SANBORN HEAD ENGINEERING

Building Trust. Engineering Success.

FINAL DESIGN SUBMITTAL

BROWNFIELD CLEANUP PROGRAM REMEDY

Gun Club Former Burn Pit Area
Union, New York
Site No. C704044

Prepared for IBMCorporation
File No. 3526.00
April 2013

DER-10 Section 1.5(b)1: I, David Shea, certify that I am currently a NYS registered professional engineer and that this remedial design report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Signature: David Shea _____ *Date:* 4/12/2013 _____

SANBORN HEAD ENGINEERING
Building Trust. Engineering Success.

Kevin Whalen
IBM Corporate Environmental Affairs
8976 Wellington Road
Manassas, Virginia, 20109

April 12, 2013
File No. 3526.00

Re: Final Design Submittal
Brownfield Cleanup Program Remedy
Gun Club Former Burn Pit Area
Site No. C704044

Dear Mr. Whalen:

We have prepared this Final Design Submittal for your transmittal to the State of New York Departments of Environmental Conservation and Health (Agencies). This submittal is required under New York State Program Policy DER-10 Section 5.2 (c) 3 and includes design plans and technical specifications. The certification required under DER-10 Section 1.5 (b) is included on the cover page of this submittal.

This Final Design Submittal reflects the revisions to the 95% Complete Design Transmittal described in our March 14, 2013 response letter to the Agencies regarding their comments on the 95% Complete Design. In an e-mail from Mr. Jonathan Greco to IBM on March 18, 2013, the Agencies concurred with the responses provided in the March 14, 2013 letter and requested the submittal of these Final Design documents. Given your approval, we will make these documents available to the Agencies through our Share File site.

In summary, the following revisions were made to the design drawings and specifications based on the Agencies' comments.

- Section 01 35 13, Part 1.3 was revised to clarify how the existing concrete and proposed crushed stone decontamination pads will be used. The location of the existing concrete decontamination pad was revised on Sheet 1 of 8, and the language on several drawings was revised to clarify decontamination procedures.
- The locations of the IRM cells were revised on several drawings to match the Construction Completion Report.
- The significance of the March 2012 field survey was clarified on Note 1A of Sheet 1 of 8.
- The site boundary as defined by the metes and bounds survey included in Appendix B.1 of the December 18, 2012 *Alternatives Analysis and Remedial Work Plan* document was added to the appropriate drawings.

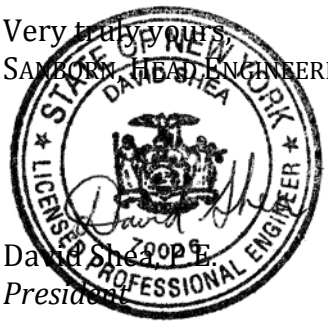
- The proposed deed restriction boundary was revised to a more regular shape encompassing the sample points referenced in Comment 7 of the Agencies' review letter. The following revisions related to the deed restriction were also incorporated:
  - Sheet 6 of 8 was added to the drawings to reflect the revised deed restriction boundary and depicting locations of proposed monuments to mark the boundary in the field. A specification and location for signage indicating that soil at depths of greater than two feet is subject to restrictions is also provided on that drawing.
  - Section 01 11 00, Part C.8 was added to include the installation of the monuments and signage to the Summary of Work.
  - Section 01 32 23, Part 1.1 F was added to indicate that a registered land surveyor will lay out the proposed monuments and prepare the legal metes and bounds of the deed restriction area.
- Section 31 00 00 has been modified removing the Robinson Hill Road Mulch soil borrow source. IBM is no longer pursuing use of this source. We understand that the Lopke Rock Products source has been found acceptable by NYSDEC and we are in the process of testing an additional candidate source as outlined below.
- Section 31 11 00, Part 3.1 E was revised to clarify that brush, weeds, grass, and other perishable materials will remain on-site.
- Section 32 31 13, Part 2.1 B was revised to indicate that excess soil that is generated during removal of existing fence posts will be placed back into the hole from which it was removed or consolidated within the area to be capped.
- Section 32 90 00, Part 1.3 E was added to indicate that topsoil sources must meet applicable SCOs.
- Section 32 90 00, Part 3.6 B.3 was added to indicate that soil generated while planting poplar poles in areas of deeper soil contamination will be stockpiled and sampled for arsenic, and either kept on-site or disposed of off-site depending on the results. The area of tree planting where this procedure shall be followed was added to Sheet 4 of 8.

We have initiated the contractor bidding process, with construction targeted to begin as early as May 2013. Construction phase engineering will be completed by Sanborn Head Engineering P.C. Consistent with our Design Work Plan, a final engineering report (FER) will be prepared and submitted to the Agencies along with record drawings and associated certifications.

We are also currently evaluating another possible local source for low-permeability soil fill with which to construct the cap. Contingent on the pending results of analytical and geophysical testing of samples from this source, we may submit a request for approval to use this material to construct the cap.

If you have questions about this submittal or if you wish to discuss this further, please contact either of us.

Very truly yours,
SANBORN, HEAD ENGINEERING P.C.



David Shea, P.E.
President

Daniel B. Carr, P.E.
Vice President

JHS/DBC/DS/dbc

Encl. Final Design Plans
Technical Specifications

S:\CONDATA\3500s\3526.00\Source Files\201304 Final Design Transmittal\20130412 Final Design Transmittal to IBM.docx

FINAL DESIGN DRAWINGS

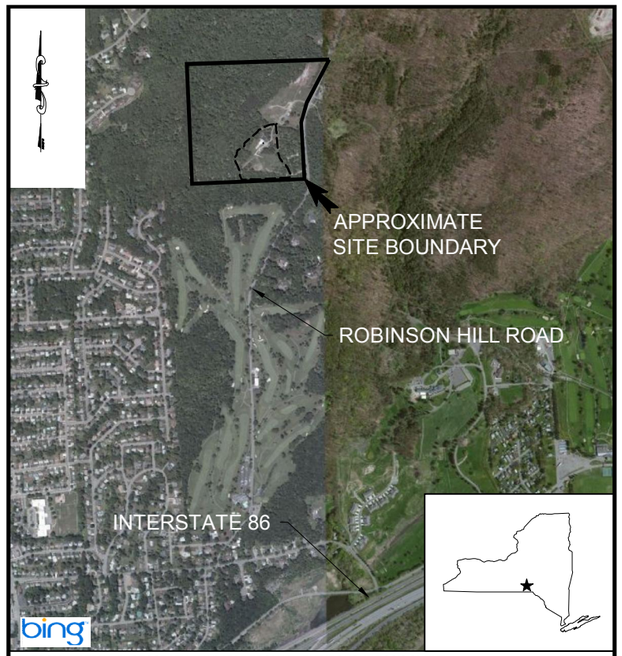
FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY

IBM GUN CLUB - FORMER BURN PIT AREA

BCP SITE NO. C704044

UNION, NEW YORK

APRIL 2013



FROM: AERIAL PHOTOGRAPH AVAILABLE FROM bing™ THROUGH ARCGIS ONLINE.
IMAGE COURTESY OF ©2012 MICROSOFT CORPORATION.

LOCUS PLAN
SCALE: 1" = 1000'

SHEET INDEX

PREPARED FOR:

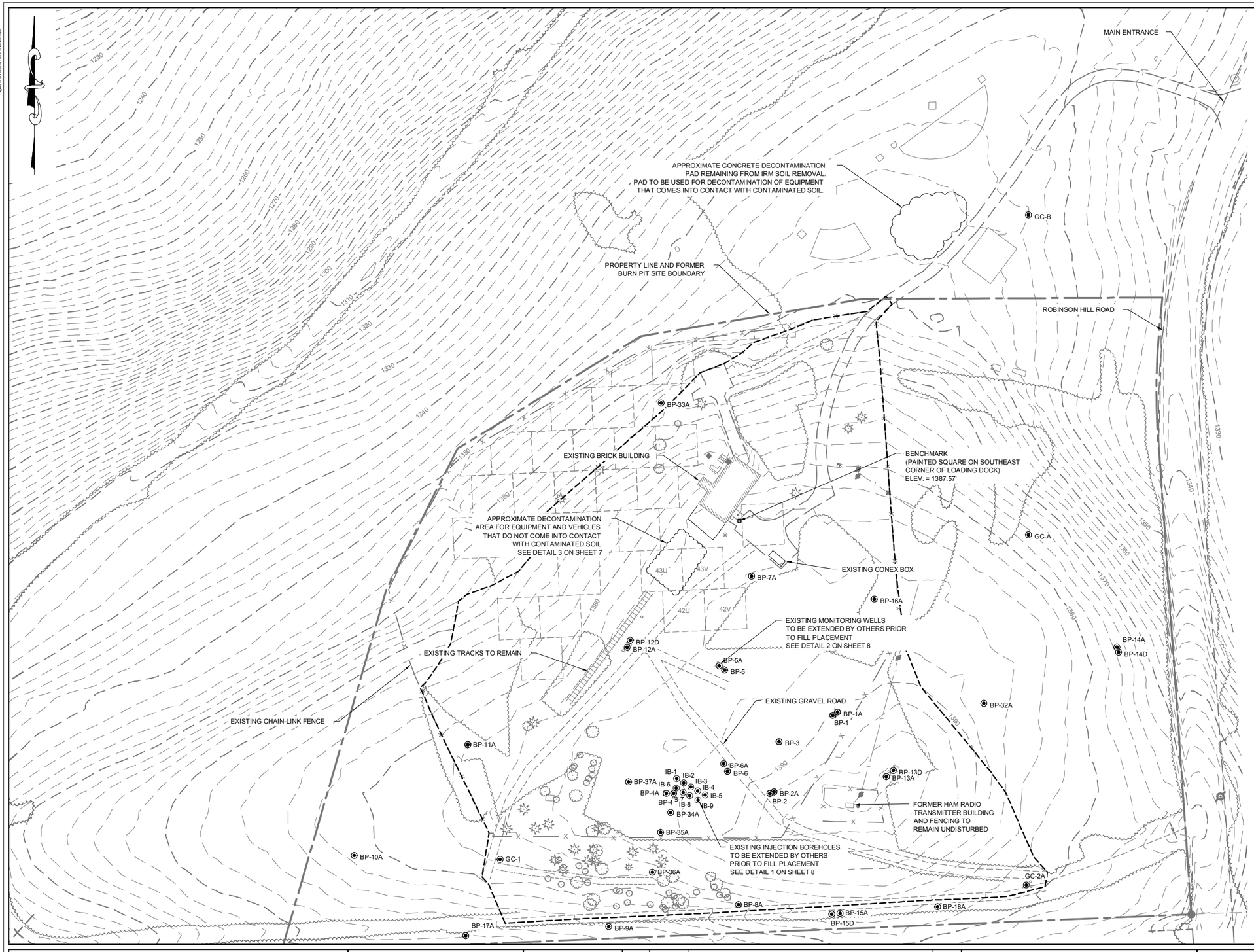
IBM

UNION, NEW YORK

PREPARED BY:

SANBORN HEAD ENGINEERING

20 FOUNDRY STREET, CONCORD, NEW HAMPSHIRE 03301
(603) 229-1900 FAX (603) 229-1919



NOTES:

1. THE BASE MAP WAS DEVELOPED FROM THE FOLLOWING SURVEY DATA MERGED BY SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD):
   - A. WITHIN THE LIMITS SHOWN ON THE PLAN VIEW FIGURE AS DENOTED IN THE LEGEND THE TOPOGRAPHY AND SITE FEATURES REFLECT FIELD GROUND SURVEY DOCUMENTED ON A PLAN ENTITLED "TOPOGRAPHIC SURVEY OF FORMER IBM GUN CLUB", PREPARED BY BUTLER LAND SURVEYING, LLC (BUTLER) OF LITTLE MEADOWS, PENNSYLVANIA AND PROVIDED TO SANBORN HEAD IN DIGITAL FORMAT. TOPOGRAPHY REPRESENTS SITE CONDITIONS ON MARCH 28, 2012. ORIGINAL SCALE: 1" = 50'. THE MARCH 2012 SURVEY WAS CONDUCTED TO OBTAIN REFINED TOPOGRAPHIC DATA FOR THE AREA THAT WILL BE AFFECTED BY SOIL EXCAVATION AND CAPPING AND TO ESTABLISH PROJECT BENCHMARKS.
   - B. OUTSIDE THE AREA OF MARCH 2012 FIELD SURVEY THE TOPOGRAPHY AND SITE FEATURES ARE FROM A PHOTOGRAMMETRIC SURVEY PLAN PREPARED BY BUTLER AND PROVIDED TO SANBORN HEAD IN DIGITAL FORMAT. THE PHOTOGRAMMETRIC MANUSCRIPT DATED AUGUST 11, 2008 WAS BASED ON AERIAL PHOTOGRAPHY FLOWN IN AUGUST, 2007.
2. THE VERTICAL DATUM IS BASED ON THE NAVD OF 1988 AND THE HORIZONTAL DATUM IS BASED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE. THE APPROXIMATE GLOBAL COORDINATES FOR THE SITE ARE: LONGITUDE - W76° 0' 20", LATITUDE - N42° 7' 57.6".
3. AS INDICATED IN THE LEGEND, THIS EXISTING CONDITIONS PLAN DOCUMENTS THE SURVEYED LIMITS OF WHERE SURFICIAL SOILS WERE EXCAVATED AND RESTORED TO APPROXIMATE PRE-EXCAVATION GRADES AS PART OF THE SHOOTING RANGE IRM AS DOCUMENTED BY A CONSTRUCTION COMPLETION REPORT APPROVED BY THE STATE OF NEW YORK AGENCIES ON NOVEMBER 9, 2012.

LEGEND

- 840 — EXISTING 10-FOOT CONTOUR
- EXISTING 2-FOOT CONTOUR
- X — EXISTING CHAIN-LINK FENCE
- EXISTING TREE LINE
- EXISTING MATURE TREES FLAGGED BY ENGINEER FOR PROTECTION DURING CONSTRUCTION TO THE EXTENT PRACTICABLE
- APPROXIMATE LIMIT OF MARCH 2012 FIELD SURVEY (SEE NOTE 1A)
- PROPERTY LINE AND FORMER BURN PIT SITE BOUNDARY
- EXISTING EDGE OF PAVED ROAD
- EXISTING EDGE OF GRAVEL PATH
- BP-6 — EXISTING MONITORING WELL LOCATION AND DESIGNATION
- IB-4 — EXISTING INJECTION WELL LOCATION AND DESIGNATION
- 43U — SURVEY LIMITS OF LEAD SHOT CONTAINING SOILS REMOVED BY IBM IN MAY 2012 UNDER INTERIM REMEDIAL MEASURE (SEE NOTE 3)

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
60' 30' 0 60' 120'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY

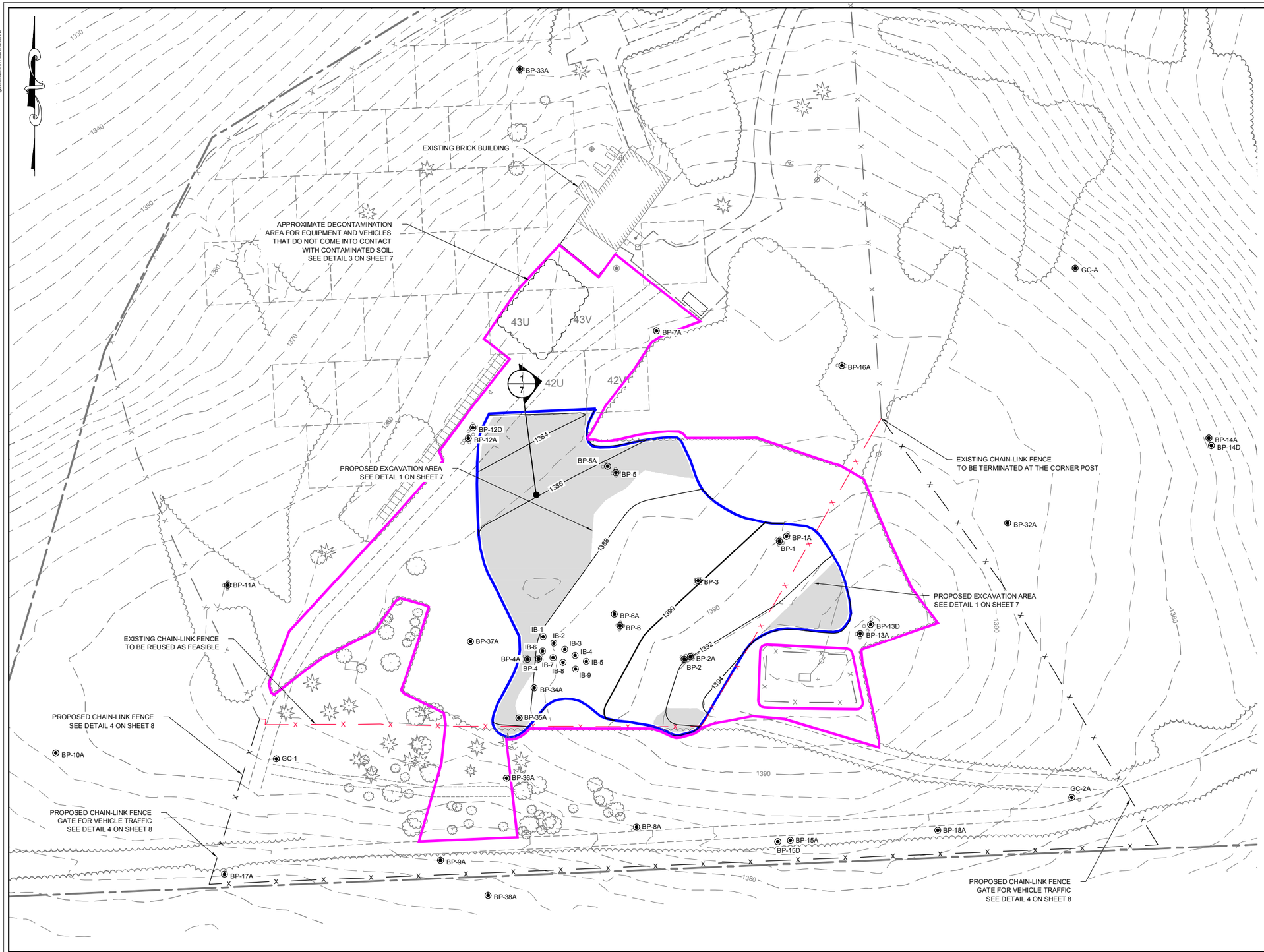
IBM GUN CLUB - FORMER BURN PIT AREA

UNION, NEW YORK

PROJECT NUMBER: 3025.00

EXISTING CONDITIONS PLAN

SHEET NUMBER: 1 OF 8



NOTES:

1. SEE SHEET 1 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.
2. MONITORING WELLS WITHIN OR NEAR THE APPROXIMATE LIMIT OF WORK SHALL BE PROTECTED FROM CONSTRUCTION EQUIPMENT AND FILL PLACEMENT ACTIVITIES.
3. THE FINAL LIMITS OF CONTAMINATED SOIL TO BE CAPPED WILL BE MARKED WITH A SYNTHETIC MARKER LAYER AND THE BOUNDARIES OF THIS MARKER WILL BE SURVEYED BY A LICENSED LAND SURVEYOR FOR RECORDING ON THE DEED FOR THE PROPERTY AS A PART OF THE ENVIRONMENTAL EASEMENT TO BE RECORDED WITH NEW YORK STATE AGENCIES.

