GeoLogic NY, Inc. P.O. Box 350 • 37 Copeland Ave. • Homer, NY 13077 • 607.749.5000 • Fax: 607.749.5063

July 18, 2016

Mr. Gary Priscott
NYSDEC Region 7 Sub-Office
1679 NY Route 11
Kirkwood, NY 13793

Reference: Addendum to Remedial Action Work Plan
Triple Cities Metal Finishing Corporation
In-Situ Stabilization
4 Nowlan Road
Binghamton, New York
Site No. C704045

Dear Mr. Priscott:

This letter serves as the Work Plan for Section 6.2, In-Situ Immobilization (Stabilization) of Metals in Soils of the Remedial Action Work Plan (RAWP) for Triple Cities Metal Finishing Corporation located at 4 Nowlan Road in Binghamton, New York. The July 2015 RAWP that was prepared by GeoLogic NY, Inc. (GeoLogic) on behalf of Binghamton Realty, Inc. was approved by New York State Department of Environmental Conservation (NYSDEC) on August 20, 2015.

Post-Excavation Information

The removal of the drywell structure, to the extent feasible, for Outfall 002A and both structures associated with Outfall 003 were completed in February 2016. Also, approximately 175 tons of soils at Outfalls 002A, 002B and 003 were removed and disposed of at the Broome County Landfill. Confirmation soil sampling and a groundwater sampling event were completed post-excavation. Both soil and groundwater samples were analyzed for volatile organic compounds (VOCs) on the Target Analyte List and for RCRA metals. The concentrations of cadmium and chromium reported in the post-excavation soils are summarized in the following table. No VOCs were detected in these samples.

Table A
Post-Excavation Confirmation Soil Data at Outfalls

Location	NYSDEC SCO* Commercial mg/kg		NYSDEC SCO* Groundwater mg/kg		Concentration Ranges mg/kg	
	Cadmium	Chromium[A]	Cadmium	Chromium[A]	Cadmium	Chromium
Outfall 002A	9.3	400/1500	7.5	19/NS	19.8 to 45.3	246 to 895
Outfall 002B	9.3	400/1500	7.5	19/NS	44.0	29.8
Outfall 003	9.3	400/1500	7.5	19/NS	24.5 to 59.2	21.8 to 24.2

* NYSDEC 6 NYCRR Part 375 Soil Cleanup Objective (SCO) for the Protection of Human Health for Commercial Use, and the Protection of Groundwater.
A - SCO for Hexavalent Chromium / Trivalent Chromium;
NS – Not Specified

The concentrations of chromium represent total concentrations. Since a Soil Cleanup Objective (SCO) for the protection of groundwater has not been set for total chromium concentrations, or for trivalent chromium (Cr III), all future soil samples collected under the RAWP will include the analysis for hexavalent chromium (Cr VI) (see Drawing No. 1 and the revised Analytical Matrix Table, Table No. 1).

Groundwater samples were collected from all monitoring wells pre-excavation and post-excavation source removal (see Table No. 2). Drawing No. 2 shows the concentrations of cadmium and chromium in groundwater at the monitoring wells near the outfall areas. The depth to groundwater near the Outfalls is between 29 and 30 feet below ground surface. The concentration ranges for cadmium and chromium in groundwater samples collected from all of the wells are summarized below.

Table B
Pre and Post-Excavation Groundwater Data

Contaminant	NYSDEC * Water Quality ug/L	Pre-Excavation Concentration Ranges ug/L	Post-Excavation Concentration Ranges ug/L
Cadmium	5	ND to 80	ND to 7.1
Chromium	50	13.6 to 363	ND to 161

* TOGS 1.1.1, NYS Water Quality Standards and Guidance Values

In-Situ Stabilization of Metals in Soils

The scope of in-situ immobilization (stabilization) of metals in soils is to be accomplished through the application of a proprietary patented amendment FESI-BOND®. The amendment was formulated specifically through bench-top studies on samples collected from both the sediments that remain at Outfall 002A, and soils with elevated concentrations of chromium and cadmium.

The objective of stabilization is to reduce the overall leachability of metals in soil so that impacted soils can remain in place. The remedy of stabilization is to address those areas at the Site that have been demonstrated by the recent data collected post-excavation that have the greatest potential of having a continuing impact on groundwater quality at and downgradient of the Site.

