at every sheet pile interlock in the specified zone (about 62 feet along the central portion of the 160 foot long sheet pile barrier). The purpose of the grouting was to prevent possible migration of DNAPL through gaps between the bottom of the steel sheets and the top of bedrock where permeable river deposits existed. At other locations, the native sediments exhibited relatively low permeability with respect to DNAPL movement and so did not need to be grouted.

At each casing location, the grouting was completed when any one of the following criteria was satisfied:

- Pressure: 500 pounds per square inch recorded in the injection header
- Volume: Injection of two cubic feet grout per linear feet sheet pile wall
- Movement: Undesirable movement of wall or casing detected

Grouting was performed first on every other interlock and then completed by grouting at the intervening interlock locations. Five of the first fifteen locations were completed due to the high pressure criterion with the remainder completed based on the volume criterion. For the intervening locations, fourteen of the fifteen locations were completed due to the high pressure criterion, and one was completed based on the volume criterion, indicating satisfactory

coverage between grout locations.

After completion of the dredging and backfill in the river and under the relieving platform, the steel sheets were cut off where the sheets penetrated the backfilled material at the pre-construction mudline. Since the backfill on the river side of the sheets was placed to the same elevation as the backfill on the land side of the sheets, an abrupt transition in river bottom elevation was avoided along the sheet pile alignment.

C. River Sediment Dredging and Backfill

River sediment dredging followed the Work Plan, with minor deviations due to the presence of a relatively hard native soil layer resulting in refusal for the clamshell dredge at some locations, and due to the presence of an obstruction at the northern end near the sheet pile wall. Most of the dredging was performed with a Cable Arm® environmental clam shell, controlled by a computerized dredging location system, and was completed between 15 September 2004 and 8 October 2004.

A post-dredging bathymetric survey on 12 October 2004 revealed some areas where the target elevations were not achieved, resulting in a second round of dredging using the environmental clamshell between 19 and 20 October 2004. The dredging was completed between 4 and 8 November 2004 by dredging in the zone immediately adjacent to the sheet pile barrier wall using a conventional bucket on a 'long-stick' excavator. Following the second round of dredging with the environmental clamshell and the dredging with the 'long-stick' excavator, the 12 October 2004 post-dredging survey was supplemented using a surveyor's rod and leveling instrument. A plan view of the dredging area, showing the section lines used for survey control is given in Figure 4.3. The pre-and post dredge river bottom elevations are shown in sectional view on Figures 4.4 through 4.8. The pre-dredge survey plan is shown in Figure 4.9. A plan view of the post-dredge river bottom elevations is shown on Figure 4.10.

The dredge spoils were placed in a scow, where they were mixed with palletized lime using a land-based excavator to adjust the moisture content and improve handling for off-site transportation. The material on the scow was transferred to dump trucks using a land based excavator and stored in a designated stockpile location on the project site. The stockpiled soil was subsequently loaded onto trucks for transportation to the designated treatment or disposal facility. The soil stockpiles were sampled and tested for compliance with the waste disposal facility requirements for contaminant concentration and moisture content.

Backfill operations were conducted between 11 and 23 November 2004 using a standard dredge bucket equipped with Cable ArmVision Technology. Use of the environmental clamshell for backfill operations was unsuccessful due to the inability of the environmental clamshell to properly close around the dry stone. Per the Work Plan, the thickness of the stone backfill was a minimum of two feet. A surveyor's rod was used to measure the depth of the river bottom before and after placement of stone. The completed backfill elevations are shown on Figures 4.4 through 4.8.

Turbidity monitoring was performed according to the Work Plan, as described in the Revision *2 Monitoring Plan for Turbidity and Total Suspended Solids*, Tarrytown Former MGP Site, dated 22 September 2004 (Reference 10).

Confirmation sampling was performed on the river backfill beneath and outside the relieving platform. Confirmation sampling locations and laboratory testing results are shown on Figure 4.11. PAH contamination was not detected in any of the samples. The laboratory data was submitted to NYSDEC previously (Reference 11); the reports are on file and are available on request.

D. Sediment Removal and Cap beneath Relieving Platform

The removal of sediment and placement of the cap beneath the relieving platform followed the Work Plan, with minor deviations due to site conditions encountered during the work. The work was performed with the sheet pile barrier wall in place, extending to a height one to two feet higher than the pre-existing ground elevation. The decking and concrete sea wall were exposed by removing overburden soils, which were stockpiled for later use. The decking and seawall were dismantled, exposing the timber pile caps and timber pile bent rows, and making access available to dredge the river sediments. The work area behind the sheet pile barrier was partially dewatered using construction pumps, which reduced the depth of water in the work area to less than four feet. Dredging under the relieving platform was performed 'in the wet' per the Work Plan, and was controlled using a surveyor's rod to measure the depth to the river bottom before and after dredging.

The minimum four feet deep dredging of sediments was achieved, with the exception of isolated areas in the work area (See Table 4.1). Obstructions prevented the excavation from reaching the target depth of 4 ft at those locations; however Table 4.1 shows that an overall average of 4 ft of sediment was excavated from the area beneath the relieving platform. The cap material consisting of a mixture of soil, cement, and bentonite was prepared in accordance with the approved project specifications. The soil-cement-bentonite cap, medium stone fill and gravel fill were placed using the same control methods to verify required thicknesses. Table 4.3 presents data demonstrating that the soil-bentonite cap was a minimum one foot thick, and the stone fill was three feet thick. At six of the eighty-one locations measured, the stone fill thickness was less than three feet thick; however the cap thickness exceeded one foot thick at those same locations, resulting in a total thickness of at least four feet, meeting the remediation objectives.

Replacement of the relieving platform involved removal of some timber piles identified as damaged or unnecessary and adding new timber piles and pile caps to satisfy structural requirements. A new concrete deck and seawall were constructed and the soil overburden was replaced. The structural work was performed according to plans and direction provided by Hillman & Miley Consulting Engineers, PLLC. Figure 4.12 presents a record drawing of the relieving platform replacement.

E. Western DNAPL Recovery Trench

The recovery trench and two recovery wells were constructed during the period from 28 October 2004 through 8 November 2004. The constructed alignment is shown on Figure 4.13. The breaking and flushing of the biopolymer slurry was successfully completed on 3 and 4 November 2004. The observation wells were installed on 15 and 16 December 2004. The hydraulic connection between and among the observation wells, the recovery trench and the

recovery wells was confirmed by taking water level readings in each well and river level readings on an hourly basis for six hours. The recovery well water levels and observation well OW-2 water level rose and fell in conjunction with the change in river level, while the water level in OW-1 did not change. Attempts to develop OW-1 by use of a vacuum truck to remove water and sediment were unsuccessful. The well was abandoned and re-installed on 5 January 2005. Hydraulic conductivity was confirmed on 12 January 2005 using water level measurements, as described previously.

An orange textile marker layer was placed near the top of the recovery trench and covered with approximately two feet of crusher run. The locations of the constructed Western DNAPL recovery trench, recovery wells and observation wells are shown on Figure 4.13.

Problems Encountered During Construction and Resolution

The work was completed according to the work plan, with some minor deviations, primarily due to obstructions encountered while dredging. Naturally occurring "hard" soil layers were encountered at three locations within the river dredging area. A concrete obstruction was identified at a fourth location. To confirm that the "hard" layers of river sediment were similar to on site soils with clay content shown to restrict downward movement of site DNAPL, thin-walled tube samples were taken and soil descriptions of the samples were prepared. The samples were taken on 8 and 9 November 2004. Three sediment samples were taken using a thin-walled tube pushed into the bottom of the dredged area by the long stick excavator and two were grab samples taken by divers by digging the supplied jars into the river substrate. The sample locations are shown on Figure 4.11 and depicted in the corresponding profiles shown on Figures 4.4 through 4.8. Table 4.3 presents the soil descriptions for the five samples. All were soils with predominantly clay content.

The excavator was unable to move or remove an obstruction near the sheet pile wall at Section I-I. Divers inspected the obstruction and observed a concrete mass with a relatively flat top extending 26.5 feet west of the sheet pile wall and having a width of 12 feet. It was determined that this concrete layer was a barrier to further downward movement of site DNAPL, and therefore it was left in place.

Obstructions were also encountered during sediment excavation beneath the relieving platform. These were identified at bent row nos. 3, 4, 11, 12, 19, and 20 and were believed to be comprised of concrete mixed with timbers. Due to the small working area (five feet width) between timber pile bent rows and concern regarding disturbance of the timber piles remaining in place and possible disturbance of the timber retaining wall, extraction of these obstructions was not practical. As previously described, the obstructions prevented the excavation from reaching the target depth of 4 ft at those locations; however Table 4.1 shows that an overall average of 4 ft of sediment was excavated from the area beneath the relieving platform. The soil-bentonite cap and stone fill was placed to a completed minimum thickness of four feet in these locations, per the Work Plan. This approach was discussed with the NYSDEC representatives on-site and concurrence was given at the time the work was performed.

Changes to Design Documents

As described in the previous section, the final dredging depths outside the sheet pile barrier

were less than the target depths in a limited number of areas. The completed dredging depths are shown on Figures 4.4 through 4.8. The deviations from the Work Plan are summarized as follows:

- Excavation was equal to or greater than target depth along Profile C-C, with the exception of STA 1+05 to 1+30. A hard layer was documented by Cable Arm® and by river boring RB-11 at about elevation -19 in the area between STA 1+05 and 1+30. This was further confirmed by the sediment sample C1, which exhibited clay content and no contamination. No further excavation was performed.

- Excavation was less than target depth along Profile D-D between STA 0+35 and STA 0+69 and at a location between STA 1+12 and 1+18. Both locations correspond to "hard" layers, confirmed by sediment samples D1, D2 and D3, which all exhibited clay content and no contamination. No further excavation was performed.

- Excavation was less than target depth along Profile E-E between STA 1+06 and 1+18. Cable Arm® documented a hard layer between STA 0+99 and 1+39. This was confirmed by sediment sample E1, which exhibited clay content and no contamination. No further excavation was performed.

- Excavation was less than target depth along Profile I-I between STA 1+22 and 1+49. This is attributed to the presence of a concrete obstruction, described previously, which could not be practically removed. No further dredging was performed in this area.

These deviations were reported (Reference 12) and were accepted by NYSDEC (Reference 13) on 24 November 2004.

Quantities and Concentration of Contaminants Removed or Treated

Results of laboratory testing for waste characterization of materials to be transported offsite for disposal are summarized on Table 4.4. The laboratory data sheets are available upon request.

Materials Disposed

The following table represents materials disposed for the entire project. Based on conversations with NYSDEC, it was determined unnecessary to categorize the disposed materials according to the place of origin on the project site.

Table 4.5 Materials Disposed During Remediation at the Tarrytown Former MGP Site

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton
DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton
Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

REMEDIATION STANDARDS APPLIED TO REMEDIAL ACTIONS

The confirmation samples for the river backfill were compared to a site cleanup target level of 4 ppm total PAH. These levels were previously established in the approved Work Plan.

PRE- AND POST-REMEDIAL DATA

Pre-remediation data was discussed and summarized in several previously-submitted reports (Reference 15). Please refer to the referenced reports for the pre-remediation data. Confirmation samples were taken from the river backfill at locations shown on Figure 4.11. No PAH contamination was detected in any of the samples. No confirmation samples were required for the installation of the barrier and recovery trench. The laboratory analytical testing data reports for confirmation samples were previously submitted to NYSDEC (Reference 11) and are available upon request.

SITE RESTORATION ACTIVITIES

The recovery trench excavation in the Western DNAPL Area was backfilled upon completion. A marker layer, consisting of orange geotextile, was placed on top of the backfill subgrade and covered by approximately 2 feet of crusher run. The upper layer (approximately two feet) of the river backfill under the relieving platform consisted of ¾ inch gravel and rip-rap to create a benthic substrate similar to the granular sediments found in the vicinity prior to dredging and to further support the transition from shoreline to river. The Hudson River was backfilled with ¾ inch stone to a minimum thickness of two feet.

SOURCE AND QUALITY OF FILL

On-site overburden soils from the Western DNAPL Area excavation that met the site cleanup criteria were used as backfill. Table 4.6 shows laboratory results of testing for the overburden soils, indicating that they satisfied the site criteria for re-use of on-site soils of 10 ppm Total BTEX and 500 ppm Total PAH. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

In addition, clean fill was brought to the site from three locations:

- Bronx, NY location operated by Tilcon
- Elmsford, NY location operated by Jaz Mar
- Yonkers, NY location managed by National RE/sources

Testing was performed to verify the chemical composition of the imported fill. Results of the laboratory testing are summarized in Table 4.7. The laboratory analytical data reports were submitted to NYSDEC during construction by D.A. Collins Environmental Services and are available upon request.

RECORD DRAWINGS

A plan, prepared by Chazen Engineering & Land Survey Co., P.C., showing the Western

DNAPL recovery trench, observation wells, recovery wells and the limits of the relieving platform replacement is attached (see Figure 4.13). Record plans and profiles of the dredging operation outside the sheet pile barrier are provided in Figures 4.4 through 4.8 and 4.10. Record drawings of the relieving platform replacement, prepared by Hillman & Miley Consulting Engineers, PLLC are provided in Figure 4.12.

MANIFESTS

Manifests documenting contaminated soils that were removed from the site during the duration of remedial activities were maintained during remedial construction. The manifests are available upon request.

ENGINEERING OR INSTITUTIONAL CONTROLS REQUIRED

The Voluntary Cleanup Agreement under which this remedial action was performed includes, at a minimum, the following controls:

- No future use of onsite groundwater
- Future development must be in accordance with the Site Management Plan
- Condition of onsite engineering controls must be reported to the NYSDEC on an annual basis.

Details on restrictions and/or requirements for the future development of the site are provided in *Tarrytown Former MGP Site, Site Management Plan,* dated 1 December 2004 (Reference 13). Section 5 of this document (Final Engineering Report Appendices) contains an environmental easement map (sheet no. SP1) as prepared by The Chazen Companies and dated 7 February 2005. Reference should also be made to the approved Institutional and Engineering Controls Plan for the Tarrytown former MGP Site.

OPERATION, MAINTENANCE, AND MONITORING (OM&M)

Monitoring of the DNAPL recovery trench will be required. The plan for system operation involves two phases: start-up and long-term operation. The start up phase will begin after system installation and is expected to continue through the first year of operation. The long term phase will begin after one complete year of operation.

Monitoring will include measurement of water and DNAPL levels in all observation and recovery wells. During the start-up period, the frequency of monitoring will vary from weekly to monthly as needed, to collect information to optimize the recovery operations. Monitoring in the long term will be at a frequency established during the start-up period. Monitoring results will determine the frequency of DNAPL removal.

DNAPL will be removed from the recovery trenches on a periodic basis, using vacuum trucks, removable submersible pumps, or other equivalent means. Recovered DNAPL will be placed in New York State Department of Transportation approved containers and then will be transported to permitted facilities for recycling, treatment, or disposal. During the start-up phase, the rate of DNAPL recovery in the recovery wells will be monitored and the frequency of extraction will be determined. The removal frequency will be adjusted accordingly. By the end of the start-up phase, the frequency of required DNAPL extraction will be established.

Extraction of DNAPL will be discontinued if the evidence demonstrates that no further significant quantities can be removed.

Refer to the Site Management Plan (Reference 13) for a discussion of requirements regarding treatment of the soils during design and construction of future developments at the site. Reference should also be made to the approved Operation, Maintenance, and Monitoring Plan for the Tarrytown former MGP site.

CLOSURE

This report described the Work Plan for the Western DNAPL and Sediment Removal Area, summarized the remedial activities performed, described approved deviations from the Work Plan and the reasons for them, and provided record drawings of the remedial construction. A certification that the work was performed in accordance with the Work Plan (and approved deviations) signed by the professional engineer responsible for oversight of the work is included with the cover letter to the Final Engineering Report.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

Table 4.1 – Dredging Depths under the Relieving Platform
Table 4.2 – Backfill Thickness under the Relieving Platform
Table 4.3 – Soil Samples Taken from River Dredging Area
Table 4.4 - Summary of Analytical Laboratory Results – Waste Characterization
Table 4.5 – Summary of Waste Quantities Transported Off Site
Table 4.6 - Summary of Analytical Laboratory Results – On-Site Soils Re-Used as Backfill
Table 4.7 - Summary of Analytical Laboratory Results – Analysis of Borrow Source Soil
Figure 4.1 – Site Locus
Figure 4.2 – Remediation Plan
Figure 4.3 – Sediment Removal Plan View
Figure 4.4 – Profile A-A & B-B
Figure 4.5 – Profile C-C & D-D
Figure 4.6 – Profile E-E & F-F
Figure 4.7 – Profile G-G & H-H
Figure 4.8 – Profile I-I
Figure 4.9 – Pre-Dredge Survey
Figure 4.10 – Post-Dredge Survey
Figure 4.11 – Location of Confirmation Samples
Figure 4.12 – Relieving Platform Record Drawing

Figure 4.13 – Site Plan Record Drawing

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

\\ROC\common\Projects\28590\008 Resp to FER Comments\Final Engineering Report\Section 4 Western DNAPL and Sediment Removal Area\Final Engineering Report Section 4 30Mar05.doc

REFERENCES

1. "Tarrytown Former MGP Site, Revised Conceptual Remediation Plan," prepared by Haley & Aldrich of New York, latest revision dated 22 July 2003.

2. Approval letter for Conceptual Remedial Action Work Plan and Supplemental Site Investigation Report, prepared by New York State Department of Environmental Conservation, dated 3 September 2003.

3. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Wet Alternative Removal Remedial Design Report," prepared by Haley & Aldrich of New York, dated 27 February 2004.

4. Conditional Approval letter for Revised Western DNAPL Barrier and Sediment Removal Design Report, prepared by New York State Department of Environmental Conservation, dated 10 March 2004.

5. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Remedial Design Response to 10 March 2004 Comments," prepared by Haley & Aldrich of New York, dated 25 June 2004.

6. Approval Letter for Items 1 and 2 in Response to 10 March 2004 Comments, prepared by New York State Department of Environmental Conservation, dated 10 August 2004.

7. Letter from Corps of Engineers to Ferry Landings, LLC, Tarrytown former MGP Site Remediation, dated 16 August 2004.

8. "Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal Remedial Design Request for Work Plan Modification," prepared by Haley & Aldrich of New York, dated 16 September 2004.

9. Approval letter for Work Plan Modification, prepared by New York State Department of Environmental Conservation, dated 8 October 2004.

10. "Revision 2 Monitoring Plan for Turbidity and Total Suspended Solids, Tarrytown Former MGP Site," memorandum from Haley & Aldrich of New York to NYSDEC, dated 22 September 2004.

11. Tarrytown Former MGP Site, Confirmation Sample Transmittal, email from Haley & Aldrich to NYSDEC, dated 24 January 2005.

12. "Tarrytown Former MGP Site, Post-Dredge Survey Results," prepared by Haley & Aldrich of New York, dated 10 November 2004.

13. Approval for Post-Dredging Survey, Email from L. Delota, New York State Department of Environmental Conservation to J. Babcock, Haley & Aldrich, 24 November 2004.

14. "Tarrytown Former MGP Site, Site Management Plan," prepared by Haley & Aldrich of New York, dated 15 December 2003.

15. List of Reports Containing Pre-Remediation Site Characterization Data:

1990	Metcalf & Eddy	Preliminary Soil Gas Survey Results, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1991	Metcalf & Eddy	Site Assessment for Anchor Motor Freight, Inc., Tarrytown, New York.
1991	Metcalf & Eddy	Underground Storage Tank Removal, Valente Industries, Tarrytown, New York.
1994	Metcalf & Eddy	Geoprobe Subsurface Investigations, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1994	Woodward-Clyde	Results of Geophysical Survey, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1995	Rust	Site Environmental History, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	RETEC	Site Investigation, Anchor Motor Freight, Inc. Tarrytown, New York.
1996	Rust	Underground Storage Tank Field Observation Report, Leaseway Motorcar Transportation Corporation, Tarrytown, New York.
1997	Parsons Engineering Science	Site Investigation Report for the Tarrytown Site, ConEdison, Tarrytown, New York.
2000	Parsons Engineering Science	Supplemental Site Investigation Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2000	Handex	Site Status Report, Penske Truck Leasing, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Sediment Sampling Report Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2002	Parsons Engineering Science	Supplemental Site Investigation Report, Tarrytown Former MGP Site, ConEdison, Tarrytown, New York.
2003	Haley & Aldrich	Supplemental Site Investigation – Spring 2003, Tarrytown Former MGP Site, Tarrytown, New York
2003	Haley & Aldrich	Pre-Design Investigation Report, Tarrytown Former MGP Site, Tarrytown, New York
2004	Haley & Aldrich	Northern DNAPL Supplemental Investigation, Tarrytown Former MGP Site Remediation, Tarrytown, New York

TABLE 4.1
WESTERN DNAPL AND SEDIMENT REMOVAL AREA
DREDGING DEPTHS UNDER THE RELIEVING PLATFORM
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Bent Row	Survey Section	Target Cut (ft)	Cut at West Edge (ft)	Cut at East Edge (ft)	Notes
1					Not in Remediation Area
2					Not in Remediation Area
3		4	2.3	5.1	Obstruction
4	H-H	4	1.9	5.3	Obstruction
5		4	3.3	5.6	
6		4	3.6	5.7	
7	G-G	4	3.3	6.4	
8		4	3.4	6.1	
9		4	3.2	5.4	
10	F-F	4	3.3	7.7	
11		4	1.3	4	Obstruction
12		4	1.9	3.8	Obstruction
13	E-E	4	3.2	6.3	
14		4	3.1	4.8	
15		4	2.9	7.8	
16	D-D	4	4	7.8	
17		4	4	4.2	
18		4	3.8	4.1	
19	C-C	4	2.5	5.5	Obstruction
20		4	2.7	4	Obstruction
21		4	3.3	5.4	
22	B-B	4	4	5.5	
23		4	4.2	3	
24		4	3.3	4.9	
25	A-A	4	2.9	5.1	
26		4	2.2	2.8	
27		4	2.4	3.6	
28					Not in Remediation Area
29					Not in Remediation Area
AVERAGE			3.1	5.2	

NOTES
1. Bent rows numbered north to south.
2. All 'West Edge' measurements obtained adjacent to new steel sheet pile wall.
3. All "East Edge" measurements obtained adjacent to existing wood sheet pile wall.

TABLE 4.2
WESTERN DNAPL AND SEDIMENT REMOVAL AREA
BACKFILL THICKNESS UNDER THE RELIEVING PLATFORM
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

	CAP			EAST EDGE				MIDDLE				WEST EDGE					
Pile Bent Row No.	Bottom of Excavation	Elevation of Cap	Cap Thickness	Initial	After medium Stone	After 3/4" Stone	Total Stone Thickness	Initial	After medium Stone	After 3/4" Stone	Total Stone Thickness	Initial	After medium Stone	After 3/4" Stone	Total Stone Thickness	Notes	Notes
1				-	-	-	-	-	-	-	-	-	-	-	-	Not in Remediation Area	
2				-	-	-	-	-	-	-	-	-	-	-	-	Not in Remediation Area	
3	-8.39	-7.19	1.2	4.1	2.5	0.7	3.4	5.3	3.2	2.2	3.1	5.4	2.7	2.2	3.2	Obstruction	
4	-10.65	-7.95	2.7	4	3	0.5	3.5	5.6	3.1	2.1	3.5	6.7	5	3	3.7	Obstruction	
5	-9.61	-7.71	1.9	5	3.4	1	4	5.8	2.5	2.5	3.3	6	3.3	2.7	3.3		
6	-9.99	-8.19	1.8	4.3	3.2	0.7	3.6	6.8	4.7	3.2	3.6	7.1	5.5	3.9	3.2		
7	-9.57	-7.57	2	4.5	2.4	0.9	3.6	7.7	6.6	2.9	4.8	8	7	4.2	3.8		
8	-10.36	-8.06	2.3	6.3	4	2.7	3.6	6.8	3.7	3	3.8	8.7	6.7	4.4	4.3		
9	-9.49	-7.79	1.7	6.3	4.3	2.8	3.5	7.3	3.7	3.3	4	7.9	4.9	4	3.9		
10	-11.62	-8.02	3.6	4.6	3.7	1.6	3	6.7	4.4	3	3.7	7.2	5.2	3.9	3.3		
11	-10.65	-6.35	4.3	5.9	2.9	2	3.9	6.9	4.4	3.1	3.8	7.3	5.3	3.7	3.6	Obstruction	
12	-10.47	-6.77	3.7	5.1	2.1	0.6	4.5	5	2.8	2.5	2.5	7.4	5.4	3.5	3.9	Obstruction	Soil-Bentonite Cap 3.7 ft thick at West Edge
13	-9.68	-7.18	2.5	4	2.7	1	3	5.6	3.5	3.3	2.3	6.8	5.7	3.8	3		Soil-Bentonite Cap 2.5 ft thick at West Edge
14	-10.12	-7.52	2.6	3.6	2.2	0.6	3	7.7	6.5	3.9	3.8	7.8	6.7	3.9	3.9		
15	-10.94	-8.14	2.8	3.6	2.5	0.7	2.9	7.3	6.2	3.6	3.7	8.2	7	4.4	3.8		Soil-Bentonite Cap 2.8 ft thick at West Edge
16	-9.12	-7.82	1.3	6.9	5.4	3.9	3	7.8	5.6	3.9	3.9	8.3	5.8	5.2	3.1		
17	-8.46	-7.46	1	8	7	3.9	4.1	7.7	6.8	3.7	4	9	7.3	5.2	3.8		
18	-9.26	-7.66	1.6	6.9	4.8	3.2	3.7	7.1	5.5	4	3.1	7.4	6	3.7	3.7		
19	-9.41	-7.41	2	7.9	5.1	3	4.9	7.2	5.5	3	4.2	7	6	4	3	Obstruction	
20	-8.82	-7.52	1.3	6.9	5	3.5	3.4	7.5	6	3.8	3.7	8.5	6	4.7	3.8	Obstruction	
21	-8.92	-7.32	1.6	7.6	6.7	3.4	4.2	8	6.7	4.6	3.4	9.3	7.8	5.5	3.8		
22	-8.67	-7.37	1.3	7.5	6.5	4	3.5	7.7	6.5	4.4	3.3	8.5	7.2	5.3	3.2		
23	-8.24	-7.04	1.2	7.8	6.5	4	3.8	7.5	6	4	3.5	8.3	6.3	5	3.3		
24	-8.91	-7.11	1.8	4.4	5.7	2.7	1.7	8	7	4	4	8	7	4.7	3.3		Soil-Bentonite Cap 1.8 ft thick at West Edge
25	-7.52	-6.52	1	6.2	4.8	3.1	3.1	7.2	6	4.4	2.8	8.3	7	5.2	3.1		Soil-Bentonite Cap 1.0 ft thick at West Edge
26	-8.26	-7.16	1.1	7	5	3.2	3.8	7	5.7	4.1	2.9	8	7	4.4	3.6		Soil-Bentonite Cap 1.1 ft thick at West Edge
27	-8.1	-7.1	1	8	5.8	4.6	3.4	7.7	6.5	4.2	3.5	7.9	6.8	4.4	3.5		
28	-8.48	-7.08	1.4	7.1	6.2	3.6	3.5	7.3	6.1	3.8	3.5	8.4	7.1	4.9	3.5	Not in Remediation Area	
29				5.7	4.5	2.2	3.5	7.7	6.2	4.2	3.5	6.8	5.2	3.3	3.5	Not in Remediation Area	
AVERAGE							**3.5**				**3.5**				**3.5**		

NOTES
1. Bent rows numbered north to south.
2. All 'West Edge' measurements obtained adjacent to new steel sheet pile wall.
3. All "East Edge" measurements obtained adjacent to existing wood sheet pile wall.
4. Initial Reading was at Top of Soil-Bentonite Cap.
5. At locations where total stone thickness is less than 3.0 ft, the soil-bentonite cap is greater than 1.0 ft.