LEGEND

- LIMIT OF SURFICIAL SOILS TO BE COVERED WITH TWO FEET OF LOW PERMEABILITY SOIL CAP AFTER PLACEMENT OF A SYNTHETIC MARKER LAYER TO DENOTE THE LIMITS OF CONTAMINATED SOILS
- APPROXIMATE LIMIT OF SOIL DISTURBANCE/WORK
- "PRIMARY CUT" AREA WHERE EXISTING SOILS WILL BE EXCAVATED AND RELOCATED INSIDE THE FOOTPRINT OF AREA TO BE CAPPED, AND COMPACTED TO PROPOSED GRADES BEFORE CAP PLACEMENT
- X — CHAIN-LINK FENCE TO BE REMOVED
- X — PROPOSED CHAIN-LINK FENCE
- 1390 — PROPOSED 10-FOOT CONTOUR OF SOILS TO BE CAPPED WITH TWO FEET OF CLEAN COMPACTED FILL
- PROPOSED 2-FOOT CONTOUR OF SOILS TO BE CAPPED WITH ENGINEERED LOW PERMEABILITY SOIL CAP

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
40' 20' 0 40' 80'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

PROJECT NUMBER: 3025.00

GRADING PLAN
SOIL FOOTPRINT TO BE CAPPED

SHEET NUMBER: 2 OF 8

NOTES:

1. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.

LEGEND

- 1390 — PROPOSED 10-FOOT FINAL GRADE CONTOUR
- 1388 — PROPOSED 2-FOOT FINAL GRADE CONTOUR
- PROPOSED EDGE OF ACCESS LANE
- "PRIMARY CUT" AREA WHERE EXISTING SOILS WILL BE EXCAVATED AND RELOCATED INSIDE THE FOOTPRINT OF AREA TO BE CAPPED, AND COMPACTED TO PROPOSED GRADES BEFORE CAP PLACEMENT
- APPROXIMATE LIMIT OF SOIL FILL CAP EXTENSION RESULTING FROM PROPOSED DESIGN GRADING
- LIMIT OF SURFICIAL SOILS TO BE COVERED WITH TWO FEET OF LOW PERMEABILITY SOIL CAP AFTER PLACEMENT OF A SYNTHETIC MARKER LAYER TO DENOTE THE LIMITS OF CONTAMINATED SOILS
- APPROXIMATE LIMIT OF SOIL DISTURBANCE/WORK

APPROXIMATE DECONTAMINATION AREA FOR EQUIPMENT AND VEHICLES THAT DO NOT COME INTO CONTACT WITH CONTAMINATED SOIL. SEE DETAIL 3 ON SHEET 7

LIMITS OF WORK TO BE CLEARED AND GRUBBED BEFORE FILL PLACEMENT WHILE PROTECTING MATURE TREES OUTSIDE OF LIMITS OF WORK

BP-33A, GC-A, BP-7A, BP-16A, BP-14A, BP-14D, BP-32A, BP-13D, BP-13A, BP-1A, BP-1, BP-3, BP-6A, BP-6, BP-2A, BP-2, BP-5A, BP-5, BP-12D, BP-12A, BP-11A, BP-37A, BP-4A, BP-4, BP-34A, BP-35A, BP-10A, GC-1, BP-36A, BP-8A, BP-15A, BP-15D, BP-18A, GC-2A, BP-9A, BP-17A, BP-38A

IB-1, IB-2, IB-3, IB-4, IB-5, IB-6, IB-7, IB-8, IB-9

43U, 43V, 42U, 42V

1330, 1340, 1350, 1360, 1370, 1380, 1390, 1386, 1388, 1392, 1394, 1384, 1382, 1378

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
40' 20' 0 40' 80'

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PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY

IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

PROJECT NUMBER: 3025.00

FINAL CAP GRADING PLAN

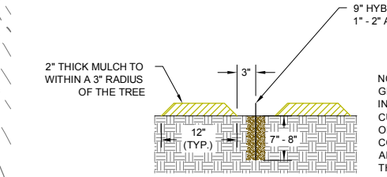
SHEET NUMBER: 3 OF 8

NOTES:

1. SEE SHEET 1 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.
2. HYBRID POPLAR TREES TO BE PLANTED IN AN 8' X 8' GRID WITH SPACING ALLOWED FOR THE PERMANENT ACCESS LANE AND MONITORING OR INJECTION WELLS.

LEGEND

- NOMINAL HYBRID POPLAR POLE PLANTING LOCATION TO BE SEEDED WITH PERENNIAL GRASS AFTER PLANTING (8' X8' GRID)
- NOMINAL HYBRID POPLAR CUTTING PLANTING LOCATION TO BE SEEDED WITH ANNUAL RYE GRASS AFTER PLANTING. PERENNIAL GRASS SEEDING SHALL TAKE PLACE BY OTHERS AT THE DIRECTION OF THE ENGINEER AFTER THE TREES HAVE BECOME ESTABLISHED (8' X8' GRID)
- PROPOSED RED SPRUCE TREE PLANTING LOCATION (50' X 50' GRID)
- A-11 — PROPOSED INJECTION BORING LOCATION AND DESIGNATION (TO BE INSTALLED BY OTHERS)
- PROPOSED ANNUAL AND PERENNIAL GRASS COVER AREA
- SOIL GENERATED WHILE PLANTING THE POPLAR POLES IN THIS AREA TO BE SEGREGATED AND STOCKPILED FOR ANALYTICAL TESTING

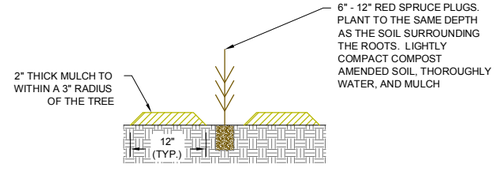


NOTE: CLEAR THE AREA OF GRASS. CUT A DEEP (±8") 'X' INTO THE SOIL. PLACE THE CUTTING INTO THE CENTER OF THE 'X' AND COMPACT COMPOST AMENDED SOIL AROUND IT WELL. WATER THOROUGHLY AND MULCH.

HYBRID POPLAR CUTTING PLANTING DETAIL

1

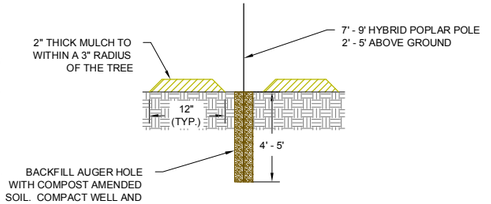
NOT TO SCALE



RED SPRUCE TREE PLANTING DETAIL

2

NOT TO SCALE



HYBRID POPLAR POLE PLANTING DETAIL

3

NOT TO SCALE

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
40' 20' 0 40' 80'

NO.	DATE	DESCRIPTION	BY

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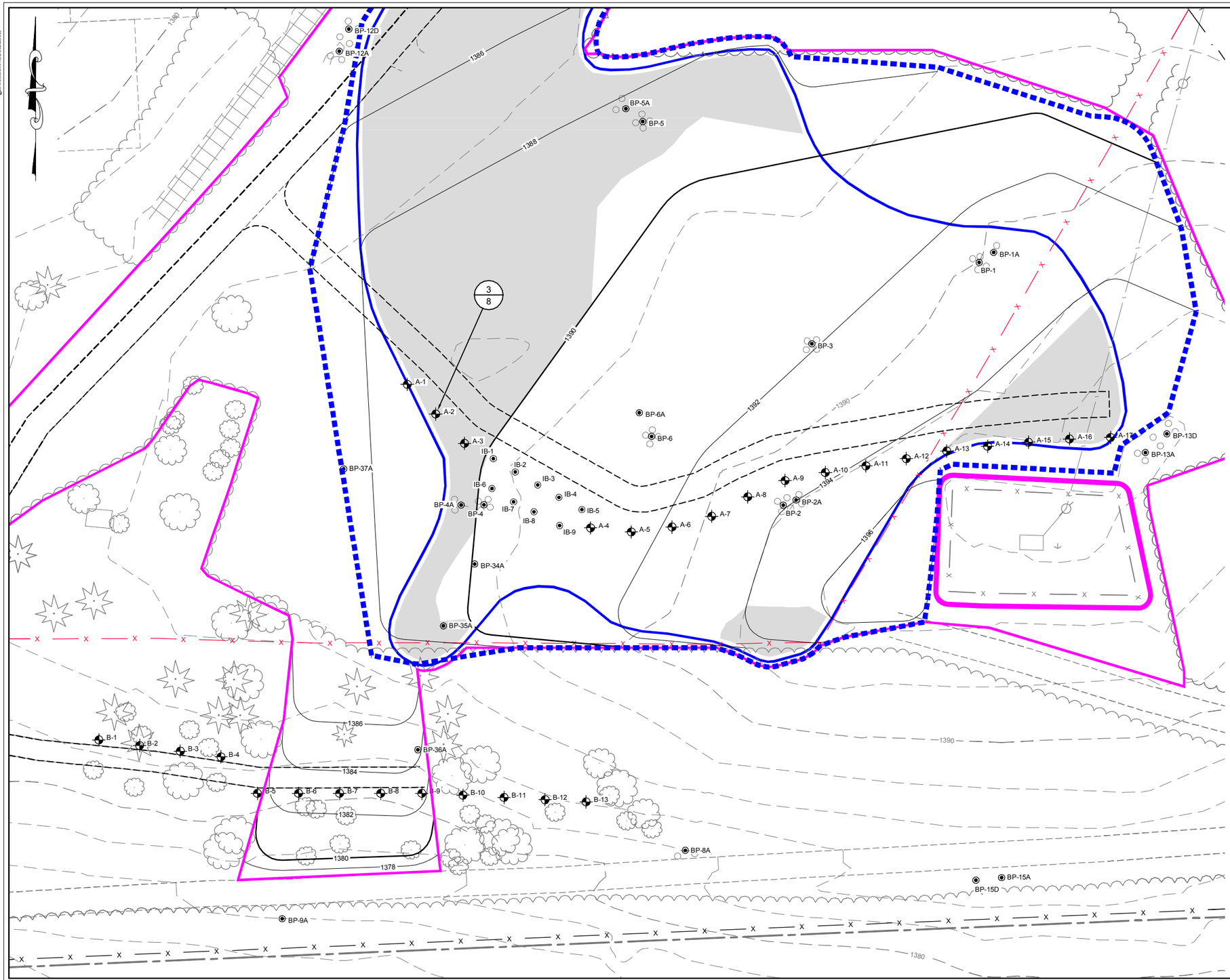
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

PROJECT NUMBER: 3025.00

PLANTING SCHEDULE

SHEET NUMBER: 4 OF 8



NOTES:

1. SEE SHEET 1 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.
2. THE PROPOSED INJECTION BORING LOCATIONS WILL BE INSTALLED UNDER SEPARATE CONTRACT AND SHOULD BE USED FOR REFERENCE ONLY. SEE DETAIL 3 ON SHEET 8 FOR MORE INFORMATION.
3. INJECTION BORINGS WILL BE DRILLED TO THE DEPTH OF THE FIRST AQUITARD UNLESS THE BOTTOM OF THE PRIMARY ROCK SOURCE IS DEEPER. IN THAT CASE, THE INJECTION BORING WILL BE DRILLED TO THAT DEPTH OR 20 FEET BELOW GROUND SURFACE, WHICHEVER OCCURS FIRST.
4. THE LISTED DRILLING DEPTHS ARE BELOW THE ESTIMATED FINAL GRADE. THE DRILLING LOCATIONS WILL BE MARKED AND THE ACTUAL FINISHED ELEVATIONS WILL BE SURVEYED AND THE ACTUAL DRILLING DEPTHS WILL BE REFINED BASED ON SURVEY DATA.

LEGEND

A-11	PROPOSED INJECTION BORING LOCATION AND DESIGNATION (TO BE INSTALLED BY OTHERS)
BP-1A	EXISTING MONITORING WELL LOCATION AND DESIGNATION
	PROPOSED EDGE OF ACCESS LANE

BORING NAME	NORTHING	EASTING	APPROXIMATE FINAL GRADE ELEVATION	FIRST INFERRED AQUITARD ELEVATION (ft)	BOTTOM OF PRIMARY INFERRED SOURCE ELEVATION (FT)	INJECTION BORING DEPTH (FT)
A-1	777,008.0	976,877.7	1388.4	1,376.0	1378.0*	12.5
A-2	776,996.5	976,888.7	1389	1,376.0	1,376.6	13.0
A-3	776,985.1	976,900.0	1389.6	1,375.9	1,375.8	13.8
A-4	776,952.2	976,949.0	1391.3	1,374.6	1,369.8	20.0
A-5	776,950.6	976,964.9	1391.7	1,375.1	1,370.6	20.0
A-6	776,952.5	976,980.7	1392.2	1,375.8	1,372.6	19.6
A-7	776,956.7	976,996.2	1392.7	1,376.8	1,374.3	18.4
A-8	776,964.2	977,010.2	1393.2	1,378.0	1,376.0	17.2
A-9	776,970.6	977,024.7	1393.6	1,378.0	1,376.3	17.3
A-10	776,973.7	977,040.4	1393.9	1,378.0	1,376.9	17.0
A-11	776,976.3	977,056.2	1394.4	1,378.0	1,377.3	17.1
A-12	776,979.1	977,071.9	1395.2	1,378.0	1,377.8	17.4
A-13	776,982.1	977,087.6	1395.7	1,378.0	1,379.3	17.7
A-14	776,984.0	977,103.5	1394.3	1,378.8	1,382.2	15.5
A-15	776,985.5	977,119.5	1394.2	1,379.5	1,383.9	14.7
A-16	776,986.8	977,135.4	1394.6	1,380.5	1,385.2	14.1
A-17	776,987.4	977,151.4	1395.5	1,381.6	1385.2*	14.0
B-1	776,869.6	976,757.7	1382.4	1,363.5	1370.0*	19.0
B-2	776,867.4	976,773.5	1382.5	1,364.5	1370.0*	18.0
B-3	776,865.2	976,789.3	1382.5	1,365.3	1370.0*	17.0
B-4	776,863.0	976,805.2	1382.5	1,366.0	1,368.3	16.5
B-5	776,848.8	976,819.4	1380.9	1,366.1	1,363.7	17.2
B-6	776,848.8	976,835.4	1382.9	1,366.0	1,362.4	20.0
B-7	776,848.8	976,851.4	1383	1,366.0	1,362.6	20.0
B-8	776,848.8	976,867.4	1383	1,366.0	1,364.1	18.9
B-9	776,848.8	976,883.4	1382.2	1,366.0	1,364.7	17.5
B-10	776,848.1	976,899.4	1381.8	1,366.0	1,365.8	16.0
B-11	776,847.2	976,915.3	1382.7	1,366.6	1,367.2	16.1
B-12	776,846.3	976,931.3	1383.6	1,367.4	1,368.0	16.2
B-13	776,845.5	976,947.3	1384.1	1,367.7	1,370.0	16.4

*DENOTES THAT THE BORING IS LOCATED OUTSIDE OF THE AREA OF PRIMARY SOURCING IN ROCK

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
40' 20' 0 40' 80'

NO.	DATE	DESCRIPTION	BY

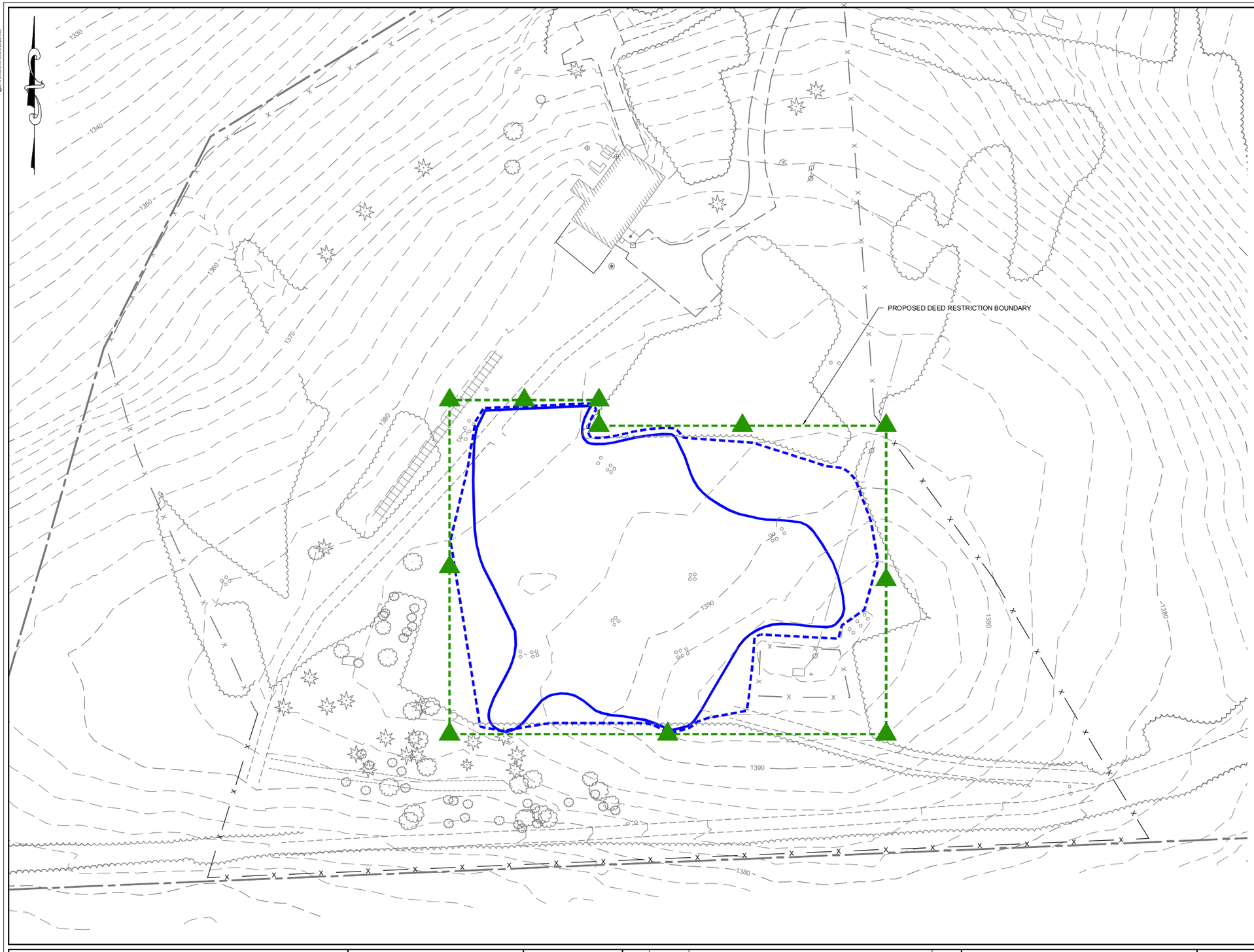
DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

PROJECT NUMBER: 3025.00

PROPOSED INJECTION BORINGS PLAN

SHEET NUMBER: 5 OF 8



NOTES:

1. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.
2. THE MONUMENTS LOCATED AT THE CORNERS OF THE AREA SUBJECT TO THE DEED RESTRICTION WILL BE MARKED WITH SIGNAGE TO BE PROVIDED BY ENGINEER TO BE DEVELOPED AS A PART OF SITE MANAGEMENT PLANNING AND APPROVED BY THE NEW YORK STATE AGENCIES.