Stabilization Application

Metals may be transported downward through the vadose zone to groundwater through atmospheric precipitation and groundwater fluctuations. Oxidation states can be transformed to other oxidation states reducing mobility and/or toxicity of metals. FESI-BOND® reduces the overall leachability of the cadmium and chromium that remain in the soils, thereby reducing their mobility to an aqueous stage.

The application of FESI-BOND® will be through direct injection using direct push technology. A 20-precent by weight stabilizer dosage to achieve adequate stabilization has been determined through treatability studies. Due to the variability in grain-size distribution between the sediments that remain at Outfall 002A and the coarse-grained soils in the planned injection area, the dosage will likely vary between 20 percent and 50-percent by weight. The sediments remaining at Drywell 002A are very fine-grained with an estimated void ratio of 2.3; the coarse-grained soils surrounding the drywells have an estimated void ratio of 0.3. The stabilization application will begin with a 50-percent by weight stabilizer dosage at Outfall 002A. This percent dosage may be modified to a lower dosage based on field observations, but will not be less than a 20-percent by weight dosage.

The FESI-BOND® stabilizer is provided in a solid, powder form. The handling and application of the stabilizer along with post-stabilization analysis will be in accordance with the attached In-Situ Stabilization Plan. A municipal water source will be used for the preparation of the stabilizer slurry.

The application process will likely vary throughout the injection event. FESI-BOND® established the quantity of stabilizer required based on a 50-percent dosage rate. The stabilizer will be injected under pressure through the use of pump(s) capable of injecting the stabilizer slurry. Due to the uncertainty with regards to the amount of pressure that will be required for optimum delivery of the stabilizer, both a Geoprobe® Grout Pump, a piston-pump injection machine that features a variable-speed control valve with pulsating fluid delivery, and a steady-state, jet pump will be available during the injection event.

The stabilizing amendment will be injected at Outfalls 002A and 003, and adjacent to Outfall 002B (see Drawing No 2). The injection zone for Outfall 002A is to extend from approximately 4 to 30 feet below ground surface (bgs) outside the excavation limits and from approximately 18 to 30 feet bgs within the excavation area (See Drawing No. 3). The building overlies former Outfall 002B. Outside the building footprint adjacent to Outfall 002B, the injection zone will extend from approximately 4 to 30 feet bgs (see Drawing No. 4). At Outfall 003, injection zone is anticipated to be from 8 to 30 feet bgs outside of the excavation area and from 18 to 30 feet bgs within the excavation area in the vicinity of the former drywell structure (see Drawing No. 5)..

It has been estimated that between 5 to 10 tons of dry FESI-BOND® at application dosages ranging between 20-percent and 50-percent by weight will be injected into the subsurface at the Site. For every ton of dry FESI-BOND®, between 240 gallons (50-percent solution by weight) to 960 gallons (20-percent solution by weight) will be injected into the subsurface.

Stabilization will commence at Outfall 002A, the area where waste sediments remain in the subsurface. After completing the first injection location, soil boring(s) will be advance near the injection location to identify the radial extent and depth achieved of the injected stabilizer. The stabilizer has a pH of approximately 8.6; field pH measurements will be made to determine the

extent achieved in order to determine the horizontal and vertical spacing of injection points. Application adjustments that may include change in the type of pump used, injection pressure and injection depths will be made to achieve proper application of the stabilizer. Additional confirmation soil borings will be advanced, as needed, during the injection process.

Additional Surface Soil Sampling

A data gap for assessing human exposure to soils at the Site has been noted. Surface soil samples within the lawn area south of the former office building along Beckwith Street will be collected for analysis in accordance with DER-10, 3.5.1(b)(1). Soils will be collected at the two locations noted on Drawing No. 6 and analyzed for the volatile and semi-volatile organic compounds, metals, PCBs and pesticides listed in 6 NYCRR Part 375, Table 375-6.8(b).

Schedule

The RAWP Schedule has been modified to reflect the extended implementation of the remedial action components of the schedule. The revised Schedule is attached.