TABLE 4.3
WESTERN DNAPL AND SEDIMENT REMVOAL AREA
SOIL SAMPLES TAKEN FROM RIVER DREDGING AREA
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Property	Sample C1	Sample D1	Sample D2	Sample D3	Sample E1
Location	Section C – 30 ft west of sheet pile wall	Section D– 40 ft west of sheet pile wall	Section E – 90 ft west of sheet pile wall	Section C – 95 ft west of sheet pile wall	Section C – 45 ft west of sheet pile wall
Soil Type	Gray Clay with sand	Gray Clay with sand	Gray Clay with sand (some silt)	Gray Clay with sand (some silt)	Gray Clay with sand
Date	10/28/04	10/28/04	11/9/04	11/9/04	10/28/04
Dilatancy	None	None	Tests not performed due to sample saturated with water		None
Toughness	Medium	Medium			Medium
Plasticity	Medium to High	Medium to High			Medium to High
Fine Sand Content	15% +/-	15% +/-	15% +/-	15% +/-	15% +/-
Fines	85% +/-	85% +/-	85% +/-	85% +/-	85% +/-

TABLE 4.4
WESTERN DNAPL AND SEDIMENT REMOVAL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Waste Characterization for Materials Disposed Off-Site
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Sample ID	C001	C002	C003	C004	C005	C006	C007
Sample Location							
Lab Sample Number	AF86581	AF86582	AF88764	AF90674	AF91415	AF92292	AF92508
Sampling Date	9/17/04	9/17/04	9/24/04	10/1/04	10/4/04	10/6/04	10/8/04
Sample Depth (feet bgs)							
	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL	Result MDL
Detected Compounds (mg/Kg or ppm)							
Metals							
Arsenic	5.67	6.45	2.61	5.91	5.62	5.46	4.28
Barium	62.3	62.5	30.7	58.1	61.8	52.7	49.4
Cadmium	0.948	0.835	BDL	0.535	BDL	0.53	BDL
Chromium	56.1	45.2	21.8	47	46.2	47.3	41.3
Lead	61.3	46.4	25	53.6	60	57.3	49.1
Mercury	0.98	0.73	0.6	0.77	0.72	0.64	0.51
Selenium	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	1.5	1.24	0.749	1.29	1.37	1.38	1.44
Total Cyanide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
PCB	ND	ND	ND	ND	ND	ND	ND
TPH	1,600	980	310	140	780	140	240

NR = not analyzed
ND = not detected
See lab reports for volatile and semi-volatile compounds

TABLE 4.5
WESTERN DNAPL AND SEDIMENT REMOVAL AREA
SUMMARY OF WASTE QUANTITIES TRANSPORTED OFF-SITE
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

Waste Type	Disposal Facility	Quantity
LNAPL Impacted Soil	ESMI	3,037.34 Ton
DNAPL Impacted Soil	ESMI	10,042.34 Ton
DNAPL Impacted Soil	Casie ProTank	10,740.87 Ton
Construction Debris	ESMI	1,286 Ton
Liquid Product	Casie ProTank	605 Gallons

TABLE 4.6
WESTERN DNAPL AND SEDIMENT REMOVAL AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
On-Site Soils Re-Used as Backfill
Final Engineering Report for Tarrytown Former MGP Site
Tarrytown, New York

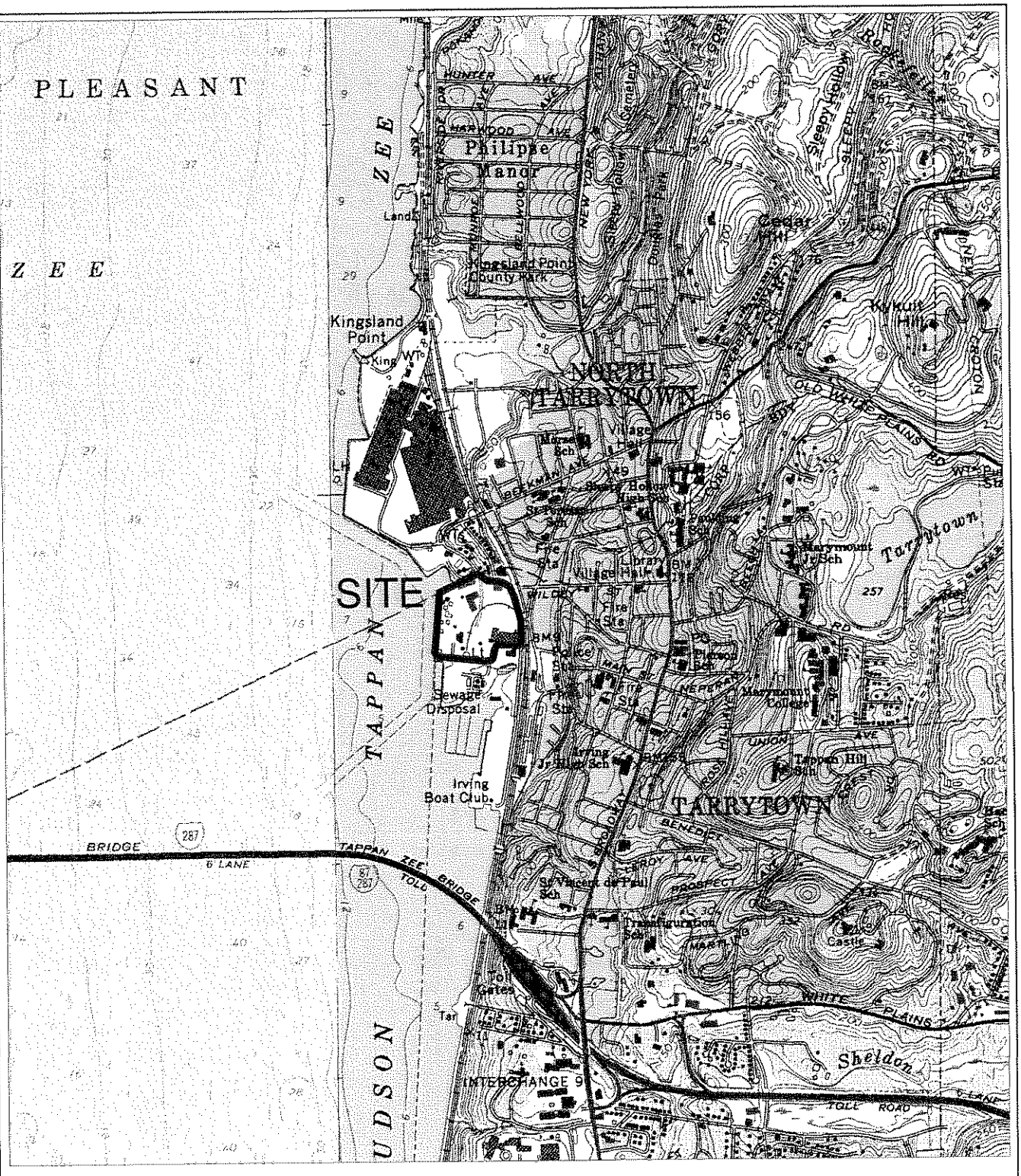
Field/Laboratory ID	Total PAH (ppm)	Total BTEX (ppm)
E001/AF87485	1.51	ND
E002/AF87486	ND	ND
CB001/AG08041	25.6	ND
CB002/AG08042	38.5	ND
CB003/AG08043	20.0	ND
CB004/AG08044	86.0	ND
CB005/AG08045	28.2	ND
CB006/AG08046	20.8	ND
Site Criteria per Work Plan	**500**	**10**

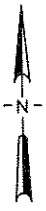
Note: ND = Not Detected.

TABLE 4.7
WESTERN DNAPL AND SEDIMENT REMOVALAREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Analysis of Borrow Source Soil
Final Engineering Report for Tarrytown Former MGP Site, Tarrytown, New York

Compound	NYSDEC TAGM 4046 Cleanup Criteria	Eastern USA Background (mg/kg)	National RE/sources Yonkers, NY (mg/kg)	Jaz Mar Elmsford, NY (mg/kg)	Tilcon Bronx, NY (mg/kg)	Comment
Aluminum	SB	33,000	3	11,800	10,100	OK, Eastern Background
Antimony	SB	N/A	5	25	ND < 0.549	OK, ND
Arsenic	7.5 or SB	3 - 12	1.0	2.2	6.52	OK < 7.5
Barium	300 or SB	15 - 600	0.5	64.5	107	OK < 300
Berylium	0.16 or SB	0 - 1.75	0.4	BDL	ND < 0.439	OK, Eastern Background
Cadmium	1 or SB	0.1 - 1	0.5	BDL	ND < 0.220	OK, ND
Calcium	SB	130 - 35,000	1.0	12,800	11,500	OK, Eastern Background
Chromium	10 or SB	1.5 - 40	0.5	12.2	18.6	OK, Eastern Background
Cobalt	30 or SB	2.5 - 60	0.5	10.1	11.6	OK < 30
Copper	25 or SB	1 - 50	0.5	24.4	31.5	OK, Eastern Background
Cyanide	N/A	N/A	N/A	0.2	ND < 0.115	OK, SB: Site-specific Cyanide values range from ND-41 mg/kg (Parsons data)
Iron	2,000 or SB	2,000 - 550,000	0.5	2.5	10,600	OK, Eastern Background
Lead	SB	200 - 500	0.5	0.5	47.4	OK, Eastern Background
Magnesium	SB	100 - 5,000	0.5	2.5	5,420	OK, Eastern Background
Manganese	SB	50 - 5,000	0.5	0.5	238	OK, Eastern Background
Mercury	0.1	0.001 - 0.2	0.1	0.1	0.0564	OK < 0.1
Nickel	13 or SB	0.5 - 25	0.5	0.5	14	OK, Eastern Background
Potassium	SB	8,500 - 43,000	1.0	1.0	4,200	OK, Eastern Background
Selenium	2 or SB	0.1 - 3.9	2.5	2.5	ND < 0.549	OK, Eastern Background
Silver	SB	N/A	0.5	0.5	ND < 0.439	OK, Background N/A
Sodium	SB	6,000 - 8,000	1.0	1.0	302	OK, Eastern Background
Thalium	SB	N/A	5.0	5.0	ND < 0.320	OK, Background N/A
Vanadium	150 or SB	1 - 300	0.5	0.5	27.9	OK < 150
Zinc	20 or SB	9 - 50	0.5	0.5	93	OK, SB: Site-specific Zinc values range from 28-1540 mg/kg (Parsons data)

Notes:
1) Soil cleanup criteria from NYSDEC Technical and Administrative Guidance Memorandum #4046, dated 24 January 1994.
2) SB = site background. 3) ND = Not detected 4) BDL = below detection limit
5) Results presented as milligrams per kilogram, dry weight.
6) Analysis performed for Target Compound List Volatile and Semi-volatile compounds had results indicating Non-Detect for all analytes





QUADRANGLE LOCATION: WHITE PLAINS, N.Y.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

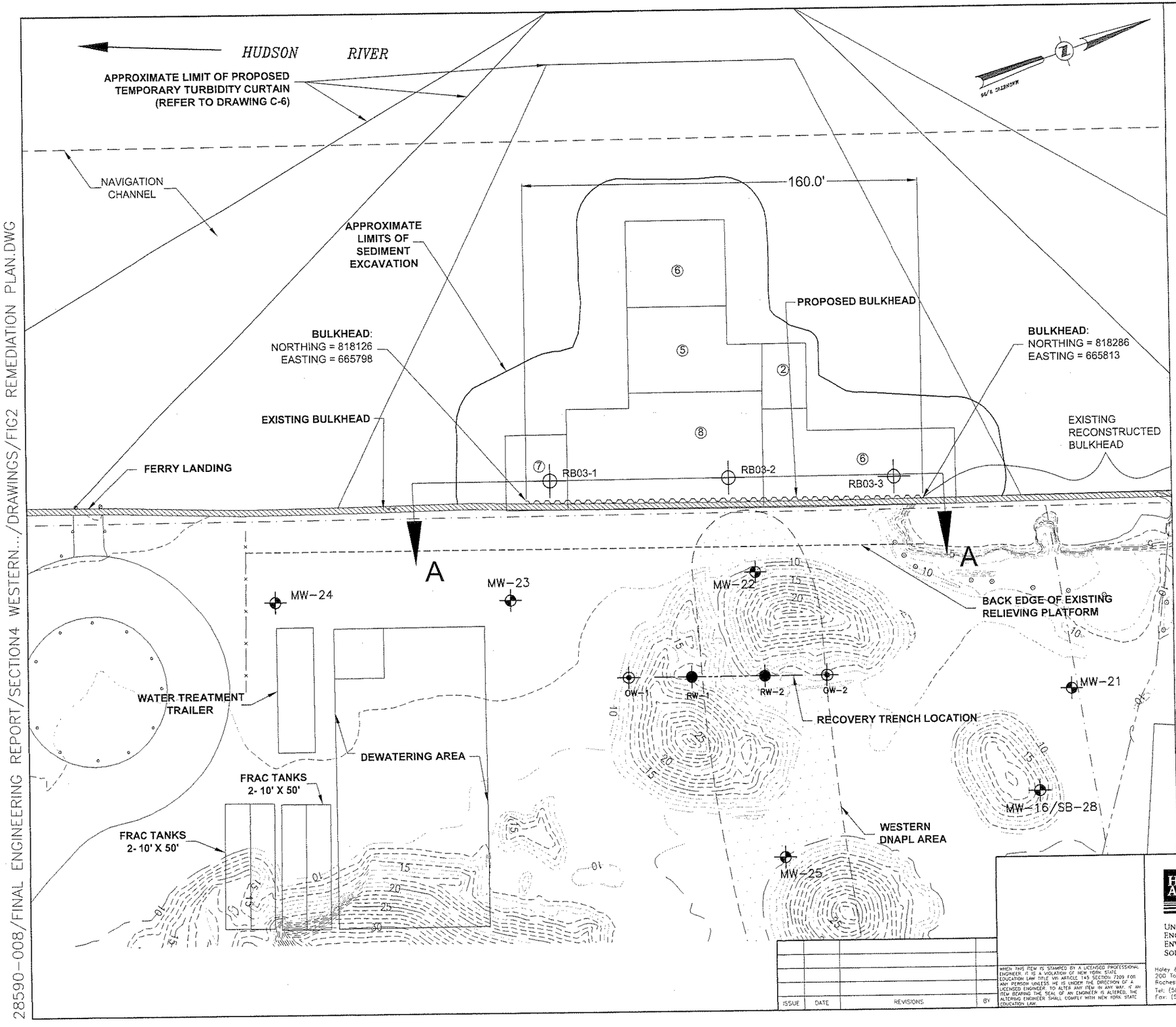
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
SITE LOCUS

SCALE: 1 = APPROX. 24000

MARCH 2005

FIGURE 4.1



BASE MAP LEGEND:

- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- EXISTING SITE CONTOURS
- MW-23 — MONITORING WELL LOCATION
- RB03-3 — GEOTECHNICAL RIVER BORING PERFORMED BY GEOLOGIC NY UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK, JULY, 2003.
- RW-1 — PROPOSED RECOVERY WELLS
- OW-1 — PROPOSED OBSERVATION WELLS
- ⑦ — PROPOSED TARGET EXCAVATION DEPTH IN FEET BELOW MUDLINE
- A — A — PROFILE ALIGNMENT (SEE DRAWING C-3)

SEDIMENT DEWATERING NOTES:

1. SEDIMENT TO BE DEWATERED ONSITE. SEDIMENT TO BE DISPOSED AT AN OFF-SITE PERMITTED FACILITY.

2. SEDIMENT DEWATERING AREA SHALL BE ENCLOSED BY A TEMPORARY BERM WITH HEIGHT SUFFICIENT TO CONTAIN DRAINAGE FROM SEDIMENT. A COLLECTION SUMP SHALL BE PROVIDED FOR DRAINAGE WATER.

3. SEDIMENT DEWATERING AREA AND BERM SHALL BE LINED WITH 10 MIL MINIMUM PLASTIC SHEETS.

4. DRAINAGE FROM SEDIMENT SHALL BE TREATED WITH CARBON FILTRATION ON-SITE PRIOR TO DISCHARGE.

5. ABSORBENT BOOM SHALL ENCLOSE EXCAVATION AREA, IN ADDITION TO TURBIDITY CURTAIN.

6. PROVIDE TURBIDITY MONITORING OUTSIDE SILT CURTAIN BOTH NORTH AND SOUTH OF WORK AREA.

GENERAL NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98. TOPOGRAPHIC CONTOURS REFLECT TIME OF SURVEY. IDENTIFIED RELIEF NOT ANTICIPATED AT TIME OF CONSTRUCTION.

2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.

3. THE LOCATIONS OF BORINGS OBSERVED BY HALEY & ALDRICH WERE APPROXIMATELY DETERMINED IN THE FIELD WITH SURVEY TAPE MEASUREMENTS FROM PHYSICAL MAPPING FEATURES. THE LOCATION OF THE BORINGS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. VERTICAL DATUM: NAVD 88.

5. HORIZONTAL DATUM: NYS PLANE EAST ZONE NAD 83.

6. DEPLOY SILT CURTAIN ADJACENT TO SHEET PILING PRIOR TO INSTALLATION OF ROCK DOWELS.

NOT FOR CONSTRUCTION

ISSUE	DATE	REVISIONS	BY

WHEN THIS ITEM IS STAMPED BY A LICENSED PROFESSIONAL ENGINEER, IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW TITLE VIII ARTICLE 145 SECTION 7209 FOR ANY PERSON UNLESS HE IS UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER ANY ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF AN ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL COMPLY WITH NEW YORK STATE EDUCATION LAW.

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

Haley & Aldrich of New York
200 Town Centre Drive
Rochester, NY 14623
Tel: (585) 359-9000
Fax: (585) 359-4650

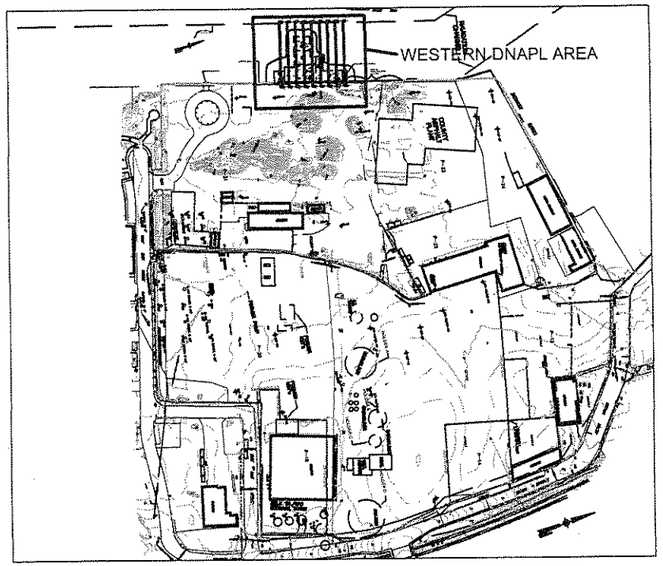
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06
WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
REMEDAITON PLAN

Date:	Scale:	File No.
MARCH 2005	AS SHOWN	28590-002

0 20 40
SCALE IN FEET

Project Engineer:	JDB
Designed By:	BEBA
Drawn By:	WCA
Checked By:	JDB
Sheet No.:	1 of 1
Figure No.:	4.2
Issue	

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG2 REMEDIATION PLAN.DWG



KEY PLAN
N.T.S

LEGEND:

MW-23 ⊕	MONITORING WELL LOCATION
⑦	PROPOSED TARGET EXCAVATION DEPTH IN FEET BELOW MUDLINE
RB29 ●	APPROXIMATE HISTORIC LOCATIONS OF RIVER BORINGS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED 28 SEPTEMBER 2000.
RB03-3 ⊕	GEOTECHNICAL RIVER BORING PERFORMED BY GEOLOGIC NY UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK, JULY, 2003.
D3 ▨	LOCATIONS OF SEDIMENT SAMPLES PERFORMED BY D.A. COLLINS ON 8 - 9 NOVEMBER 2004.

NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.

2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.

4. VERTICAL DATUM: NAVD 88

5. HORIZONTAL DATUM: NYS PLANE EAST ZONE NAD 83

PLAN VIEW
SCALE: AS SHOWN

0 60 120
SCALE IN FEET

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

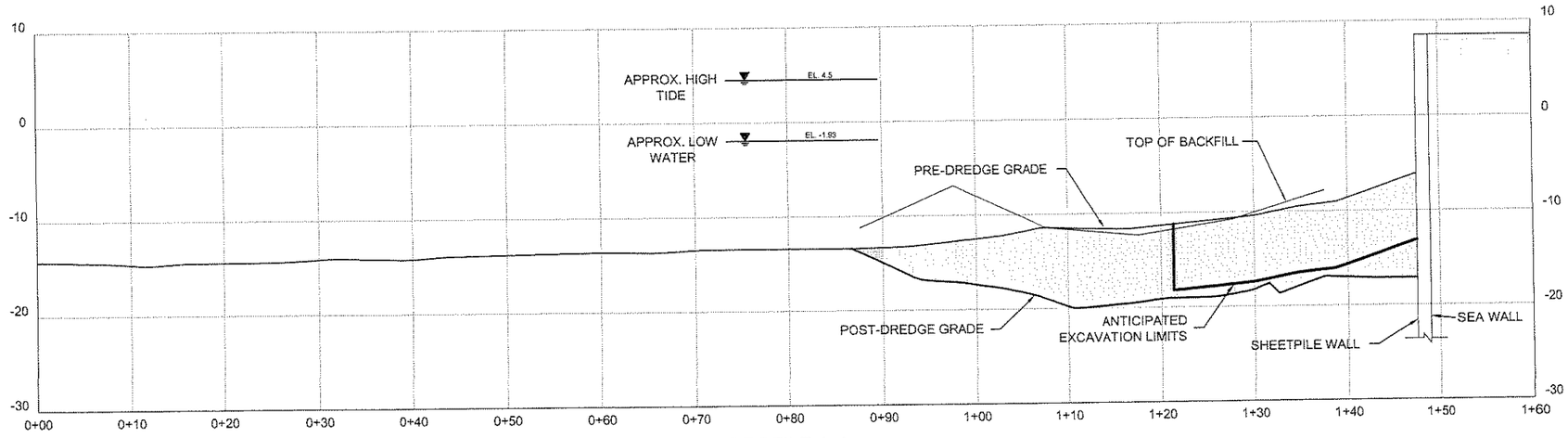
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE SEDIMENT REMOVAL PLAN VIEW

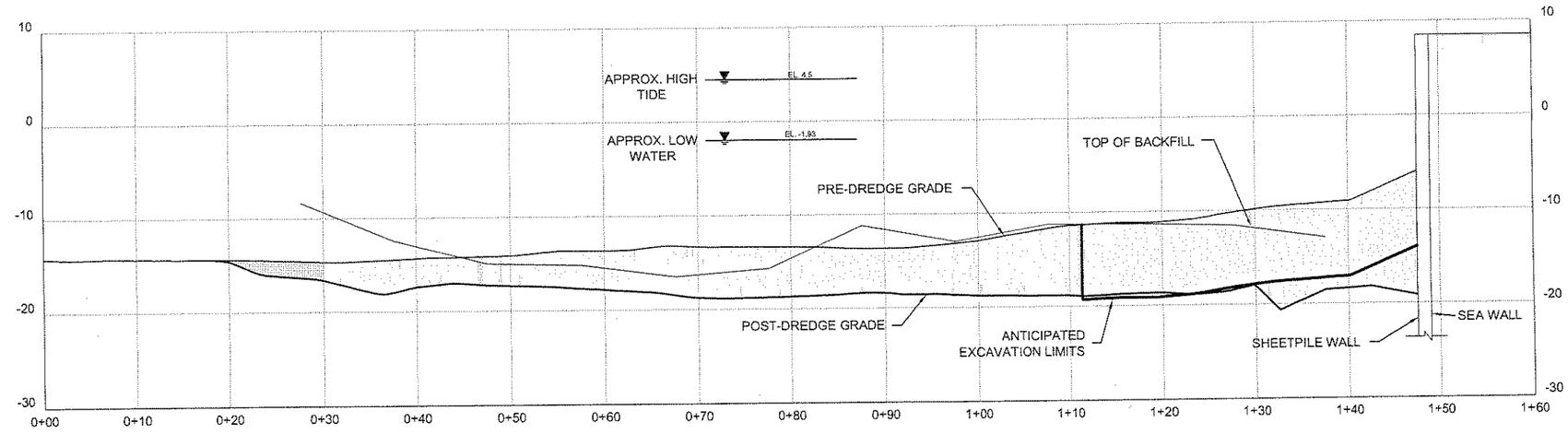
SCALE: AS SHOWN MARCH 2005

FIGURE 4.3

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG 3.DWG



PROFILE A-A



PROFILE B-B

NOTES:

1. PRE DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004 AND A POINT FILE NAMED TARRCOLL.XYZ.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. TOP OF SEDIMENT ELEVATIONS ADJACENT TO THE SHEET PILE WALL AND UP TO 20 FEET AWAY FROM SHEETPILE WALL BASED ON SURVEY DATA PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES, SURVEY PERFORMED 8 NOVEMBER 2004.

4. VERTICAL DATUM: NAVD 88

LEGEND:

- WATER LEVEL
- DREDGED VOLUME
- LOCATION OF SEDIMENT SAMPLE OBTAINED BY D.A. COLLINS

0 15 30

SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

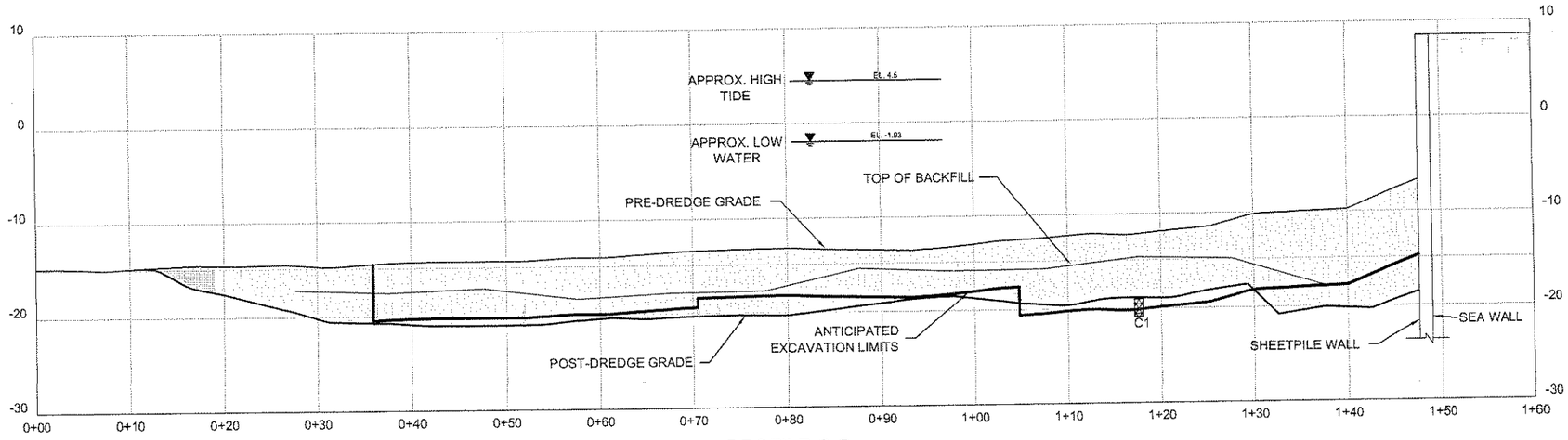
WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
PROFILE A-A & B-B

SCALE: AS SHOWN

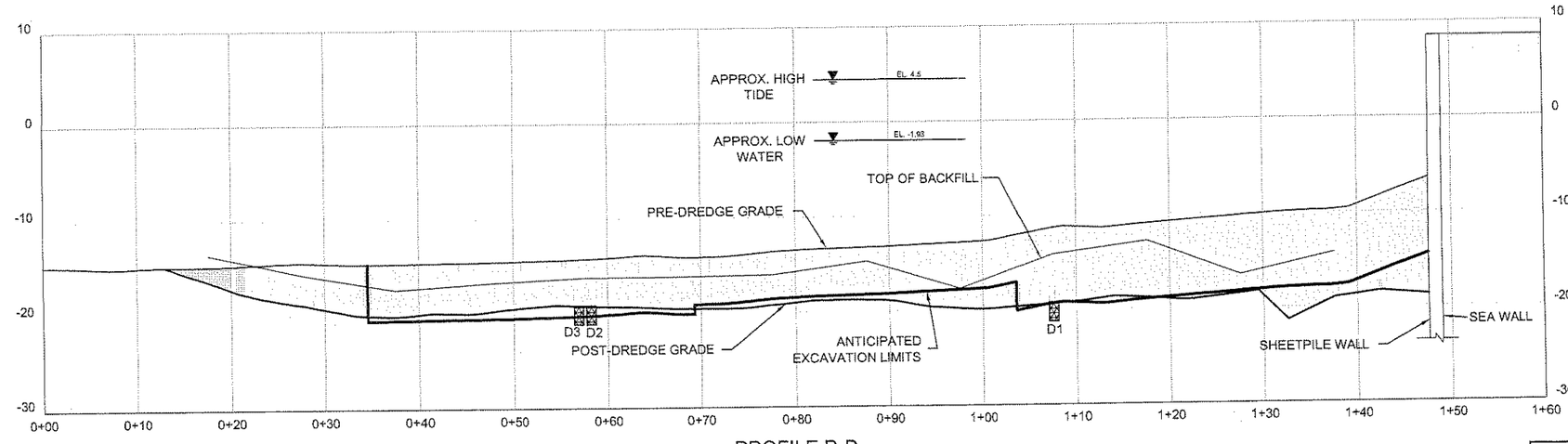
MARCH 2005

FIGURE 4.4

28590--008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG 4 - 8 PROFILES.DWG



PROFILE C-C



PROFILE D-D

NOTES:

1. PRE DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004 AND A POINT FILE NAMED TARRCOLL.XYZ.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. TOP OF SEDIMENT ELEVATIONS ADJACENT TO THE SHEET PILE WALL AND UP TO 20 FEET AWAY FROM SHEETPILE WALL BASED ON SURVEY DATA PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES, SURVEY PERFORMED 8 NOVEMBER 2004.