LEGEND

- 840 — EXISTING 10-FOOT CONTOUR
- EXISTING 2-FOOT CONTOUR
- X — EXISTING CHAIN-LINK FENCE
- EXISTING TREE LINE
- EXISTING MATURE TREES FLAGGED BY ENGINEER FOR PROTECTION DURING CONSTRUCTION TO THE EXTENT PRACTICABLE
- APPROXIMATE LIMIT OF SOIL FILL CAP EXTENSION RESULTING FROM PROPOSED DESIGN GRADING
- LIMIT OF SURFICIAL SOILS TO BE COVERED WITH TWO FEET OF LOW PERMEABILITY SOIL CAP AFTER PLACEMENT OF A SYNTHETIC MARKER LAYER TO DENOTE THE LIMITS OF CONTAMINATED SOILS
- PROPOSED DEED RESTRICTION BOUNDARY
- PROPOSED MONUMENT TO DOCUMENT DEED RESTRICTED AREA

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
40' 20' 0 40' 80'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
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DATE: APRIL 2013

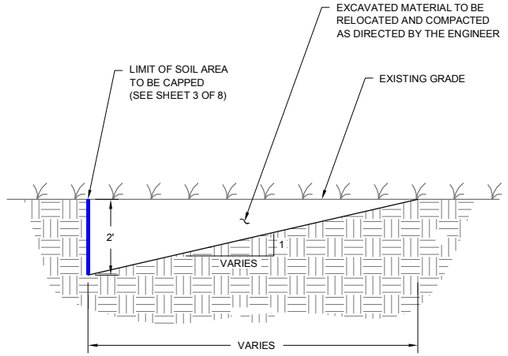
FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY

IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

PROPOSED DEED RESTRICTION BOUNDARY PLAN

PROJECT NUMBER: 3526.00

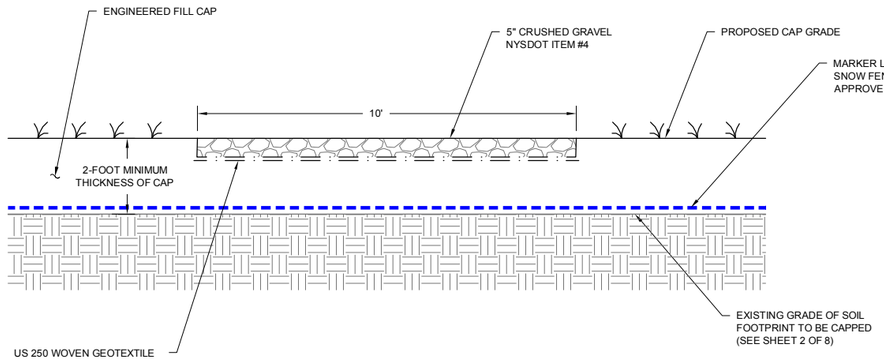
SHEET NUMBER: 6 OF 8



TYPICAL EXCAVATION DETAIL

1

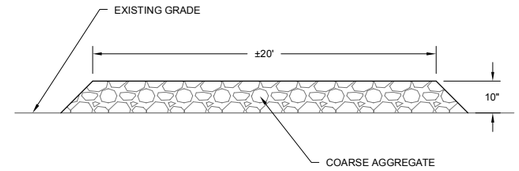
NOT TO SCALE



PERMANENT ACCESS LANE DETAIL

2

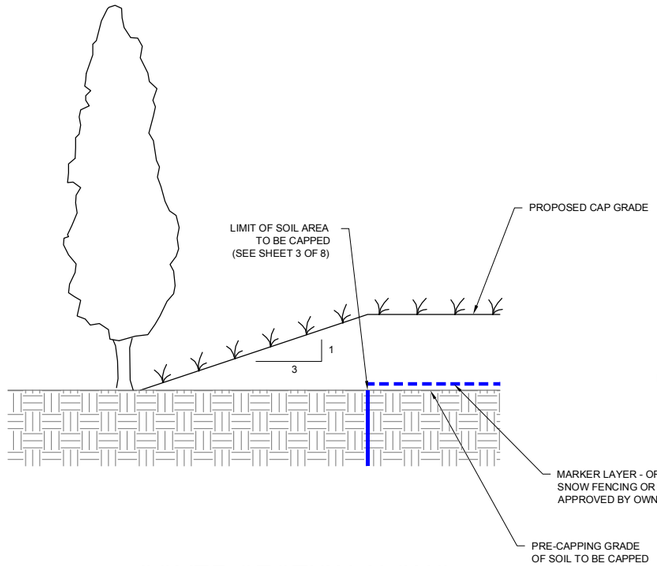
NOT TO SCALE



DECONTAMINATION PAD DETAIL

3

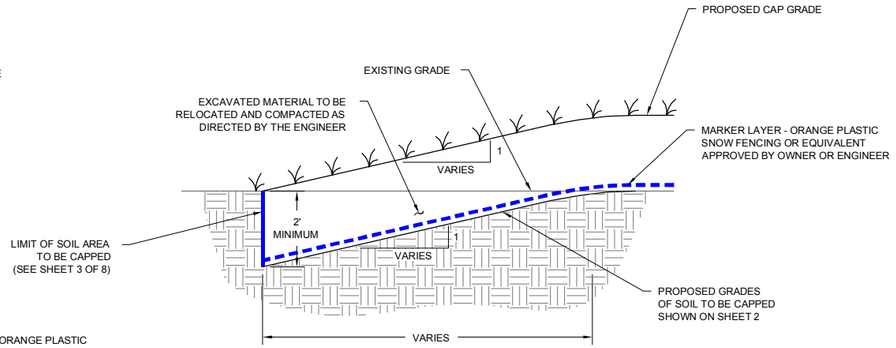
NOT TO SCALE



COVER SECTION ALONG TREE LINE TAPER DETAIL

4

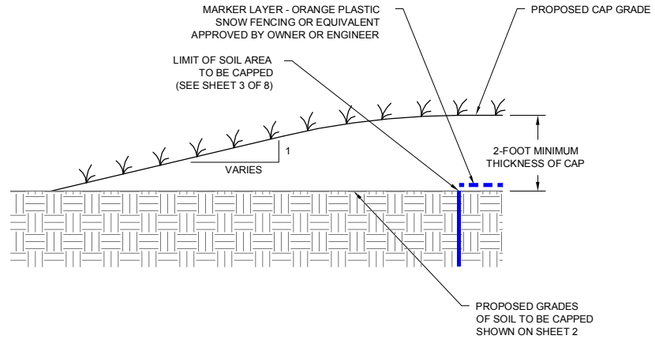
NOT TO SCALE



COVER SECTION TAPER OVER EXCAVATION DETAIL

5

NOT TO SCALE



TYPICAL COVER SECTION TAPER DETAIL

6

NOT TO SCALE

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE AS NOTED

NO.	DATE	DESCRIPTION	BY

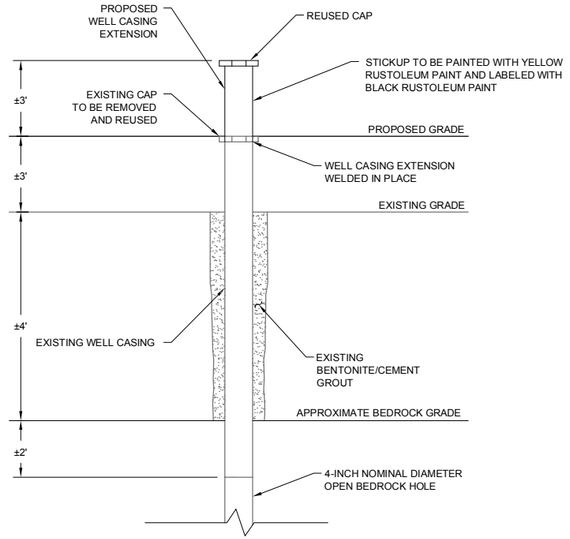
DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

DETAILS (SHEET 1)

PROJECT NUMBER: 3025.00

SHEET NUMBER: 7 OF 8

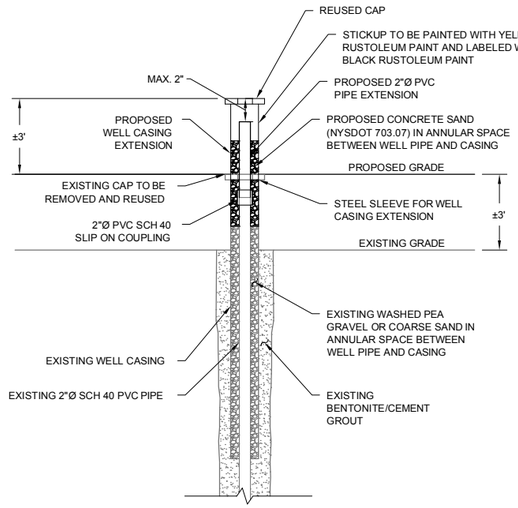


TYPICAL EXISTING INJECTION WELL EXTENSION DETAIL

1

NOT TO SCALE

NOTE: TO BE INSTALLED BY OTHERS, FOR REFERENCE ONLY.

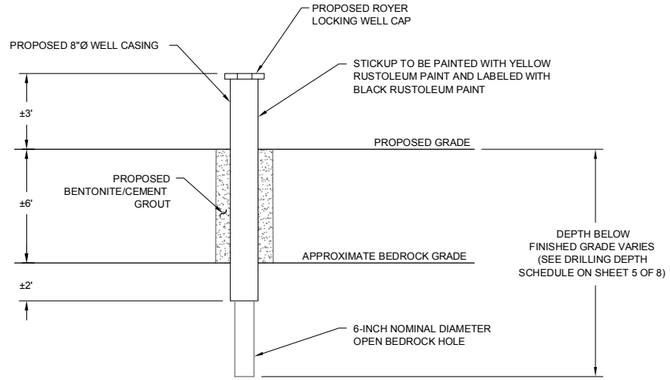


TYPICAL MONITORING WELL EXTENSION DETAIL

2

NOT TO SCALE

NOTE: TO BE INSTALLED BY OTHERS, FOR REFERENCE ONLY.

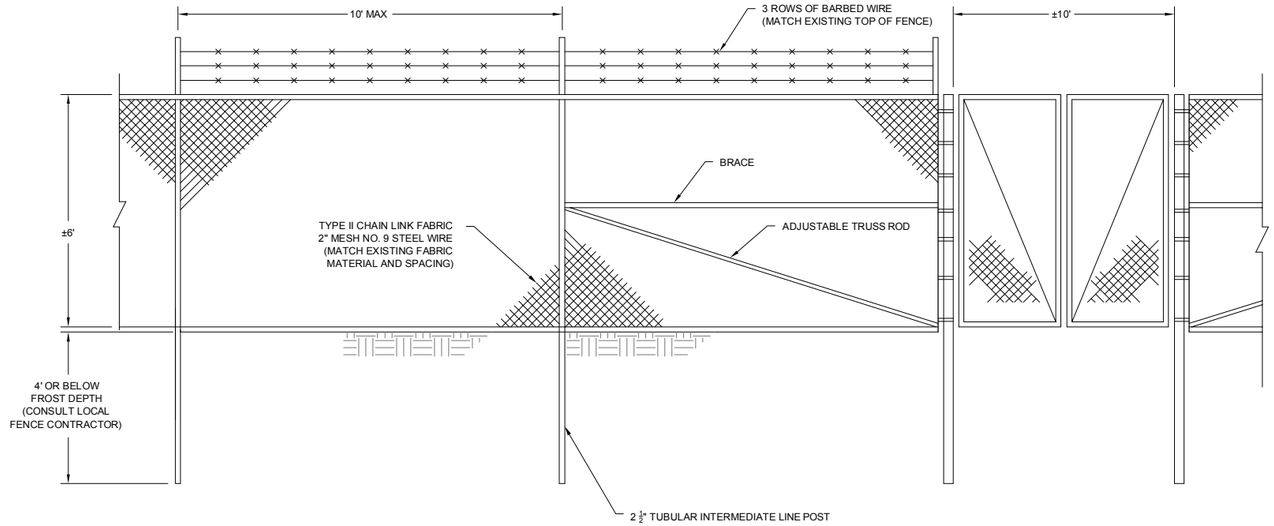


TYPICAL INJECTION BOREHOLE COMPLETION DETAIL

3

NOT TO SCALE

NOTE: TO BE INSTALLED BY OTHERS, FOR REFERENCE ONLY.



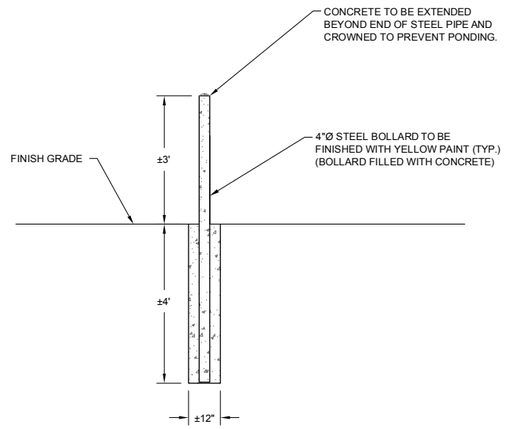
NOTES:

1. FENCE POSTS TO BE SET IN CONCRETE. CONCRETE SHALL BE PLACED TO WITHIN 3-4 INCHES OF THE GROUND SURFACE AND BACKFILLED WITH SOIL AFTER CURING.
2. ALL CORNER AND INTERMEDIATE BRACES OR PULL POSTS SHALL HAVE TWO BRACES.
3. GATES TO BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS.

TYPICAL CHAIN LINK FENCE WITH GATE DETAIL

4

NOT TO SCALE



TYPICAL MONUMENT (BOLLARD) DETAIL

5

NOT TO SCALE

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE AS NOTED

NO.	DATE	DESCRIPTION	BY

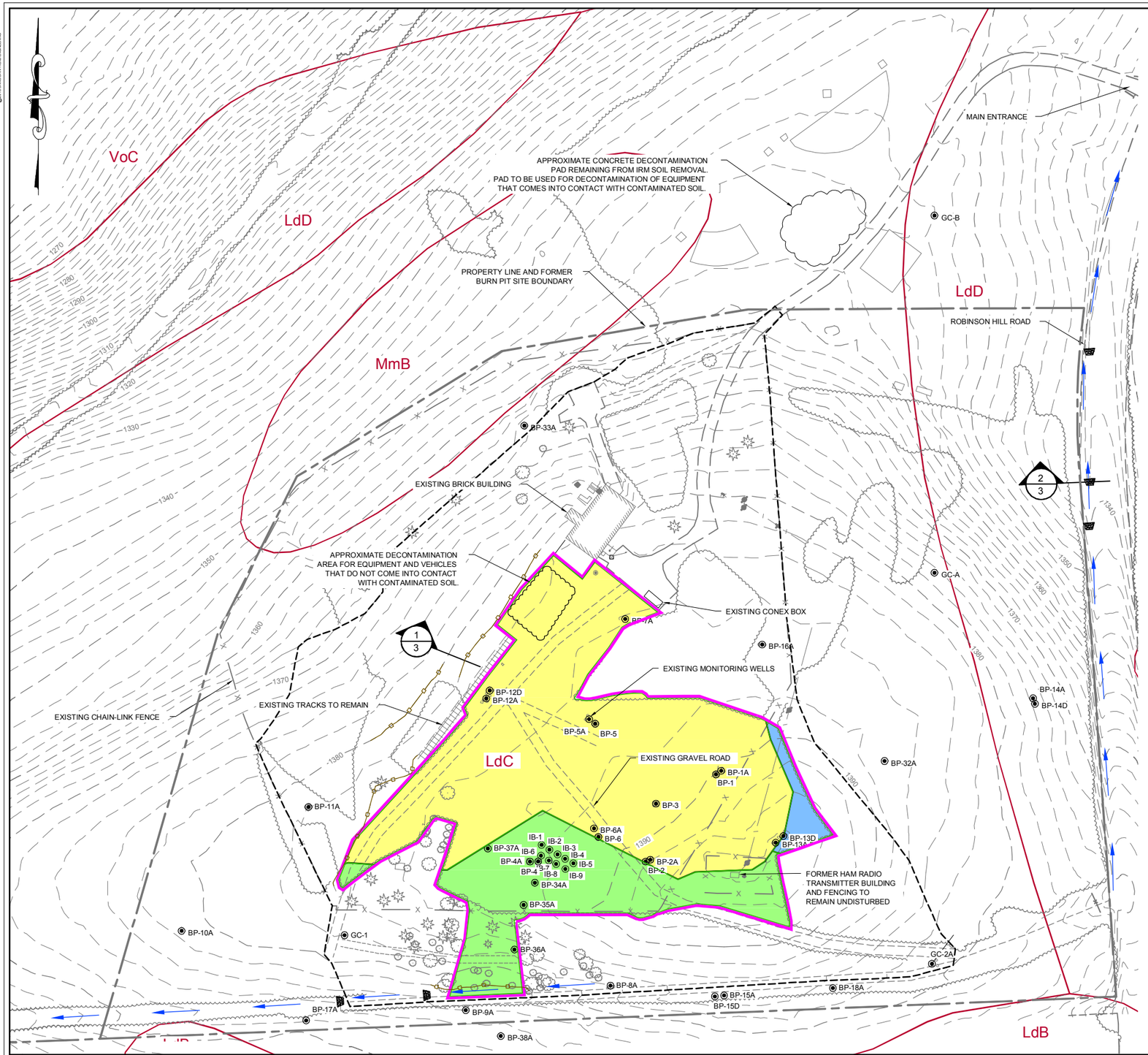
DRAWN BY: M. HILDENBRAND
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

DETAILS (SHEET 2)

PROJECT NUMBER: 3025.00

SHEET NUMBER: 8 OF 8



NOTES:

1. THE BASE MAP WAS DEVELOPED FROM THE FOLLOWING SURVEY DATA MERGED BY SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD):
   - A. WITHIN THE LIMITS SHOWN ON THE PLAN VIEW FIGURE AS DENOTED IN THE LEGEND THE TOPOGRAPHY AND SITE FEATURES REFLECT FIELD GROUND SURVEY DOCUMENTED ON A PLAN ENTITLED "TOPOGRAPHIC SURVEY OF FORMER IBM GUN CLUB", PREPARED BY BUTLER LAND SURVEYING, LLC (BUTLER) OF LITTLE MEADOWS, PENNSYLVANIA AND PROVIDED TO SANBORN HEAD IN DIGITAL FORMAT. TOPOGRAPHY REPRESENTS SITE CONDITIONS ON MARCH 28, 2012. ORIGINAL SCALE: 1" = 50'. THE MARCH 2012 SURVEY WAS CONDUCTED TO OBTAIN REFINED TOPOGRAPHIC DATA FOR THE AREA THAT WILL BE AFFECTED BY SOIL EXCAVATION AND CAPPING AND TO ESTABLISH PROJECT BENCHMARKS.
   - B. OUTSIDE THE AREA OF MARCH 2012 FIELD SURVEY THE TOPOGRAPHY AND SITE FEATURES ARE FROM A PHOTOGRAMMETRIC SURVEY PLAN PREPARED BY BUTLER AND PROVIDED TO SANBORN HEAD IN DIGITAL FORMAT. THE PHOTOGRAMMETRIC MANUSCRIPT DATED AUGUST 11, 2008 WAS BASED ON AERIAL PHOTOGRAPHY FLOWN IN AUGUST 2007.
2. THE VERTICAL DATUM IS BASED ON THE NAVD OF 1988 AND THE HORIZONTAL DATUM IS BASED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE. THE APPROXIMATE GLOBAL COORDINATES FOR THE SITE ARE: LONGITUDE - W76° 0' 20", LATITUDE - N42° 7' 57.6".
3. SOIL TYPES AND BOUNDARIES WERE OBTAINED FROM THE NATIONAL RESOURCE CONSERVATION SERVICE (NRCS) WEB SOIL SURVEY FOR BROOME COUNTY, NEW YORK.
4. DRAINAGE AREAS INDICATED ON THE SHEET ARE DERIVED FROM THE PRE-CONSTRUCTION TOPOGRAPHY.

LEGEND

- 840 — EXISTING 10-FOOT CONTOUR
- EXISTING 2-FOOT CONTOUR
- EXISTING CHAIN-LINK FENCE
- EXISTING TREE LINE
- EXISTING MATURE TREES FLAGGED BY ENGINEER FOR PROTECTION DURING CONSTRUCTION TO THE EXTENT PRACTICABLE
- APPROXIMATE LIMIT OF MARCH 2012 FIELD SURVEY (SEE NOTE 1A)
- PROPERTY LINE AND FORMER BURN PIT SITE BOUNDARY
- EXISTING EDGE OF PAVED ROAD
- EXISTING EDGE OF GRAVEL PATH
- BP-6 EXISTING MONITORING WELL LOCATION AND DESIGNATION
- IB-4 EXISTING INJECTION WELL LOCATION AND DESIGNATION
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED SILT FENCE WITH HAYBALE BACKING (TO BE INSTALLED AS NECESSARY)
- DRAINAGE FLOW DIRECTION
- PROPOSED CHECK DAM (TO BE INSTALLED AS NECESSARY)
- LoE SOIL TYPE BOUNDARY AND DESIGNATION

DRAINAGE AREAS:

- DRAINAGE 1 (1.9 ACRES)
- DRAINAGE 2 (0.7 ACRES)
- DRAINAGE 3 (0.1 ACRES)

KEY NO.	SOIL TYPE	SOIL ERODIBILITY COEFFICIENTS
LdB	LORDSTOWN CHANNERY SILT LOAM, 0% TO 5% SLOPES	0.32
LdC	LORDSTOWN CHANNERY SILT LOAM, 5% TO 15% SLOPES	0.32
LdD	LORDSTOWN CHANNERY SILT LOAM, 15% TO 25% SLOPES	0.32
LoE	LORDSTOWN AND OQUAGA CHANNERY SILT LOAM, 25% TO 35% SLOPES	0.32
MhB	MARDIN CHANNERY SILT LOAM, 2% TO 8% SLOPES	0.32
MhC	MARDIN CHANNERY SILT LOAM, 8% TO 15% SLOPES	0.32
MhD	MARDIN CHANNERY SILT LOAM, 15% TO 25% SLOPES	0.32
MhE	MARDIN CHANNERY SILT LOAM, 25% TO 35% SLOPES	0.32
MmB	MARDIN CHANNERY SILT LOAM, MODERATELY SHALLOW VARIANT, 2% TO 8% SLOPES	0.32
VoB	VOLUSIA CHANNERY SILT LOA, 3% TO 8% SLOPES	0.32
VoC	VOLUSIA CHANNERY SILT LOA, 8% TO 15% SLOPES	0.32

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
60' 30' 0 60' 120'

NO.	DATE	DESCRIPTION	BY

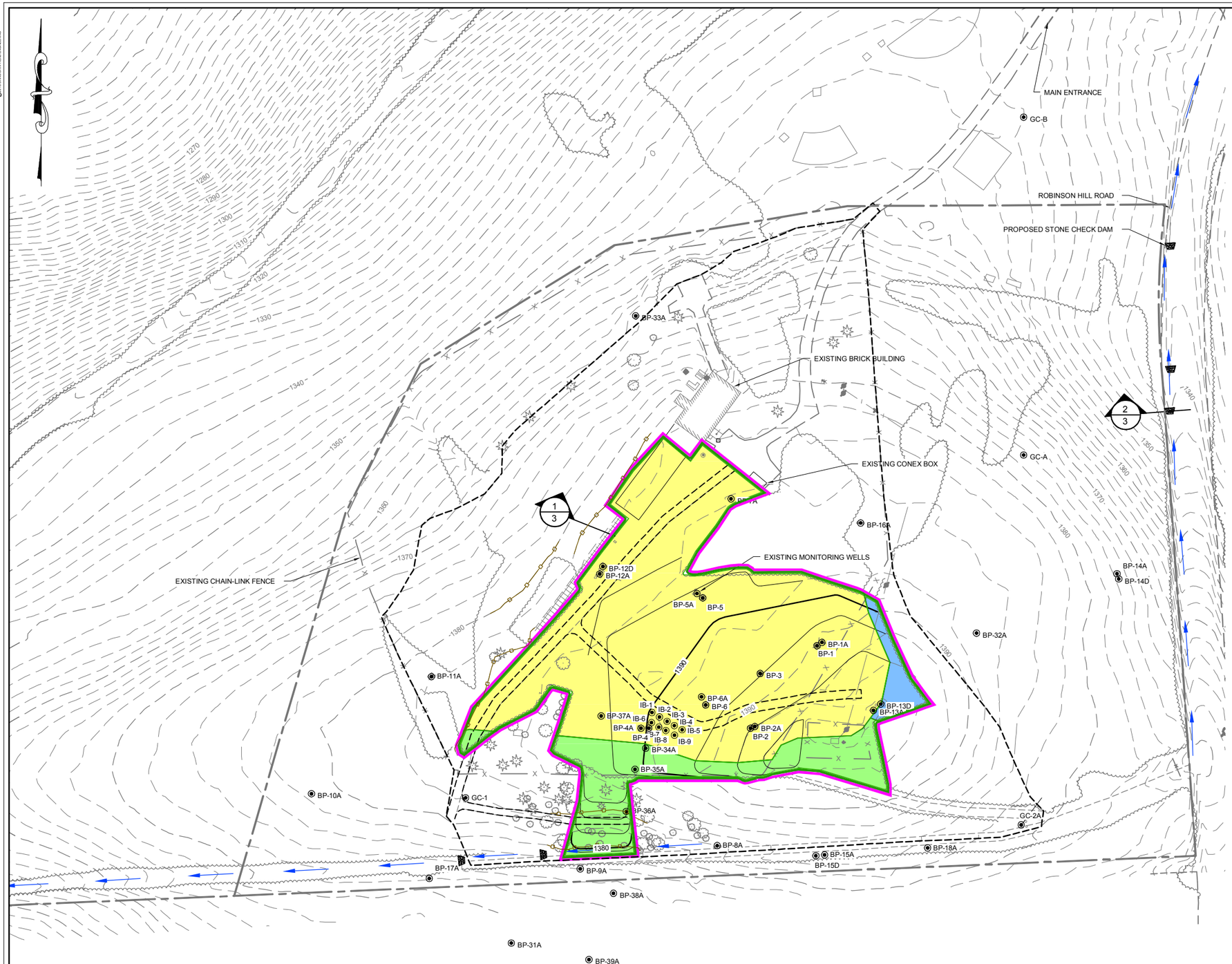
DRAWN BY: J. GRACE
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

EROSION PREVENTION AND SEDIMENT CONTROL PLAN
PRE-CONSTRUCTION SITE WORK

PROJECT NUMBER: 3025.00

SHEET NUMBER: EPSC-1



NOTES:

1. SEE EPSC-1 FOR ADDITIONAL NOTES AND LEGEND INFORMATION.
2. DRAINAGE AREAS ON THIS SHEET ARE DERIVED FROM POST-CONSTRUCTION TOPOGRAPHY.
3. SEE EPSC-3 FOR STABILIZATION REQUIREMENTS.
4. EROSION CONTROL MEASURES TO BE REMOVED AFTER VEGETATION HAS BEEN ESTABLISHED AND ACCEPTED BY THE OWNER.

LEGEND

- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED SILT FENCE WITH HAYBALE BACKING
- DRAINAGE FLOW DIRECTION
- PROPOSED 10-FOOT CAP CONTOUR
- PROPOSED 2-FOOT CAP CONTOUR
- PROPOSED GRAVEL ROAD
- AREA TO BE SEEDED WITH ANNUAL RYE GRASS AND/OR PLANTED WITH HYBRID POPLAR TREES. PERENNIAL GRASS SEEDING SHALL TAKE PLACE IN THIS AREA BY OTHERS AT THE DIRECTION OF THE ENGINEER AFTER TREES HAVE BECOME ESTABLISHED

DRAINAGE AREAS:

- DRAINAGE 1 (2.1 ACRES)
- DRAINAGE 2 (0.4 ACRES)
- DRAINAGE 3 (0.1 ACRES)

SANBORN HEAD ENGINEERING

GRAPHICAL SCALE
60' 30' 0 60' 120'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: J. GRACE
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

EROSION PREVENTION AND SEDIMENT CONTROL PLAN
CONSTRUCTION AND STABILIZATION

PROJECT NUMBER: 3025.00

SHEET NUMBER: EPSC-2

NOTES:

1. SOIL EROSION AND SEDIMENT CONTROL PRACTICES AND STRUCTURES WILL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS SPECIFIED IN THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (AUGUST 2005), AND WILL BE INSTALLED IN PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT STABILIZATION IS ESTABLISHED. SOIL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF WORK WITHIN THE LIMIT OF DISTURBANCE. SOIL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE STABILIZED BEFORE DIRECTING RUNOFF TO THEM.

2. ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME, ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:

   A. STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS.

   B. STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION, WITH NO OUTLET, WITH A DEPTH GREATER THAN 2 FEET.

3. SEED AND MULCH SHALL BE APPLIED WHEN IT IS DETERMINED THAT NO MORE SOIL DISTURBANCE IS EXPECTED TO OCCUR.

4. THE WORK AREAS SHALL BE GRADED AND MAINTAINED SUCH THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.

5. SEDIMENTATION STRUCTURES WILL BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND FOLLOWING STORM EVENTS THAT CREATE RUNOFF FROM THE SITE.

6. STOCKPILES ARE NOT TO BE LOCATED WITHIN 50' OF A FLOODPLAIN, WETLAND, OR DISCHARGE STRUCTURE. THE BASE OF ALL STOCKPILES SHALL BE PROTECTED WITH SILT FENCING AND HAY BALES.

7. A CRUSHED STONE STABILIZED CONSTRUCTION ENTRANCE SHALL BE INSTALLED WHEREVER A CONSTRUCTION ACCESS ROAD INTERSECTS ANY PAVED ROADWAY. CONSTRUCTION ENTRANCES SHOULD BE COMPOSED OF 1-1/2" CRUSHED STONE, 8" THICK, BE AT LEAST 24'X50' AND SHOULD BE UNDERLAIN WITH A SUITABLE SYNTHETIC SEDIMENT FILTER FABRIC (MIRAFI 600X) AND MAINTAINED.

8. PAVED ROADWAYS MUST BE KEPT CLEAN.

9. STABILIZATION SPECIFICATIONS:

   A. SOIL AMENDMENTS:

   LIME - SHALL BE CALCIC OR DOLOMITIC GROUND AGRICULTURAL LIMESTONE HAVING A MINIMUM TOTAL NEUTRALIZING VALUE OF 88% CALCIUM CARBONATE EQUIVALENCE AND SHALL BE APPLIED AT A RATE OF 2 TONS PER ACRE, UNLESS TOPSOIL ANALYSES REQUIRE OTHERWISE. LIME TO BE APPLIED TO ATTAIN A pH OF 6.0 IN THE UPPER 2 INCHES OF SOIL.

   FERTILIZER - SHALL BE A COMPLETE INITIAL COMMERCIAL FERTILIZER, 10-10-10 GRADE FOR GRASS AREAS. IT SHALL BE DELIVERED TO THE SITE IN THE ORIGINAL UNOPENED CONTAINERS, EACH SHOWING THE MANUFACTURER'S GUARANTEED ANALYSIS. FERTILIZER SHALL BE STORED SO THAT WHEN USED IT SHALL BE DRY AND FREE-FLOWING. FERTILIZER TO BE APPLIED EVENLY OVER ENTIRE AREA AT A RATE OF 800 POUNDS PER ACRE, UNLESS TOPSOIL ANALYSES REQUIRE OTHERWISE.

   B. SEEDING AND MULCHING:

   SEED - THE FOLLOWING SPECIFICATION IS FOR SEED TO BE USED WHERE POPLAR CUTTINGS ARE PLANTED PRIOR TO THE CUTTINGS BEING ESTABLISHED:

   ANNUAL RYE GRASS WITH A MINIMUM 80% GERMINATION APPLIED AT A RATE OF 270 POUNDS/ACRE.

   THE FOLLOWING SPECIFICATION IS FOR SEED TO BE USED WHERE POPLAR POLES ARE PLANTED, AND WHERE POPLAR CUTTINGS ARE PLANTED IN THE SPRING AFTER THE CUTTINGS ARE ESTABLISHED:

   NYSDOT STANDARD SPECIFICATION SECTION 713-04 AND SUPPLEMENTAL LANDSCAPE DEVELOPMENT SPECIFICATION 427A1. MIX SHALL CONTAIN NO PRIMARY NOXIOUS WEED SEEDS. THE NO-MOW SEED MIX WILL MEET THE FOLLOWING MINIMUM REQUIREMENTS AND BE APPLIED AT A RATE OF 270 POUNDS/ACRE:

TYPE OF SEED	MINIMUM GERMINATION (%)	QUANTITY OF PURE LIVE SEED (% OF MIXTURE)
HARD RESCUE	80	50
CHEWING FESCUE	80	25
SHEEP'S FESCUE	80	20-25
ANNUAL RYE GRASS	80	5

IF SEEDING IS TO BE PERFORMED BETWEEN AUGUST 20 AND OCTOBER 20, ANNUAL RYE GRASS SHALL BE INCLUDED IN THE MIXTURE AND THE QUANTITY OF SHEEP'S FESCUE SHALL BE DECREASED. THE SEED SHALL BE FURNISHED AND DELIVERED PREMIXED IN THE PROPORTIONS SPECIFIED ABOVE. A MANUFACTURER'S CERTIFICATE OF COMPLIANCE TO THE SPECIFIED MIX SHALL BE SUBMITTED BY THE MANUFACTURER FOR EACH SEED TYPE. THESE CERTIFICATES SHALL INCLUDE THE GUARANTEED PERCENTAGES OF PURITY, WEED CONTENT, AND GERMINATION OF THE SEED, AND ALSO THE NET WEIGHT AND DATE OF SHIPMENT.

MULCH - MULCH SHALL BE HAY MULCH CONSISTING OF DRY HAY OR STRAW MULCH FREE OF MOLD, PRIMARY NOXIOUS WEED SEEDS, TWIGS, DEBRIS, AND ROUGH OR WOODY MATERIALS AND SHALL BE APPLIED AT THE RATE OF TWO TONS PER ACRE.

PRE-CONSTRUCTION SEQUENCE:

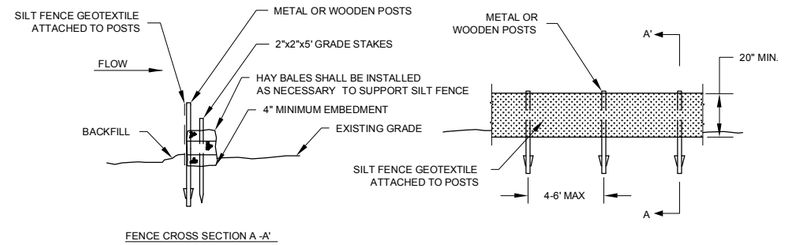
1. DELINEATE THE LIMIT OF DISTURBANCE FOR THE CAPPING PROJECT WITH WOODEN STAKES.
2. CONTRACTOR TO STAGE EQUIPMENT AND SUPPLIES WITHIN THE AREA OF DISTURBANCE FOR THE PROJECT.
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE AND PERIMETER SILT FENCING WHERE REQUIRED. INSPECT SILT FENCE AND REPAIR, REPLACE AND MAINTAIN AS REQUIRED.
4. INSTALL TEMPORARY STONE CHECK DAMS IN SWALES TO THE EAST NEAR ROBINSON HILL ROAD AND TO THE SOUTH OF THE FORMER BURN PIT AREA.
5. INSTALL DECONTAMINATION PAD.

CONSTRUCTION SEQUENCE:

1. EXTEND EXISTING MONITORING WELLS AND INJECTION BOREHOLES WITHIN LIMIT OF DISTURBANCE.
2. EXCAVATE OR PLACE FILL TO REACH PRE-CAPPING GRADES.
3. INSTALL TEMPORARY ACCESS WAYS AS NECESSARY.
4. PLACE FILL TO REACH CAPPING GRADES.
5. INSTALL PERMANENT ACCESS LANES.
6. SEED AND MULCH AND/OR PLANT HYBRID POPLAR TREES AS NECESSARY.
7. INSTALL NEW INJECTION BOREHOLES.

STABILIZATION SEQUENCE:

1. THE WORK ITEMS ABOVE SHOULD BE COMPLETED DURING THE SPRING AND SUMMER MONTHS AND SEEDING SHOULD BE COMPLETED BEFORE SEPTEMBER 15TH TO ALLOW TIME FOR VEGETATION TO ESTABLISH.
2. REMOVE ACCUMULATED SEDIMENT FROM EROSION CONTROL DEVICES AS NEEDED.
3. REMOVE SILT FENCING UPON SUCCESSFUL ESTABLISHMENT OF VEGETATION
4. REMOVE STONE CHECK DAMS.