4. VERTICAL DATUM: NAVD 88

5. SAMPLES C1, D1
   SOIL TYPE = GRAY, FAT CLAY WITH SAND
   DILATANCY = NONE
   TOUGHNESS = MEDIUM
   PLASTICITY = MEDIUM TO HIGH
   FINE SAND CONTENT = ±15%
   FINES = ±85%

6. SAMPLES D2, D3
   SOIL TYPE = GRAY, CLAY WITH SAND (SOME SILT)
   FINE SAND CONTENT = ±15%
   FINES = ±85%

LEGEND:

WATER LEVEL

DREDGED VOLUME

LOCATION OF SEDIMENT SAMPLE OBTAINED BY D.A. COLLINS

0 15 30
SCALE IN FEET

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

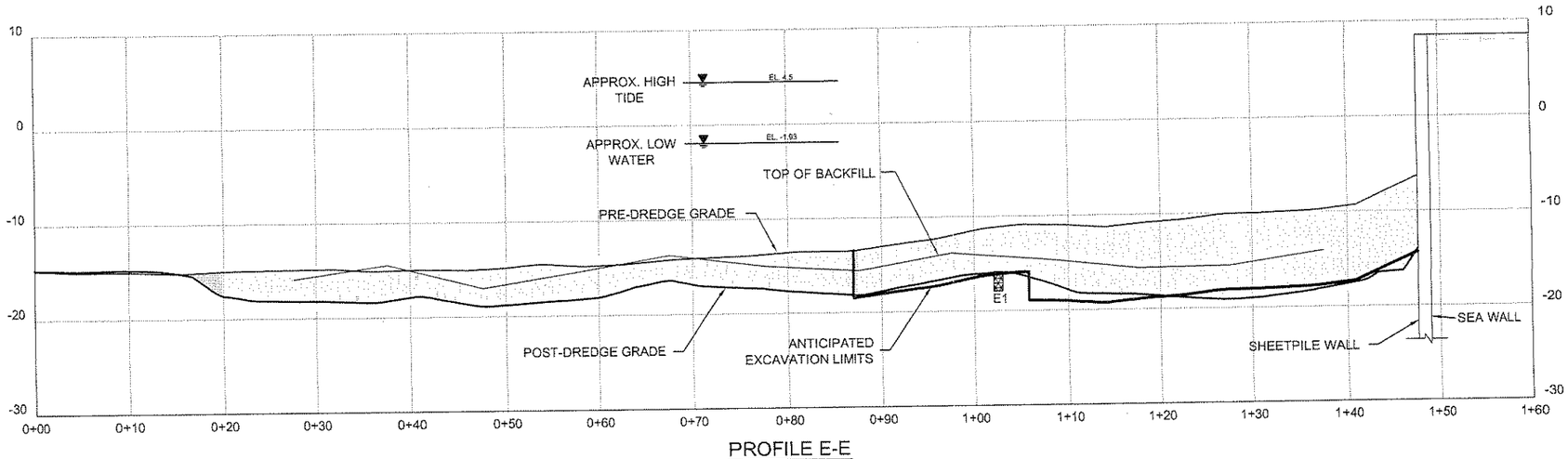
TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE PROFILE C-C & D-D

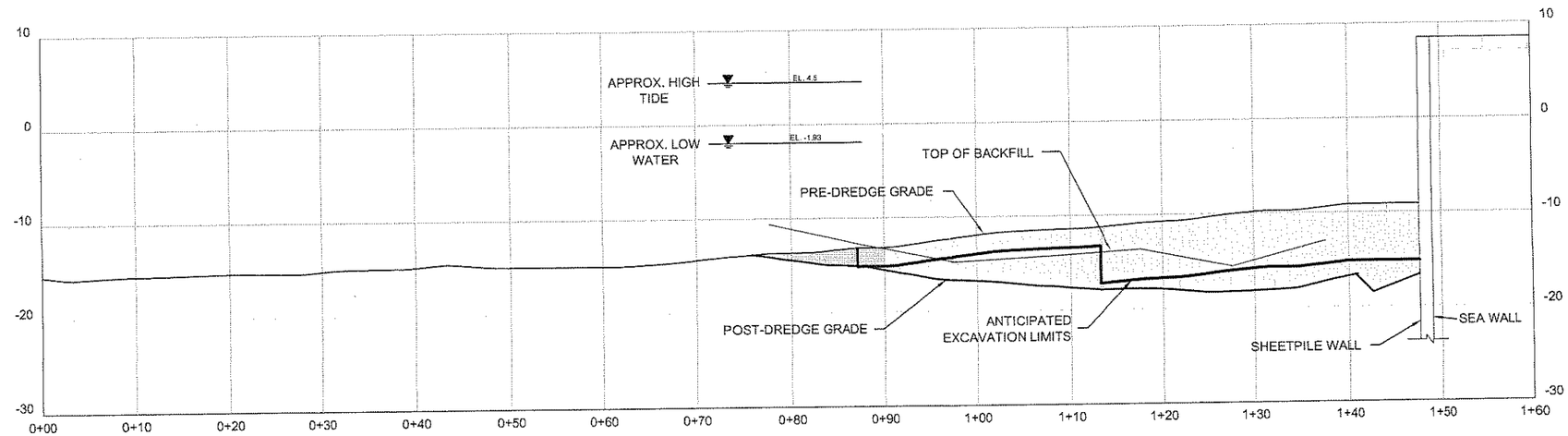
SCALE: AS SHOWN
MARCH 2005

FIGURE 4.5

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG 4 - 8 PROFILES.DWG



PROFILE E-E



PROFILE F-F

NOTES:

1. PRE DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004 AND A POINT FILE NAMED TARRCOLL.XYZ.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. TOP OF SEDIMENT ELEVATIONS ADJACENT TO THE SHEET PILE WALL AND UP TO 20 FEET AWAY FROM SHEETPILE WALL BASED ON SURVEY DATA PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES, SURVEY PERFORMED 8 NOVEMBER 2004.

4. VERTICAL DATUM: NAVD 88

5. SAMPLE E1
   SOIL TYPE = GRAY, FAT CLAY WITH SAND
   DILATANCY = NONE
   TOUGHNESS = MEDIUM
   PLASTICITY = MEDIUM TO HIGH
   FINE SAND CONTENT = ±15%
   FINES = ±85%

LEGEND:

WATER LEVEL

DREDGED VOLUME

LOCATION OF SEDIMENT SAMPLE OBTAINED BY D.A. COLLINS

0 15 30
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

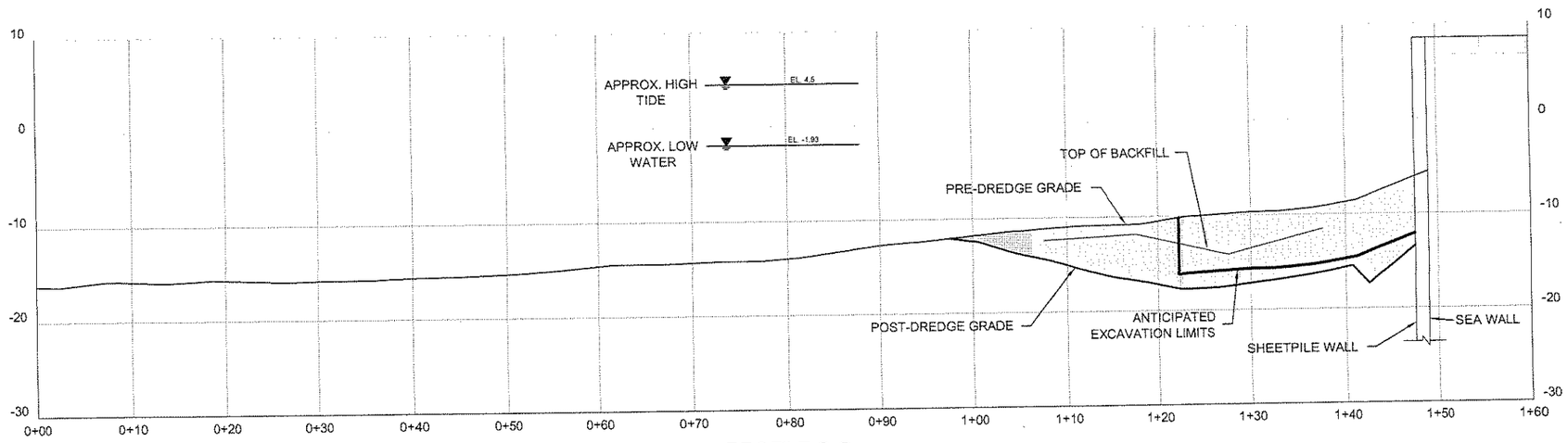
WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE PROFILE E-E & F-F

SCALE: AS SHOWN

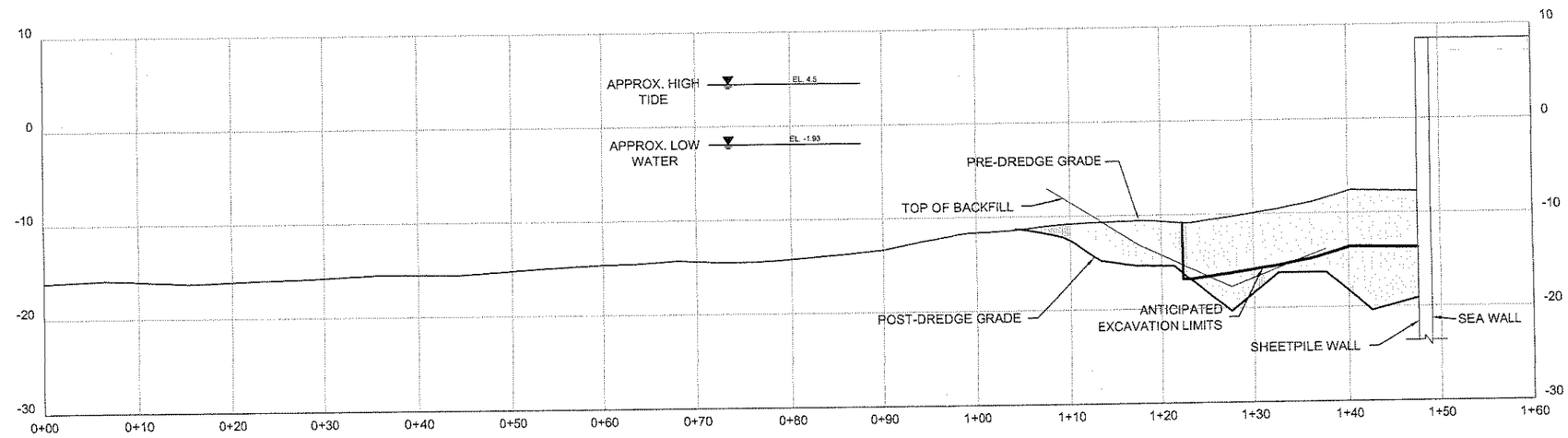
MARCH 2005

FIGURE 4.6

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG 4 - 8 PROFILES.DWG



PROFILE G-G



PROFILE H-H

NOTES:

1. PRE DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004 AND A POINT FILE NAMED TARRCOLL.XYZ.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. TOP OF SEDIMENT ELEVATIONS ADJACENT TO THE SHEET PILE WALL AND UP TO 20 FEET AWAY FROM SHEETPILE WALL BASED ON SURVEY DATA PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES, SURVEY PERFORMED 8 NOVEMBER 2004.

4. VERTICAL DATUM: NAVD 88

LEGEND:

WATER LEVEL

DREDGED VOLUME

LOCATION OF SEDIMENT SAMPLE OBTAINED BY D.A. COLLINS

0 15 30

SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
PROFILE G-G & H-H

SCALE: AS SHOWN

MARCH 2005

FIGURE 4.7

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/FIG 4 - 8 PROFILES.DWG

NOTES:

1. PRE DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004 AND A POINT FILE NAMED TARRCOLL.XYZ.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. TOP OF SEDIMENT ELEVATIONS ADJACENT TO THE SHEET PILE WALL AND UP TO 20 FEET AWAY FROM SHEETPILE WALL BASED ON SURVEY DATA PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES, SURVEY PERFORMED 8 NOVEMBER 2004.

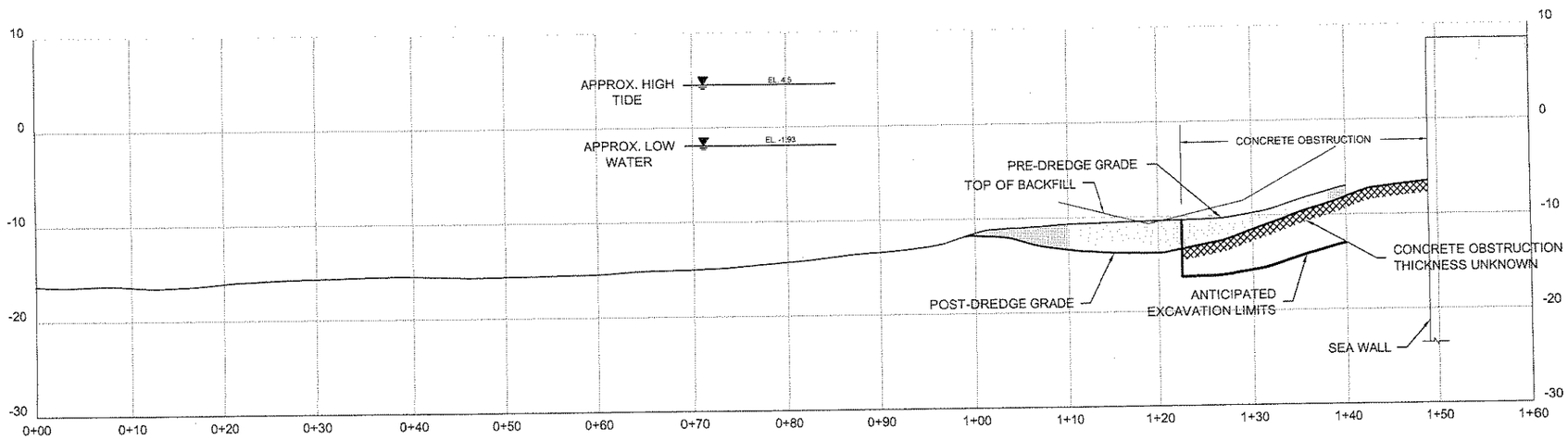
4. VERTICAL DATUM: NAVD 88

LEGEND:

WATER LEVEL

DREDGED VOLUME

LOCATION OF SEDIMENT SAMPLE OBTAINED BY D.A. COLLINS



PROFILE I-I

0 15 30

SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
PROFILE I-I

SCALE: AS SHOWN MARCH 2005

FIGURE 4.8

SEE DRAWING FROM HYDROGRAPHIC SURVEYS ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-2928-1673, DATED 3 MAY 2004
APPENDIX F

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

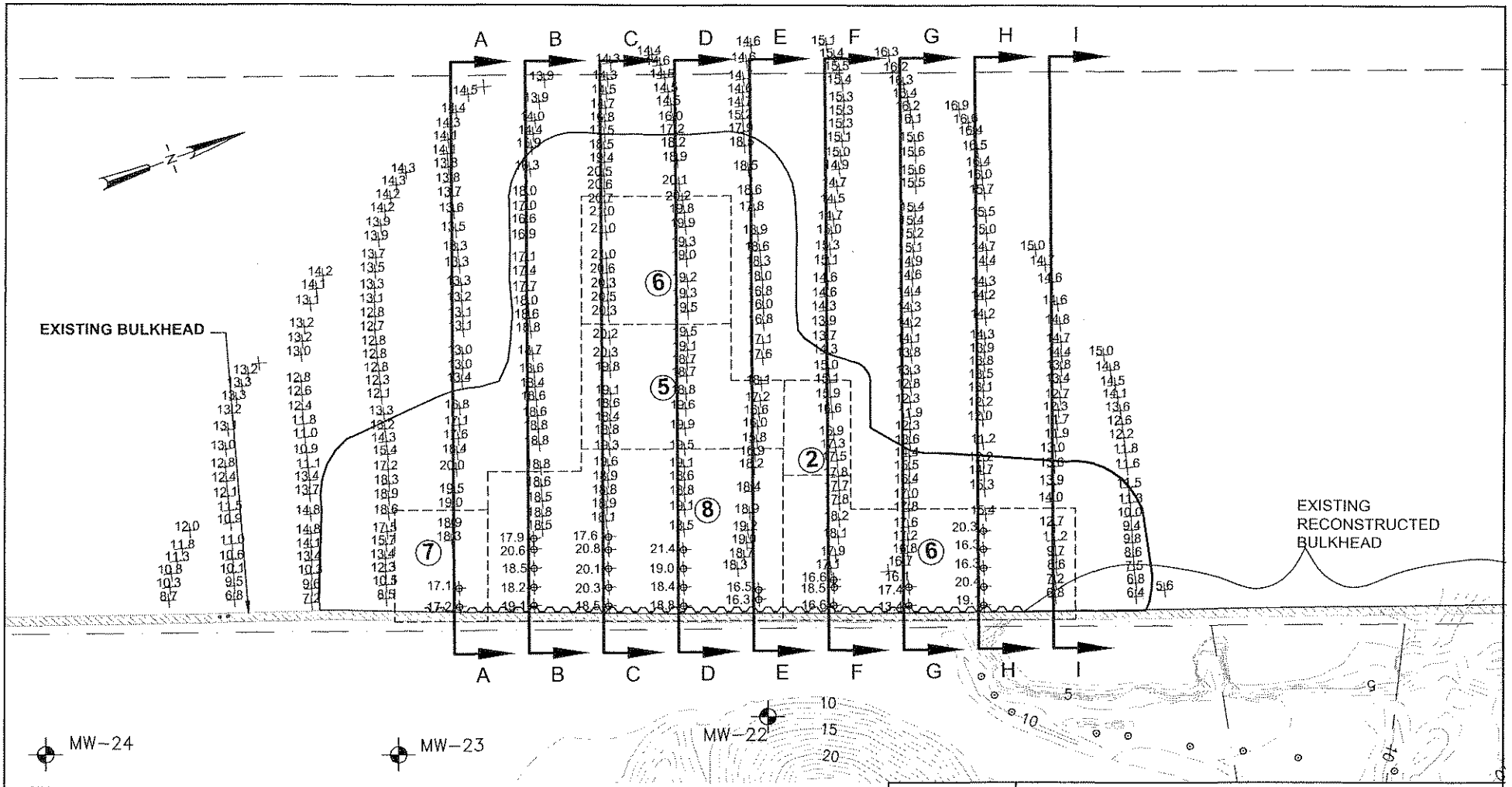
WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
PRE-DREDGE SURVEY

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 4.9

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/DEPTHS HAND & SURVEY.DWG



NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.

2. POST DREDGING ELEVATIONS DERIVED FROM HYDROGRAPHIC SURVEYS DRAWING ENTITLED "EXISTING CONDITION SOUNDINGS", DRAWING NUMBER 04-DACO-04/020-3044-1762, DATED 25 OCTOBER 2004 AND A POINT FILE NAMED COLL102504.XYZ.

3. VERTICAL DATUM: NAVD 88

4. ALL ELEVATIONS ARE NEGATIVE WITHIN THE DREDGE LOCATION

LEGEND:

(7) PROPOSED TARGET EXCAVATION DEPTH IN FEET BELOW MUDLINE

18.5 DESIGNATION OF POST-DREGED BATHEYMETRIC SURVEY PERFORMED BY HYDROGRAPHIC SURVEY

17.9 ⊕ DESIGNATION OF SURVEY ROD ELEVATIONS PERFORMED BY D.A. COLLINS

0 20 40
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

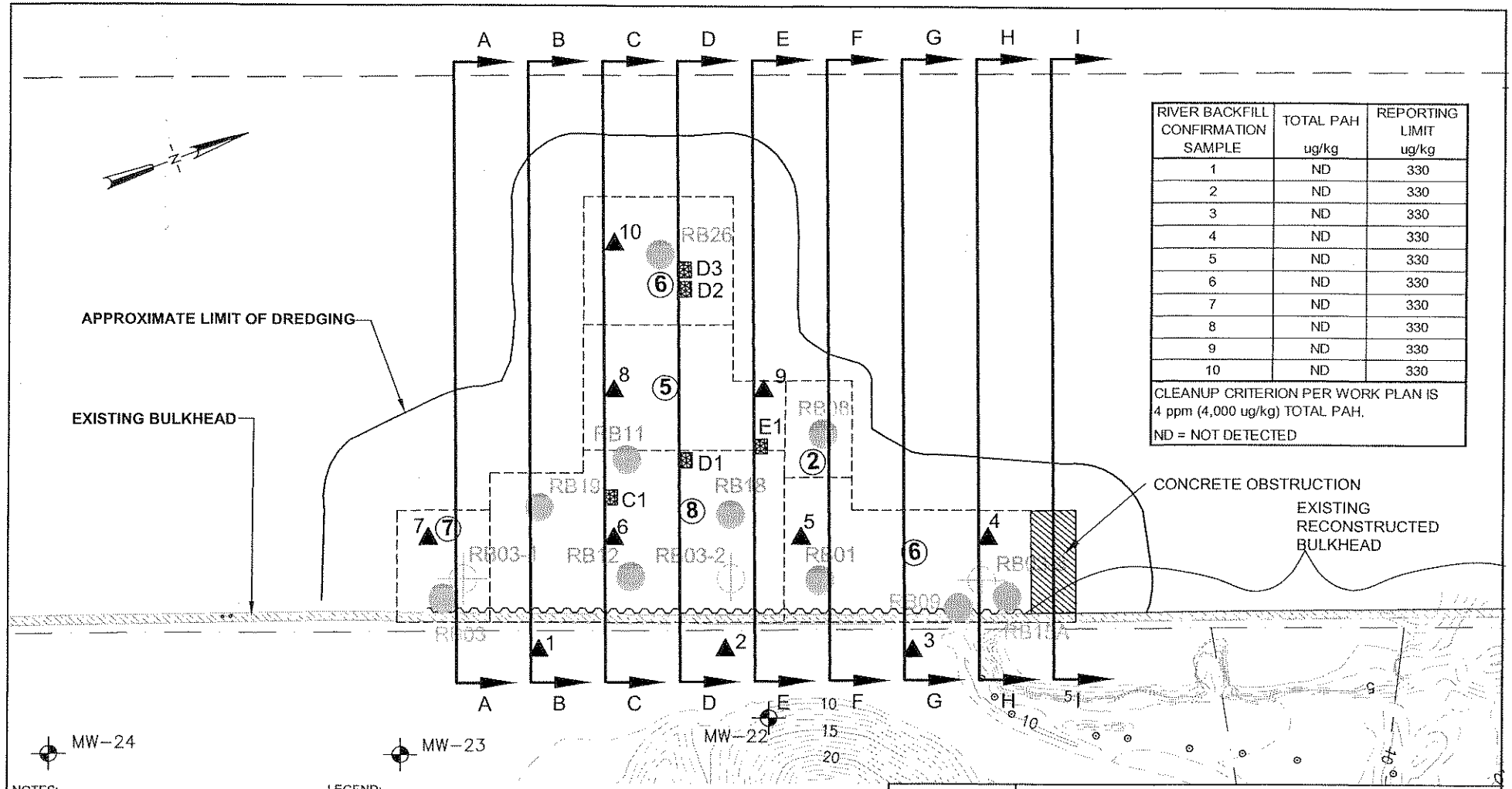
WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
POST DREDGE BATHYMETRIC SURVEY & SURVEY ROD READINGS

SCALE: AS SHOWN

MARCH 2005

FIGURE 4.10

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/CONFIRMATION SAMPLES.DWG



RIVER BACKFILL CONFIRMATION SAMPLE	TOTAL PAH ug/kg	REPORTING LIMIT ug/kg
1	ND	330
2	ND	330
3	ND	330
4	ND	330
5	ND	330
6	ND	330
7	ND	330
8	ND	330
9	ND	330
10	ND	330

CLEANUP CRITERION PER WORK PLAN IS 4 ppm (4,000 ug/kg) TOTAL PAH.

ND = NOT DETECTED

NOTES:

1. BASE PLAN ILLUSTRATING EXISTING SITE STRUCTURES AND FEATURES DERIVED FROM THE CHAZEN COMPANIES' DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY LANDS OF FERRY INVESTMENTS, LLC" DATED 12/02/02. DATE OF SURVEY WAS 12/08/98.

2. MONITORING WELL LOCATIONS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED NOVEMBER 2000.

LEGEND:

MW-23 — MONITORING WELL LOCATION

⑦ — PROPOSED TARGET EXCAVATION DEPTH IN FEET BELOW MUDLINE

RB29 — APPROXIMATE HISTORIC LOCATIONS OF RIVER BORINGS DERIVED FROM PARSONS ENGINEERING SCIENCE, INC., FIGURE 3-1 ENTITLED "TOTAL BTEX CONCENTRATIONS IN SOIL SAMPLES, SUPPLEMENTAL INVESTIGATION TARRYTOWN SITE" DATED 28 SEPTEMBER 2000.

RB03-3 — GEOTECHNICAL RIVER BORING PERFORMED BY GEOLOGIC NY UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK, JULY, 2003.

D3 — LOCATIONS OF SEDIMENT SAMPLES PERFORMED BY D.A. COLLINS ON 8 - 9 NOVEMBER 2004.

1 — APPROXIMATE CONFIRMATION SAMPLE LOCATIONS-RIVER BACKFILL

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
LOCATION OF CONFIRMATION SAMPLES

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 4.11

SEE DRAWING "PLAN & SECTIONS", DRAWING S-1, "SECTONS & DETAILS", DRAWING S-2, 2 JULY 2004, BY HILLMAN & MILEY
SEE APPENDIX D

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
RELIEVING PLATFORM RECORD DRAWING

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 4.12

SEE DRAWING "AS-BUILT SURVEY GAS HOLDERS & TAR WELL, LNAPL, DNAPL & WDNAPL REMEDIATION AREAS", DRAWING SP1, 3/24/05, BY CHAZEN ENGINEERING AND LAND SURVEYING CO. P.C., SEE APPENDIX G

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

TARRYTOWN PROPERTY DEVELOPMENT
FERRY LANDINGS, LLC
TARRYTOWN, NEW YORK
SITE NO. C360069
BROWNFIELD CLEANUP INDEX NO. W3-1007-04-06

WESTERN DNAPL BARRIER AND SEDIMENT REMOVAL AREA
FINAL ENGINEERING REPORT FOR TARRYTOWN FORMER MGP SITE
SITE PLAN RECORD DRAWING

SCALE: NOT TO SCALE

MARCH 2005

FIGURE 4.13

28590-008/FINAL ENGINEERING REPORT/SECTION4 WESTERN.../DRAWINGS/

Section 5

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

Tel: 585.359.9000
Fax: 585.359.4650
HaleyAldrich.com

HALEY & ALDRICH

30 March 2005
File No. 28590-008

Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Attention: Lech M. Dolata

Subject: Final Engineering Report for Tarrytown Former MGP Site
Section 5 - Appendices
Tarrytown, New York
Site No. C360069
Brownfield Cleanup Index No. W3-1007-04-06

Dear Mr. Dolata:

On behalf of Ferry Landings LLC, Haley & Aldrich of New York (Haley & Aldrich) is pleased to present for your review and approval this Final Engineering Report for Tarrytown Former MGP Site, Section 5 for the Tarrytown Former Manufactured Gas Plant (MGP) Site. This section provides a description of the appendices prepared for the Final Engineering Report..

This is the fifth section of the Final Engineering Report for Tarrytown Former MGP Site. The other sections of the Final Engineering Report are:

- Section 1 Holder and Tar Well Area
- Section 2 LNAPL Area
- Section 3 Northern DNAPL Area
- Section 4 Western DNAPL and Sediment Removal Area

The reports are organized to conform to *Section 5.8 Remedial Action Report* in the Draft Technical Guidance for Site Investigation and Remediation, dated March 2001 by NYSDEC.

APPENDIX CONTENTS

Section 5 of Final Engineering Report contains appendices applicable to Section 1, Section 2, Section 3, and/or Section 4. The contents of Section 5 are as follows:

- Appendix A – Memorandum, *Tarrytown Former MGP Site, Sediment Dredging and Backfill, Turbidity and Suspended Solids Control*, prepared by Haley & Aldrich, dated 17 March 2005.

- Appendix B – Letter, Re: *Relieving Platform at the Ferry Landings Project*, prepared by Hillman & Miley, dated 26 January 2005.