FENCE CROSS SECTION A -A'

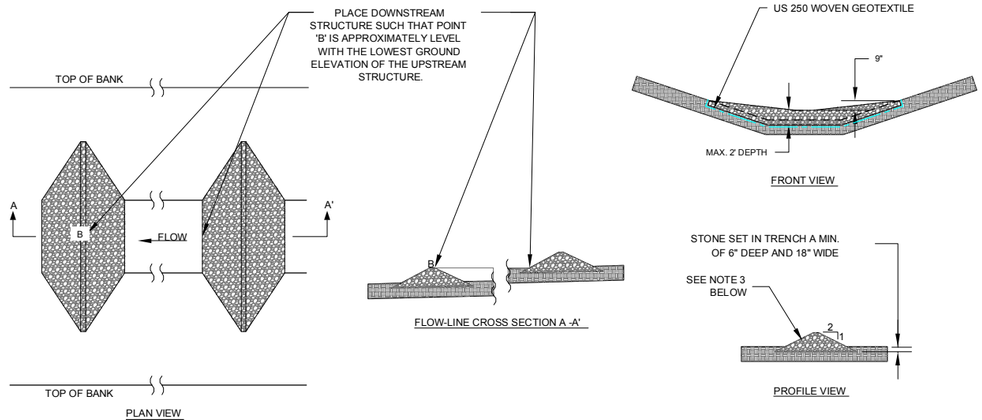
TYPICAL SILT FENCE DETAIL

1

NOT TO SCALE

NOTES:

1. SILT FENCE SHALL BE A MINIMUM OF 20 INCHES HIGH WITH THE BOTTOM OF THE GEOTEXTILE KEYED INTO THE GROUND A MINIMUM OF 4 INCHES. POSTS SHALL BE OF WOOD OR METAL AND A MINIMUM OF 48" IN LENGTH AND DRIVEN INTO THE GROUND A MINIMUM OF 16".
2. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL STRUCTURES ARE TO BE REMOVED AND ACCUMULATED SEDIMENT DISPOSED OF IN A SECURE UPLAND LOCATION.
3. TO THE DEGREE PRACTICAL, SILT FENCE SHALL BE INSTALLED ALONG THE CONTOUR.
4. ALL SILT FENCES SHALL BE PLACED AT LEAST 10 FEET FROM THE TOE OF A SLOPE TO ALLOW FOR MAINTENANCE AND ROLL DOWN.



TYPICAL STONE CHECK DAM DETAIL

2

NOT TO SCALE

NOTES:

1. MAXIMUM HEIGHT SHALL NOT EXCEED 2 FEET.
2. CHECK DAMS SHALL BE LINED WITH FILTER FABRIC.
3. WELL-GRADED STONE 2-9 INCHES IN SIZE SHALL BE USED (SUCH AS NYSDOT LIGHT STONE FILL NYSDOT ITEM NUMBER 733.2102).

SANBORN HEAD ENGINEERING

SCALE AS NOTED

NO.	DATE	DESCRIPTION	BY

DRAWN BY: J. GRACE
DESIGNED BY: M. HILDENBRAND
REVIEWED BY: D. SHEA
PROJECT MGR: A. HORNEMAN
PIC: D. CARR
DATE: APRIL 2013

FINAL DESIGN - BROWNFIELD CLEANUP PROGRAM REMEDY
IBM GUN CLUB - FORMER BURN PIT AREA
UNION, NEW YORK

EROSION PREVENTION AND SEDIMENT CONTROL PLAN
NOTES AND DETAILS

PROJECT NUMBER: 3025.00

SHEET NUMBER: EPSC-3

TECHNICAL SPECIFICATIONS

SANBORN HEAD ENGINEERING

TECHNICAL SPECIFICATIONS

SECTION 00 73 19

HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor is responsible for all aspects of the health and safety of its employees and equipment, including identification of possible health and safety issues related to the project. The Engineer will make its health and safety plan available to the Contractor. This health and safety plan (HASP) will be provided for informational purposes only, however, the Contractor is responsible for developing its own health and safety program for its activities on-site. The Contractor's own HASP shall be kept on-site in an easily accessible location.

B. All of Contractor's on-site employees that will be directly or indirectly involved in intrusive work shall be certified to work at sites where there is a potential for exposure to hazardous substances, or other potential health and safety hazards. Contractor's on-site employees shall have had the proper health and safety training and are involved in an appropriate medical monitoring program pursuant to OSHA:

1910.120 Hazardous Waste Operations and Emergency Response
1926 Safety and Health Regulations for Construction

and any other applicable portions of OSHA. Contractor shall provide and maintain records of training certificates and medical monitoring at the job site.

C. It should be clearly noted that the Contractor is at all times responsible for full compliance with all appropriate health and safety requirements. The presence of Engineer's personnel at the site does not indicate that Engineer is responsible to ensure or oversee that the Contractor complies with appropriate health and safety requirements.

1.2 RELATED SPECIFICATIONS

A. Section 01 35 13 Special Procedures.

1.3 SITE-SPECIFIC CONDITIONS

A. The project involves regrading and capping of surficial soils containing arsenic, lead, cadmium, chromium, nickel, zinc, and volatile organic compounds (VOCs), some of which are found at concentrations exceeding thresholds for residential site use. Further details regarding site-specific contaminants are provided in the Engineer's HASP and supplemental information package which is available to the Contractor.

B. The Contractor is responsible for safe handling of soils during work, notification to all subcontractors of health and safety practices, decontamination of all equipment and vehicles, as described in Section 01 35 13, Special Procedures, and Dust Control as described in 01 57 26.

C. Contractor shall not operate moving equipment while using cellular phones, texting, or other electronic communications while on or traveling to and from the job site.

1.4 SUBMITTALS

A. Contractor shall submit a copy of its site-specific health and safety plan to the Engineer for review and approval prior to beginning on-site activities.

1.5 SIGNAGE

A. The Contractor shall place appropriately-sized, highly visible signs at each site entrance and near the crest of Robinson Hill Road and other locations where sight lines on the public road are limited indicating the presence of construction traffic. Construction barrels or cones may be used in addition to the signs, provided they are secured in place.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 SAFETY MEETINGS

A. Prior to beginning work each day, the Contractor shall conduct a safety meeting in conjunction with Engineer to discuss all the hazards on-site and to set forth the health and safety requirements during work.

B. Contractor shall conduct daily safety briefings with its on-site employees and subcontractors and Engineer.

[END OF SECTION 00 73 19]

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This specification summarizes the Work to be performed at the Former IBM Gun Club site in the Town of Union, New York (site). This specification section is not all-inclusive and is intended to summarize the key aspects of the Work. The Contractor shall be entirely responsible for performing all Work described in these Contract Documents, whether or not it is specifically or fully described in this specification section.

B. The purpose of the Work is to consolidate and cap contaminated soil associated with the Former Burn Pit Area of the site and establish vegetative cover to enhance uptake of water. Drilling and construction of remediation system injection wells will be conducted by others as part of a clean up under the New York State Brownfields Program. The clean up is being implemented under an agreement between IBM and the New York State Department of Environmental Conservation (NYSDEC). IBM is the owner of the site (Owner).

C. Major Work items to be performed in accordance with these Contract Documents shall include, but not be limited to, the following:

1. Site preparation activities, including removal and, for those portions not reused, proper disposal of existing chain-link fence, field delineation of the limit of work, construction and maintenance of a decontamination pad for removal of clean soil from construction equipment and vehicles before they exit the site, and establishment and maintenance of erosion and sedimentation controls.

2. Construction of new perimeter chain-link fencing to secure the work area in accordance with the Drawings and Specifications.

3. Clearing and chipping of existing trees and brush.

4. Layout of site grading cut and fills.

5. Excavation of contaminated soil from specific areas and the placement and compaction of this soil within the footprint of the Former Burn Pit Area (i.e., regrading of contaminated soils), as shown on the Drawings.

6. Construction of a low-permeability soil cap, comprised of 18 inches of clean fill material and 6 inches of topsoil over the footprint of contaminated soils to be marked with a synthetic marker layer as shown on the Drawings.

7. Construction of gravel access lanes to the groundwater monitoring wells and remediation system injection wells.

8. Grading of the capped area, vegetation of all disturbed areas, and tree planting as shown on the Drawings.

9. Installation of boundary monuments and associated signage documenting the area subject to a deed restriction on excavation and agricultural use. The monuments located at the corners of the area subject to the deed restriction will be marked with signage to be provided by Engineer to be developed as a part of site management planning and approved by the New York State Agencies.

D. All Work summarized above is more fully indicated, shown, and described in the Contract Documents.

E. Access to the work area by the Contractor shall be made using the path marked on the Drawings. The Contractor shall make all reasonable efforts to limit and repair impacts to the site, including traffic control and maintaining a clean, compact work area.

1.2 WORK BY OTHERS

A. The following work items shown on the Drawings shall be executed by others:

1. Prior to construction of the soil cap, the casings of existing groundwater monitoring wells and remediation injection wells within the area to be capped will be extended vertically upward so as to remain accessible following construction of the soil cap.

2. Following construction of the soil cap and the gravel access lanes, additional groundwater remediation injection wells will be installed.

3. In the spring following the first winter after tree planting, the area initially planted with annual grass will be seeded with a roadside seed mix. See Section 32 90 00, 3.1C.

1.3 SITE LOCATION & ACCESS

A. The site is located on Robinson Hill Road between Endicott and Johnson City. From I-86 (Southern Tier Expressway), take Route 201 North to Harry L Drive west. Head north on County Road 65/Oakdale Road and west on Robinson Hill Road. Continue 2.2 miles; the site is on the right side of Robinson Hill Road.

B. Site access is restricted by a chained entryway and a locked gate farther along the access road. The Contractor will be provided a key to the site for the duration of the work. The site shall remain locked at all times when work is not being performed.

C. Access to the site will be contingent on the Contractor providing documentation of insurance coverage naming the Owner, Engineer, and the Binghamton Country Club as additional insureds.

D. Site work involving heavy equipment operation shall be conducted during normal business hours (0700 hrs to 1700 hrs) during work days.

1.4 MOBILIZATION

A. The following items shall be required during mobilization of the Contractor's forces and equipment necessary for performing the work described above.

1. The Contractor shall notify the Engineer at least 72 hours prior to mobilization.

2. No additional compensation will be made to the Contractor for remobilization after removal of any equipment from the site.

3. The Contractor shall be responsible for locating all public and private utilities within the work area, including contacting the various utility location services in New York.

4. Project work limits shall be flagged by the Contractor prior to the start of clearing and maintained during the construction process. Ground disturbance outside of the limit of work that occurs as a result of contractor completion of the work shall be repaired at the expense of the contractor.

[END OF SECTION 01 11 00]

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SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SUMMARY

This Section includes information for measurement and payment for the Work described in the Drawings and Specifications.

1.2 LUMP-SUM MEASUREMENT

A. Lump-sum measurement will be for the entire item or unit of work, or combination thereof, as specified and as indicated in the Schedule of Values.

1. If the Contractor requests progress payments for lump-sum items or amounts in the Schedule of Values, such payments will be made in accordance with a detailed program of payment-apportioning, prepared by the Contractor and submitted to the Engineer for approval.

2. The programs of payment for each applicable lump-sum item shall show fixed definable and measureable quantities where possible and unit prices as developed and assigned by the Contractor to the different portions of the work. The summation of extensions of quantities and unit prices and related costs shall equal the amount of the lump-sum bid item indicated in the Schedule of Values.

3. Upon approval by the Engineer, progress payments will be made in accordance with the Contractor's payment-apportioning program and from the approved progress schedule, reflecting the progress which occurred during the payment period as approved by the Engineer.

1.3 MEASUREMENT OF UNIT PRICE QUANTITIES

A. All work to be paid for at a Contract price per unit measurement will be measured by the Engineer in accordance with US Standard Measures.

B. A ton shall consist of 2,000 pounds.

C. Unit measurements will be made following the Schedule of Values.

D. Certified weigh slips or tickets or product receipts and bills of lading for imported soil shall be used in determining the weights of material placed during work.

E. Volume measurement will be by the unit volume placed or removed as shown in the Drawings.

1.4 VALUES OF UNIT PRICES

A. The units and quantities listed in the Schedule of Values are estimates only, and final payment shall be made for the actual units and quantities which are used or placed

during work and required in the Drawings and Specifications, as measured by the Engineer.

B. The Contactor's bid unit price ($/unit) shall reflect the cost of materials plus the labor and equipment to place/install the materials.

1.5 CONTRACT PAYMENTS

A. Progress Payments

1. Not more than once monthly, the Contractor shall submit to the Engineer an invoice for work performed or completed. The invoice shall be certified and shall be supported by evidence that the work described in the invoice has been completed and that the materials included are in place or stored as indicated.

2. Unless otherwise specified, partial payments for Contractor-supplied materials not yet installed will be made after such materials have been furnished and stored for use, provided they are stored in an area approved by the Engineer. These materials shall be covered by insurance. The invoice may include the amount and value of accepted materials that have been furnished and delivered to the site.

3. The Contractor shall include the supplier's invoices to substantiate the costs of the materials.

B. Full Compensation

1. Payment will be full compensation for furnishing all labor, materials, equipment, tools, transportation, facilities, services and incidentals, and for performing the work necessary for completing the work described in the Contract Documents.

2. When it is specified or indicated in the Contract Documents that the Contractor is to perform work or supply materials for which no price is fixed, it is understood and agreed that there is included in each lump-sum price bid, or unit price bid, the entire cost of the work, including all items of work which are incidental to the completion of those portions of the work covered by such lump-sum or unit price bid, or, if not directly incidental to any specific Bid Item in the Schedule of Values, the cost thereof has been distributed among those Bid Items considered most appropriate by the Contractor.

3. Work that is not clearly delineated in the Contract Documents to be included in a particular Bid Item in the Schedule of Values shall be assigned to one of the lump-sum items in the Schedule of Values by the Contractor, to ensure that all items of work are included in the Contract Price. Additional compensation will not be made for work items which do not clearly fall under listed Bid Items in the Schedule of Values.

1.6 REJECTED, EXCESS, OR WASTED MATERIALS

Material wasted or disposed of in a manner not included in the Contract Documents; rejected materials, including any material rejected after placement due to the failure of the Contractor to conform to the provisions of the Contract; material not unloaded from the transporting vehicle; material placed outside the limits of work as shown in the Drawings or defined by the Engineer; or excess materials remaining on hand following completion of work, will not be paid for and such quantities shall not be included in the final total quantities. No additional compensation will be made for loading, hauling and disposing of any of these materials. The Contractor is responsible for paying any restocking fees resulting from materials returned to the manufacturer or supplier.

1.7 MEASUREMENT AND PAYMENT

All costs related to the work specified herein is considered included with the related item of work in the Schedule of Values, or incidental to the Work.

[END OF SECTION 01 22 13]

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SECTION 01 31 00

PROJECT COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. The Contractor shall not commence work until a preconstruction conference with representatives of the Contractor, Owner, and Engineer is conducted. This preconstruction conference will be arranged by the Engineer and is intended to establish lines of communication between the parties involved. The time and place of the preconstruction conference will be determined at least one week prior to the start of work.

1.2 PROGRESS MEETINGS

A. The Contractor shall make arrangements for weekly progress meetings. The meetings will be held to review the work progress, to discuss upcoming work, to make necessary adjustments to schedules, to discuss submittals, changes and substitutions, and to discuss any other items affecting the Project. The Engineer will preside at progress meetings.

B. Attendance at the progress meetings will include the Contractor, Owner, Engineer and major subcontractors and suppliers as appropriate to discuss agenda topics for each meeting.

1.3 JOB SITE ADMINISTRATION

A. The Contractor shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the health and safety aspects of the work and the means, methods, techniques, sequences and procedures of construction. The Contractor shall be responsible to see that the completed work complies accurately with the Contract Documents.

B. The Contractor shall keep a competent and authorized supervisory representative at each work location during all working hours who shall act as the agent of the Contractor.

C. The supervisory representative shall be a competent English-speaking superintendent capable of reading and thoroughly understanding the Drawings and Specifications, with full authority to fulfill the Contractor's duties and responsibilities on the job. If, in the opinion of the Owner or Engineer, the supervisory representative or any of his successors proves incompetent, not conscientious, or not industrious, then the Contractor shall replace the supervisory representative upon written request of the Owner or Engineer.

D. The Contractor shall only employ competent individuals on the job. Whenever the Owner or Engineer notifies the Contractor in writing that, in his opinion, any individual on the job, whether employed by the Contractor or any of the

subcontractors, imperils the safety of others or is incompetent, unfaithful, disorderly, or otherwise unsatisfactory, such individual shall be discharged from the Contract work and shall not be employed on it, except with the written consent of the Owner or Engineer.

E. The Engineer's presence does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.

[END OF SECTION 01 31 00]

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SECTION 01 32 19

SUBMITTALS SCHEDULE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the general requirements and procedures for preparing and transmitting data to the Owner/Engineer for their information or review.

B. All submittals must be received and approved or acknowledged, as required, by the Engineer before the Work associated with that submittal can proceed.

C. Five (5) copies of all required submittals shall be forwarded to the Engineer at least seven (7) days prior to the Contractor's intended use of the submittal item.

1.2 CONSTRUCTION SCHEDULE

A. The Contractor shall submit a construction schedule for the work within 10 days of the Notice of Award. The schedule shall include major Work items and anticipated project milestones.

B. The schedule shall be updated as needed during the project to reflect the work completed and any changes in the schedule.

1.3 DAILY SUBMITTALS

A. The Contractor shall prepare and submit to the Engineer by the end of each working day a "Daily Report" that summarizes the Work completed each day and identifies the number of workers on site working for the Contractor and each Subcontractor, and includes the major equipment items on site. The Daily Report shall identify dates of commencement and completion of all aspects of the Work and shall be kept as a permanent record at the site.

1.4 SUMMARY OF SPECIFIC SUBMITTALS

Section	Description
00 73 19	Contractor's site-specific Health and Safety Plan
01 35 13	Coarse Aggregate
01 57 13	Silt Fence
31 00 00	Low Permeability Soil Cap Soil Gradation Analysis every 500 cubic yards
31 00 05	Crushed Gravel
	Filter Fabric
32 31 13	Chain-link fence and gates

32 90 00	Topsoil Samples Seeding, Fertilizing and Watering Schedules Tree Planting and Tree Care Inspection Dates
	Seed Mixture Annual Rye Seed
	Fertilizer
	Compost
	Limestone
	Trees
01 78 39	Project Record Documents

1.5 ENGINEER'S REVIEW

A. The Engineer will as soon as practicable, but in no case more than seven (7) days after receipt of a submittal, return two copies of the submittal to the Contractor marked with one of the following "Actions" and the Engineer's review comments as appropriate.
   1. Approved
   2. Approved as Noted
   3. Disapproved
   4. Rejected; or
   5. No Action

1.6 RESUBMISSION REQUIREMENTS

A. The Contractor shall make any corrections or changes in submittals required by Engineer, and resubmit revised editions.

[END OF SECTION 01 32 19]

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SECTION 01 32 23

SURVEY CONTROL

PART 1 – GENERAL

1.1 LINES, GRADES, AND LEVELS

A. The Owner has established monuments for benchmarks, and for horizontal and vertical control for construction purposes. The Contractor shall safeguard all survey points and benchmarks. Should any of these points be destroyed, the replacement cost shall be borne by the Contractor. The Contractor shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established survey points and benchmarks.