- Appendix C – Memorandum, *Tarrytown Former MGP Site, Construction Water Management*, prepared by Haley & Aldrich, dated 17 March 2005.
- Appendix D – Drawing, *As-Built Survey, Gas Holders & Tar Well, LNAPL, NDNAPL, & WDNAPL Remediation Areas*, prepared by The Chazen Companies, dated 11 October 2004.
- Appendix E – Submittal, *LNAPL Collection System, System Controls, As-Built Diagram*, submitted by D.A. Collins Environmental Services, dated 6 December 2004.
- Appendix F – Drawing, *Tarrytown Former MGP Site, Existing Conditions Soundings, 20' x 5' Grid*, prepared by Hydrographic Surveys, dated 3 May 2004.
- Appendix G – Drawings, *Concrete Bulkhead & Relieving Platform, Ferry Landings LLC, Tarrytown New York, S-1 Plan & Section and S-2 Sections & Details*, prepared by Hillman & Miley, dated 2 July 2004.
- Appendix H – Drawing, *Environmental Easement Map, Prepared for National Resources, LLC*, prepared by The Chazen Companies, dated 7 February 2005.

CLOSURE

This report described the Appendices to the Final Engineering Report. A certification that the work was performed in accordance with the Work Plan (and approved deviations) signed by the professional engineer responsible for oversight of the work is included with the cover letter to the Final Engineering Report.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Jonathan D. Babcock, P.E.
Project Manager

Vincent B. Dick
Vice President

Enclosures:

Appendix A
Appendix B
Appendix C
Appendix D
Appendix E
Appendix F
Appendix G
Appendix H

c: C. Monheit, Ferry Landings, LLC
R. Manz, D.A. Collins Environmental Services

\\ROC\common\Projects\28590\008 Resp to FER Comments\Final Engineering Report\Section 5 FER Appendices\Final FER Appendices 30Mar05.doc

Appendix A

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

MEMORANDUM

17 March 2005
File No. 28590-008

TO: Ferry Landings, LLC
Carl Monheit

C: File

FROM: Haley & Aldrich of New York
Jonathan D. Babcock

SUBJECT: Tarrytown Former MGP Site
Sediment Dredging and Backfill
Turbidity and Suspended Solids Control

This memorandum describes the control and monitoring measures used for sediment dredging and backfill within the Hudson River during the Tarrytown Former MGP Site remediation project. The turbidity control and monitoring measures are described in the report *Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal - Wet Alternative Removal - Remedial Design Report*, dated 27 February 2004 . That report is also referred to herein as the Work Plan. The monitoring plan for turbidity and total suspended solids is given in the 22 September 2004 memorandum from Haley & Aldrich to New York State Department of Environmental Conservation (NYSDEC).

The primary objective of the control measures and monitoring plan is to prevent an increase in total suspended solids (TSS) in the Hudson River outside the work area. This was accomplished in three ways:

- Work was performed within a system of silt curtains that isolated the work area from the rest of the Hudson River,
- Dredging was performed using an environmental clamshell (by CableArm™) which encloses the sediment within the bucket to minimize loss of sediment as the bucket is raised, and
- Monitoring of turbidity and total suspended solids was performed continuously during dredging and backfill operations.

SILT CURTAIN SYSTEM

The silt curtain system was described in the Work Plan, and is shown on the attached drawings by Elastec/American Marine (#3337A2 and # 3337E). It consisted of an inner

curtain, made of 22 oz/sy polyvinyl chloride (PVC) plastic which enclosed the work area, a secondary curtain made of impermeable XR-5 6730 polyester fabric, and outer current deflection curtains made of permeable XL 55 geotextile. The work area inside the inner curtain extended 275 along the sheet pile wall at the relieving platform and extended 175 feet out into the Hudson River.

The inner silt curtain extended to the river bottom, and was provided with sufficient height to accommodate tidal water level fluctuations. The curtains were mounted to the relieving platform with tide slides so the curtain could move up and down with the tide. The silt curtains were deployed in the period 8/23 to 9/3/04 and were removed after river backfill was completed in the period 12/6 to 12/8/04.

ENVIRONMENTAL CLAM SHELL

The dredging was performed using a crane-mounted environmental clamshell by CableArm™. The clamshell is equipped with a passive venting system that reduces re-suspension of sediments. While the bucket is being lowered, the vents open allowing water to flow through. This reduces downward water pressure and helps to minimize re-suspension. When the bucket is raised, the vents close, reducing the possibility of water washing material out of the bucket. Once the bucket reaches the surface, excess water is drained through the vents, avoiding excess dewatering requirements.

TURBIDITY AND TOTAL SUSPENDED SOLIDS MONITORING

The turbidity and total suspended monitoring plan was developed in conjunction with the NYSDEC, using data from a pre-dredging turbidity and TSS sampling program as guidance (Memorandum Haley & Aldrich to NYSDEC, dated 13 September 2004). The pre-dredging data showed that empirical relationships between turbidity and TSS, and between upstream and downstream turbidity could not be established. The tidal change in flow (current changing from southward to northward with the ebb and flow of the tide) and suspended solids characteristics of the Hudson River precluded such relationships.

The turbidity and total suspended monitoring plan is attached for reference. The plan included automated and visual monitoring, and water quality sampling. Continuous turbidity monitoring outside the turbidity curtain system was performed using two turbidity monitoring buoys, one each at the north side and south side. The buoys provided real-time turbidity data to a computer on shore. Visual monitoring of the river water inside, between and outside the silt curtains was performed to detect changes in water color or opacity outside the inner curtain. To confirm the effectiveness of the turbidity monitoring, water samples were taken daily near the turbidity buoys and analyzed for TSS.

Results of the TSS sampling are shown in Table 1. Downstream TSS was no greater than 5 ppm more than upstream TSS, with the exception of 1 October 2004, when the increase in TSS was attributed to barge traffic not related to the remediation project in the downstream area outside the silt curtains.

During the course of work, minor instances of turbidity breakthrough from the inner curtain were noted visually, and corrective actions were taken. These were located at the connection

between the turbidity curtains and the relieving platform. Additional curtain fabric was installed at the problem locations, and was effective in containing the turbidity within the work area. No visual increase in turbidity was identified outside the secondary curtain.

After remediation was completed, removal of the silt curtains was delayed to wait for the turbidity inside the inner curtain to reduce or stabilize. During the delay period, a severe wind storm on 12/1/04 damaged the curtains, allowing the mixing of ambient Hudson River water with the water within the inner curtain. TSS samples were taken from inside and outside the work area after the storm. The values were 66 ppm inside the inner curtain compared to 100 ppm outside the inner curtain, and after consultation with NYSDEC, the curtains were removed.

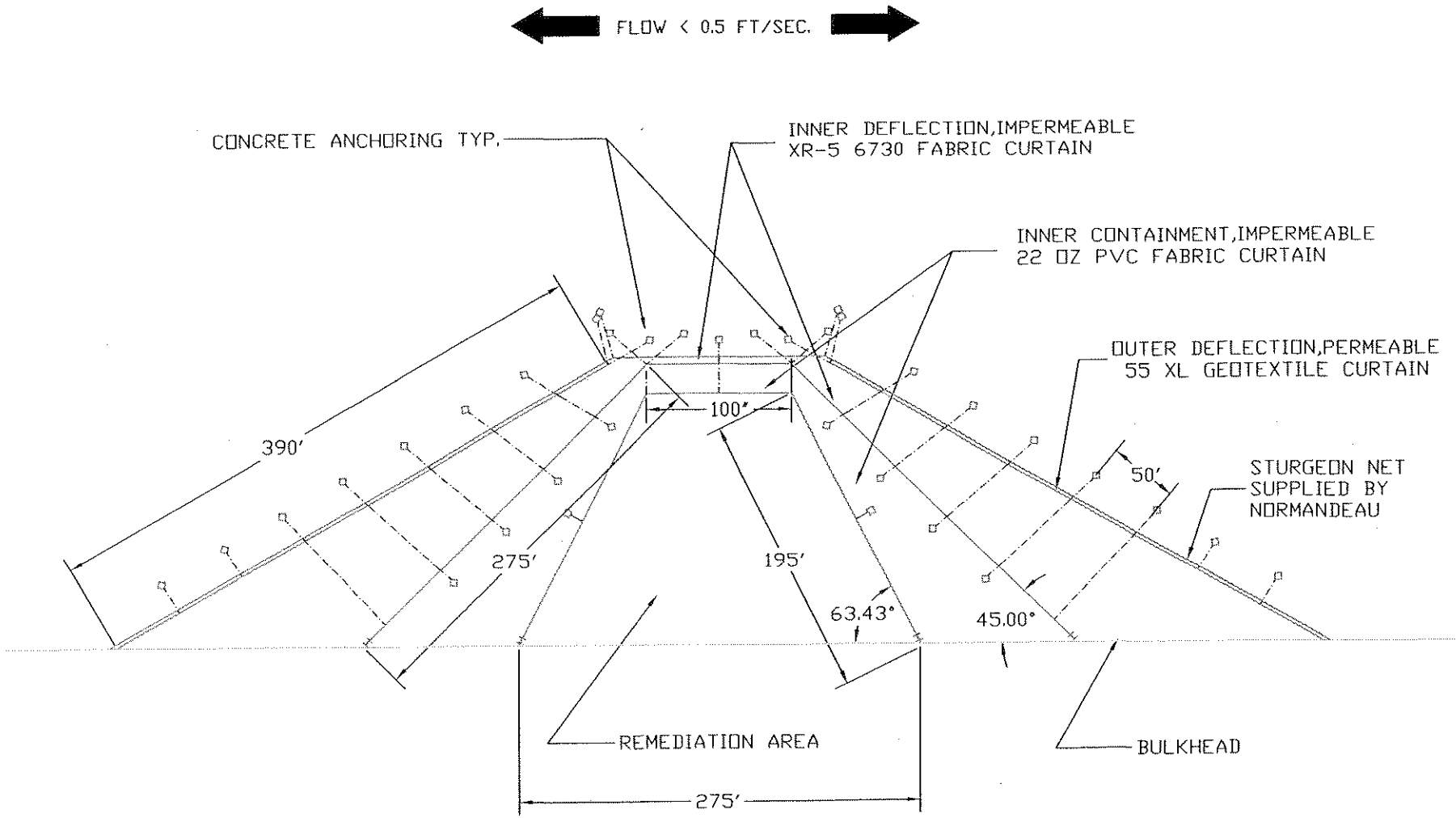
Table 1. Total Suspended Solids Monitoring During Dredging

Date	Upstream TSS (mg/l)	Downstream TSS (mg/l)	
14-Sep	20	21	
15-Sep	17	17	
16-Sep	30	30	
17-Sep	30	28	
20-Sep	14	16	
21-Sep	23	21	
22-Sep	25	24	
23-Sep	18	19	
24-Sep	17	22	
27-Sep	19	19	
28-Sep	30	21	
29-Sep	50	37	
30-Sep	28	21	
1-Oct	24	44	[1]
4-Oct	16	10	
5-Oct	21	13	
6-Oct	14	14	
7-Oct	5	11	
8-Oct	17	16	[2]
19-Oct	22	21	[3]
20-Oct	25	23	
21-Oct	19	20	
22-Oct	23	22	

[1] Excessive tug/barge traffic to the north of the project site (Downstream)

[2] Dredge Operations Completed October 8, 2004

[3] Dredge Operations resumed October 19, 2004 through October 21, 2004

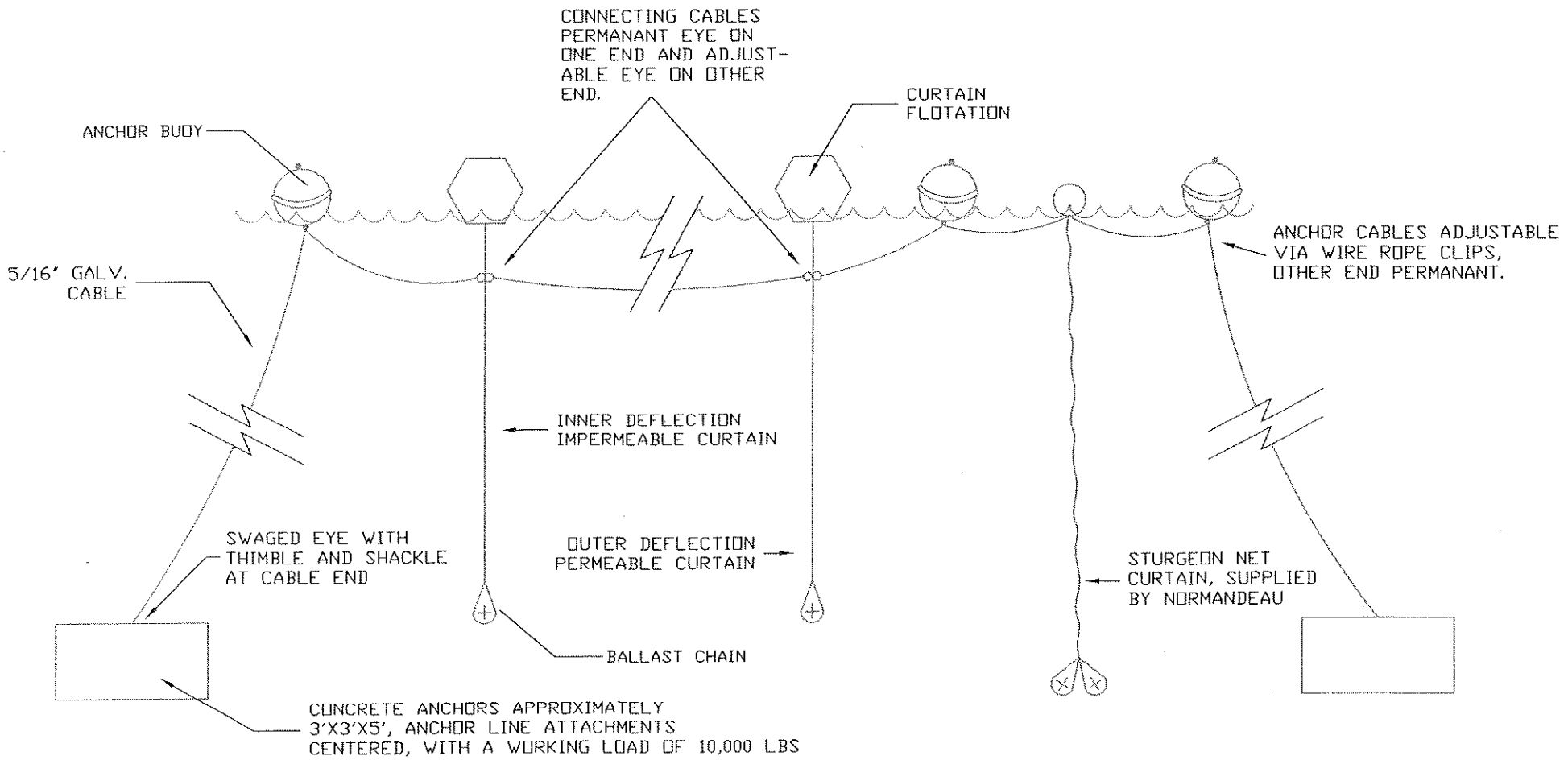


NO.	REVISION	DATE

ELASTEC / AMERICAN MARINE

TARRYTOWN CURTAIN
PLANVIEW, OF REMEDIATION SITE

DETAILS	SCALE	DRAWN BY	DATE	DRAWING NO.	APPROVED BY
	NTS	G.CASSELL	11/04/03	3337A2	



NO.	REVISION	DATE
02	ANCHOR SPEC'S	04/02/04
01	ADDED NET CURTAIN	04/02/04

ELASTEC / AMERICAN MARINE

ANCHOR SYSTEMS
TARRYTOWN, N.Y.

SCALE	DRWG. NO.	DATE	DRAWN BY	APPR.BY:
NTS	3337E	09/03/03	G.CASSELL	

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

MEMORANDUM

22 September 2004
File No. 28590-005

TO: New York State Department of Environmental Conservation
Lech Dolata

C: Ferry Landings, LLC
Carl Monheit

FROM: Haley & Aldrich of New York
Jonathan D. Babcock, P.E.

SUBJECT: Tarrytown Former MGP Site
Revision 2 Monitoring Plan for Turbidity and Total Suspended Solids

As discussed in our 15 September 2004 progress meeting, this memorandum presents a revised plan for monitoring turbidity and total suspended solids during work in the river. This memorandum documents the agreed upon plan revisions. Text requested by NYSDEC is in italics.

Revision 2 Turbidity and TSS Monitoring Plan

The following is the revised plan for monitoring turbidity and TSS during work in the Hudson River.

1. Turbidity monitoring will continue using two buoys with real-time data transmission to an on-shore location. The turbidity monitoring will continue as presented previously in the Work Plan. *Turbidity monitoring must be performed continuously during the dredging operations. Turbidity data must be recorded and stored at time intervals no longer than one hour.*

2. Visually monitor water inside, between and outside the turbidity curtains. Note hourly trends in turbidity monitoring from Item 1.

3. If the hourly trends and visual observation indicate a probable increase in TSS outside the curtains (due to project activities), then two TSS samples will be taken, one at each turbidity monitoring buoy.

4. The TSS results will be evaluated based on site conditions including work activities, other activities in the river (shipping, shoreline construction/maintenance by others, etc), weather and wave conditions.

5. Project specification 02170, addressing turbidity, says there should be no 'substantial visible contrast to natural conditions.' *If suspended solids attributable to dredging are visible in the water beyond the first inner curtain, the reason for the breach must be immediately identified and repair must follow without delay.*

6. *If suspended solids attributable to dredging are visible in substantial quantity in the water beyond the first inner curtain (substantial breakthrough of solids occurred), as determined by the NYSDEC on-site representative, the work must stop, the reason for the solids breakthrough determined followed by an immediate repair. Water column samples must be taken from behind the second line of curtain, in the area affected by the solids breakthrough, and shall be tested for TSS and individual PAHs. This PAH test shall be independent from the regular weekly testing of water column required by the specifications.* Turbidity readings and Total Suspended Solids samples also shall be taken at the two turbidity buoys.

7. *If suspended solids attributable to dredging are visible in the water beyond the second inner curtain, the dredging will immediately discontinue, the PRP's consultant and the contractor shall evaluate the reasons for the solids break through and report it to NYSDEC. Water column sample must be taken from behind the second line of curtain, in the area affected by the solids breakthrough, and shall be tested for TSS and individual PAHs. This PAH test shall be independent from the regular weekly testing of water column required by the specifications. The dredging operations may resume after the problem causing solids breakthrough has been corrected and NYSDEC approval is given.*

8. Whenever an action is needed (TSS sampling, operations changes, curtain adjustments or repairs), the environmental factors occurring at the time shall be logged (wind, rain, tide, operations, other river activity, etc.)

9. *TSS samples must be collected daily, during dredging, in locations upstream and downstream from the dredged area.*

10. Regardless of the turbidity and visual monitoring, at least one PAH sample shall be taken per week during operations in the River, at both the upstream and downstream turbidity monitoring locations.

11. *An elevated above ground observation platform, from which dredging operations can be effectively monitored, will be made available to the NYSDEC's on-site representative.*

Appendix **B**

HILLMAN & MILEY
CONSULTING ENGINEERS PLLC

January 26, 2005

Carl Monheit
Ferry Landings LLC
485 West Putnam Avenue
Greenwich CT 06830

Re: Relieving Platform At the Ferry Landings Project
H&M 04.2693

Dear Carl:

I have received copies of test reports for Concrete Compression Tests, In-place Soil Density, Concrete Field Inspections and the Pile Driving Record from the referenced project. Please be advised that based on my review of these documents and our own inspections, it is my opinion that DA Collins Companies has installed the relieving platform, piles, pile caps, concrete slab, retaining wall and backfill in accordance with the approved construction documents.

I believe the work of DA Collins on the platform part of the project is substantially complete and recommend final payment for that work be processed.

Sincerely,
Hillman & Miley Consulting Engineers PLLC

Kevin J Miley

by: Kevin J Miley, PE
Principal

KJM:lrh
enc: reports
K:\WORDPERFEC FILES\MyFiles\04-2693-finalrpt.wpd

222 Mamaroneck Ave White Plains, NY 10605 Phone: 914.428.0909 Fax: 914.428.5012

TRANSMITTAL

RECEIVED
JAN 19 2005
HILLMAN & MILEY CONSULTING ENGINEERS, PLLC

D.A. COLLINS ENVIRONMENTAL SERVICES
101 Route 67, P.O. Box 191
Mechanicville, New York 12118
Phone: 518-664-9855 Fax: 518-664-0925
AN EQUAL OPPORTUNITY EMPLOYER

D.A. COLLINS COMPAN[IES]

☒ APPROVED
☐ APPROVED AS NOTED
☐ REVISE AND RESUBMIT
☐ NOT APPROVED

ENGINEERS review and approval of this submittal is expressly limited as provided in the Contract Documents and are only to determine compliance with information given in Contract Documents and conformance with design concept of the completed Project as a functioning whole. CONTRACTOR is, and ENGINEER is NOT, responsible for all matters relating to fabrication, shipping, handling, storage, assembly, construction, quantities or dimension and detail, installation and construction, for all safety aspects of performing the Work and for coordinating the Work.

HILLMAN & MILEY CONSULTING ENGINEERS, PLLC

Date 1/26/05 By [signature]

TO:
Mr. Kevin Miley
Hillman & Miley Consulting Engineers, PLLC
222 Mamaroneck Ave
White Plains, NY 10605
914-428-0909

PROJECT:
Tarrytown Former MGP Site

ATTENTION:

WE ARE SENDING: [X] ATTACHED [ ] UNDER SEPARATE COVER

	DRAWINGS		AS REQUIRED		YOUR RECORDS
	SPECIFICATIONS		MAKE CORRECTIONS		APPROVAL
	DESCRIPTIVE MATERIAL		AMEND & RESUBMIT		COMMENTS
X	SUBMITTALS		REJECTED SEE REMARKS		ACTION AS NOTED
	OTHER		FOR BID DUE ON:		QUOTATIONS

COPIES	DATE OR #	DESCRIPTION
1	1/04/05	"Summary of Laboratory Test Results For Concrete" For Cast-In-Place Relieving Platform, As Provided by Tectonic Engineers
1	11/30/04 – 12/03/04	"Daily Field Reports and In-Place Soil Density Test Results" For Backfill Above CIP Relieving Platform, As Provided by Tectonic Engineers
1	10/27/04	Concrete Field Inspection and Compression Test Results" For Precast Seawall Sections – Batch 1, As Provided by Construction Technology
	11/01/04	Concrete Field Inspection and Compression Test Results" For Precast Seawall Sections – Batch 2, As Provided by Construction Technology
1	11/16/04	"Pile Driving Record" As Provided By William J. Loftus Associates – WDNAPL Pile Installation

REMARKS:

Kevin,

Please find the outstanding items for certification of the cast-in-place relieving platform and precast concrete seawall for the Tarrytown Former MGP Site attached.

Thank you very much.

SIGNED: [signature] *John Cianci*

TECTONIC

SUMMARY OF LABORATORY TEST RESULTS FOR CONCRETE

PROJECT: **Tarrytown Former MGP** *W.O. #:* **4002.01**
LOCATION: **Tarrytown, NY**
CLIENT: **DA Collins**
DATE: **January 4, 2005**

CYLINDER ID.																
Date Cast	Lab. Sample #	Set	Type of Sample	Sample Size (Dia. x L) Inches	Slump (In.)	Air (%)	Samp Temp (°F)	Unit Wt. (lbs/ft^3)	Total Pour (Yd^3)	Date Tested	Age at Test (Days)	Test Strength (PSI)	Spec. Strength (PSI)	% Req. Strength	Location in Structure	Remarks
11/23/04	04-10013	1	Concret	6.00 x 12.00	3.75	4.60	70.0	150.6		11/30/04	7	5,090	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10014	1	Concret	6.00 x 12.00	3.75	4.60	70.0	150.6		12/21/04	28	6,540	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10015	1	Concret	6.00 x 12.00	3.75	4.60	70.0	150.6		12/21/04	28	6,700	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10016	1	Concret	6.00 x 12.00	3.75	4.60	70.0	150.6		12/21/04	28	6,720	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10017	2	Concret	6.00 x 12.00	4.50	4.80	67.0			11/30/04	7	4,470	5000	89%	Slab Bulkhead AA to HH	
11/23/04	04-10018	2	Concret	6.00 x 12.00	4.50	4.80	67.0			12/21/04	28	6,050	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10019	2	Concret	6.00 x 12.00	4.50	4.80	67.0			12/21/04	28	6,080	5000	100(+)	Slab Bulkhead AA to HH	
11/23/04	04-10020	2	Concret	6.00 x 12.00	4.50	4.80	67.0			12/21/04	28	6,100	5000	100(+)	Slab Bulkhead AA to HH	
12/7/04	04-10451	1	Concret	6.00 x 12.00	5.50	2.00	70.0	144.7	10	12/14/04	7	4,880	5000	98%	Slab	
12/7/04	04-10452	1	Concret	6.00 x 12.00	5.50	2.00	70.0	144.7	10	1/4/05	28	5,290	5000	100(+)	Slab	
12/7/04	04-10453	1	Concret	6.00 x 12.00	5.50	2.00	70.0	144.7	10	1/4/05	28	5,700	5000	100(+)	Slab	
12/7/04	04-10454	1	Concret	6.00 x 12.00	5.50	2.00	70.0	144.7	10	1/4/05	28	5,590	5000	100(+)	Slab	

REVIEWED BY :

☐ 70 Pleasant Hill Road
Mountainville, NY
10953
Phone: 845-534-5959
Fax: 845-534-5999

☐ 12 Comell Road
Latham, NY 12110
Phone: 518-783-1630
Fax: 518-783-1544

☐ 4 West Main Street
Northborough, MA 01532
Phone: 508-393-7411
Fax: 508-393-4740

☐ 9100 Centre Pointe Drive
Suite 100
West Chester, OH 45069
Phone: 513-942-9530
Fax: 513-942-9531

☐ 804 Moorefield Park Drive
Suite 100
Richmond, VA 23236
Phone: 804-330-7203
Fax: 804-330-7213

☐ 1344 Silas Deane Highway
Suite 500
Rocky Hill, CT 06067
Phone: 860-563-2341
Fax: 860-257-4882

REPORT NO.: 14 DATE: Tue 11/30/04

CLIENT: DA Collins

PROJECT NAME: Tarrytown Former MGP Site

TECTONIC PROJECT MANAGER: Mark Steir

TECTONIC FIELD REPRESENTATIVE: Victor Rodriguez

LOCATION: Tarrytown, NY

GENERAL CONTRACTOR: DA Collins

GENERAL CONTRACTOR'S REPRESENTATIVE: Jeff Stewart

OWNER:

SPECIALTY CONTRACTOR: ↓ ☐ EARTH ☐ CONCRETE ☐ STEEL ☐ OTHER

PLANS AND SPECIFICATIONS
BY:
DATE:

CONTRACTOR'S EQUIPMENT OBSERVED IN USE:
walk-behind double drum vibratory roller

SHOP DRAWINGS
TYPE:
APP. BY:

VISITORS: REPRESENTING: ARR. DPT.

SAMPLES
TYPE: QTY:

PHOTOS ☐
QTY:

WEATHER: clear

TEMP. (°F): 41° - 52°

CONSTRUCTION ACTIVITIES: INDICATE ACTIVITIES MONITORED

Monitored backfill @ bulkhead slab on Deck (AA to Hh). See attached report.

FORMS ATTACHED:

☒ SOIL COMPACTION
☐ NON-CONFORMANCE REPORT
☐ PRE-POUR INSPECTION
☐ CONCRETE INSPECTION
☐ STRUCTURAL STEEL
☐ OTHER:

FOLLOW-UP FROM PRIOR REPORT ☐ YES ☐ NO DATE OF PRIOR REPORT

NON-CONFORMANCE CORRECTED:

WHAT, IN PARTICULAR, SHOULD BE OBSERVED, CHECKED, OR TESTED DURING THE NEXT VISIT?

NOTICE

The field representative is on the site solely to observe operations of the contractor identified, observe conformance with contract document, and report those operations to the client. The presence and activities of the field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequences of construction.

☐ THIS DFR IS PRELIMINARY

This preliminary report is provided solely as evidence that field observation was performed. Observation and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

FIELD REPRESENTATIVE: [signature] DATE: 11/30/04

☑ THIS DFR IS FINAL

The final report is the instrument of service. Any conclusions drawn from this report should be discussed with and validated by the owner's engineer.

REVIEWED BY: [signature] DATE: 12/8/04

TECTONIC

IN PLACE SOIL DENSITY TEST REPORT

W.O. NO.: 4002.01 | PAGE 2 OF 2

DATE: 11/30/04 | REPORT NO.: 14

☐ 70 Pleasant Hill Road, Mountainville, NY 10953, Phone: 845-534-5959, Fax: 845-534-5999
☐ 12 Cornell Road, Latham, NY 12110, Phone: 518-783-1630, Fax: 518-783-1544
☐ 4 West Main Street, Northborough, MA 01532, Phone: 508-393-7411, Fax: 508-393-4740
☐ 9100 Centre Pointe Drive, Suite 100, West Chester, OH 45069, Phone: 513-942-9530, Fax: 513-942-9531
☐ 804 Moorefield Park Drive, Ste. 100, Richmond, VA 23236, Phone: 804-330-7203, Fax: 804-330-7213
☐ 1344 Silas Deane Highway, Suite 500, Rocky Hill, CT 06067, Phone: 860-563-2341, Fax: 860-257-4882

PROJECT NAME: Tarrytown Former MGP Site

LOCATION: Tarrytown, NY

CLIENT: DA Collins

CONTRACTOR: ↓

CONTRACTOR'S REPRESENTATIVE: Jeff Stewart

TECTONIC'S REPRESENTATIVE: Victor Rodriguez

WEATHER	BRITE SUN	CLEAR	OVERCAST	RAIN	SNOW
		X			

TEMP. (°F)	<32	32-50	50-70	70-85	85 UP
		X			

WIND	STILL	MODER.	HIGH
		X	

HUMIDITY	DRY	MODER.	HUMID
		X	

FIELD TEST METHOD: Troxler Nuclear Gauge

SOIL ID. NO.	DESCRIPTION OF SOIL OR FILL	SOURCE OF FILL	U.S.C.S.	OPTIMUM MOISTURE %	MAX. DRY DENSITY (pcf)	LAB TEST METHOD
BS-5	Blk c-f SAND, little Silt	Onsite		7.6	135.6	ASTM D1557 Method A

TEST NO.	TEST LOCATION	ELEV OR DEPTH	DEPTH OF SOURCE ROD	SOIL ID. NO.	% MOISTURE	TEST DRY DENSITY lbs./cu. ft.	% OF MAX. DRY DENSITY
1.	HH (South End)	1½' AS	12"	BS-5	7.3	132.7	97.9
2.	DD (Center)	1½' AS	↓	↓	6.2	132.9	98.0
3.	GG	2½' AS			6.1	134.0	98.8
4.	CC	2½' AS			8.1	130.0	95.9
5.	FF	3½' AS			7.6	132.0	97.3
6.	BB (South End)	3½' AS	↓	↓	7.0	131.0	96.6

REMARKS:

COPY TO:

PREPARED BY: VJR TM

DATE: 11/30/04

15 DATE: Wed 12/1/04

☐ 70 Pleasant Hill Road, Mountainville, NY 10953, Phone: 845-534-5959, Fax: 845-534-5999

☐ 12 Cornell Road, Latham, NY 12110, Phone: 518-783-1630, Fax: 518-783-1544

☐ 4 West Main Street, Northborough, MA 01532, Phone: 508-393-7411, Fax: 508-393-4740

☐ 9100 Centre Pointe Drive, Suite 100, West Chester, OH 45069, Phone: 513-942-9530, Fax: 513-942-9531

☐ 804 Moorefield Park Drive, Suite 100, Richmond, VA 23236, Phone: 804-330-7203, Fax: 804-330-7213

☐ 1344 Silas Deane Highway, Suite 500, Rocky Hill, CT 06067, Phone: 860-563-2341, Fax: 860-257-4882

CLIENT: DA Collins

PROJECT NAME: Tarrytown Former MGP Site

TECTONIC PROJECT MANAGER: Mark Steer

TECTONIC FIELD REPRESENTATIVE: Victor Rodriguez

LOCATION: Tarrytown, NY

GENERAL CONTRACTOR: DA Collins

GENERAL CONTRACTOR'S REPRESENTATIVE: Jeff Stewart

OWNER:

SPECIALTY CONTRACTOR: ↓ ☐ EARTH ☐ CONCRETE ☐ STEEL ☐ OTHER

PLANS AND SPECIFICATIONS BY:

CONTRACTOR'S EQUIPMENT OBSERVED IN USE:

DATE:

SHOP DRAWINGS TYPE:

APP. BY:

VISITORS: REPRESENTING: ARR. DPT.

SAMPLES TYPE: QTY:

PHOTOS ☐ QTY:

WEATHER: overcast (raining)

TEMP. (°F) 41° - 51°

CONSTRUCTION ACTIVITIES: INDICATE ACTIVITIES MONITORED

Arrived onsite and contractor informed me that no backfilling would take place today due to heavy rain.

FORMS ATTACHED:

☐ SOIL COMPACTION ☐ NON-CONFORMANCE REPORT ☐ PRE-POUR INSPECTION ☐ CONCRETE INSPECTION ☐ STRUCTURAL STEEL ☐ OTHER:

FOLLOW-UP FROM PRIOR REPORT ☐ YES ☐ NO DATE OF PRIOR REPORT

NON-CONFORMANCE CORRECTED:

WHAT, IN PARTICULAR, SHOULD BE OBSERVED, CHECKED, OR TESTED DURING THE NEXT VISIT?

NOTICE

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☐ THIS DFR IS FINAL

Final report is the instrument of service. Any conclusions drawn from this report should be discussed with and evaluated by the owner's engineer.

FIELD REPRESENTATIVE: DATE: 12/1/04

REVIEWED BY: DATE: 12/3/04

TECTONIC — DAILY FIELD REPORT

REPORT NO.: 16 | DATE: 12/2/04

☒ 70 Pleasant Hill Rd, PO Box 37, Mountainville, NY 10953, Phone: 845-534-5959, Fax: 845-534-5655

☐ 12 Cornell Road, Latham, NY 12110, Phone: 518-783-1630, Fax: 518-783-1544

☐ 1344 Silas Deane Highway, Suite 500, Rocky Hill, CT 06067, Phone: 860-563-2341, Fax: 860-257-4882

☐ 9100 Centre Pointe Drive, Suite 100, West Chester, OH 45069, Phone: 513-942-9530, Fax: 513-942-9531

CLIENT: DA Collins

PROJECT NAME: Tarrytown Former MPG

TECTONIC PROJECT MANAGER: Mark Stier

TECTONIC FIELD REPRESENTATIVE: Jim Upright

LOCATION: Tarrytown, New York

GENERAL CONTRACTOR: DA Collins

GENERAL CONTRACTOR'S REPRESENTATIVE: Jeff

OWNER:

SPECIALTY CONTRACTOR: EARTH ☐ CONCRETE ☐ STEEL ☐ OTHER

PLANS AND SPECIFICATIONS
BY
DATE

CONTRACTOR'S EQUIPMENT OBSERVED IN USE:
1 bulldozer 1 walk behind Makasa MRH 800GS smooth drum roller
1 excavator

SHOP DRAWINGS
TYPE
APP. BY

VISITORS: REPRESENTING: ARR. DPT.

SAMPLES
TYPE QTY

PHOTOS ☐
QTY

WEATHER: Partly cloudy, light breeze

TEMP. (°F) 45-50

CONSTRUCTION ACTIVITIES: INDICATE ACTIVITIES MONITORED

Arrived on site at request of client to perform compaction testing of placed fill material. Upon arrival contractor was placing lift of imported soil with bulldozer. Closest material was material BS-1, material was micaceous and very moist. Contractor attempted to compact soil with walk behind roller but material was pumping underfoot and was moving under the action of roller. Informed Jeff that material was too wet (nuclear density gauge test indicated moisture content of 14.5% and optimum was 5.6%) for proper compaction. Jeff said he was going to remove the material to allow it to dry or get drier material from supplier and dismissed me. He indicated that he would call when he was ready with drier material.

FORMS ATTACHED:

☒ SOIL COMPACTION ☐ PRE-POUR INSPECTION ☐ STRUCTURAL STEEL
☐ NON-CONFORMANCE REPORT ☐ CONCRETE INSPECTION ☒ OTHER: plan

FOLLOW-UP FROM PRIOR REPORT ☐ YES ☐ NO DATE OF PRIOR REPORT

NON-CONFORMANCE CORRECTED:

WHAT, IN PARTICULAR, SHOULD BE OBSERVED, CHECKED, OR TESTED DURING THE NEXT VISIT?

NOTICE

The field representative is on the site solely to observe operations of the contractor identified, observe conformance with contract document, and report those operations to the client. The presence and activities of the field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequences of construction.

☒ THIS DFR IS PRELIMINARY
This preliminary report is provided solely as evidence that field observation was performed. Observation and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☒ THIS DFR IS FINAL
final report is the instrument of service. Any conclusions drawn from this report should be discussed with and ...ated by the owner's engineer.

FIELD REPRESENTATIVE: Jim Upright (signature) DATE: 12/2/04

REVIEWED BY: (signature) DATE: 12/7/04

TECTONIC

DAILY FIELD REPORT

REPORT NO.: 17 | DATE: 12/3/04

70 Pleasant Hill Rd, PO Box 37, Mountainville, NY 10953, Phone: 845-534-5959, Fax: 845-534-5655

☐ 12 Comell Road, Latham, NY 12110, Phone: 518-783-1630, Fax: 518-783-1544

☐ 1344 Silas Deane Highway, Suite 500, Rocky Hill, CT 06067, Phone: 860-563-2341, Fax: 860-257-4882

☐ 9100 Centre Pointe Drive, Suite 100, West Chester, OH 45069, Phone: 513-942-9530, Fax: 513-942-9531

CLIENT: DA Collins

PROJECT NAME: Tarrytown Former MPG

TECTONIC PROJECT MANAGER: Mark Stier

TECTONIC FIELD REPRESENTATIVE: Jim Upright

LOCATION: Tarrytown, New York

GENERAL CONTRACTOR: DA Collins

GENERAL CONTRACTOR'S REPRESENTATIVE: Jeff

OWNER:

SPECIALTY CONTRACTOR: EARTH ☐ CONCRETE ☐ STEEL ☐ OTHER

PLANS AND SPECIFICATIONS BY DATE

CONTRACTOR'S EQUIPMENT OBSERVED IN USE: 1 bulldozer, 1 Makusa MRH 800 GS walk behind smooth drum Compactor 1 excavator, hand tools

SHOP DRAWINGS TYPE APP. BY

VISITORS: REPRESENTING: ARR. DPT.

SAMPLES TYPE QTY

PHOTOS ☐ QTY

WEATHER: Partly cloudy, windy TEMP. (°F) 45°-50°

CONSTRUCTION ACTIVITIES: INDICATE ACTIVITIES MONITORED

Arrived on site at client's request to perform compaction testing for fill placement along seawall. Contractor had new fill imported that was drier than material from previous days. Contractor placed fill and compacted with minimum of 4 passes at walk behind compactor. Material moved slightly under foot in some places but ~~comp~~ results of testing with nuclear density gauge were satisfactory. Contractor placed second lift and compacted with a minimum of 4 passes with compactor. Compaction test results were satisfactory however soil moved under action of compactor. This was the last lift to be placed except for granular subbase layer, which was placed and sealed with compactor. This lift was only 4" to 6" thick. Jeff indicated that he would need concrete inspection probably on Wednesday at the the coming week but he would call to schedule.

FORMS ATTACHED:

■ SOIL COMPACTION ☐ PRE-POUR INSPECTION ☐ STRUCTURAL STEEL

☐ NON-CONFORMANCE REPORT ☐ CONCRETE INSPECTION ■ OTHER: plan

FOLLOW-UP FROM PRIOR REPORT ☐ YES ☐ NO DATE OF PRIOR REPORT

NON-CONFORMANCE CORRECTED:

WHAT, IN PARTICULAR, SHOULD BE OBSERVED, CHECKED, OR TESTED DURING THE NEXT VISIT?

NOTICE

The field representative is on the site solely to observe operations of the contractor identified, observe conformance with contract document, and report those operations to the client. The presence and activities of the field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequences of construction.

☒ THIS DFR IS PRELIMINARY

This preliminary report is provided solely as evidence that field observation was performed. Observation and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

FIELD REPRESENTATIVE: DATE: 12/3/04

REVIEWED BY: DATE: 12/7/04

☑ THIS DFR IS FINAL

A final report is the instrument of service. Any conclusions drawn from this report should be discussed with and evaluated by the owner's engineer.

TECTONIC ENGINEERING CONSULTANTS P.C.

IN PLACE SOIL DENSITY TEST REPORT

~~P.O. Box 449, 800 Route 32 Highland Mills, N.Y. 10930~~ ~~Phone: 914-928-6581 Fax: 914-928-9217~~ 70 Pleasant Hill Rd Mountainville, NY 10953 845-534-5959

24 Computer Drive West Albany, N.Y. 12205 Phone: 518-482-0737 Fax: 518-482-4805

714B Southbridge Street Auburn, MA 01501 Phone: 508-832-7146 Fax: 508-832-0775

W.O. NO. 4002.01 | PAGE 2 OF 3

DATE: 12/3/04 | REPORT NO. 17

PROJECT: Tarrytown Former MGP

LOCATION: Tarrytown, NY

CLIENT: OA Collins

CONTRACTOR: OA Collins

WEATHER	BRITE SUN	CLEAR ✓	OVERCAST	RAIN	SNOW
TEMP. (°F)	< 32	32 - 50 ✓	50 - 70	70 - 85	85 UP
WIND	STILL	MODER. ✓	HIGH ✓		
HUMIDITY	DRY ✓	MODER.	HUMID		

FIELD TEST METHOD: Nuclear Moisture Density Gauge Troxler 3440

CONTRACTOR'S REPRESENTATIVE: Jeff

TECTONIC'S REPRESENTATIVE: Jim Upright

SOIL ID. NO.	DESCRIPTION OF SOIL OR FILL	SOURCE OF FILL	U.S.C.S.	OPTIMUM MOISTURE %	MAX. DRY DENSITY (pcf)	LAB TEST METHOD
BS-1	Brn C f sand, some f gravel	Import		6.6	125.6	D1557/C

TEST NO.	TEST LOCATION	ELEV OR DEPTH	DEPTH OF SOURCE ROD	SOIL ID. NO.	% MOIST.	TEST DRY DENSITY lbs/cu. ft.	% OF MAX. DRY DENSITY
1	3 blocks south of North end	-2	10	BS-1	12.1	118.9	94.7
2	6 blocks south of North end	-2	10		11.1	120.6	96.0
3	8 blocks south of North end	-2	10		13.0	119.6	95.2
4	2 blocks south of North end	-1	12		12.3	120.7	96.1
5	Same as test # 4	-1	6		11.9	118.9	94.7
6	4 blocks south of north end	-1	12		12.4	117.7	93.7
7	retest location 4	-1	12		11.7	119.6	95.2
8	retest location 6	-1	12		12.7	120.1	95.6
9	9 blocks south of north end	-1	12		12.9	119.1	94.0

REMARKS:

Each bca block (blue) 14' long

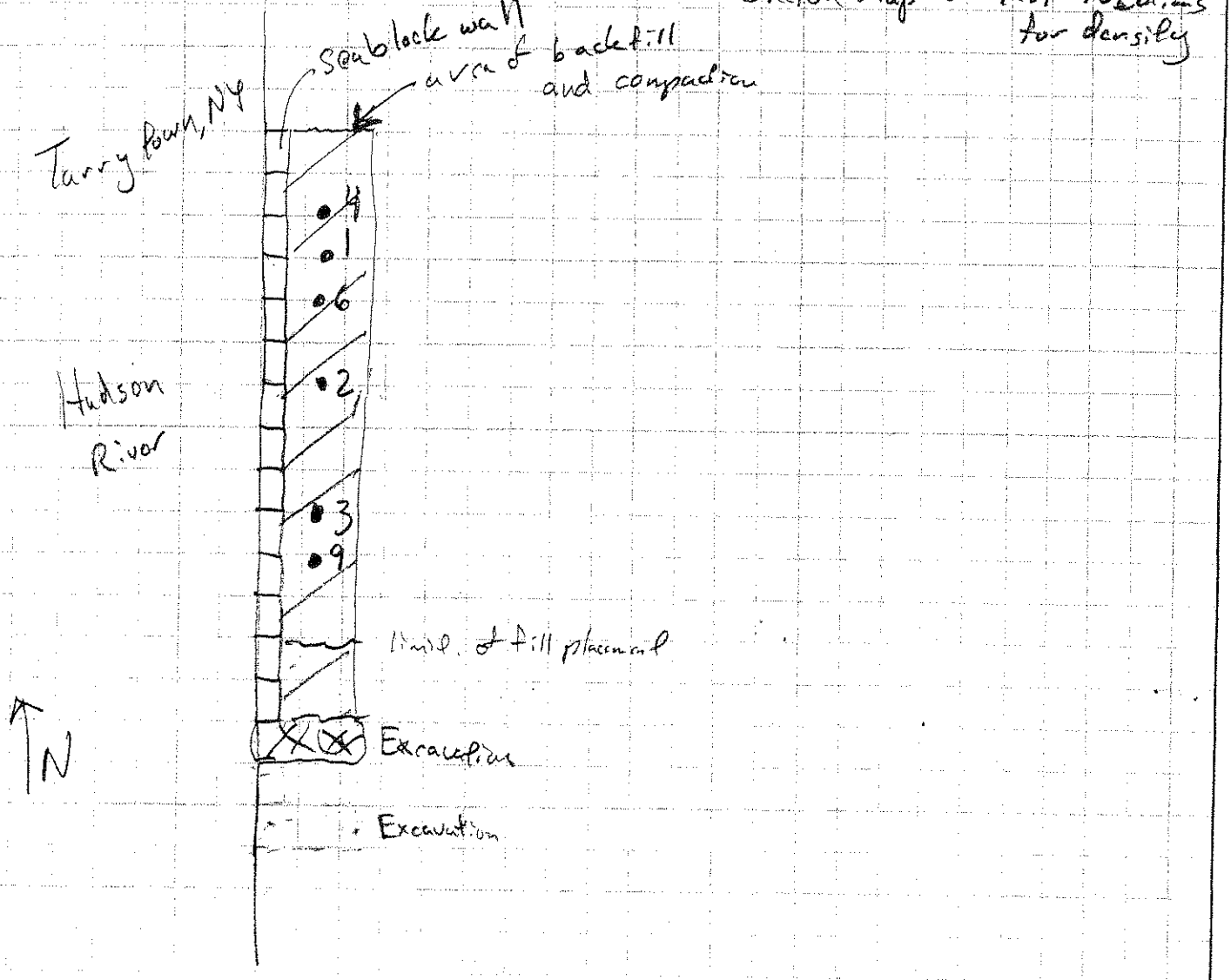
COPY TO:

PREPARED BY: Jim Upright DATE: 12/3/04

TECTONIC
Mountainville, NY
Albany, NY
Cincinnati, OH
Hartford, CT
Northborough, MA
Richmond, VA
(800) 829-6531

JOB 4002.01
SHEET NO. 3 OF 3
CALCULATED BY JAH DATE 12/3/04
CHECKED BY DATE
SCALE 1/4" ≈ 1'4"

Sketch map of test locations for density



CONSTRUCTION TECHNOLOGY

INSPECTION & TESTING DIVISION, P.D.& T.S., INC.
4 William Street, Ballston Lake, New York 12019
Phone: (518) 399-1848 Fax: (518) 399-1913

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NOV 29 2004
D.A. COLLINS CONST.

CLIENT: D. A. COLLINS, INC.
POST OFFICE BOX 191
MECHANICVILLE, NEW YORK 12118

ATT'N: MR. JOHN CIANCI
PROJEC FERRY LANDINGS, LLC: TARRYTOWN, NY.

REPORT NUMBER: 1 : PAGE #: 1
CORRECTION DATE: 10/27/04
OUR FILE NUMBER: 245.029
INSPECTOR & TEST SET: BOB BEHAN #6
AMBIENT WEATHER: 40's: CLOUDY
OUR FILE LOCATION: 47384

CONCRETE FIELD INSPECTION & COMPRESSION TEST RESULTS

PLACEMENT LOCATION OF LOAD # 1 : PRECAST BULKHEADS
PLACEMENT LOCATION OF LOAD # 2 : PRECAST BULKHEADS
PLACEMENT LOCATION OF LOAD # 3 : PRECAST BULKHEADS

LOAD NUMBER:		1	2	3
TRUCK NUMBER/TICKET NUMBER:		4574 / 54736	4566 / 54737	4567 / 54738
YARDAGE DELIVERED / SUBTOTAL:		10.00 / 10.00	10.00 / 20.00	10.00 / 30.00
TIME CONC. BATCHED / ARRIVED:		9.30 / 10.00	11.10 / 11.30	11.35 / 12.01
TIME PLACEMENT BEGAN / ENDED:		10.10 / 10.44	11.35 / 11.55	12.06 / 12.27
CONCRETE AGE (HOURS) (SPEC:	MAX: 1.50)	1.23	0.75	0.87
SLUMP ON ARRIVAL (INCHES):		3.00	5.00	4.75
WATER ADDED ONSITE (GALLONS):				
WATER ADDED AT DISCRETION OF:				
SLUMP OF CONCRETE INTO PUMP:	IF APPLICABLE:			
PLACEMENT SLUMP (INCH) (SPEC:	- 5.00)	3.00	5.00	4.75
ENTRAINED AIR (% VOL) (SPEC:	4.00 - 7.00)	6.80	6.70	6.80
UNIT WEIGHT (PCF) (SPEC:	-)	145.12	144.53	144.10
CONCRETE TEMP. (F) (SPEC:	45 - 85)	71	70	70
NUMBER OF TEST SPECIMEN CAST:		6	3	3
LAB CYLINDER CONTROL NUMBERS		47384 - 47389	47390 - 47392	47393 - 47395
REMARKS:				

UNLESS NOTED ALL TESTING IAW: ASTM: C31, C138, C143, C172, C173, C231, C470, C567, C617, C1064

CONCRETE SUPPLIER: PALLETTE CONCRETE CORP.
CONCRETE DESIGN STRENGTH: 5000 P.S.I. @ 28 DAYS
SUPPLIERS MIX FORMULA: PER SUBMITTAL:
CEMENT: LBS.
CEMENT: LBS.
WATER: GAL.
COARSE AGGREGATE #1: LBS.
COARSE AGGREGATE #2: LBS.
COARSE AGGREGATE #3: LBS.
FINE AGGREGATE: LBS.
ADMIXTURE #1: OZS.
ADMIXTURE #2: OZS.
ADMIXTURE #3: OZS.
AIR ENTRAINING AGENT: OZS.

CONCRETE TEST CYLINDER COMPRESSIVE RESULTS PER: ASTM: C39
UNLESS OTHERWISE NOTED ALL CYLINDERS RECEIVED: 10/28/04

CYLINDER NUMBER	TEST DATE	TEST AGE: DAYS	ULTIMATE LOAD & BREAK TYPE	UNIT P.S.I.
47384	11/03/04	7	108,000 C	3820
47385	11/03/04	7	110,500 C	3910
47386	11/24/04	28	155,000 C	5480
47387	11/24/04	28	154,500 C	5470
47388	11/24/04	28	157,000 C	5550
47389		SPARE		
47390	11/03/04	7	102,000 C	3610
47391	11/24/04	28	148,000 C	5240
47392	11/24/04	28	146,000 C	5160
47393	11/03/04	7	100,000 C	3540
47394	11/24/04	28	149,500 C	5290
47395	11/24/04	28	152,000 C	5380

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MANAGER TECHNICAL SVCS.

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INSPECTION & TESTING DIVISION, P.D.& T.S., INC.
4 William Street, Ballston Lake, New York 12019
Phone: (518) 399-1848 Fax: (518) 399-1913

CLIENT: **D. A. COLLINS, INC.**
POST OFFICE BOX 191
MECHANICVILLE, NEW YORK 12118

ATT'N: MR. JOHN CIANCI
PROJEC **FERRY LANDINGS, LLC: TARRYTOWN, NY.**

REPORT NUMBER: 1 : PAGE #: 2
INSPECTION DATE: 10/27/04
OUR FILE NUMBER: 245.029
INSPECTOR & TEST SET: BOB BEHAN #8
AMBIENT WEATHER: 40's: CLOUDY
OUR FILE LOCATION: 47396

CONCRETE FIELD INSPECTION & COMPRESSION TEST RESULTS

PLACEMENT LOCATION OF LOAD # 4 : PRECAST BULKHEADS

LOAD NUMBER:			4
TRUCK NUMBER/TICKET NUMBER:		4572 /	54739
YARDAGE DELIVERED / SUBTOTAL:		8.00 /	38.00
TIME CONC. BATCHED / ARRIVED:		12.20 /	12.45
TIME PLACEMENT BEGAN / ENDED:		12.49 /	1.16
CONCRETE AGE (HOURS) (SPEC:	MAX: 1.50)		0.93
SLUMP ON ARRIVAL (INCHES):			3.75
WATER ADDED ONSITE (GALLONS):			
WATER ADDED AT DISCRETION OF:			
SLUMP OF CONCRETE INTO PUMP:	IF APPLICABLE:		
PLACEMENT SLUMP (INCH) (SPEC:	- 5.00)		3.75
ENTRAINED AIR (% VOL) (SPEC:	4.00 - 7.00)		6.40
UNIT WEIGHT (PCF) (SPEC:	-)		146.14
CONCRETE TEMP. (F) (SPEC:	45 - 85)		72
NUMBER OF TEST SPECIMEN CAST:			3
LAB CYLINDER CONTROL NUMBERS		47396 -	47398
REMARKS:			

UNLESS NOTED ALL TESTING IAW: ASTM: C31, C138, C143, C172, C173, C231, C470, C567, C617, C1064

CONCRETE SUPPLIER:	PALLETTE CONCRETE CORP.
CONCRETE DESIGN STRENGTH:	5000 P.S.I. @ 28 DAYS
SUPPLIERS MIX FORMULA:	PER SUBMITTAL:
CEMENT:	LBS.
CEMENT:	LBS.
WATER:	GAL.
COARSE AGGREGATE #1:	LBS.
COARSE AGGREGATE #2:	LBS.
COARSE AGGREGATE #3:	LBS.
FINE AGGREGATE:	LBS.
ADMIXTURE #1:	OZS.
ADMIXTURE #2:	OZS.
ADMIXTURE #3:	OZS.
AIR ENTRAINING AGENT:	OZS.

CONCRETE TEST CYLINDER COMPRESSIVE RESULTS PER: ASTM: C39
UNLESS OTHERWISE NOTED ALL CYLINDERS RECEIVED: 10/28/04

CYLINDER NUMBER	TEST DATE	TEST AGE: DAYS	ULTIMATE LOAD & BREAK TYPE	UNIT P.S.I.
47396	11/03/04	7	112,500 C	3980
47397	11/24/04	28	158,000 C	5590
47398	11/24/04	28	153,500 C	5430

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MANAGER TECHNICAL SVCS.

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CLIENT: D. A. COLLINS, INC.
POST OFFICE BOX 191
MECHANICVILLE, NEW YORK 12118

ATT'N: MR. JOHN CIANCI
PROJEC FERRY LANDINGS, LLC: TARRYTOWN, NY.

REPORT NUMBER: 2 : PAGE #: 1
INSPECTION DATE: 11/01/04
OUR FILE NUMBER: 245.029
INSPECTOR & TEST SET: DAVE CASAW #5
AMBIENT WEATHER: 40's: CLEAR
OUR FILE LOCATION: 47700

CONCRETE FIELD INSPECTION & COMPRESSION TEST RESULTS

PLACEMENT LOCATION OF LOAD # 1 : SEAWALL BARRIER # 7,8
PLACEMENT LOCATION OF LOAD # 2 : SEAWALL BARRIER # 8,9
PLACEMENT LOCATION OF LOAD # 3 : SEAWALL BARRIER # 9, 10, 11

		1	2	3
LOAD NUMBER:		1	2	3
TRUCK NUMBER/TICKET NUMBER:		4567 / 54894	4566 / 54900	4572 / 54901
YARDAGE DELIVERED / SUBTOTAL:		10.00 / 10.00	10.00 / 20.00	10.00 / 30.00
TIME CONC. BATCHED / ARRIVED:		6.45 / 7.10	7.05 / 7.25	7.40 / 8.00
TIME PLACEMENT BEGAN / ENDED:		7.15 / 7.40	7.42 / 7.59	8.05 / 8.32
CONCRETE AGE (HOURS) (SPEC:	MAX: 1.50)	0.92	0.90	0.87
SLUMP ON ARRIVAL (INCHES):		4.00	5.00	5.00
WATER ADDED ONSITE (GALLONS):				
WATER ADDED AT DISCRETION OF:				
SLUMP OF CONCRETE INTO PUMP:	IF APPLICABLE:			
PLACEMENT SLUMP (INCH) (SPEC:	- 5.00)	4.00	5.00	5.00
ENTRAINED AIR (% VOL) (SPEC:	4.00 - 7.00)	4.20	4.50	4.80
UNIT WEIGHT (PCF) (SPEC:	-)	151.23	149.20	146.65
CONCRETE TEMP. (F) (SPEC:	45 - 85)	80	80	80
NUMBER OF TEST SPECIMEN CAST:		3	3	3
LAB CYLINDER CONTROL NUMBERS		47700 - 47702	47703 - 47705	47706 - 47708
REMARKS:				

UNLESS NOTED ALL TESTING IAW: ASTM: C31, C138, C143, C172, C173, C231, C470, C567, C617, C1064

CONCRETE SUPPLIER: PALLETTE CONCRETE CORP.
CONCRETE DESIGN STRENGTH: 5000 P.S.I. @ 28 DAYS
SUPPLIERS MIX FORMULA: PER SUBMITTAL:
CEMENT: LBS.
CEMENT: LBS.
WATER: GAL.
COARSE AGGREGATE #1: LBS.
COARSE AGGREGATE #2: LBS.
COARSE AGGREGATE #3: LBS.
FINE AGGREGATE: LBS.
ADMIXTURE #1: OZS.
ADMIXTURE #2: OZS.
ADMIXTURE #3: OZS.
AIR ENTRAINING AGENT: OZS.