B. The Contractor shall employ competent personnel to provide the surveying functions necessary for the proper construction of the work. The Contractor shall be responsible for the layout of all grid coordinate locations, lines, grades, and levels necessary for the proper construction and testing of the work called for in the Construction Drawings and Specifications, at no additional cost to the Owner.

C. The Contractor shall make all measurements and check all dimensions necessary for the proper construction of the Project in accordance with the Construction Drawings and Specifications. During the execution of the Work, the Contractor shall make all necessary measurements to prevent misalignment of said work, and shall be responsible therefore for the accurate construction of the Project.

D. The Engineer will be responsible for providing a registered land surveyor to survey the limits (metes and bounds) of contaminated soil to be capped as denoted by the limits of marker layer prior to placement of the soil fill cap. The metes and bounds will be depicted on the record drawings to be submitted to the NYSDEC with the Final Engineering Report.

E. The Engineer will be responsible for providing a registered land surveyor to survey the final grades following completion of earthwork activities. This survey is to be certified by the surveyor and prepared at a scale of 1-inch equals 50 feet. The survey will serve as the Record Drawing documenting that the soil cap has been prepared to the grades indicated on the Construction Drawings.

F. The Engineer will be responsible for providing a registered land surveyor to lay out the proposed locations of monuments for the proposed deed restriction area and to provide the legal metes and bounds of that area.

[END OF SECTION 01 32 23]

SECTION 01 35 13

SPECIAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This section establishes sustainability practices that shall be implemented during work, including the Contractor's responsibility for containing on-site contaminated soils that collect on construction equipment and vehicles using decontamination procedures.

1.2 RELATED SPECIFICATIONS

A. Section 31 05 00 Earthwork

B. Section 01 57 26 Dust Control

1.3 DECONTAMINATION

A. The Contractor shall provide all labor, materials, equipment and incidentals necessary to remove contaminated and nuisance soil, dirt, and dust from moveable excavation equipment, trailer and dump trucks, transport vehicles, and equipment and tools prior to leaving the Site.

B. Contractor shall endeavor to limit the contact of equipment with contaminated site soils during regrading and capping operations to what is absolutely necessary to complete the work. For example, the Contactor shall manage delivery of clean soil to the site in such a way that trucks delivering the soil shall not be permitted to contact metals-containing soil that has been disturbed as part of earthwork activities. The Contractor shall communicate a sequencing plan for placement and compaction of soil fill such that the trucks will only traffic on clean compacted soil fill or gravel access roads.

C. The Contractor shall construct a crushed stone pad decontamination area in the location shown on the Drawings for removal of nuisance soil from vehicles that do not come into contact with contaminated soil.

D. Trucks and other equipment that come into direct contact with contaminated soil shall be decontaminated on the existing concrete pad. The Contractor shall collect and filter the wash water, and coordinate with Engineer to collect the necessary samples for analytical testing. The Contractor shall either discharge the water on-site or off-site depending on the analytical results.

1.4 SUSTAINABILITY PRACTICES

A. The Contractor shall, to the extent practicable during work, implement the following sustainability practices:

1. Use clean diesel or biofuels in construction equipment to reduce atmospheric emissions;

2. Limit equipment and truck idling to no more than 10 minutes;

3. Use local sources of mulch, compost,soil and other construction-related materials;

4. Use vegetation requiring little or no irrigation;

5. Use renewable energy to the extent possible;

6. Limit waste by recycling consumables and other products used during work (i.e, plastic water bottles, paper, cardboard, etc.);

7. Limit waste by recycling inert construction materials (metal fencing components that cannot be reused, etc.);

8. Minimize soil erosion by regular maintenance of soil erosion control measures;

9. Limit the number of trips made for disposal during work;

10. Limit off-site migration by decontaminating construction vehicles prior to leaving the site.

B. The Engineer shall, to the extent practicable during work, implement the following sustainability practices:

1. Use automated data collection when possible;

2. Use passive sampling devices where feasible;

3. Integrate stakeholders into decision-making process;

4. Solicit community involvement to increase public acceptance and awareness of long-term activities and restrictions.

PART 2 – PRODUCTS

2.1 COARSE AGGREGATE

A. Coarse aggregate to be used in construction of the decontamination pad shall be free from ice, snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious matter. The aggregate shall meet the following gradation requirements:

Sieve Size	Percent Finer by Weight
4-inch	100
1-inch	15-60
¼ inch	0-25
No. 40	0-10

PART 3 – EXECUTION

3.1 DECONTAMINATION AREAS

A. The Contractor shall construct and maintain a gravel decontamination area for moveable equipment and trucks that do not come into contact with contaminated soil at the location shown on the Drawings. This area shall be approximately 20' x 20' and shall be at least 10" thick.

B. The Contractor shall utilize the existing concrete decontamination pad for trucks and other equipment that come into contact with contaminated soil.

C. For both pads, decontamination shall first involve mechanical removal of soil, mud, and other material without the use of water to limit water usage. Such mechanical removal shall be conducted on the paved drive area east of the site building before entering the decontamination pads.

3.2 SOURCE OF WASHWATER

A. There is no water service available on the Site. The Contractor shall obtain excess treated groundwater water for decontamination wash water from the groundwater treatment facilities (GTF) located in Endicott or other sources(s) as coordinated by Engineers representatives. The Contractor shall limit the use of wash water used for decontamination purposes. Potable water or water from other sources will not be used unless approved by Engineer in the event that sufficient quantity of water is not available from the GTF.

B. The Contractor shall be responsible for transportation and on-site storage of water.

3.3 DECONTAMINATION OF EQUIPMENT AND TOOLS

A. All mechanical equipment, hand tools, or other equipment that comes in contact with contaminated site soil, dirt, or dust shall be properly decontaminated. Decontamination of equipment and tools shall be performed on the existing concrete decontamination pad as shown on the Drawings.

B. Decontamination shall involve washing equipment and tools with a high pressure, low volume water spray, such as a power washer or steam cleaning tool, to remove all soils and residues from equipment and tools.

C. The Contractor shall collect and filter the wash water from the concrete pad, and collect the necessary samples for analytical testing. The Contractor shall either discharge the water on-site or off-site depending on the analytical results.

3.4 DECONTAMINATION OF TRUCKS AND TRAILERS

A. The Contractor shall remove all soils, dust, rocks, etc. from the exterior of trucks, transport vehicles, trailers, and other heavy equipment prior to the equipment leaving the site. Decontamination shall take place on the gravel decontamination pad constructed by the Contractor for trucks that do not come into contact with contaminated soil, and shall take place on the existing concrete pad for trucks that do come into contact with contaminated soil.

B. All visible material shall be removed from loaders, backhoes, and transport vehicles using brooms and shovels. A high pressure, low volume water spray shall then be used to remove any residual materials on the machinery (including the tires of transport vehicles and heavy machinery).

C. The Contractor shall not allow equipment or trucks to leave the site with water leaking or with soil or mud dripping or caked to the equipment. All equipment leaving the site shall be dry except during rainy or snowy weather, or with the Engineer's approval for other exceptions.

D. The Contractor shall collect and filter the wash water from the concrete pad, and collect the necessary samples for analytical testing. The Contractor shall either discharge the water on-site or off-site depending on the analytical results.

[END OF SECTION 01 35 13]

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SECTION 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.1 GENERAL QUALITY CONTROL

A. The Contractor shall maintain quality control over the suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. The Contractor shall comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

1.2 OBSERVATION AND TESTING

A. The Engineer will administer the Construction Agreement, perform construction observation, and soil and material testing. These services will be performed in accordance with the requirements of governing authorities, to establish whether the work is in accordance with the Drawings and Specifications.

B. The Contractor shall cooperate with the Engineer during all testing and sampling, and furnish tools, equipment, samples of materials, and assistance as requested.

C. The Contractor shall allow the Engineer ample time and opportunity for inspecting and testing of material used in the work. The Contractor shall advise the Engineer promptly upon placing orders for materials so that arrangements may be made, if desired, for inspection before shipment from the manufacturer. The Contractor must anticipate that possible delays may occur due to the necessity of materials being inspected and accepted for use.

D. The work shall, at all times, be subject to the observation of the Owner and/or the Engineer. Observation or non-observation by the Owner and/or the Engineer shall not relieve the Contractor from his contractual obligation to furnish work and material as required, and properly complete the work in accordance with the Drawings and Specifications. If the Owner or the Engineer considers that the work is not properly accomplished, he may condemn or reject all or any part of the work and any materials or equipment incorporated in it. If any material, equipment, or work is condemned or rejected by the Owner or the Engineer, the Contractor shall bear all expenses for removal and proper replacement of such material, equipment, or work replacing any work done by others which is adversely affected by removal and proper replacement of improper work done by the Contractor.

1.3 SUBSTANDARD WORK OR MATERIALS

A. Any defective or substandard work or materials furnished by the Contractor which is discovered before the final acceptance of the work, as established by the Engineer, or during the subsequent guarantee period, shall be removed immediately by the

Contractor even if it had been initially overlooked by the Engineer and recommended for payment. Any equipment or materials condemned or rejected by the Engineer shall be tagged as such and shall be immediately removed from the site by the Contractor. Satisfactory work or materials shall be substituted by the Contractor for that rejected.

B. The Engineer may order tests on substandard or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor and the nature, extent, and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the work, equipment, or material is not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work or materials has been impaired, then such work or materials shall be deemed substandard and shall be replaced by the Contractor. The Contractor may elect to replace the substandard work or material in lieu of performing the tests.

[END OF SECTION 01 45 00]

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SECTION 01 52 00

TEMPORARY FACILITIES, CONTROLS, AND SITE MAINTENANCE

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall provide all temporary facilities, construction controls, and site maintenance necessary for the successful completion of the Work.

B. The Contractor shall establish and initiate use of each temporary facility when it is reasonably required for proper performance of the Work, and shall terminate the use of, and remove from the site, the facilities when no longer needed or when directed to do so by the Engineer.

1.2 RELATED SPECIFICATIONS

A. Section 01 35 13 Special Procedures

B. Section 01 57 26 Dust Control

C. Section 31 25 00 Erosion and Sedimentation Control

1.3 TEMPORARY FACILTIES

A. Temporary facilities provided by the Contractor shall include:

1. Drinking water for their employees.

2. Washwater for equipment decontamination, dust control, and water that may be necessary to facilitate soil compaction.

3. Portable sanitary facilities for use by all project personnel.

B. The Contractor shall install, operate, maintain and protect temporary facilities in a manner that will be safe, non-hazardous, sanitary, and protective of persons and property. Facility locations selected by the Contractor shall be reviewed and accepted by the Engineer prior to their implementation. The locations for drinking water, washwater and sanitary facilities shall be outside of the exclusion zone for site operations and downstream of decontamination operations.

1.4 CONSTRUCTION CONTROLS

A. The Contractor shall maintain excavations free of water, protect the site from puddling, ponding, or running water, and furnish and install all required temporary erosion control facilities as called for on the Drawings and in the Specifications.

B. The Contractor shall be responsible for controlling dust that may be generated during performance of the Contract work in accordance with Section 01 57 26 and the Community Air Monitoring Program.

C. The Contractor shall protect installed work, provide special protection where specified in individual Specification sections, and provide temporary and removable protection for installed products. It shall be the responsibility of the Contractor to minimize erosion of, or fugitive dust resulting from excavation, loading of material, placement of soil material or from material stockpiles. At the request of the Engineer, the Contractor shall immediately install additional temporary protection including, but not limited to, additional silt fence, hay bales or straw mulch, as deemed necessary by the Engineer.

D. Any existing structures (such as monitoring wells, utility poles, etc.) that are to remain are to be protected from damage during construction. Measures taken for this protection shall include flagging and construction of barricades where necessary. Any structure damaged by construction activity shall be repaired and/or replaced by the Contractor at the Contractor's expense.

1.5 SITE MAINTENANCE AND CLEANUP

A. During progression of the Work, all Work areas shall be kept clean, all rubbish shall be removed on a daily basis, and all surplus materials and unneeded construction equipment shall be removed from the site when no longer required for the Work.

B. When Contractor’s operations have allowed or caused material or debris to enter existing watercourses, ditches, drains, pipes, or structures, such material or debris shall be removed and disposed during the progress of the Work.

C. At the completion of the Work, the Contractor shall remove all rubbish from any grounds that he has occupied, and shall leave the roads and all parts of the premises affected by their operations in a neat and clean condition.

D. The Contractor shall restore or replace, when and as directed, any property damaged by their Work, equipment, or employees, to pre-existing conditions.

[END OF SECTION 01 52 00]

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SECTION 01 57 26

DUST CONTROL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Dust control will be of paramount importance during construction activities at the site. The contractor shall conduct operations and maintain the work site so as to minimize the creation and dispersion of dust. Dust control shall be used throughout the work at the site.

B. Dust control shall comply with the Fugitive Dust and Particulate Monitoring and Screening Action Levels outlined in the project Community Air Monitoring Program Plan (Copy Attached). Such monitoring will be conducted by Engineer in Accordance with requirements of NYDEC DER-10, Appendix 1B.

C. Any deficiencies noted by the Engineer in terms of dust control shall be immediately rectified by the Contractor at no additional cost.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water is not available on-site. Water for dust control shall be obtained by the Contractor from the Owner's groundwater treatment facilities in Endicott, NY unless directed otherwise by Engineer. Contractor shall be responsible for transporting water from the Owner's facility to the site.

B. Chemical dust suppressants shall not be used.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall implement strict dust control measures during active construction periods on-site. These control measures will generally consist of water applications as required to prevent dust emissions if adjustment to practices do not limit dust. These practices could include but are not limited to:
   1. Restricting vehicle speeds
   2. Hauling materials in tarped or water tight containers
   3. Reducing the active excavation size
   4. Placing tarps on stockpiles.

[END OF SECTION 01 57 26]

APPENDIX F

CAMP, Fugitive Dust/Particulate Monitoring

Brownfield Cleanup Program, Alternatives Analysis and Remedial Work Plan
IBM Gun Club – Former Burn Pit Area
Union, New York

Introduction

This Appendix summarizes the community air monitoring program (CAMP) associated with the work discussed in the Remedial Work Plan portion of the Brownfield Alternatives Analysis and Remedial Work Plan. The fugitive dust and particulate monitoring program associated with these activities will be performed by Sanborn, Head and Associates, Inc. (Sanborn Head).

Fugitive Dust and Particulate Monitoring

Particulate concentrations will be monitored at the upwind and downwind limit of work during remedial activities that may be associated with a potential for generating fugitive dust and particulates. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers (10^{-6} meter) in size (PM-10) and capable of integrating over 15 minutes or less. The equipment will be equipped with an audible alarm to indicate exceedance of the applicable action levels summarized in Exhibit 1 below. Readings will be documented and made available for the Agencies upon request. Attachment 1 provides a table format that will be used in documenting observations

Exhibit 1: Particulate Screening Action Levels

Downwind PM-10 Levels 15-min. Avg. Above Background [µg/m³]	**Action**	**Comment**
100 µg/m³≤PM-10<150 µg/m³ or if dust is observed leaving the exclusion zone	Employ dust suppression techniques	Work may continue after suppressing dust.
PM-10>150 µg/m³ after employing dust suppression	Stop work and re-evaluate dust suppression activities	Work can resume when downwind PM-10 has been reduced to less than 150 µg/m³.

Attachment 1 Particulate Air Monitoring Log

ATTACHMENT 1
PARTICULATE AIR MONITORING LOG

Date: _____ Project: _____

Instrument: _____

Location/PM-10/15 min avg. or point	Time	Monitoring Result	Action/Comment

SECTION 01 74 00

WASTE MANAGEMENT, SITE CLEANUP, AND CLOSEOUT

PART 1 – GENERAL

1.1 SUMMARY

A. This section describes the Contractor's responsibilities for maintaining a clean work area, requirements for site cleanup and restoration upon completion of work, and closeout procedures.

1.2 RELATED SPECIFICATIONS

A. Section 01 32 19, Submittals Schedule

B. Section 01 35 13, Decontamination

C. Section 32 90 00, Topsoil, Seeding, and Planting

D. Section 01 52 00, Temporary Facilities, Controls, and Site Maintenance

1.3 WASTE MANAGEMENT

A. As the project progresses and as directed by the Engineer, the Contractor shall remove and properly dispose of debris and waste material generated during work.

B. It shall be the Contractor's responsibility to provide dumpsters or other waste material containers on-site and to schedule pickup and disposal on a regular basis.

C. Materials from this site shall not be reused at another location.

D. Inert materials such as components of metal fencing that cannot be reused on-site shall be recycled.

E. No soil or other natural material (wood chips etc) shall be removed from the site for use or disposal at another location unless directed by Engineer.

1.4 SITE CLEANUP AND CLOSEOUT

A. The Contractor shall not vacate the site until all waste material, construction debris, material stockpiles, and other materials are removed from the site or left in a condition approved by the Engineer.

B. The Contractor shall thoroughly decontaminate all equipment, tools, temporary facilities, and vehicles before demobilization.

C. When the work is approaching completion, the Owner and the Engineer shall walk the site and create a punch list of all items that require additional cleaning or maintenance. The Contractor shall address all of the items in the punch list to the Engineer's satisfaction before final payment is made.

D. Prior to final payment, the Contractor shall submit the following items to the Engineer for review and approval:

1. Completed Project Record Documents;

2. Certifications or Manufacturer's Warrantees or Guarantees for products and materials purchased and installed on-site;

3. A planting schedule that includes watering the newly seeded area and the time frame for tree planting and tree care. This schedule shall include the proposed inspection dates for the Engineer. The work shall not be considered complete until the Engineer has inspected and approved the establishment of grass and trees. The Contractor may be required to spread additional seed or replace dead or dying trees following the Engineer's inspections and according to Section 32 90 00, Topsoil, Seeding and Planting.

[END OF SECTION 01 74 00]

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes preparation, maintenance, completion, and submission of all project record Drawings, Specifications, and related documents.

B. The requirements specified herein are in addition to any requirements for record documents specified elsewhere in these Specifications.

1.2 RELATED SPECIFICATIONS

A. Section 01 32 19, Submittals

1.3 MAINTENANCE OF RECORD DOCUMENTS

A. The Contractor shall maintain at the job site one (1) copy of the following Project Documents for record purposes:

1. Construction Drawings
2. Specifications
3. Change Orders
4. Owner's and Engineer's Field Orders
5. Reviewed Shop Drawings
6. Clarifications or Explanatory Drawings and Specifications
7. Inspection Reports
8. Bills of Lading for any delivery of materials including imported soil fill materials shipped to the site
9. Laboratory Test Records
10. Field Test Records
11. Manufacturer's Certifications
12. Records of proper disposal/recycling of general refuse/demolition materials (metal etc).

B. The Contractor shall store documents used for record purposes in the field office or other approved location, apart from documents used for construction. Scanned copies filed electronically are acceptable.

C. The Contractor shall maintain documents in clean, dry, legible condition, and make documents available at all times for inspection by the Owner and Engineer and their authorized representatives.