CONCRETE TEST CYLINDER COMPRESSIVE RESULTS PER: ASTM: C39
UNLESS OTHERWISE NOTED ALL CYLINDERS RECEIVED: 11/02/04

CYLINDER NUMBER	TEST DATE	TEST AGE: DAYS	ULTIMATE LOAD & BREAK TYPE	UNIT P.S.I.
47700	11/08/04	7	128,500 C	4550
47701	11/29/04	28	162,000 C	5730
47702	11/29/04	28	166,000 C	5870
47703	11/08/04	7	120,500 C	4260
47704	11/29/04	28	159,500 C	5640
47705	11/29/04	28	162,500 C	5750
47706	11/08/04	7	123,000 C	4350
47707	11/29/04	28	156,000 C	5520
47708	11/29/04	28	160,500 C	5680

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POST OFFICE BOX 191
MECHANICVILLE, NEW YORK 12118

ATT'N: MR. JOHN CIANCI
PROJEC **FERRY LANDINGS, LLC: TARRYTOWN, NY.**

REPORT NUMBER: 2 : PAGE #: 2
INSPECTION DATE: 11/01/04
OUR FILE NUMBER: 245.029
INSPECTOR & TEST SET: DAVE CASAW #5
AMBIENT WEATHER: 40's: CLEAR
OUR FILE LOCATION: 47709

CONCRETE FIELD INSPECTION & COMPRESSION TEST RESULTS

PLACEMENT LOCATION OF LOAD # 4 : SEAWALL BARRIER # 11, 12

LOAD NUMBER:		4
TRUCK NUMBER/TICKET NUMBER:	4555 /	54902
YARDAGE DELIVERED / SUBTOTAL:	8.00 /	48.00
TIME CONC. BATCHED / ARRIVED:	7:57 /	8:20
TIME PLACEMENT BEGAN / ENDED:	8:34 /	9:00
CONCRETE AGE (HOURS) (SPEC: MAX: 1.50)		1.05
SLUMP ON ARRIVAL (INCHES):		4.00
WATER ADDED ONSITE (GALLONS):		
WATER ADDED AT DISCRETION OF:		
SLUMP OF CONCRETE INTO PUMP: IF APPLICABLE:		
PLACEMENT SLUMP (INCH) (SPEC: - 5.00)		4.00
ENTRAINED AIR (% VOL) (SPEC: 4.00 - 7.00)		5.80
UNIT WEIGHT (PCF) (SPEC: -)		147.16
CONCRETE TEMP. (F) (SPEC: 45 - 85)		80
NUMBER OF TEST SPECIMEN CAST:		3
LAB CYLINDER CONTROL NUMBERS	47709 -	47711
REMARKS:		

UNLESS NOTED ALL TESTING IAW: ASTM: C31, C138, C143, C172, C173, C231, C470, C567, C617, C1064

CONCRETE SUPPLIER:	PALLETTE CONCRETE CORP.
CONCRETE DESIGN STRENGTH:	5000 P.S.I. @ 28 DAYS
SUPPLIERS MIX FORMULA:	PER SUBMITTAL:
CEMENT:	LBS.
CEMENT:	LBS.
WATER:	GAL.
COARSE AGGREGATE #1:	LBS.
COARSE AGGREGATE #2:	LBS.
COARSE AGGREGATE #3:	LBS.
FINE AGGREGATE:	LBS.
ADMIXTURE #1:	OZS.
ADMIXTURE #2:	OZS.
ADMIXTURE #3:	OZS.
AIR ENTRAINING AGENT:	OZS.

CONCRETE TEST CYLINDER COMPRESSIVE RESULTS PER: ASTM: C39
UNLESS OTHERWISE NOTED ALL CYLINDERS RECEIVED: 11/02/04

CYLINDER NUMBER	TEST DATE	TEST AGE: DAYS	ULTIMATE LOAD & BREAK TYPE	UNIT P.S.I.
47709	11/08/04	7	121,000 C	4280
47710	11/29/04	28	161,000 C	5700
47711	11/29/04	28	157,500 C	5570

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RESPECTFULLY SUBMITTED,
CONSTRUCTION TECHNOLOGY

TOM JOSLIN, S.E.T. (NICET)
MANAGER TECHNICAL SVCS.

William F. Loftus Associates

FOUNDATION ENGINEERS
120 CHARLOTTE PLACE
ENGLEWOOD CLIFFS,
NEW JERSEY 07632
TEL: 201-871-4800
FAX: 201-871-8950

PILE DRIVING REPORT

1. Application No. _____

2. Location County Asphalt
Tarrytown, N.Y.

3. Contractor Loftus Contracting

4. Pile Type Treated Timber Capacity 30 Ton

5. Hammer Vulcan 50C

	DATE 2004	PILE NO.	ORIG. LGTH. OF PILE	DIAMETERS TIP	DIAMETERS CUT OFF	ELEV. CUT OFF	ELEV. TIP	PILE LENGTH TIP TO CUT OFF	PILE LENGTH TIP TO GROUND	Blows/Inch Penetration at Completion of Driving	Calculated Bearing Capacity Tons	DEVIATION FROM DESIGNED LOCATION N-S	DEVIATION FROM DESIGNED LOCATION E-W	VARIATION FROM PLUMB	REMARKS
1	10/20	16-1	30	8"	12"	—	—	25.5	—	2.5	30T			OK	
2	10/20	16-2	30					25.5							
3	10/20	16-3	30					25.0							
4	10/20	16-4	30					25.0							
5	10/20	16-5	30					25.0							
6	10/19	16-6	30					24.5							
7	10/20	17-1	30					26.5							
8	10/21	17-1B	35					27.0							BATTER
9	10/19	17-2	30					25.5							
10	10/19	17-3	30					25.0							
11	10/19	17-5	30					25.0							
12	10/20	18-1	30					25.5							
13	10/19	18-2	30					25.5							
14	10/19	18-5	30					24.0							
15	10/19	19-1	30					25.5							
16	10/21	19-1B	35					22.5							BATTER
17	10/19	19-2	31					26.0							
18	10/19	19-4	30					25.5							
19	10/19	19-6	30					24.5							
20	10/25	20-1	35					26.5							
21	10/25	20-2	35					25.5							
22	10/25	20-3	35					26.5							
23	10/25	20-5	35					25.5							
24	10/25	21-1	35					26.0							
25	10/25	21-1A	35					27.0							
26	10/25	21-2	35					27.0							
27	10/25	21-3	35					26.5							
28	10/25	22-2	35					26.5							
29	10/25	22-5	35					26.5							
30	10/26	24-1	35					28.0							
31	10/26	24-2	35					27.5							
32	10/26	24-6	35					25.0							
33	10/26	25-1	35					27.0							
34	10/26	25-2	35					27.5							
35	10/26	26-2	35					28.0							
36	10/26	26-5	35					28.0							
37	10/26	26-6	35					27.0							
38	10/26	27-6	35					28.0							
39	10/26	28-2	35					28.0							
40	10/26	28-3	35					28.5							
41	10/26	28-5	35					28.0							
42	10/26	28-6	35					28.0							
43	10/26	29-1	35					30.0							
44	10/26	29-2	35					29.0							
45	10/26	29-3	35					29.0							
46	10/26	29-4	35					28.0							
47	10/26	29-5	30					27.5							
48	10/26	29-6	30					29.0							
49	10/26	30-1	35					32.5							
50	10/26	30-2	35					29.5							

I hereby certify that this is a true record of the driving of piles in this location, and that all piles have been installed in accordance with design and New York City Building Code Requirements, except as noted.

License Number 39047,7208mNY

Signature of Prof. Engr. or Arch. _____ Date 11/16/04

NOTES:

1. Deviations shown are as per .01ft and refer to the theoretical location of the pile.

2. Base lines established by others.

SHEET# 1 OF 2 SHEETS

JOB # Y-5984

William F. Loftus Associates

FOUNDATION ENGINEERS
120 CHARLOTTE PLACE
ENGLEWOOD CLIFFS,
NEW JERSEY 07632
TEL: 201-871-4800
FAX: 201-871-8950

PILE DRIVING REPORT

1. Application No. _____

2. Location County Asphalt
Tarrytown N.Y.

3. Contractor Loftus Contracting

4. Pile Type Treated Timber Capacity 30 Ton

5. Hammer Vulcan 50C

	DATE 2004	PILE NO.	ORIG. LGTH. OF PILE	DIAMETERS TIP	DIAMETERS CUT OFF	ELEV. CUT OFF	ELEV. TIP	PILE LENGTH TIP TO CUT OFF	PILE LENGTH TIP TO GROUND	Blows/Inch Penetration at Completion of Driving	Calculated Bearing Capacity Tons	DEVIATION FROM DESIGNED LOCATION N-S	DEVIATION FROM DESIGNED LOCATION E-W	VARIATION FROM PLUMB	REMARKS
1	10/26	30-3	35	8"	12"	—	—	29.5	—	2.5	30T			OK	
2		30-4	35					29.5							
3		30-5	35					29.7							
4		30-6	35					29.7							
5	10/26	30-B	32					29.5							BATTER
6															
7															
8															
9															
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50															

I hereby certify that this is a true record of the driving of piles in this location, and that all piles have been installed in accordance with design and New York City Building Code Requirements, except as noted.

License Number 39047,7208mNY

Signature & Prof. Engr. Reg. No. 39047 Date 1/11/05

NOTES:

1. Deviations shown are as per .01ft and refer to the theoretical location of the pile.

2. Base lines established by others.

SHEET# 2 OF 2 SHEETS

JOB # Y-5984

Appendix C

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

MEMORANDUM

17 March 2005
File No. 28590-008

TO: Ferry Landings, LLC
Carl Monheit

C: File

FROM: Haley & Aldrich of New York
Jonathan D. Babcock

SUBJECT: Tarrytown Former MGP Site
Construction Water Management

This memorandum describes the implementation of construction water management systems during the Tarrytown Former MGP Site remediation. Construction water management was performed in accordance with the Construction Water Management Plan (CWMP) by D.A. Collins Environmental Services (D.A. Collins), dated 18 September 2004.

EXCAVATION DEWATERING

In conformance with the CWMP, dewatering water from on site excavations was pumped to frac tanks, sent through a treatment system and stored in additional frac tanks for sampling and analysis prior to discharge. The attached table shows the data related to the eight batches of excavation construction water treated and tested prior to discharge to the Hudson River. One sample (Discharge 4) failed the post-treatment analysis. The carbon was replaced in the filtration system and the water was re-treated, and after the second treatment, satisfied the discharge criteria, and was discharged.

SEDIMENT EXCAVATION UNDER RELIEVING PLATFORM

In accordance with the Work Plan (*Tarrytown Former MGP Site, Western DNAPL Barrier and Sediment Removal - Wet Alternative Removal - Remedial Design Report*, dated 27 February 2004), sediment under the relieving platform was excavated 'in-the-wet,' without complete dewatering of the dredging area. The work under the relieving platform was performed inside the steel sheeting driven at the face of the sea wall, which ultimately serves as a barrier to migration of residual DNAPL contamination from the land into the Hudson River. By connecting the new sheeting to the existing sheeting at the north end, and installing a temporary sheet pile 'return' at the south end, the work area under the relieving platform was contained on all four sides.

D.A. Collins used temporary pumps to draw down the water level inside the work area to facilitate dredging, cap construction and replacement of the relieving platform. The pump suction was placed near the zone of greatest river inflow to the containment area, and was surrounded with an absorbent boom and temporary silt curtain. The pumps were taking Hudson River water from the work area and discharging it back to the Hudson River within the confines of the inner turbidity curtain.

Pump discharge sampling was performed at pump startup, which generally occurred at the beginning of a week, after the weekend shut down, as shown on the attached table, prepared by D.A. Collins. During the operation of the temporary pumps, discharge sampling showed minor exceedences of discharge criteria on four occasions. In all cases, the exceedences were mitigated.

The 10/21/04 sample had a TSS value of 22.5 mg/l compared to a discharge criterion of 20 mg/l. This was mitigated because the water was discharged inside the inner turbidity curtain, and TSS readings outside the curtain that day were 19 mg/l upstream and 20 mg/l downstream, an acceptable condition for suspended solids outside the work area.

The 11/17/04 sample had a benzene value of 1.4 ug/l compared to a discharge criterion of 0.8 ug/l. This was a minor exceedence and was mitigated by discharging inside the inner turbidity curtain. Upon receiving the test results, the pumps were shut down, re-started and a repeat sample was taken. The repeat sample showed no benzene exceedence.

The 11/22/04 sample had a TSS value of 23 mg/l compared to a discharge criterion of 20 mg/l. This was a minor exceedence and was mitigated because the water was discharged inside the inner turbidity curtain, and TSS readings outside the curtain that day were 27 mg/l upstream and 22 mg/l downstream, an acceptable condition for suspended solids outside the work area.

The 11/29/04 sample had a benzene value of 7.8 ug/l, an ethylbenzene value of 16 ug/l, an o-xylene value of 6.7 ug/l and a TSS value of 33.5 mg/l, all in exceedence of discharge criteria (see attached table). Upon receiving the test results, the pumps were shut down, and not re-started for the remainder of the project, mitigating the discharge of contaminated water. The water level inside the sheet pile containment equalized with that outside the containment. With the pumps shut off, no additional water quality sampling for construction water was performed. By this time, D.A. Collins was re-constructing the relieving platform and did not require the water level to be reduced.

In each case, the observance of an exceedence was assessed in conjunction with NYSDEC, and relevant mitigating factors or actions were identified and the actions were taken. Water quality data was reviewed with NYSDEC upon receipt throughout the course of the project.

D.A. Collins Environmental Services (DAC) is please to provide the following Construction Water Discharge Summary for the Tarrytown Former MGP Site. All supporting analytical reports are attached.

1.0 Construction Water Discharge

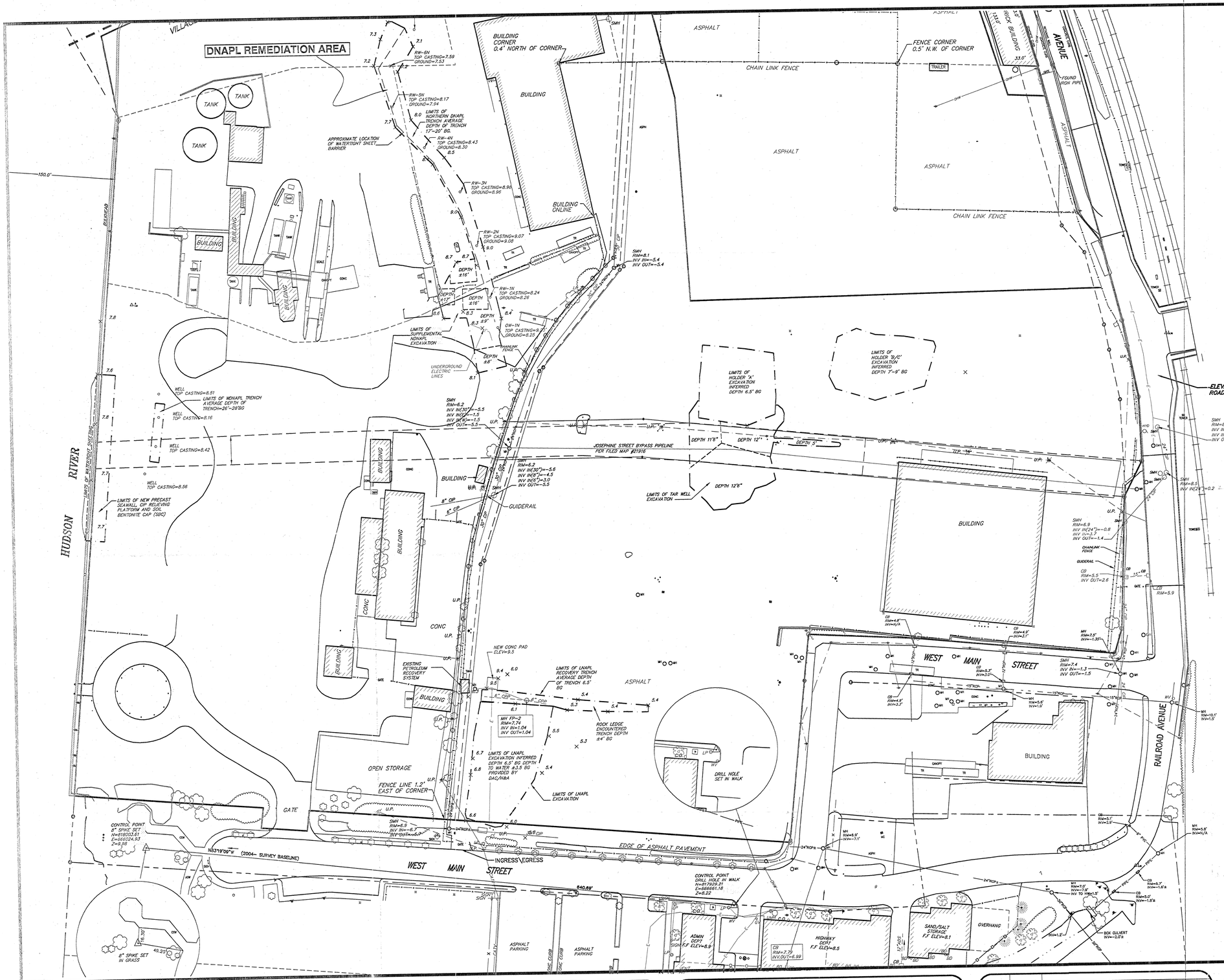
Tarrytown Former MGP Site
Construction Water Management - Sampling Summary (12/27/04)

Date	Sample Identification	Discharge Type	Permit Compliance	Parameter of Concern (Concentration)	Source Area	Mitigation/Notes
5/27/2004	Discharge1	Treated Construction Water	YES	NONE	LNAPL Excavation	Approved by DEC prior to Discharge
6/12/2004	Discharge2	Treated Construction Water	YES	NONE	LNAPL Excavation	Approved by DEC prior to Discharge
6/25/2004	Discharge3	Treated Construction Water	YES	NONE	Tar Well/Gas Holder	Approved by DEC prior to Discharge
6/29/2004	Discharge4	Treated Construction Water	NO	Benzene (100 µg/l) Toluene (16 (µg/l) TSS (23 mg/L)	Tar Well/Gas Holder	NOT DISCHARGED-Replaced Carbon in Treatment System, Retreated and discharged as Discharge 5
7/19/2004	Discharge5	Treated Construction Water	YES	NONE	NDNAPL	Approved by DEC prior to Discharge
7/23/2004	Discharge6	Treated Construction Water	YES	NONE	NDNAPL	Approved by DEC prior to Discharge
8/2/2004	Discharge7	Treated Construction Water	YES	NONE	NDNAPL	Approved by DEC prior to Discharge
8/2/2004	Discharge8	Treated Construction Water	YES	NONE	NDNAPL	Approved by DEC prior to Discharge
10/21/2004	Discharge9	Bulkhead Dewatering Sampled @ Pump Startup	NO	TSS (22.5 mg/l)	WDNAPL	Discharge within containment/ No elevated TSS observed outside containment (Upstream TSS = 19 ppm, Downstream 20 ppm). Reviewed by DEC
11/3/2004	Discharge10	Bulkhead Dewatering Sampled @ Pump Startup	YES	NONE	WDNAPL	Reviewed by DEC
11/11/2004	Discharge11	Bulkhead Dewatering Sampled @ Pump Startup	YES	NONE	WDNAPL	Reviewed by DEC
11/17/2004	Discharge12	Bulkhead Dewatering Sampled @ Pump Startup	NO	Benzene (1.4 µg/l)	WDNAPL	PUMPS SHUT DOWN, RESTARTED AND SAMPLED 11/22/04. See Discharge 13
11/22/2004	Discharge13	Bulkhead Dewatering Sampled @ Pump Startup	NO	TSS (23 mg/l)	WDNAPL	Discharge within containment/ No elevated TSS observed outside containment (Upstream TSS = 27 ppm, Downstream 22 ppm). Reviewed by DEC
11/29/2004	Discharge14	Bulkhead Dewatering Sampled @ Pump Startup	NO	Benzene (7.8 µg/l) Ethylbenzene (16 µg/l) 0-Xylene (6.7 µg/l) TSS (33.5 mg/l)	WDNAPL	PUMPS SHUT DOWN FOR REMAINDER OF PROJECT (Upstream TSS = 29 ppm, Downstream 28 ppm)

[1] Effluent Limitations:

Benzene	0.8	µg/l
Ethylbenzene	5	µg/l
Toluene	5	µg/l
o-xylene	5	µg/l
m-xylene	5	µg/l
p-xylene	5	µg/l
TSS	20	mg/l

Appendix D



LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- X 108.7 — EXISTING SPOT GRADE
- X — X — EXISTING FENCE
- OHW — EXISTING OVERHEAD WIRES
- 8" SAN — EXISTING UNDERGROUND SEWER LINE
- 15" RCP — EXISTING UNDERGROUND STORM LINE
- HYD — EXISTING HYDRANT
- CB — EXISTING CATCH BASIN
- SMH — EXISTING SANITARY SEWER MANHOLE
- DMH — EXISTING STORM SEWER MANHOLE
- UP — EXISTING UTILITY POLE
- WV — EXISTING WATER VALVE
- GV — EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN

NOTES :

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW .

ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S INKED SEAL OR HIS EMBOSSED SEAL SHALL BE CONSIDERED TO BE VALID TRUE COPIES .

SUB-SURFACE STRUCTURES NOT VISIBLE OR READILY APPARENT ARE NOT SHOWN AND THEIR LOCATION AND EXTENT ARE NOT CERTIFIED.

SUBJECT TO COVENANTS, EASEMENTS, RESTRICTIONS, CONDITIONS AND AGREEMENTS OF RECORD.

DWELLING SHOWN HEREON SERVED BY UNDERGROUND UTILITIES .

SURVEY SUBJECT TO ANY RIGHT , TITLE OR INTEREST THE PUBLIC MAY HAVE FOR HIGHWAY USE .

UNDERGROUND FACILITIES AND STRUCTURES SHOWN HEREON WERE TAKEN FROM DATA OBTAINED FROM PREVIOUS MAPS AND RECORD DRAWINGS. ALL ABOVE GROUND STRUCTURES AND SURFACE FEATURES SHOWN HEREON ARE THE RESULT OF A FIELD SURVEY UNLESS OTHERWISE NOTED. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTENCE OF WHICH ARE NOT KNOWN OR CERTIFIED BY THE UNDERSIGNED. THE SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION.

PROPERTY SHOWN HEREON LIES WITHIN FLOOD ZONE'S A3, B & C AREAS OF MINIMAL FLOODING, AS SHOWN ON FLOOD INSURANCE RATE MAP FOR THE TOWN OF GREENBURGH, N.Y. COMMUNITY PANEL #360933 0001 B, DATED NOVEMBER 18, 1981.

TOPOGRAPHY SHOWN HEREON COMPILED FROM AERIAL COMPLETED ON NOVEMBER 18, 1998. 2' CONTOUR INTERVAL, DATUM NAVD-1988. TOPOGRAPHY MAY NOT REFLECT THE CURRENT CONDITION OF SITE.

DEPTH OF NDNAPL TRENCH 17'-20' BG (BELOW GRADE), PROFILES PROVIDED BY D.A. COLLINS ENVIRONMENTAL SERVICES JULY 12, 2004.

LNAPL TRENCH AND TAR WELL EXCAVATION DEPTHS MEASURED DURING INSTALLATION BY D.A. COLLINS ENVIRONMENTAL SERVICES/HALEY & ALDRICH.

DEPTH OF WATER IN LNAPL EXCAVATION MEASURED BY LEAD LINE, D.A. COLLINS ENVIRONMENTAL SERVICES/HALEY & ALDRICH, DURING INSTALLATION.

DEPTH OF WDNAPL TRENCH 26'-28' BG (BELOW GRADE) PROVIDED BY DA COLLINS ENVIRONMENTAL SERVICES.

LIMITS OF NEW PRECAST SEAWALL, CIP RELIEVING PLATFORM AND SOIL BENTONITE CAP (SBC) PROVIDED BY DA COLLINS ENVIRONMENTAL SERVICES.

SURVEY DATUM

VERTICAL DATUM REFERENCE :
PID LX0999
DESCRIBED BY NATIONAL GEODETIC SURVEY 1955
AT TARRYTOWN.
NAVD-1988 7.44 (FEET) ADJUSTED
AT TARRYTOWN, AT THE NEW YORK CENTRAL RAILROAD STATION, AN OUTLINED SQUARE ON THE TOP OF THE SOUTHWEST CORNER OF THE STONE DOOR SILL OF WEST ENTRANCE TO BAGGAGE ROOM, 28 1/2 FEET EAST OF EAST RAIL OF EAST TRACK, 28 FEET SOUTH OF NORTHWEST CORNER OF STATION AND ABOUT LEVEL WITH TRACKS.

HORIZONTAL DATUM REFERENCE:
This is a Height Modernization Survey Station.
AJ3348 CORS – This is a GPS Continuously Operating Reference Station.
AJ3348 DESIGNATION – NJ INST OF TECH 2 CORS ARP
AJ3348 CORS_ID – NJI2
AJ3348 PID – AJ3348
AJ3348 STATE/COUNTY– NJ/ESSEX AJ3348 USGS QUAD – ELIZABETH (1995) AJ3348 AJ3348 *CURRENT SURVEY CONTROL AJ3348 AJ3348*
NAD 83(CORS)– 40 44 29.30573(N) 074 10 39.72731(W) ADJUSTED
AJ3348* NAVD 88 – 50.24 (meters) 164.8 (feet) GPS OBS

MAP REFERENCE :

1. MAP ENTITLED "TARRYTOWN PROPERTY DEVELOPMENT, TARRYTOWN FORMER MGP SITE LNAPL REMEDIATION" PREPARED BY HALEY AND ALDRICH OF NEW YORK, DATED DEC. 18, 2003.

2. MAP ENTITLED "TARRYTOWN PROPERTY DEVELOPMENT, TARRYTOWN FORMER MGP SITE NORTHERN DNAPL BARRIER AND RECOVERY TRENCH REMEDIATION" PREPARED BY HALEY AND ALDRICH OF NEW YORK, DATED NOV. 23, 2003.

STEVEN J. ALEX, L.S. #50016

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
Capital District Office: 30 Gurley Avenue, Troy, New York 12182, Phone: (518) 235-8050
Orange County Office: 263 Route 17K, Newburgh, New York 12550, Phone: (845) 567-1133
North Country Office: 110 Glen Street, Glens Falls, New York 12801, Phone: (518) 812-0513

rev.	date	description
4	3/24/05	ADD PERMANENT SURVEY MARKS AND DATUM
3	1/07/05	WDNAPL TRENCH, BULKHEAD, WELLS
2	11/15/04	REVISE LNAPL TRENCH
1	10/22/04	DEPTHS OF EXCAVATION, GENERAL NOTES

FERRY LANDINGS

AS-BUILT SURVEY
GAS HOLDERS & TAR WELL
LNAPL,NDNAPL & WDNAPL
REMEDIATION AREAS

TOWN OF GREEBURGH, VILLAGE OF TARRYTOWN, WESTCHESTER COUNTY, NEW YORK

drawn	checked
TCR	SJA
date	scale
10/11/04	1" = 50'
project no.	
50405.00	
sheet no.	
SP1	
1 of 1	

Appendix E

SUBMITTAL FOR:

TARRYTOWN FORMER MGP SITE

TARRYTOWN, NY

LNAPL COLLECTION SYSTEM

SYSTEM CONTROLS- AS-BUILT DIAGRAM

(15010/16010)

SUBMITTED TO:

HALEY & ALDRICH OF NEW YORK
Mr. Jonathan Babcock, P.E.
200 Town Centre Drive, Suite 2
Rochester, New York 14623

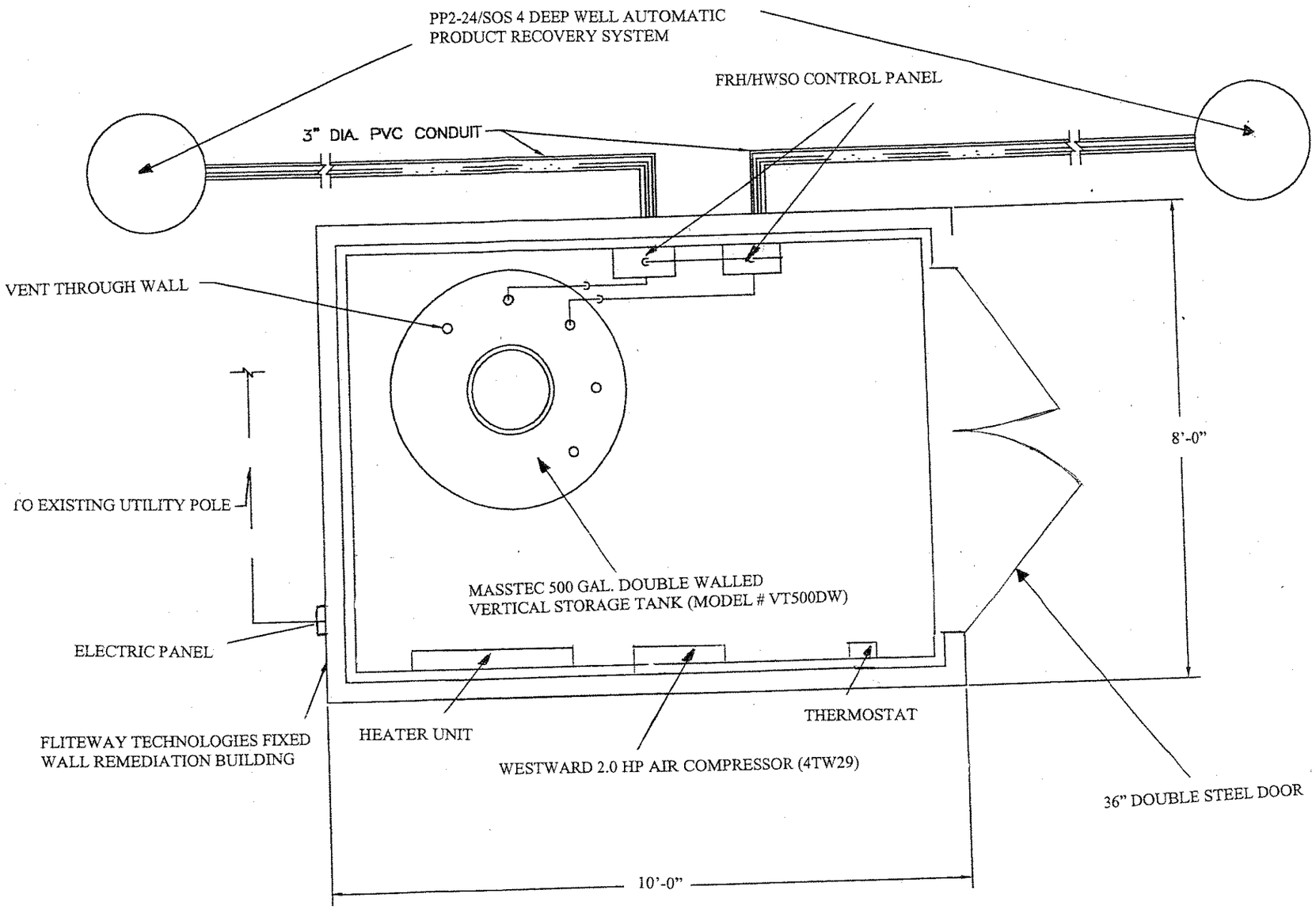
SUBMITTED BY:

D.A. COLLINS ENVIRONMENTAL SERVICES
101 Route 67, PO Box 191
Mechanicville, New York 12118-0190
Ph. 518-664-9855 / Fax 518-664-9609

D.A. COLLINS COMPANIES

A Proud Member of the D.A. Collins Companies

DECEMBER 6, 2004



LNAPL MECHANICAL SYSTEM – AS-BUILT MARKUP
12/06/04

SCALE = N.T.S

D.A. Collins Environmental Services (DAC) is please to provide as-built mechanical diagrams for product recovery system for the LNAPL collection trench for the Tarrytown Former MGP Site Project. In accordance with specifications 15010 and 16010, please find the following information herein.

1.0 As-Built Diagram

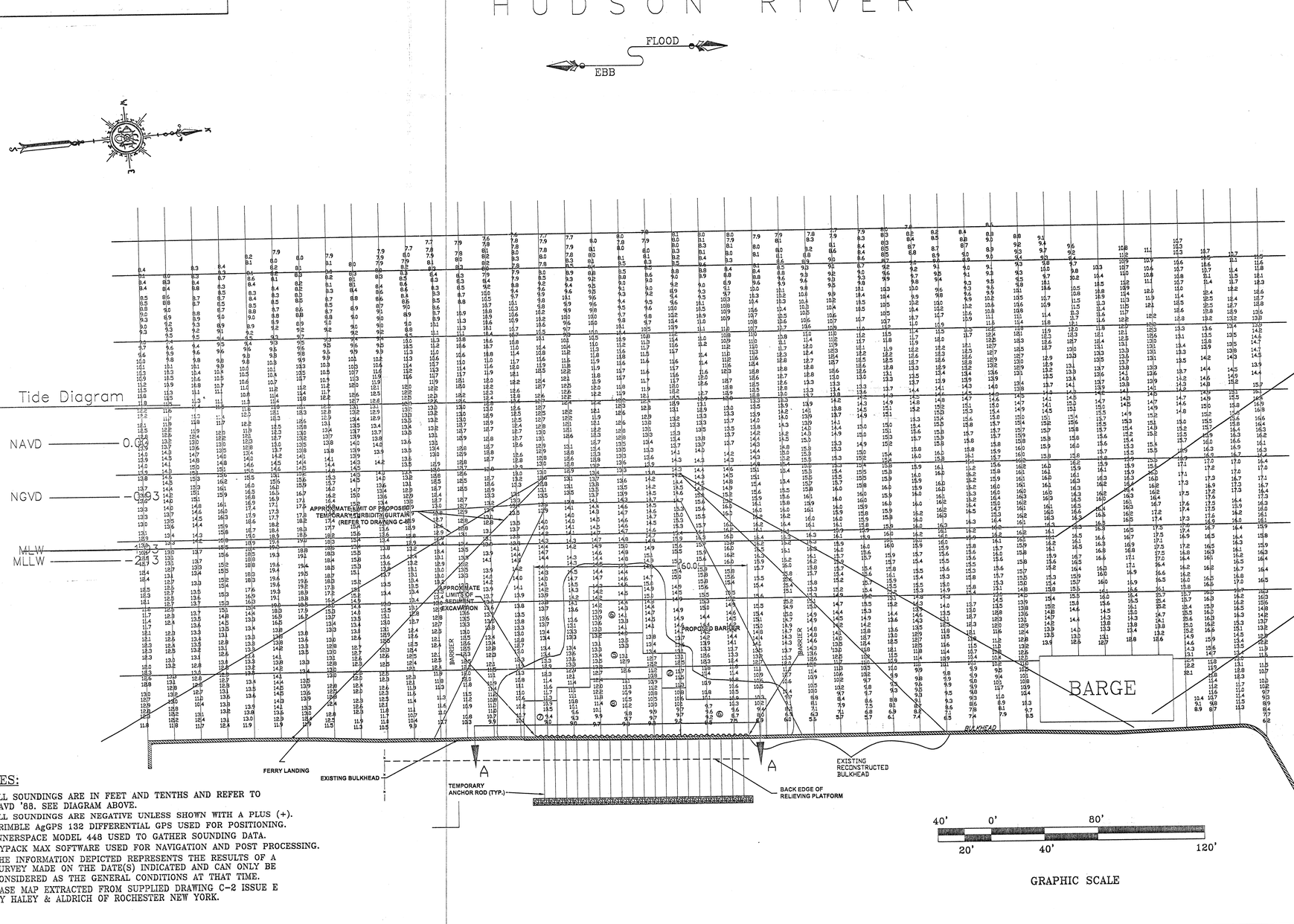
As-built diagrams for the LNAPL system controls installed at the Tarrytown Former MGP Site are attached hereto for review.

Appendix F

C:\Drawings\2004\Pictures\D.A. Collins.JPG

C:\Drawings\2002\VICINITY MAPS\tappanzee.JPG

VICINITY MAP



NOTES:

1. ALL SOUNDINGS ARE IN FEET AND TENTHS AND REFER TO NAVD '88. SEE DIAGRAM ABOVE.
2. ALL SOUNDINGS ARE NEGATIVE UNLESS SHOWN WITH A PLUS (+).
3. TRIMBLE AgGPS 132 DIFFERENTIAL GPS USED FOR POSITIONING.
4. INNERSPACE MODEL 448 USED TO GATHER SOUNDING DATA.
5. HYPACK MAX SOFTWARE USED FOR NAVIGATION AND POST PROCESSING.
6. THE INFORMATION DEPICTED REPRESENTS THE RESULTS OF A SURVEY MADE ON THE DATE(S) INDICATED AND CAN ONLY BE CONSIDERED AS THE GENERAL CONDITIONS AT THAT TIME.
7. BASE MAP EXTRACTED FROM SUPPLIED DRAWING C-2 ISSUE E BY HALEY & ALDRICH OF ROCHESTER NEW YORK.

NO.	DATE	DESCRIPTION	APR.

REVISION

PROJECT:
TARRYTOWN FORMER MGP SITE
EXISTING CONDITION SOUNDINGS
20' X 5' GRID

DWN. BY JLS
CHK. BY MJD
APR. BY AWB
SCALE: 1"=40'

FATHOMETRIC SURVEY PREPARED FOR:
D.A. COLLINS ENVIRONMENTAL SERVICES
101 ROUTE 67
MECHANICVILLE, NY 12118

I hereby certify that all work was performed under my direct supervision and is a true representation of conditions existing on the dates of the survey.

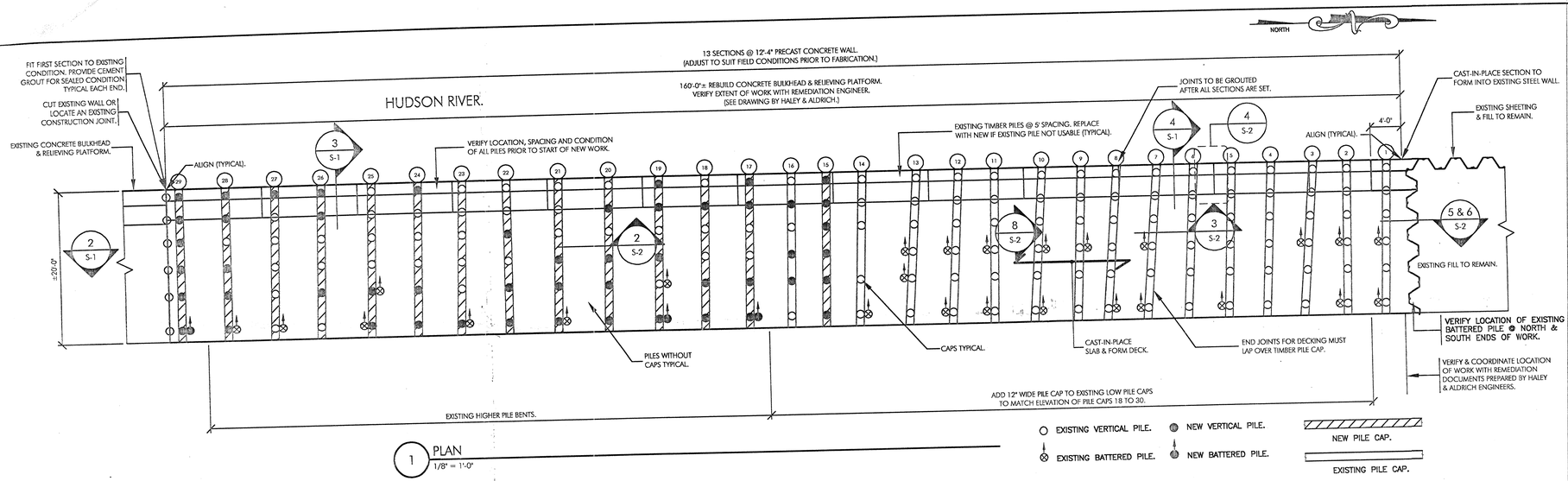
C:\Drawings\NEW SIGNATURE.jpg

Alfred W. Benson III
#50 NATIONALLY CERTIFIED INSHORE HYDROGRAPHER

HYDROGRAPHIC SURVEYS
237 DELSEA DRIVE SEWELL, NEW JERSEY 08080 PHONE: 856-589-8546 FAX: 856-589-4897
JIM STEFFEN - Data Processing Manager & NATIONALLY CERTIFIED HYDROGRAPHER & BILL BENSON- Field Operations Manager
E-Mail: Hydrographic@comcast.net MICHELE J. DICKEY - Office Manager TOLL FREE: 1-800-887-8681 PIN#8546
OVER 25 YEARS IN BUSINESS & OVER 5,000 PROJECTS!

HYPACK TAG:TARRCOLL	DATE: MAY 3, 2004
ANALOG #050304	LINE FILES: DACOLLINSTARRYTOWN
FIELD BOOK: N/A	DRAWING NO.: 04-DACO-04/020-2928-1673

Appendix G



1 PLAN
1/8" = 1'-0"

2 LONGITUDINAL SECTION - TYPICAL
1/2" = 1'-0"

3 TYPICAL CROSS SECTION
1/4" = 1'-0"

4 TYPICAL CROSS SECTION
1/4" = 1'-0"

PILES:

1. THE CONTRACTOR BEFORE ORDERING THE PILES SHALL DRIVE A SUFFICIENT NUMBER OF TEST PILES TO DETERMINE THE NECESSARY LENGTHS. THIS WORK SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LENGTHS OF PILES TO BE ORDERED FOR THE WORK.

2. PILE DRIVING TO BE SUPERVISED BY A LICENSED PROFESSIONAL ENGINEER.

3. SIGNED AND SEALED DRIVING RECORDS SHALL BE SUBMITTED BY A PROFESSIONAL ENGINEER LICENSED IN NEW YORK SHOWING THE PENETRATION, LENGTH OF PILE, AND ALL OTHER PERTINENT DATA, AND CERTIFYING THAT THE PILES HAVE BEEN DRIVEN TO THE PROPER BEARING CAPACITY.

4. A LICENSED SURVEYOR SHALL LAY OUT THE PILES AND MAKE THE RE-SURVEY INDICATING AS-DRIVEN PILE LOCATIONS. NO CONCRETE IS TO BE PLACED UNTIL RE-SURVEY IS CHECKED BY ENGINEER AND PILE CAPS REDESIGNS OR MODIFICATIONS ARE DETERMINED.

5. MAXIMUM PERMITTED PILE TOLERANCES: 3" FROM PLAN LOCATION; 3% OUT OF PLUMB; 110% OF REQUIRED DESIGN CAPACITY.

6. PILES THAT ARE BOWED BROKEN, COLLAPSED OR OTHERWISE DAMAGED, SHALL BE REJECTED.

7. IF ANY PILES ARE BROKEN, DRIVEN OUT OF PLUMB, OR DEVIATE, NECESSITATING A REDESIGN, CONTRACTOR SHALL DRIVE ADDITIONAL PILES, IF REQUIRED, AND PAY FOR ALL COSTS ARISING HERE FROM, INCLUDING COST OF ADDITIONAL REINFORCED CONCRETE WORK AND ALL REDESIGNS.

8. SPECIAL PILE FITTINGS SUCH AS A.P.F. ARROW POINT, THE RIVAL BOOT, THE DRIVING RINGS OR OTHER DRIVING HARDWARE NECESSARY TO INSURE PROPER INSTALLATION WITHOUT SPLITTING OR BROOMING DURING DRIVING SHALL BE UTILIZED AS REQUIRED.

9. PILES TO BE DOUGLAS FIR, SOUTHERN PINE, OR WOODS OF COMPARABLE STRENGTH, PRESSURE TREATED. MINIMUM DESIGN COMPRESSION STRESS PARALLEL TO GRAIN TO BE 1200 PSI.

10. PHYSICAL CHARACTERISTICS OF PILE TO CONFORM TO REQUIREMENTS OF ASTM D25 WITH MINIMUM PILE TIP TO BE 8" DIAMETER AND MINIMUM BUTT 12" DIAMETER.

11. PILES SHALL BE DRIVEN TO 20 TONS REQUIRED LOAD BEARING CAPACITY AS MEASURED BY ENGINEERING NEWS RECORD FORMULA.

CONCRETE:

1. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318 AND SHALL BE IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE FOR DETAILING OF REINFORCED CONCRETE, ALL AS AMENDED BY THE NEW YORK STATE BUILDING CODE.

2. ALL CAST-IN-PLACE CONCRETE SHALL BE CONTROLLED STONE CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 LBS PER SQUARE INCH AT 28 DAYS, WITH MINIMUM CEMENT FACTOR 5.75 BAGS PER CUBIC YARD OF CONCRETE. CONTRACTOR SHALL SUPPLY CONCRETE HAVING A 28 DAY STRENGTH 25 PERCENT GREATER THAN THE DESIGN STRENGTH SPECIFIED.

2A. ALL CONCRETE SHALL HAVE A MAXIMUM WATER CEMENT RATIO OF 0.48.

3. CONCRETE MAY CONTAIN A WATER REDUCING ADMIXTURE, AND/OR HIGH RANGE WATER REDUCING ADMIXTURE (SUPERPLASTICIZER).

3A. ADMIXTURES SHALL CONFORM WITH ASTM C-494 REQUIREMENTS AND CONTAIN NO MORE CHLORIDE IONS THAN ARE PRESENT IN MUNICIPAL DRINKING WATER.

3B. ALL PUMPED CONCRETE, ARCHITECTURAL CONCRETE, CONCRETE FOR INDUSTRIAL SLABS, PARKING DECKS, AND OTHER CONCRETE WITH A WATER-CEMENT RATIO OF 0.45 OR LESS SHALL CONTAIN THE HIGH RANGE WATER REDUCING ADMIXTURE (SUPERPLASTICIZER).

4. NON-CHLORIDE ACCELERATING ADMIXTURES SHALL BE USED IN ALL CONCRETE SLABS PLACED AT TEMPERATURE BELOW 50 DEGREES F. ADMIXTURE SHALL CONFORM WITH ASTM C-494 REQUIREMENTS, AND CONTAIN NO MORE CHLORIDE IONS THAN ARE PRESENT IN MUNICIPAL DRINKING WATER.

5. AIR ENTRAINING ADMIXTURE CONFORMING TO ASTM C260, SHALL BE USED IN ALL CONCRETE EXPOSED TO THE WEATHER.

6. ALL REINFORCING BARS SHALL BE NEW BILLET STEEL, DEFORMED TYPE, (ASTM A-615 GRADE 60) EPOXY COATED AND SHALL COMPLY WITH ACI CODE REQUIREMENTS.

11. ALL WELDED WIRE MESH (WWM) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-185. FLAT SHEET, EPOXY COATED.

12. PROVIDE MINIMUM REINFORCING IN ALL CONCRETE AS PER ACI BUILDING CODE REQUIREMENTS.

13. MINIMUM LENGTH OF SLAB REINFORCEMENT SHALL BE AS PER ACI BUILDING CODE.

14. LENGTH OF REINFORCING SPLICES SHALL CONFORM TO ACI BUILDING CODE REQUIREMENTS.

15. TOP STEEL IN BEAMS AT DISCONTINUOUS ENDS SHALL EXTEND INTO ADJACENT SLAB 40 BAR DIAMETERS OR A MINIMUM OF 2'-0" UNLESS GREATER EXTENSION IS CALLED FOR ON DRAWINGS.

16. CONCRETE SHALL BE CURED WITH APPROVED METHODS FOR A MINIMUM OF SEVEN DAYS AFTER PLACEMENT.

17. CONCRETE PROTECTION FOR REINFORCING STEEL SHALL BE AS FOLLOWS UNLESS INDICATED OTHERWISE ON DRAWINGS:

SLABS . . . . . 1 1/2"

18. SUBMIT SHOP DRAWINGS OF REINFORCING STEEL FOR REVIEW BEFORE FABRICATION.

19. ALL CONCRETE WORK, INCLUDING CONCRETE, FORMS AND REINFORCEMENT SHALL BE INSPECTED AT THE WORK SITE BY QUALIFIED INSPECTORS. A RECORD SHALL BE KEPT OF SUCH INSPECTION WHICH SHALL COVER THE CERTIFICATION OF THE CONCRETE AS REQUIRED BY THE BUILDING CODE FOR THE PLACING OF THE CONCRETE, THE SLUMP, UNIT WEIGHT, AIR CONTENT OF THE CONCRETE, PLACING OF THE REINFORCING STEEL, THE SIZE AND DIMENSION OF THE CONCRETE MEMBERS AND REINFORCING, AND A COMPLETE RECORD OF ALL TEST SAMPLES AND RESULTS.

20. THE PRODUCER OF CONCRETE SHALL USE MIX PROPORTIONS AND WATER CEMENT RATIOS WHICH HAVE BEEN SHOWN BY PREVIOUS TESTS TO PRODUCE SATISFACTORY CONCRETE OF THE REQUIRED STRENGTH AT A SLUMP OF 5 INCHES WITH A TOLERANCE OF PLUS OR MINUS 1 INCH. EACH LOAD OF CONCRETE SHALL BE CERTIFIED BY THE PRODUCER TO THE OWNER AS TO THE CONCRETE STRENGTH AND QUANTITIES PER CUBIC YARD OF EACH MATERIAL. A COPY OF SUCH CERTIFICATION SHALL BE READILY AVAILABLE TO THE BUILDING DEPARTMENT DURING THE PROGRESS OF THE WORK AND FOR TWO YEARS THEREAFTER.

21. SAMPLES MUST BE TAKEN FROM MIXER AND TESTED FOR SLUMP, AIR CONTENT, TEMPERATURE, AND WEIGHT PER CUBIC FOOT AS PER 27-607. FOR EACH CLASS OF CONCRETE POURED EACH DAY THREE (3) TEST CYLINDERS SHALL BE MADE FROM SAMPLING FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF. CYLINDERS SHALL BE CURED AND STORED AND TESTED AS REQUIRED BY THE NEW YORK STATE CODE.

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NEW STATE BUILDING CODE.

2. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS. DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT OR ENGINEER AND RESOLVED PRIOR TO PROCEEDING WITH THE WORK.

3. ALL WORK SHALL COMPLY WITH THE RULES AND REGULATIONS OF ALL GOVERNMENTAL AGENCIES HAVING JURISDICTION.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE AND FAMILIARIZING HIMSELF WITH EXISTING CONDITIONS.

5. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL SAFE WORKING CONDITIONS AND SHALL OBSERVE ALL SAFETY REQUIREMENTS ESTABLISHED BY JURISDICTIONAL AGENCIES AND THE OWNER. WHERE CONFLICTS EXIST, THE MORE STRINGENT REQUIREMENTS SHALL APPLY CARE SHALL BE EXERCISED TO AVOID ENDANGERING PERSONAL OR THE STRUCTURE.

6. FURNISH ALL SCAFFOLDING, HOISTING EQUIPMENT AND ANY OTHER EQUIPMENT THAT MAY BE REQUIRED TO PERFORM THE WORK INDICATED IN A SAFE AND ORDERLY MANNER.

7. THE CONTRACTOR SHALL REPAIR, AT NO COST TO THE OWNER, ANY DAMAGE CAUSED BY HIM DURING OR RESULTING FROM HIS OPERATIONS.

8. CONTRACTOR SHALL REPLACE ALL EXISTING CONSTRUCTION BEING REMOVED FOR CONSTRUCTION PURPOSES. MATCH EXISTING CONSTRUCTION IN KIND.

9. AFTER CHECKING AND VERIFYING ALL FIELD MEASUREMENTS, CONTRACTOR SHALL SUBMIT (5 COPIES, UNLESS OTHERWISE SPECIFIED) SHOP DRAWINGS, FULL, COMPLETE, AND DETAILED AS PER INDUSTRY STANDARDS, AND BEARING A STAMP OR WRITTEN INDICATION THAT CONTRACTOR HAS SATISFIED HIS RESPONSIBILITY WITH RESPECT TO THE REVIEW OF THE SUBMISSION.

10. CONTRACTOR SHALL HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS AND SIMILAR DATA, AND REVIEWED OR COORDINATED EACH SHOP DRAWING WITH OTHER SHOP DRAWINGS AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.

11. ENGINEER WILL REVIEW AND APPROVE SHOP DRAWINGS WITH REASONABLE PROMPTNESS, BUT ENGINEER'S REVIEW AND APPROVAL WILL BE ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT AND FOR COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS AND SHALL NOT EXTEND TO MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION, OR TO SAFETY PRECAUTIONS OR PROGRAMS INCIDENT THERETO.

12. ENGINEER'S REVIEW AND APPROVAL OF SHOP DRAWINGS OR SAMPLES SHALL NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ANY VARIATION FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS UNLESS CONTRACTOR HAS IN WRITING CALLED ENGINEER'S ATTENTION TO EACH SUCH VARIATION AT THE TIME OF SUBMISSION AND ENGINEER HAS GIVEN WRITTEN APPROVAL OF EACH SUCH VARIATION BY A SPECIFIC WRITTEN NOTATION ON SHOP DRAWING; NOR WILL ANY APPROVAL BY ENGINEER RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OR OMISSIONS IN THE SHOP DRAWINGS OR FROM RESPONSIBILITY FOR HAVING COMPLIED WITH THE PROVISIONS OF NOTE 10.

13. MATERIALS SHALL NOT BE PURCHASED, FABRICATED OR DELIVERED TO THE SITE BEFORE THE SHOP DRAWINGS HAVE BEEN APPROVED.

14. UPON COMPLETION OF WORK, ALL EXCESS MATERIAL, DEBRIS, ETC., SHALL BE REMOVED AND WORK AREA LEFT CLEAN TO THE OWNER'S SATISFACTION.

15. STRUCTURAL DESIGN COMPLIES WITH THE LATEST EDITION OF THE NEW YORK STATE BUILDING CODE.

16. CONTRACTOR MUST NOTIFY ENGINEER OF WORK PROGRESS SO THAT REGULAR PERIODIC INSPECTION OF ALL ASPECTS OF THE CONCRETE WORK, INCLUDING EXCAVATION, ROCK CUT, SUBGRADES, REINFORCEMENT PLACEMENT, CONCRETE PLACEMENT, ETC., FOR FOUNDATIONS AND WALLS CAN BE MADE. WORK CANNOT PROCEED WITHOUT APPROVAL OF ENGINEER AT EACH PHASE OF THE WORK.

CONTROLLED FILL:

1. ALL FILL WITHIN THE BUILDING WALLS SHALL BE CONTROLLED FILL COMPACTED TO 95% OF THE MAXIMUM MODIFIED PROCTOR DENSITY WHEN TESTED IN ACCORDANCE WITH ASTM D 1557.

2. ALL BORROW MATERIAL SHALL BE APPROVED PRIOR TO BEING PLACED.

3. FILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 12 INCHES AND SHALL BE COMPACTED PRIOR TO PLACEMENT OF NEXT LIFT.

4. CONTRACTOR SHALL PROVIDE FOR IN-PLACE DENSITY TESTING AS THE WORK PROGRESSES. ALL LIFTS MUST BE APPROVED BY THE ARCHITECT PRIOR TO PROCEEDING WITH THE NEXT LIFT.

HARDWARE:

1. ALL HARDWARE SHALL BE HOT-DIP GALVANIZED WHEN USED IN CCA TREADED LUMBER.

2. HARDWARE USED IN ACQ, CBA-A & CA-B TREADED TIMBER MUST BE STAINLESS STEEL.

TIMBER:

1. TIMBER FOR PILE CAPS AND BEAMS SHALL BE 12X12 NOMINAL MEMBERS, SOUTHERN PINE, GRADE NO.1 SR, Fb=1350 PSI OR BETTER, PRESSURE TREATED IN ACCORDANCE WITH AWPA STANDARDS FOR FOR MARINE ENVIRONMENT, USING CCA WATER BORNE PRESERVATIVE AT 2.50 LBS./CU.FT. RETENTION.

2. ALL FIELD CUTS SHALL BE FIELD TREATED WITH COPPER NAPHTHENATE HAVING A MINIMUM OF 2% METALLIC SOLUTION IN ACCORDANCE WITH AWPA STANDARS M4.

3. FOR ALL OTHER TYPES OF PRESERVATIVE TREATMENTS SUBMIT MANUFACTURER DATA AND FORMALATIONS FOR APPROVAL. NON-CCA TREATMENTS SHALL REQUIRE A CHANGE TO STAINLESS STEEL HARDWARE.

NO.	DATE:	REVISIONS
1	9-3-2004	GENERAL REVISIONS
1	10-21-2004	CAST-IN-PLACE SLAB & FIELD CONDITIONS.