1.4 RECORD DRAWINGS

A. Project Drawings

1. Contractor shall maintain "as-built" or record drawings of all work continuously as the job progresses. A separate set of Drawings, for this purpose only, shall be kept at the job site at all times.

2. All deviations from the drawings, exact locations of permanent property markers or monuments, details, and other work shall be finally incorporated on this reproducible set.

3. During the course of construction, actual locations to scale shall be identified on the Record Drawings for all work. Deviations from the Construction Drawings shall be shown in detail.

4. Progress payments may be withheld if the Contractor does not mark-up record drawings on a weekly basis.

5. The final set of Record Drawings shall be signed and dated by the Contractor, and shall be delivered to the Engineer prior to the acceptance of the Project.

B. Shop Drawings

1. One complete set of reviewed shop drawings, including the manufacturer's printed catalog cuts and data, shall be collected and maintained for record purposes.

2. Shop drawings shall be filed and maintained separate from project drawings.

1.5 RECORD SPECIFICATIONS

A. Project Specifications

1. The Specifications book for record purposes shall be filed in a large-ring, 3-ring binder or binders.

2. Information, changes, and notes shall be recorded in the Specifications in blank areas, such as page margins or the backs of opposite pages, or on separate sheets inserted in the binder. All such information, changes, and notes shall be recorded with red pen.

3. In each section, in an appropriate location, record the manufacturer, trade name, catalog number, and supplier of each product actually installed.

B. Change Orders and Field Orders

1. All Change Orders and Engineer's Field Orders shall be incorporated into the front of the Specifications book in reverse chronological order. Use

appropriate page dividers to identify addenda and change orders and to separate addenda from the Specifications.

2. In addition, the changes to the Specifications affected by Change Order or Field Order shall be annotated on the affected page or pages of the Specifications, or adjacent thereto.

1.6 SUBMISSION OF DOCUMENTS

A. At completion of the project, and before submitting the invoice for final payment, the Contractor shall deliver record documents to the Engineer.

B. For project drawings, include three (3) blueline or blackline prints.

C. Record documents shall be delivered neatly and efficiently packaged.

D. Submission of record documents shall be accompanied with a transmittal letter, in triplicate, containing the following information:

1. Date of submission.

2. Project title and number.

3. Contractor's name and address.

4. Title and number of each record document. (Shop drawings may be grouped in basic categories or divisions of work.)

5. Certification that each document as submitted is complete and accurate.

[END OF SECTION 01 78 39]

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SECTION 31 00 00

LOW PERMEABILITY SOIL CAP

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall provide labor, materials, equipment, and incidentals necessary to construct a low-permeability soil cap over the Former Burner Pit Area as shown on the Drawings and specified herein, including, but not limited to, placement, compaction, and grading of low permeability soil cap material.

B. The Owner and Engineer have identified a pre-qualified borrow source for the low-permeability cap soils and topsoil. If the Contractor proposes an alternate source for cap soils, he shall be responsible for all steps associated with demonstrating that the proposed soils comply with applicable NYSDEC requirements, including providing all submittals and performing all testing for review and approval by NYSDEC, the Owner, and the Engineer.

C. At all times during work, the Contractor shall limit engine idling of construction equipment and trucks to no more than 10 minutes.

D. To the extent possible, the Contractor shall use sustainably produced biofuels or clean diesel fuel to reduce pollutant discharges and greenhouse gases to the atmosphere.

1.2 SUBMITTALS

A. In the event that a pre-qualified borrow source is used for the cap soils, the Contractor shall submit bills of lading and weight tickets that document that each delivery is from a pre-qualified borrow source.

B. In the event that the Contractor proposes an alternate source for cap soils other than from the pre-approved source, the Contractor shall demonstrate that the soil meets the following criteria prior to delivery to the site:

1. The topsoil source shall meet NYSDEC requirements for chemical quality for residential reuse as defined under DER-10 Section 5.4(e)2, Appendix 5. Preference will be given for soil from a virgin mine or pit approved for use by NYSDOT. NYSDEC DER approval of the source of material will be required.

2. The soil gradation and permeability-density relationship shall meet the requirements outlined in this Specification.

3. The submittal shall identify the proposed borrow source and include sufficient soils testing results to establish the permeability-density relationship based on testing conducted in accordance with the Proctor Moisture/Density Tests (ASTM Methods D1557 Method C), and reconstituted permeability tests (U.S. Army Corps of Engineers, EM-1110-2-1906, Appendix VI I, or ASTM D5084). At a minimum, three permeability tests shall be performed for each sample of proposed fill materials. The soil for these tests shall be reconstituted to densities corresponding to 90, 94 and 97 percent of the maximum dry density as determined by ASTM D-1557 Method C.

4. The Engineer shall be afforded the opportunity to revise the fill compaction criteria outline in Section 3.3 as needed to produce a final in-place material substantially meeting the desired properties.

1.3 CONSTRUCTION QUALITY ASSURANCE TESTING AND MONITORING

A. After fill placement and compaction, the Engineer shall select areas within the limits of the fill for field density testing to confirm the degree of compaction obtained as specified in Section 3.3. The Contractor shall cooperate fully in obtaining the information desired and shall allow the Engineer sufficient time to make necessary observations and tests.

B. During construction, Contractor shall provide results of testing for soil gradation by ASTM Method D 422 every 500 cubic yards before delivery to the site. If the results of the soils gradation analyses suggest the material varies from that represented by the Contractor's submittal data, the Contractor shall perform additional soil moisture-density and hydraulic conductivity testing to demonstrate the required material properties are being met. No fill shall be placed until the results of such testing have been approved by the Engineer. The Engineer shall be afforded the opportunity to revise the fill compaction criteria outline in Section 3.3 as needed to produce a final in-place material substantially meeting the desired properties

PART 2 - MATERIALS

2.1 PRE-QUALIFIED LOW PERMEABILITY SOIL CAP MATERIAL

A. The following source of soil cap materials has been pre-qualified by NYSDEC:

Lopke Rock Products
Sandy Silt
3430 State Route 434
Apalachin, NY
(607) 687-1114
NYSDOT #6-13 Site Soil, Lounsberry, NY

B. The soil shall meet the physical requirements outlined below.

Soil fill to be used to cover the existing grade shall be an inorganic soil free from ice, snow, roots, surface coatings, sod, loam, rubbish, and other deleterious matter that meets the following gradation requirements:

Sieve Size	Percent Passing by Weight
4-inch	100
No. 4	50-100
No. 40	30-90
No. 200	20-75

C. All proposed fill material shall be substantially free from organic materials, wood, trash, and other objectionable materials which may be compressible or which cannot be properly

compacted. It shall have physical properties such that it can be readily spread and compacted to the specified permeability and/or density.

2.2 In the event that the Contractor proposes an alternate source for cap soils other than from the pre-approved source, the Contractor shall propose soil that meets the recommendations outlined in Section 1.2 of this Specification.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION - GENERAL

A. Prior to fill placement, the subgrade should free from debris, organic material, ice, and snow. Fill shall not be placed over frozen soil unless otherwise approved by the Engineer.

B. The Contractor shall have completed excavation, placement and compaction of contaminated soil fill and cap materials in such a manner as to minimize disturbance of the underlying natural ground. Deterioration of the subgrade between excavation and initial fill placement shall be the responsibility of the Contractor and shall be repaired at the Contractor's expense.

C. All subgrades will be observed by the Engineer prior to fill placement. Sufficient time must be given to the Engineer to inspect and perform any necessary tests on the subgrade.

3.2 FILL PLACEMENT AND COMPACTION - GENERAL

A. Fill shall be placed to the elevations and dimensions shown on the Drawings.

B. In all fill areas, the Contractor shall proof roll the surface of the soil prior to cap placement with a minimum of four (4) passes of a 10,000-pound vibratory roller, or Engineer-approved alternative, before fill is placed, unless otherwise directed by the Engineer.

C. Fill shall be placed in loose continuous layers and compacted as specified in Section 3.3. The loose lift fill thickness shall not exceed 12 inches. Smaller lift heights may be required to achieve the specified compaction.

D. The Contractor shall use mechanical means designed specifically for compaction. The Engineer reserves the right to disapprove any device of inadequate capacity or, in his opinion, of a type unsuited to the character of material being compacted.

E. Fill areas shall be graded to drain and provide a smooth surface that will readily shed water.

F. Fill placement shall not be allowed during weather conditions which do not permit proper moisture and density controls. Do not resume fill operations until the moisture content and the density of the previously placed fill are as specified. During freezing conditions, each lift of fill must be compacted before the water in the fill can freeze.

G. Fill that is too wet for proper compaction shall be disced, harrowed, rototilled, or otherwise dried to a proper moisture content for compaction to the required density.

H. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Compaction shall not be performed until the moisture content of

the fill material is uniform. Sufficient water shall be added to allow for compaction to the required density.

I. The Engineer will observe construction and perform field density testing at a frequency of at least five tests per acre per lift. Where tests indicate that fill does not conform to the compaction density specified in Section 3.3, the Contractor shall remove and recompact the fill to the specified density without additional cost to the Owner.

J. The Engineer's presence does not include supervision or direction of the actual work by the Contractor, their employees, or agents. Neither the presence of the Engineer nor any observations and testing performed shall excuse the Contractor from defects discovered in their work.

K. Care will be taken to protect monitoring and injection wells during completion of fill placement and compaction. Contractor shall be responsible for cost of repairing any damage to wells caused by Contractor's action.

3.3 FILL COMPACTION CRITERIA

A. Unless otherwise noted in plans or directed and approved by the Engineer, the soil fill shall be compacted to a density which is at least 90% of maximum dry density as determined by ASTM D 1557 Method C.

B. The Contractor shall afford the Engineer the opportunity to modify the above criteria on the basis of data provided through Submittals outlined in Section 1.2.

3.4 GRADING TOLERANCE

A. Grading shall be established to shed water and prevent ponding of surface water runoff.

B. Grading shall be finished to the required elevations plus or minus 1 inch.

[END OF SECTION 31 00 00]

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SECTION 31 05 00

EARTHWORK

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall provide all labor, materials, equipment and incidentals necessary to complete the Work shown on the Drawings and specified herein, including, but not limited to:

1. Excavation and on-site placement of contaminated soil;

2. Construction of permanent access lanes for use upon completion of the work;

3. Backfilling and hand compaction of soils around monitoring wells in the work area.

B. Provision, placement, grading, and compaction of the soil cap is specified in Section 31 00 00 – Low Permeability Soil Cap.

C. At all times during work, the Contractor shall limit equipment and truck idling.

D. To the extent possible, the Contractor shall use sustainably produced biofuels or clean diesel fuel to reduce pollutant discharges and greenhouse gases to the atmosphere.

1.2 RELATED SPECIFICATIONS

A. Section 00 73 19 Health and Safety Requirements

B. Section 01 35 13 Special Procedures

C. Section 01 57 26 Dust Control

D. Section 31 00 00 Low Permeability Soil Cap

E. Section 31 25 00 Erosion and Sedimentation Controls

1.3 SUBMITTALS

A. The Contractor shall submit for the Engineer's review and approval manufacturer's product data sheets and specifications for filter fabric.

B. Prior to delivery to the site, the Contractor must demonstrate that the quality and gradation of coarse aggregate meets these Specifications.

C. Prior to delivery to the site, the Contractor must demonstrate that the crushed gravel quality and gradation meet these Specifications.

PART 2 - PRODUCTS

2.1 FILTER FABRIC FOR ACCESS LANES

A. Filter fabric shall meet the requirements of NYSDOT Standard Specifications Table 737-01B, Separation Geotextile Requirements, and have an apparent opening size less than or equal to 0.024 inches. Filter fabric shall be stored on-site in rolls, away from construction activities and traffic, and shall be protected from the weather. US Fabrics Woven Geotextile US 250, or an approved equivalent, shall be used (US Fabrics: 1-800-518-2290).

2.2 MARKER LAYER BETWEEN CONTAMINATED SOIL AND SOIL CAP FILL

A. A synthetic marker layer shall be placed between the area of contaminated soil and the soil cap fill. The marker layer shall be orange, high density polyethylene (HDPE) mesh construction fence with 1.75 inch mesh size and having a tensile strength of 75 lbs/ft. Tenax Guardian extruded lightweight safety fence is pre-approved for this project.

2.3 CRUSHED GRAVEL FOR PERMANENT ACCESS LANES

A. Crushed gravel to be used in construction of permanent access lanes shall be inorganic and free from ice, snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious matter. NYSDOT Item #4 shall be used and shall meet the requirements of NYSDOT Standard Specification 304, Subbase Course.

B. Aggregate and gravel shall be stockpiled on-site away from construction activities and traffic, in locations that prevents intermixing. Stockpiles shall be constructed in a manner that prevents segregation of the various particle sizes.

PART 3 - EXECUTION

3.1 EXCAVATION AND ON-SITE PLACEMENT OF CONTAMINATED SOILS

A. Maintain strict dust control at all times.

B. Excavation shall be made to the approximate depth and approximate limits shown on the Drawings and based on the field instruction of the Engineer. The Contractor shall mark the approximate limits of excavation prior to construction using utility marking paint, grade stakes, or other means.

C. Excavated materials shall be immediately placed in the areas specified on the Drawings, and shall at no time be stockpiled. Large cobbles and boulders excavated during earthwork activities shall be removed from soil prior to placement in the cap area.

D. Excavated materials shall be placed and compacted in accordance with the specification for low permeability soil fill.

E. Scheduling, coordination, traffic control, and decontamination of trucks transporting excavated material to the designated disposal facility shall be the responsibility of the Contractor.

3.2 PROTECTION OF EXISTING STRUCTURES

A. The Contractor shall protect structures, pavement, monitoring wells, and other features on-site. The Contractor shall install barriers surrounding the excavation to prevent the flow of storm or ground water into the excavations.

3.3 TRUCK DECONTAMINATION AREA

A. The Contractor shall furnish, install, and maintain a decontamination area for trucks and equipment in accordance with Section 01 35 13, Decontamination.

3.4 BACKFILLING CONTAMINATED SOIL EXCAVATION AREA

A. Backfill materials shall meet the requirements outlined in Section 31 00 00, Low Permeability Soil Cap.

3.5 SOIL MARKER PLACEMENT

A. The synthetic soil marker shall be placed between the layer of contaminated soil and the soil cap. The soil marker shall be secured in place using plastic tent stakes and individual sections shall be overlapped a minimum of 3 inches. Stakes shall be placed in the marker at 20-foot intervals and the Contractor shall take reasonable precaution to maintain the continuity of the soil marker during placement of the initial layer of cap material.

3.6 CONSTRUCTION OF PERMANENT ACCESS LANES

A. Permanent access lanes shall be 10 feet wide, as shown in the Drawings. Filter fabric shall be placed between the surface and the aggregate and shall extend four (4) inches beyond the width of the road on either side. It should be laid smooth and free from tension, stress, folds, wrinkles, or creases. Sections shall be placed to overlap a minimum of 4 inches at each end or side. Any damaged fabric shall be replaced by the Contractor at no additional cost to the Owner.

B. Crushed gravel for permanent access lanes shall be placed to a depth of five (5) inches. The Contractor shall take care to place the gravel in a manner that prevents damage to the filter fabric.

3.7 BACKFILLING AROUND MONITORING WELLS

A. Once the soil cap is in place and approved by the Engineer, the Contractor shall remove the temporary monitoring well protection structures and backfill by hand around the monitoring wells with clean fill material and topsoil to the grade required in the Drawings. The backfill material shall be hand compacted to the same compaction standards described in Section 31 00 00, Low Permeability Soil Cap. The Contractor shall take care not to damage the well casings during work.

[END OF SECTION 31 05 00]

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This work shall consist of grubbing, removing, and disposing of all vegetation and debris including branches, trees and shrubs, within the limits of work shown on the Drawings or specified below. Stumps and roots shall be left intact and the ground surface shall not be disturbed.

1.2 RELATED SPECIFICATIONS

A. Section 31 05 00 – Earthwork

B. Section 31 25 00 – Erosion and Sedimentation Control

C. Section 32 90 00 – Planting

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. No trees shall be cut outside of the designated work area.

B. Once Contractor stakes out the limit of soil disturbance/work as shown on the Drawings, Engineer will be afforded the opportunity to re establish markings on mature trees to be protected during construction and review the markings with Contractor before clearing and grubbing begins.

C. Burning of brush will not be permitted.

D. The Contractor shall perform the work of grubbing to include the removal of brush and trees to the level of the ground surface. The ground surface shall not be disturbed during this work, and stumps and roots shall be ground to the level of the ground surface but not removed.

E. Brush, weeds, grass and other perishable material resulting from clearing and grubbing operations shall be chipped if necessary and placed at an on-site location approved by the Engineer.

F. Branches and wood shall be chipped on-site and the resulting material shall be stockpiled on-site for use as tree mulch, as described in Section 32 90 00, Planting. Stockpiled material shall be stored away from construction activities and in a manner that prevents detrimental impacts from work and weather.

[END OF SECTION 31 11 00]

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, tools and equipment, and perform all operations necessary to provide erosion and sedimentation control measures in accordance with the Drawings and Specifications.

1.2 RELATED SPECIFICATIONS

A. Section 31 00 00, Earthwork

1.3 PROJECT CONDITIONS

A. The Contractor shall conduct the work in such a manner as to prevent erosion and the resulting sedimentation. The work area shall be graded, shaped, and otherwise drained in a manner that minimizes soil erosion, damage to vegetation, and damage to areas outside the work area. The Contractor shall implement and maintain erosion and sedimentation control measures as shown on the Drawings, or as indicated by the Engineer for the duration of construction and until vegetative cover is provisionally accepted and such measures are no longer required.

B. Erosion and Sedimentation Control at this site must conform with the Stormwater Pollution Prevention Plan (SWPP) under NYSDEC Construction Stormwater General Permitting (GP-0010-001) that is administered by the Town of Union New York. A copy of the SWPP is appended to this specification.

1.4 SUBMITTALS

A. The Contractor shall submit to the Engineer certification that the silt fence meets the required specifications at least 7 days prior to delivery of the material to the site. Envirofence® is pre-approved for use on this project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Straw Bales shall consist of rectangular-shaped bales of cured straw or straw free from noxious weed, seed, and rough or woody material, and weighing at least 40 pounds per bale.

B. Silt Fence

1. Silt Fence shall be a woven polypropylene and/or polyester material that meets the requirements tabulated below as determined by the New York State Standards and Specifications for Erosion and Sedimentation Control:

Fabric Property	Test Method	Fabric Requirement
Tensile strength (lbs)	ASTM D1682	90 (minimum)
Percent Elongation (%)	ASTM D1682	50%
Mullen Burst Strength (PSI)	ASTM D3786	190
Puncture Strength (lbs)	ASTM D751 (mod.)	40
Equivalent Opening Size	US Std Sieve CW-02215	40-80
Ultraviolet Radiation Stability (%)	ASTM G-26	90

2. The geotextile shall be securely fastened to posts a minimum of 4 feet long spaced between 4 and 6 feet apart.

PART 3 - EXECUTION

3.1 CONSTRUCTION SEQUENCE

A. Construction of erosion control measures along the perimeter of the work area shall be completed prior to any site work.