NO.	DATE:	ISSUED

KEVIN J. MILEY
NEW YORK
PROFESSIONAL ENGINEER
NO. 060391-1

HILLMAN & MILEY
CONSULTING ENGINEERS PLLC

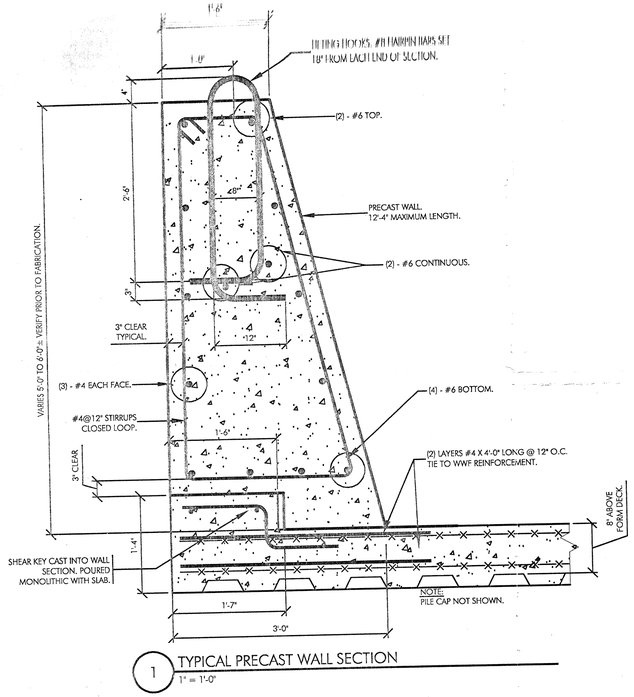
222 Mamaroneck Ave
White Plains, NY 10605
Phone: 914.428.0909
Fax: 914.428.5012
info@hillmanmiley.com

CONCRETE BULKHEAD & RELIEVING PLATFORM
FERRY LANDINGS LLC
TARRYTOWN NEW YORK

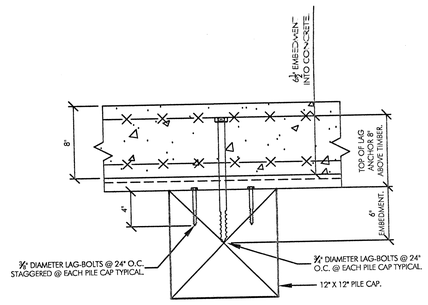
PROJECT NO. 04.2693	SCALE: AS NOTED
DESIGNER: K.J.M	DRAWN BY: T.J.R.
CHECKED BY:	DATE: 7/2/2004

DRAWING TITLE:
PLAN & SECTIONS

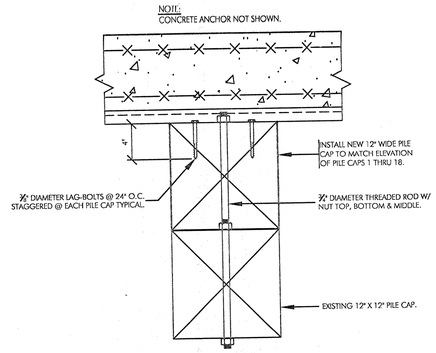
SHEET NO: S-1



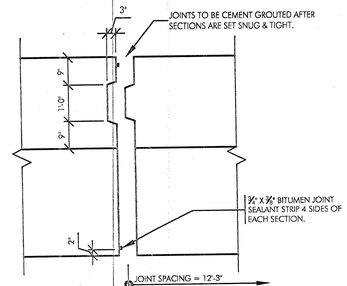
1 TYPICAL PRECAST WALL SECTION
1" = 1'-0"



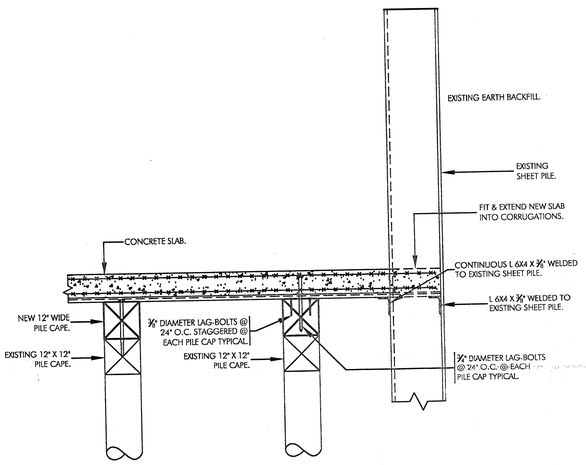
2 TYPICAL SECTION - DECK & CONCRETE ANCHORAGE
1 1/2" = 1'-0"



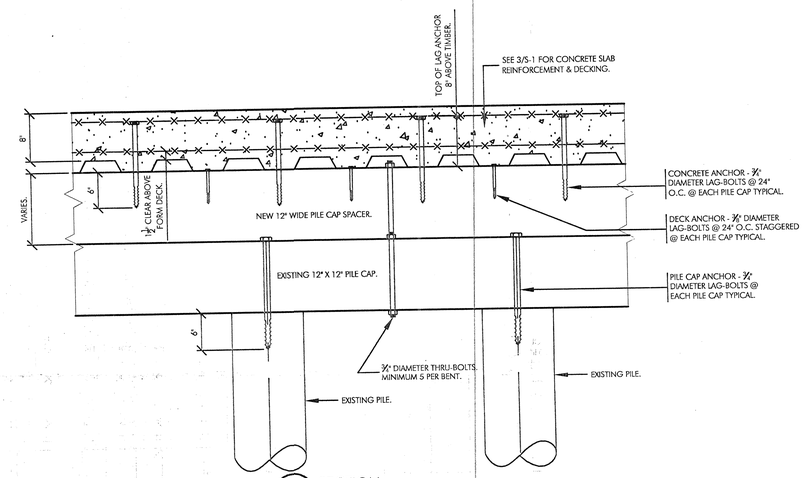
3 TYPICAL SECTION PILE CAP SHIMMING
1 1/2" = 1'-0"



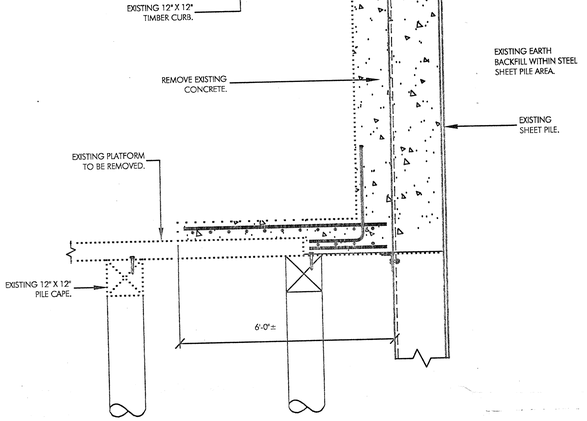
4 PLAN - WALL CONSTRUCTION JOINT
1/2" = 1'-0"



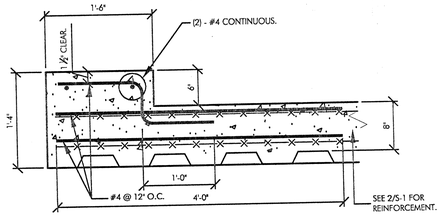
6 SECTION NEW CONDITION - NORTH END
1/2" = 1'-0"



8 SECTION
1" = 1'-0"



5 SECTION DEMO EXISTING CONDITION NORTH END
1/2" = 1'-0"



7 DETAIL SLAB SHEAR KEY
1" = 1'-0"

NO.	DATE:	REVISIONS
1	9-3-2004	GENERAL REVISIONS
1	10-21-2004	CAST-IN-PLACE SLAB & FIELD CONDITIONS.

NO.	DATE:	ISSUED

KEVIN J. MILEY
NEW YORK
PROFESSIONAL ENGINEER
NO. 060391–1

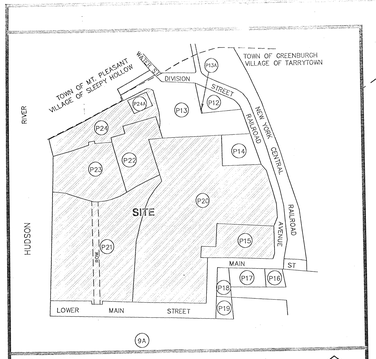
HILLMAN & MILEY
CONSULTING ENGINEERS PLLC

222 Mamaroneck Ave
White Plains, NY 10605
Phone: 914.428.0909
Fax: 914.428.5012
info@hillmanmiley.com

CONCRETE BULKHEAD & RELIEVING PLATFORM FERRY LANDINGS LLC TARRYTOWN NEW YORK

PROJECT NO. 04.2693	SCALE: AS NOTED
DESIGNER: K.J.M	DRAWN BY: T.J.R.
CHECKED BY:	DATE: 7/2/2004
DRAWING TITLE: SECTIONS & DETAILS	
SHEET NO: S-2	

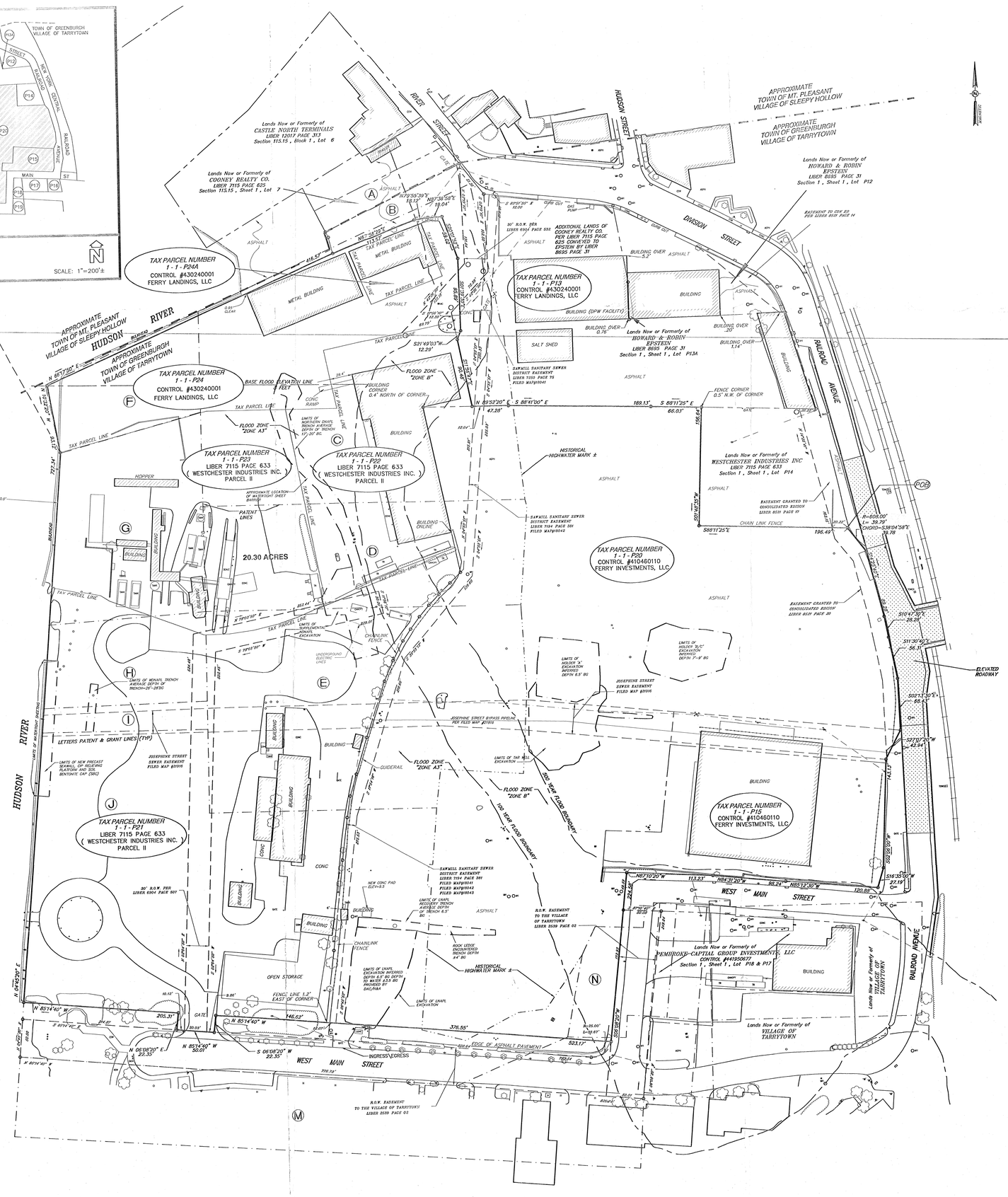
Appendix H



AREA MAP

SOURCE: VILLAGE OF NORTH TARRYTOWN TAX MAP

SCALE: 1"=200'±



LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- PATENT & GRANT LINES
- EASEMENT & RIGHT OF WAY LINES
- DEED PARCEL & TAX LINE
- TAX PARCEL LINE
- HISTORIC HIGHWATER MARK
- X — X — EXISTING FENCE
- EXISTING STONE WALL
- EXISTING TREE LINE
- OHW — EXISTING OVERHEAD WIRES
- W — EXISTING UNDERGROUND WATER LINE
- G — EXISTING UNDERGROUND GAS LINE
- 8" SAN — EXISTING UNDERGROUND SEWER LINE
- 15" ROF — EXISTING UNDERGROUND STORM LINE
- HYD EXISTING HYDRANT
- CB EXISTING CATCH BASIN
- SMH EXISTING SANITARY SEWER MANHOLE
- DMH EXISTING STORM SEWER MANHOLE
- UP EXISTING UTILITY POLE
- WV EXISTING WATER VALVE
- GV EXISTING GAS VALVE
- EXISTING WATER SHUT OFF
- EXISTING LIGHT POLE
- EXISTING SIGN

EASEMENT NOTES :

WITH RESPECT TO TITLE NO. JP-50003-I-W (EFFECTIVE NOV. 1, 2004)

ITEM A EASEMENTS REFERED TO IN FILED MAP # 2311 SHOWN HEREON (AFFECTS P13, P21, P22, P23, P24 & P--24A)

ITEM B EASEMENT OF RIGHT OF WAY PER LIBER 6904 PAGE 532 SHOWN HEREON (AFFECTS P13 P24)

ITEM C PROPERTY SHOWN HEREON SUBJECT TO THE COVENANTS AND CONDITIONS IN LETTERS OF PATENT RECORDED IN LIBER 1596 OF DEEDS AT PAGE 76, LIBER 868 OF DEEDS AT PAGE 302, AND LIBER 1127 OF DEEDS AT PAGE 150, LIBER 671 OF DEEDS AT PAGE 109 AND LIBER 3275 OF DEEDS AT PAGE 115. (AFFECTS P13, P22, P21, & P24A)

ITEM D COVENANTS, CONDITIONS, AND EASEMENTS IN LIBER 7250 OF DEEDS AT PAGE 75 SHOWN HEREON (AFFECTS P13, P24, & P24A)

ITEM E RESTRICTIVE COVENANTS AND RESERVATIONS IN LIBER 31 OF DEEDS AT PAGE 207 ARE UNPLOTTABLE AND INDETERMINATE.

ITEM F NOTICE OF AGREEMENT BY BETWEEN WESTCHESTER INDUSTRIES, INC AND CONSOLIDATED EDISON COMPANY OF NEW YORK IN CONTROL # 403540559 (AFFECTS P21, P22, P23.)

ITEM G NOTICE OF AGREEMENT BY BETWEEN WESTCHESTER INDUSTRIES, INC AND CONSOLIDATED EDISON COMPANY OF NEW YORK IN CONTROL # 403540559. (AFFECTS P21, P22, P23)

ITEM H STREET RESERVATIONS IN LIBER 1626 OF DEEDS AT PAGE 151 ARE UNPLOTTABLE AND INDETERMINATE.

ITEM I ACCESS EASEMENT IN CONTROL #431360491 BETWEEN FERRY ANDINGS, LLC AND WESTCHESTER INDUSTRIES (AFFECTS P13, P22, P24, P24A)

ITEM L SEWER EASEMENT IN LIBER 3001 OF DEEDS AT PAGE 268 SHOWN HEREON (AFFECTS P15, P20)

ITEM M LETTERS OF PATENT WITH THE RIGHT OF REVERTER AND RIGHT OF RE--ENTRY IN LIBER 1596 OF DEEDS AT PAGE 76, LIBER 435 OF DEEDS AT PAGE 39, LIBER 671 OF DEEDS AT PAGE 109 AND LIBER 54 OF DEEDS AT PAGE 124 (AFFECTS P15, P20)

ITEM N EASEMENT TO THE COUNTY OF WESTCHESTER IN LIBER 7194 OF DEEDS AT PAGE 381 SHOWN HEREON (AFFECTS P15, P20)

ITEM O EASEMENT TO CONSOLIDATED EDISON COMPANY OF NEW YORK IN LIBER 8521 OF DEEDS AT PAGE 20 SHOWN HEREON (AFFECTS P15, P20)

ITEM P NOTICE OF AGREEMENT MADE BY FERRY INVESTMENTS IN CONTROL #440761176 (AFFECTS P15, P20)

ITEM Q EASEMENTS REFERED TO IN FILED MAP # 21916 SHOWN HEREON AND (AFFECTS P21, P22, P23)

ITEM R RIGHTS AND EASEMENTS OF THE VILLAGE OF TARRYTOWN FOR THE DISPOSAL OF SEWERAGE AS THE SAME WAS GRANTED TO THEM BY WILLIAM R. BULL IN LIBER 2213 OF DEEDS AT PAGE 31 (AFFECTS P21, P22, P23)

ITEM S RIGHTS AND EASEMENTS OF THE NEW YORK CENTRAL RAILROAD TO USE AND MAINTAIN THE SIDING TRACKS AS THEY EXIST UPON THE PREMISES, RAIL LINE NO LONGER EXISTS ON PARCEL, LOCATION INDETERMINATED.

ITEM T TERMS, COVENANTS, CONDITIONS, AGREEMENTS, AND EASEMENT OF RIGHT OF WAY CONTAINED IN LIBER 6904 OF DEEDS AT PAGE 507 IS SHOWN HEREON AND (AFFECTS P21, P22, P23)

ITEM U TERMS, COVENANTS, CONDITIONS, AND AGREEMENTS CONTAINED IN A LEASE RECORDED IN LIBER 6625 OF DEEDS AT PAGE 402 HAS BEEN TERMINATED

ITEM V COVENANTS AND CONDITIONS CONTAINED IN LETTERS PATENT RECORDED IN LIBER 671 PAGE 109, LIBER 1596 PAGE 76, LIBER 868 PAGE 302, LIBER 1127 PAGE 150, LIBER 1644 PAGE 152, LIBER 2157 PAGE 115, LIBER 2193 PAGE 236, LIBER 2198 PAGE 242 AND LIBER 2224 PAGE 302 AND LIBER 435 PAGE 39 (AFFECTS LOTS P21, P22 P23)

ITEM W EASEMENT RECORDED IN LIBER 8521 OF DEEDS AT PAGE 14 DOES NOT (AFFECTS P21, P22, P23)

ITEM X TEMPORARY EASEMENT GRANT IN LIBER 7246 OF DEEDS AT PAGE 789 HAS BEEN TERMINATED.

ADDITIONAL ITEM EASEMENT AGREEMENT WITH THE VILLAGE OF TARRYTOWN IN LIBER 2539 OF DEEDS AT PAGE 6 (AFFECTS WEST MAIN STREET)

NOTES:

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW .

ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S INKED SEAL OR HIS EMBOSSED SEAL SHALL BE CONSIDERED TO BE VALID TRUE COPIES . CERTIFICATIONS INDICATED HEREON SIGNIFY THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE EXISTING CODE OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS AS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS. SAID CERTIFICATIONS SHALL RUN ONLY TO THE PERSON SO NOTED.

SURVEY SUBJECT TO ANY RIGHT , TITLE OR INTEREST THE PUBLIC MAY HAVE FOR HIGHWAY USE .

UNDERGROUND FACILITIES AND STRUCTURES SHOWN HEREON WERE TAKEN FROM DATA OBTAINED FROM PREVIOUS MAPS AND RECORD DRAWINGS. ALL ABOVE GROUND STRUCTURES AND SURFACE FEATURES SHOWN HEREON ARE THE RESULT OF A FIELD SURVEY UNLESS OTHERWISE NOTED. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTANCE OF WHICH ARE NOT KNOWN OR CERTIFIED BY THE UNDERSIGNED. THE SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION.

FLOOD ZONE NOTE :

FLOOD ZONE LINES SHOWN HEREON ARE APPROXIMATE AND THE LOCATION IS SUBJECT TO AN INTERPRETATION OF THE PUBLISHED BASE FLOOD ELEVATIONS.

PROPERTY SHOWN HEREON LIES WITHIN FLOOD ZONE'S A3, B & C, AS SHOWN ON FLOOD INSURANCE RATE MAP FOR THE VILLAGE OF TARRYTOWN, N.Y. COMMUNITY PANEL #360933 0001 B, DATED NOVEMBER 18, 1981. BASE FLOOD ELEVATION= 8 FEET.

FILED MAP REFERENCE :

1. MAP ENTITLED " MAP OF PROPERTY SURVEYED FOR WILLIAM R. BULL " FILED IN THE WESTCHESTER COUNTY CLERKS OFFICE ON JUNE 7, 1921 AS FILED MAP #2311.
2. MAP ENTITLED "PROPERTY MAP FOR RIGHT OF WAY ACQUISITION TARRYTOWNS EXTENSION, SAWMILL SANITARY SEWER DISTRICT" PREPARED BY CHAS H. SELLS, INC. RECORDED IN THE WESTCHESTER CLERK'S OFFICE ON SEPTEMBER 13, 1973 AS FILED MAP #18041.
3. MAP ENTITLED "PROPERTY MAP FOR RIGHT OF WAY ACQUISITION TARRYTOWNS EXTENSION, SAWMILL SANITARY SEWER DISTRICT" PREPARED BY CHAS H. SELLS, INC. RECORDED IN THE WESTCHESTER CLERK'S OFFICE ON SEPTEMBER 13, 1973 AS FILED MAP #18042.
4. MAP ENTITLED "PROPERTY MAP FOR RIGHT OF WAY ACQUISITION TARRYTOWNS EXTENSION, SAWMILL SANITARY SEWER DISTRICT" PREPARED BY CHAS H. SELLS, INC. RECORDED IN THE WESTCHESTER CLERK'S OFFICE ON SEPTEMBER 13, 1973 AS FILED MAP #18043.
5. MAP ENTITLED " WESTCHESTER COUNTY SANITARY SEWER BYPASS " RECORD IN THE WESTCHESTER COUNTY CLERKS OFFICE ON MAY 14, 1985 AS FILED MAP #21916

PATENT REFERENCES :

B – CHARLES OLMSTED, JULY 2, 1861. LIBER 868 PAGE 302
C – SAMUEL WOOD, AUGUST 15, 1861. LIBER 1596 PAGE 76
D – WILLIAM WOOD, AUGUST 15, 1861. LIBER 435 PAGE 39
E – SETH BIRD, NOVEMBER 14, 1861. LIBER 671 PAGE 109
F – THE DINNEL AND JEWELL, COMPANY, FEBRUARY 27, 1903
G – WILLIAM R. BULL, APRIL 18, 1919, LIBER 2193 PAGE 236
H – WESTCHESTER LIGHTING, COMPANY, JUNE 30, 1919, LIBER 2198 PAGE 242
I – WILLIAM R. BULL, NOVEMBER 14, 1919, LIBER 2224 PAGE 302
J – WILLIAM R. BULL, SEPTEMBER 14, 1917, LIBER 2157 PAGE 115
M – VILLAGE OF TARRYTOWN, JANUARY 20, 1947

NOTE: APPROXIMATE LOCATIONS OF PATENTS SHOWN HEREON TAKEN FROM LETTER PATENT & DEEDS OF RECORD AND EXISTING MAPS OF RECORD PROVIDED BY THE NEW YORK STATE OFFICE OF GENERAL SERVICES.

TAX PARCEL NUMBER	DEED REFERENCE
TOWN OF GREENBURGH, VILLAGE OF TARRYTOWN : SECTION 1 , SHEET 1 , LOT P24 SECTION 1 , SHEET 1 , LOT P24A	FRANK D. COONEY , JR. AND JOHN T. COONEY – TO – FERRY LANDINGS, LLC A DELAWARE LIMITED LIABILITY COMPANY CONTROL #430240001 RECORDED : MARCH 7, 2003
TOWN OF GREENBURGH, VILLAGE OF TARRYTOWN : SECTION 1 , SHEET 1 LOT P21, LOT P22 & LOT P23	TARRYTOWN RAIL & WATER TERMINAL, Inc. – TO – WESTCHESTER INDUSTRIES, INC. LIBER 7115 PAGE 633 DATED : MARCH 01 , 1973 RECORDED : MARCH 27 , 1973
TOWN OF GREENBURGH, VILLAGE OF TARRYTOWN : SECTION 1 , SHEET 1 , LOTS P15 & P--20	PEMBROKE ACQUISITIONS, LLC – TO – FERRY INVESTMENTS, LLC CONTROL #410460110 RECORDED : MARCH 22, 2001

PROPOSED SURVEY DESCRIPTION ENVIRONMENTAL EASEMENT TO BE CONVEYED TO NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

All that plot piece or parcel of land situate and being in the Village of Tarrytown, Town of Greenburgh, County of Westchester and State of New York, bounded and described as follows:

BEGINNING at a point on the westerly side of Railroad Avenue said point being the northeasterly corner of the herein described parcel and the southeasterly corner of lands now or formerly Westchester Industries, Inc as described in Liber 7115 of deeds at page 633, thence along the westerly side of Railroad Avenue southeasterly on a curve to the right of radius 608.00 feet an arc length of 39.79 feet having a chord bearing S 38° 04'58" E 39.78 feet, S 14°25'40" E 89.28 feet, S 10°47'32" E 28.28 feet, S 11°30'40" E 56.31 feet, S 2°13'30" E 68.43 feet, S 27°07'20" W 42.94 feet, S2°06'00" W 143.13 feet and S 16°35'00" W 27.19 to the intersection of the northerly side of West Main Street with the westerly side of Railroad Avenue, said point being the southeasterly corner of the herein described parcel and the southeasterly corner of lands now or formerly Ferry Investments, LLC described in Control #410460110; thence along the northerly and westerly side of West Main Street, N 85°12'30" W 120.88 feet, N 84°31'20" W 98.24 feet, N 87°10'20" W 113.23 feet, S 6°08'20" W 224.58 feet, N 85°14'40" W 523.17 feet, S 6°08'20" W 22.35 feet, N 85°14'40" W 50.01 feet, N 6°08'20" E 22.35 feet, and N 85°14'40" W 205.31 feet to the southwesterly corner of the herein described parcel and a point on the easterly bank of the Hudson River, thence along same N 4°45'20" E 727.34 feet, and N 10°32'20" W 93.12 feet to the northwesterly corner of the herein described parcel, thence along the southerly bank of the Hudson River and lands now or formerly Ferry Landings, LLC described in Control #430240001, N 66°17'50" E 416.57, N 67°56'29" E 113.57 feet, N 79°55'39" E 118.12 feet, N 87°36'58" E 19.04 feet, S 20°01'52" E 59.02 feet, S 01°38'30" E 95.89 feet, S 21°49'03" W 12.29 feet, S 11°56'47" E 90.48 feet, N 89° 52'20" E 47.28 feet, S 88°41'00" E 189.13 feet and S 88°41'25" E 66.03 feet to a point; thence along lands now or formerly of Westchester Industries, Inc. described in Liber 7115 of deeds at page 633, S 1°48'35" W 156.64 feet and S 88°11'25" E 196.49 to the point or place of beginning.

CONTAINING 20.30 ACRES OF LAND

I HEREBY CERTIFY THAT THIS SURVEY MAP IS BASED ON AN ACTUAL FIELD SURVEY COMPLETED JAN. 27, 2005 AND THAT THIS SURVEY MAP WAS MADE BY ME OR UNDER MY DIRECTION, AND CONFORMS WITH THE MINIMUM STANDARDS OF PRACTICE ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS.

STEVEN J. ALEX L.S. #50016

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
Capital District Office: 20 Corlis Avenue, Troy, New York 12182, Phone: (518) 235-8050
Orange County Office: 356 Meadow Avenue, Newburgh, New York 12550, Phone: (845) 567-1133
North Country Office: 110 Ger Street, Glens Falls, New York 12801, Phone: (518) 812-0513

rev.	date	description

#129 MAIN STREET

ENVIRONMENTAL EASEMENT MAP PREPARED FOR NATIONAL RESOURCES, LLC

TOWN OF GREENBURGH, VILLAGE OF TARRYTOWN, WESTCHESTER COUNTY, NEW YORK

drawn	checked
TCR	SJA
date	scale
2/07/05	1" = 50'
project no.	
50512.00	
sheet no.	
SP1	
1 of 1	

4940