B. All temporary erosion control measures shall be maintained throughout the course of site construction activities. At the time of provisional acceptance of the work, the Contractor shall remove temporary erosion control structures and properly dispose of accumulated sediment at the direction of Engineer.

C. The Engineer or Owner may order that additional erosion and sediment controls be installed at any time. The Contractor shall comply with Engineer's or Owner's request and immediately install the required controls.

3.2 INSTALLATION

A. Silt fences and/or staked straw bales shall be installed downgradient of work areas as shown on the plans or as indicated by Owner or Engineer. Silt fence shall be installed in accordance with the manufacturer's instructions. Straw bales shall be staked with ends tightly abutting adjacent bales as shown on the Drawings. The base of all straw bales and silt fencing shall be embedded to the depths shown on the Drawings.

B. The Contractor shall provide protection against erosion on sloped areas as required. Rills or gullies caused by erosion in the Contractor's work area or in areas topographically below his work shall be regraded and seeded at the Contractor's expense until an accepted vegetative stand is established.

[END OF SECTION 31 25 00]

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SECTION 32 31 13

CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall provide all labor, materials, equipment and incidentals necessary to install chain link fence and gates as shown on the Drawings and specified herein.

1.2 RELATED SPECIFICATIONS

A. Section 31 05 00 Earthwork

B. Section 32 90 00 Planting

1.3 SUBMITTALS

A. The Contractor shall submit for the Engineer's review and approval manufacturer's product data sheets and specifications for chain link fence and gate materials.

PART 2 - PRODUCTS

2.1 EXISTING CHAIN LINK FENCE

A. Existing sections of chain link fence and gates on site shall be disassembled and reassembled in the locations indicated in the Drawings.

B. Existing barbed wire and fence gate posts and concrete shall be removed and properly recycled or disposed of off-site and any holes or voids resulting from post removal shall be filled with clean soil and compacted to minimize settling. These areas shall be subsequently seeded and mulched according to the requirements in Section 32 90 00, Planting. Documentation of disposition of materials from this demolition shall be provided to Engineer as a part of Project Record Documents under 01 78 39. Any soil that is generated during fence demolition will be placed back into the hole from which it was removed, or placed within the area to be capped.

2.2 NEW CHAIN LINK FENCE

A. Chain link fence shall conform to AASHTO M 181.

B. Fencing material shall be 3.76 mm, 50 mm (9 gauge, 2 in) mesh, Type II fabric.

1. Fencing shall be 6-feet high and fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

C. Metallic coated steel posts, rails, or gate frames shall conform to AASHTO M 181 Grade 1 or Grade 2. Miscellaneous fittings and hardware shall conform to AASHTO M 181 Section 29.

D. Tension bars shall not be less than 6 mm by 19 mm (0.25 in by 0.75 in.).

E. Wire ties and clips for fastening fabric to posts and top rail shall be of the same material and the same or larger gauge as the fabric.

F. The chain link fence and gates shall have three (3) strands of four-point pattern barbed wire with barb spacing at a maximum of 5 inches. Zinc-coated steel barbed wire support arms shall be placed at a 45° angle to the fence and should be able to withstand a weight of 250 pounds applied at the outermost strand of barbed wire.

G. Post caps shall be constructed of formed steel or aluminum, sized to post diameter, and be secured in place with a set screw retainer.

2.3 CONCRETE

A. Concrete used for placement of fence and gate posts shall have a minimum compressive strength of 3,000 psi at 28 days. Aggregate materials shall not exceed 1" in size and a minimum of five (5) sacks of cement per cubic yard of concrete shall be used.

PART 3 - EXECUTION

3.1 GENERAL

A. Posts, braces, or anchors shall be embedded in concrete and temporary guys or braces may be required to hold the posts in proper position until such time as the concrete has set sufficiently to hold the posts. No materials shall be installed on posts set in concrete or strain placed on guys and bracing until 3 days have elapsed from the time of placing of the concrete.

1. The portions of aluminum posts that will be in contact with concrete shall be coated both inside and outside with protective coating to 1 in. above the top of the concrete. The coating shall be allowed to dry for at least 24 hours before the concrete is placed.

B. All posts shall be set plumb and firm and to the required grade, spacing, and alignment.

C. Soil thickness on site varies in places and fence post installation may require augering. The Contractor shall record the installed depth of each post and provide this information to the Engineer upon completion of fence installation.

D. The fence shall be grounded.

3.2 CHAIN LINK FENCE

A. The fence shall be erected so that the bottom is between 1 and 2 in. above the ground.

1. The top rail shall pass through the post tops to form a continuous brace from end to end of each section of fence, and shall be securely fastened to the posts at post assemblies by suitable clamps.

2. Post assemblies as shown on the Drawings shall be installed at ends, at corners or changes in line where the angle of deflection is 30 degrees or more, at abrupt changes in vertical grades where pull posts are required, and at gates.

3. Braces shall be spaced approximately midway between the top and the ground, and extend to the first line post. Braces shall be securely fastened to posts by suitable clamps.

B. Fabric shall be fastened to the post with suitable fabric bands, stretcher bar bands, and hook bolts, and to the top rail with wire ties as shown on the Drawings. The fabric shall be free of sags and bends.

3.3 GATES

A. Gates shall be firmly and securely erected in accordance with the manufacturer's recommendations.

[END OF SECTION 32 31 13]

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SECTION 32 90 00

TOPSOIL, SEEDING, AND PLANTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to place topsoil, finish grade, apply compost, apply fertilizer, apply lime, apply seed, mulch, plant trees, and maintain all seeded areas as specified herein.

B. The Contractor shall seed all previously vegetated areas disturbed by its operations. All areas disturbed or not having sufficient vegetation to prevent erosion shall be seeded.

C. Trees shall be planted in the areas shown on the Drawings and as described in this Specification.

1.2 RELATED SPECIFICATIONS

A. Section 01 32 19 Submittals

B. Section 31 25 00 Erosion and Sedimentation Control

C. Section 31 00 00 Earthwork

1.3 SAMPLES AND APPROVAL OF MATERIAL

A. Samples of all materials proposed for use shall be submitted for inspection and acceptance upon the Engineer's request.

B. The Contractor shall submit the proposed seed mix, fertilizer, and lime, including the manufacturer's certificate of compliance, to the Engineer for review prior to seeding.

C. The Contractor shall submit to the Engineer a schedule of planned seeding and fertilizing for approval before starting those activities.

D. The Engineer reserves the right to inspect and accept or reject any trees that show signs of desiccation or disease, or that otherwise appear unsuitable for planting. Trees deemed unsuitable for planting shall be replaced by the Contractor at no additional cost to the Owner.

E. In the event that the Contractor proposes an alternate source for topsoil other than from the pre-approved sources listed in Section 31 00 00, the Contractor shall demonstrate that the topsoil meets the following criteria prior to delivery to the site:

i. The topsoil source shall meet NYSDEC requirements for chemical quality for residential reuse as defined under DER-10 Section 5.4(e)2, Appendix 5. Preference

will be given for soil from a virgin mine or pit approved for use by NYSDOT. NYSDEC DER approval of the source of material will be required.

ii. The topsoil gradation and pH characteristics shall meet the requirements outlined in this Specification.

iii. The submittal shall identify the proposed borrow source.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be fertile, natural or manufactured soil capable of sustaining vigorous plant growth, typical of the locality, free from stones greater than 2 inches, roots, sticks, clay, peat, weeds, and sod, and obtained from naturally well-drained areas. The pH shall be between 5.5 and 7.6 and should not contain toxic material harmful to plant growth.

2.2 FERTILIZER

A. Fertilizer shall be a complete initial commercial fertilizer (10-10-10) for grass areas. It shall be delivered to the site in the original unopened containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it shall be dry and free-flowing. Fertilizer shall meet all the requirements of NYSDOT Standard Specification Section 713-03.

2.3 COMPOST

A. Compost shall be NYSDOT Type A, source-separated compost or composed biosolids that have been commercially or municipally produced and shall be an organic substance produced by the biological or biochemical decomposition of compostable source-separated or biosolid material that is separated at the point of waste generation. Source-separated and biosolid materials may include but not be limited to, leaves and yard trimmings, food scraps, food processing residues, manure and/or other agricultural residuals, forest residues and bark, soild and/or unrecyclable paper, and biosolid materials.

Source-separated compost and composted biosolids shall be reasonably free of sticks, stones, refuse, materials deleterious to soil structure, or any material toxic to plants. The Engineer reserves the right to reject compost containing foreign material on the basis of visual examination. Biosolids are regulated by the NYSDOH, and must meet all regulatory requirements. Composted biosolids shall have a certificate from a laboratory approved by the NYSDOH verifying compliance with all applicable laws, rules and regulations. Only facilities permitted to compost biosolids under 6NYCRR Part 360 will be allowed to furnish finished compost for use in topsoil. The certification shall be supplied by the Contractor prior to the delivery of any composted biosolids, topsoil containing composted sewage sludge, or other such regulated material to the site.

2.4 LIMESTONE

A. Limestone shall be a calcic or dolomitic ground agricultural limestone having a minimum total neutralizing value of 88% calcium carbonate equivalence and meeting the requirements of NYSDOT Standard Specification Section 713-02.

2.5 SEED

A. Seed to be used after planting of Poplar cuttings shall be annual rye grass with a minimum 80% germination and shall be applied at a rate of 270 pounds/acre.

B. Seed mix applied to Poplar cuttings after they are established and to Poplar poles shall meet the NYSDOT Standard Specification Section 713-04 and Supplemental Landscape Development Specification 427A1, and shall contain no primary noxious weed seeds. The no-mow seed mix will meet the following minimum requirements and be applied at a rate of 270 pounds/acre:

Type of Seed	Minimum Germination (%)	Quantity of Pure Live Seed (% of Mixture)
Hard Fescue	80	50
Chewing Fescue	80	25
Sheep's Fescue	80	20-25
Annual Rye Grass	80	5

If seeding applied to poplar cuttings after they are established and to Poplar poles is to be performed between August 20 and October 20, annual rye grass shall be included in the mixture and the quantity of Sheep's Fescue shall be decreased.

C. The seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mix shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content, and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates to the Engineer.

D. Mulch shall be hay mulch consisting of dry hay or straw mulch free of mold, primary noxious weed seeds, twigs, debris, and rough or woody materials.

2.6 TREES

A. Rooted tree cuttings planted for phytoremediation shall be hybrid poplars, a combination of either *Populus deltoides* and *Populus trichocarpa* or *Populus deltoides* and *Populus nigra* (DN-34 or DN-21), and shall be planted at a rate of 700 per acre. Hramor Nursery in Manistee, MI (231.723.4846) and EcoloTree of North Liberty, Iowa, are pre-approved vendors for these trees (319.331.2076). Tree cuttings shall be planted within the soil cap and contaminated soil areas.

B. Tree poles, 7-9 feet in height, planted for phytoremediation shall be hybrid poplars, a combination of *Populus deltoides* and *Populus nigra* (DN-34), and shall be planted at a rate of 700 per acre. Hramor Nursery in Manistee, MI (231.723.4846) is a pre-

approved vendor for these trees. Tree poles shall be planted outside the soil fill cap and contaminated soil areas.

C. Red spruce trees shall be planted at a rate of 18 per acre. The New York State Tree Nursery in Saratoga Springs, NY, is an approved source (518.581.1439) of containerized 6"-12" trees.

D. Other sources of tree materials will be considered favoring more locally sourced equivalent materials.

E. The Contractor shall communicate with the nurseries about tree availability and to schedule shipping several months prior to planting activities to ensure that the trees will be available for timely planting.

F. Mulch for trees shall be previously stockpiled shredded tree mulch generated during clearing and grubbing activities.

PART 3 – EXECUTION

3.1 PREPARATION FOR SEEDING

A. Unless otherwise shown on the Drawings, topsoil shall be placed to a minimum thickness of 6 inches. The Contractor shall exercise care to ensure that the underlying soil remains intact and does not become mixed with the topsoil during placement.

B. The areas disturbed by earthwork operations shall be covered with straw mulch after the Engineer has approved the capping and grading work.

C. Seeding shall take place after the Engineer has approved the tree planting work and shall be done over the entire work area disturbed by earthwork activities, or as directed by the Engineer. Areas to be populated with Poplar cuttings shall be seeded with annual rye grass, while areas that are populated with Poplar poles shall be seeded with the seed mix specified in Section 2.5B. Seeding and initial fertilization shall be performed between August 20 and October 20, or as permitted.

D. Those areas to be populated with rooted cutting trees shall be seeded by others with the seed mix specified in Section 2.5B in the spring of the following year or as directed by Engineer.

E. For all areas to be seeded:
   1. Limestone shall be applied uniformly over the area at the rate of ninety (90) pounds per 1,000 square feet (2 tons per acre), unless topsoil analyses require otherwise.
   2. Fertilizer (10-10-10) shall be applied uniformly over the area at the rate of eighteen (18) pounds per 1,000 square feet (800 pounds per acre), unless topsoil analyses require otherwise.
   3. Seed shall be applied uniformly over the area at the application rate noted in Part 2.5 of this Specification.
   4. Hay mulch shall be applied uniformly over the area at the rate of ninety (90) pounds per 1,000 square feet (two tons per acre).

F. The application of fertilizer and seed shall be performed in accordance with NYSDOT Standard Specification Section 610-3.02. Seeding shall take place at least 24 hours after fertilizer is incorporated.

G. The application of straw mulch is to be placed in accordance with NYSDOT Standard Specification Section 610-3.02 and shall be placed within 72 hours of seeding. Mulch anchorage is not required.

3.2 SEEDING

A. All areas to be seeded shall be prepared in accordance with NYSDOT Standard Specification Section 610-3.02.

B. Seeding shall not be done in windy weather or when the ground is frozen, excessively wet, or otherwise untillable. If seeding is done during July or August, additional mulch material may be required by the Engineer.

C. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the work being performed.

D. Seeding shall be done within five (5) days following soil preparation, unless otherwise approved by the Engineer.

E. When protection of newly-graded areas is necessary at a time outside of the normal seeding season, the Contractor shall protect those areas by whatever means necessary (such as additional mulch) or by other measures as approved by the Engineer.

3.3 MAINTENANCE AND PROVISIONAL ACCEPTANCE OF SEEDING

A. The Contractor shall keep all seeded areas watered and in good condition, reseeding if and when necessary until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain these areas in an approved condition until provisional acceptance.

B. On slopes, the Contractor shall protect against wash-outs. Any wash-out that occurs shall be regraded, reseeded, and maintained at the Contractor's expense until a good sod cover is established.

C. The Engineer will inspect all work for provisional acceptance at the end of the eight (8) week grass maintenance period, upon the written request of the Contractor, received at least ten (10) days before the anticipated date of inspection.

D. A satisfactory stand will be defined as a section of grass of 10,000 square feet or larger that has:

1. No bare spots larger than three (3) square feet.

2. No more than ten percent (10%) of total area with bare spots larger than one (1) square foot.

3. No more than fifteen percent (15%) of total area with bare spots larger than 6 inches square.

E. The Contractor shall furnish full and complete written instructions for maintenance of the seeded areas to the Engineer at the time of provisional acceptance.

F. The inspection by the Engineer will determine whether maintenance shall continue in any area or manner.

G. After all necessary corrective work and cleanup has been completed, and maintenance instructions have been received, the Engineer will acknowledge the provisional acceptance of the seeded areas. The Contractor's responsibility for maintenance of seeded areas, or parts of seeded areas shall cease on receipt of provisional acceptance.

3.4 GUARANTEE PERIOD AND FINAL ACCEPTANCE OF SEEDING

A. All seeded areas shall be guaranteed by the Contractor for not less than one (1) full year from the time of provisional acceptance.

B. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted by the Contractor at least ten (10) days before the anticipated date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded, and maintained, meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the Engineer shall acknowledge in writing the final acceptance of the seeded areas.

3.5 PREPARATION FOR TREE PLANTING

A. Trees shall be planted between September 1 and November 1 or between April 1 and May 31, unless the schedule is altered by the Engineer.

B. The Contractor shall follow the grid system shown on the Drawings. Grass and debris in a 2-foot radius around the space where the tree is to be planted should be cleared of grass and debris.

C. The cuttings/poles and tree roots shall be kept moist at all times and shall be prevented from drying out while they are stored before planting. Any plants deemed unsuitable for planting due to dry roots shall be replaced by the Contractor at no additional cost to the Owner.

D. The cuttings shall be prepared for planting according to the nursery's instructions.

3.6 TREE PLANTING

A. Hybrid Poplar Cuttings

1. Hybrid poplar cuttings shall be planted at a rate of 700/acre, equivalent to an 8'x8' grid.

2. Cuttings shall be planted using a planting spade. A small, deep 'X' shall be cut into the soil and the cutting shall be placed in the center of the "X" to a depth that allows not more than 2 inches of the cutting to be above grade. The soil and compost mixture around the cutting shall be compacted to remove air space and the cutting shall be thoroughly watered and mulched.

3. Mulch shall be placed around cuttings to a depth of 2 inches in a manner that will protect the trees without suffocating the roots. Mulch shall not be placed within 3 inches of the base of the cuttings.

B. Hybrid Poplar Poles

1. Hybrid poplar poles (7-9' tall) shall be planted at a rate of 700/acre, equivalent to an 8'x8' grid.

2. Poles shall be planted using a tree auger. A hole 4-5' feet deep shall be augured and the pole shall be placed in the hole and backfilled with the same amount of soil excavated. The soil and compost mixture shall be firmly compacted around the pole and shall be thoroughly watered and mulched. Mulch shall not be placed within 3 inches of the base of the poles.

3. Soil generated while augering the holes for the poplar poles located within areas of deeper contaminated soil, as shown on the Drawings, shall be segregated and stockpiled. A composite sample of the soil shall be collected by the Engineer and submitted for laboratory analysis of arsenic. The soil shall be disposed of at an approved, off-site disposal facility if the results are greater than Residential Soil Cleanup Objectives (SCOs), and shall be reused on-site if the results are less than or equal to Residential SCOs.

C. Red Spruce Trees

1. Red spruce trees shall be interspersed among the poplars at a rate of 18/acre, equivalent to a 50'x50' grid. Spruce trees shall not be planted within 10' of monitoring wells

2. A small hole shall be dug to accommodate the tree and any soil surrounding its roots. The tree shall be placed to the depth of the root flare. The soil and compost mixture around the tree shall be compacted and the tree shall be watered and mulched.

3. Mulch shall be placed around the red spruce trees to a depth of 2 inches in a manner that will protect the trees without suffocating the roots. Mulch shall not be placed within 3 inches of the base of the trees.

3.7 MAINTENANCE OF TREE PLANTINGS

A. The Contractor shall keep the cuttings and trees thoroughly watered for the first month following planting, or as directed by the Engineer. The Engineer shall inspect the tree development in the spring following planting. The Contractor shall be

responsible for removal, disposal and replanting of dead or dying rooted cuttings, poles and trees if the following success rates are not met:

1. Survival of 50% of rooted cuttings;
2. Survival of 75% of poles and spruce trees.

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