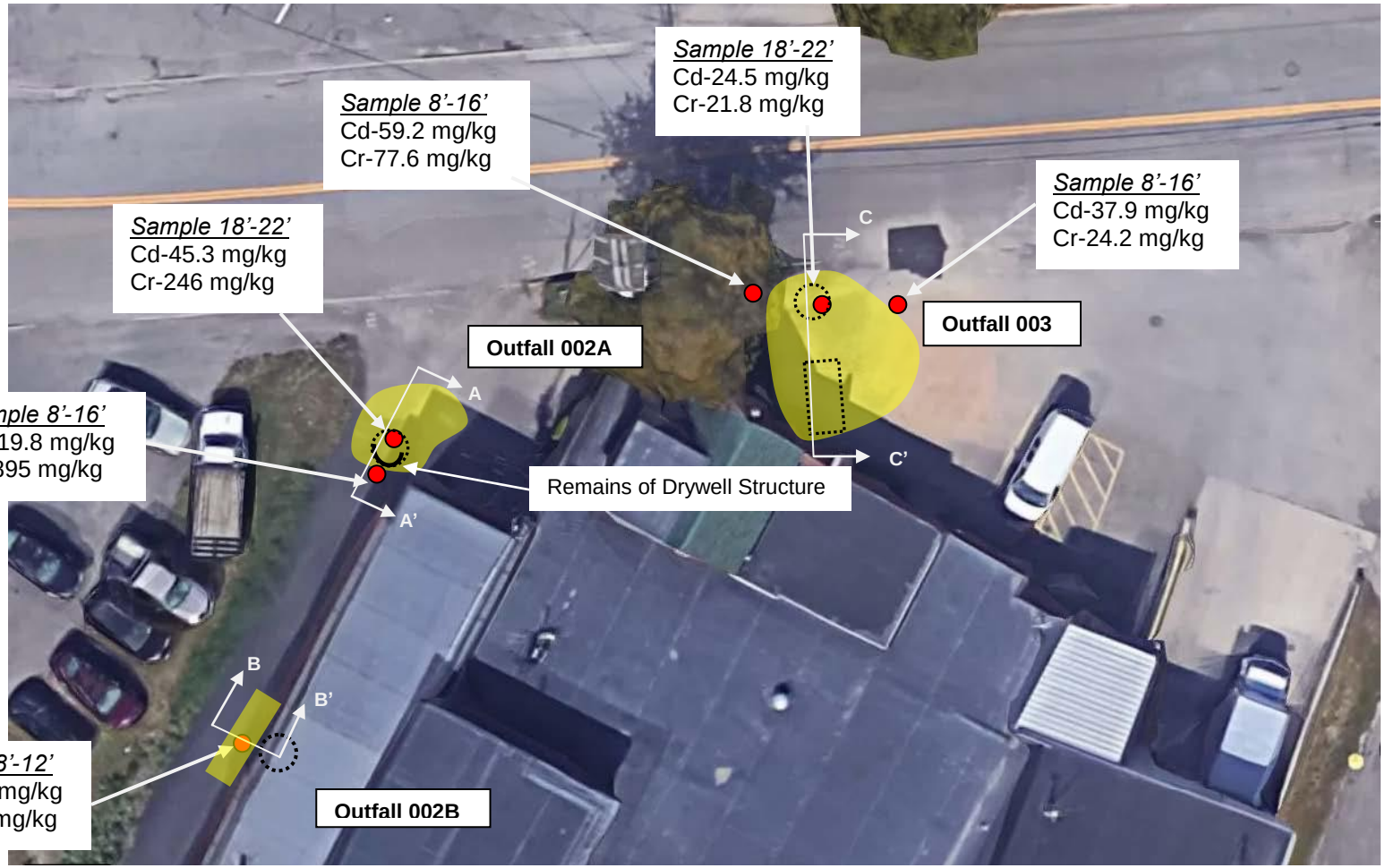
If you have any questions or comments, please contact the undersigned.

Sincerely

Kenneth J. Teter, P.E.

Susan M. Cummins
Project Manager

Enc. Drawings, Table No. 1 and 2, Schedule. Stabilization Plan
cc: J. Morgan, C. Morgan
T. of Fenton Library



N

Project North

Approximate Limits of Excavation

Former Drywell

Former Septic Tank

GeoLogic

GeoLogic NY, Inc.

CONFIRMATION SOIL SAMPLE LOCATION
Triple Cities Metal Finishing
Binghamton, New York
BCP Site #C704045

DRAWN BY:	SCALE:	PROJECT NO:
sc	Not To Scale	99011A
REVIEWED BY:	DATE:	DRAWING NO:
kt	May 2016	1

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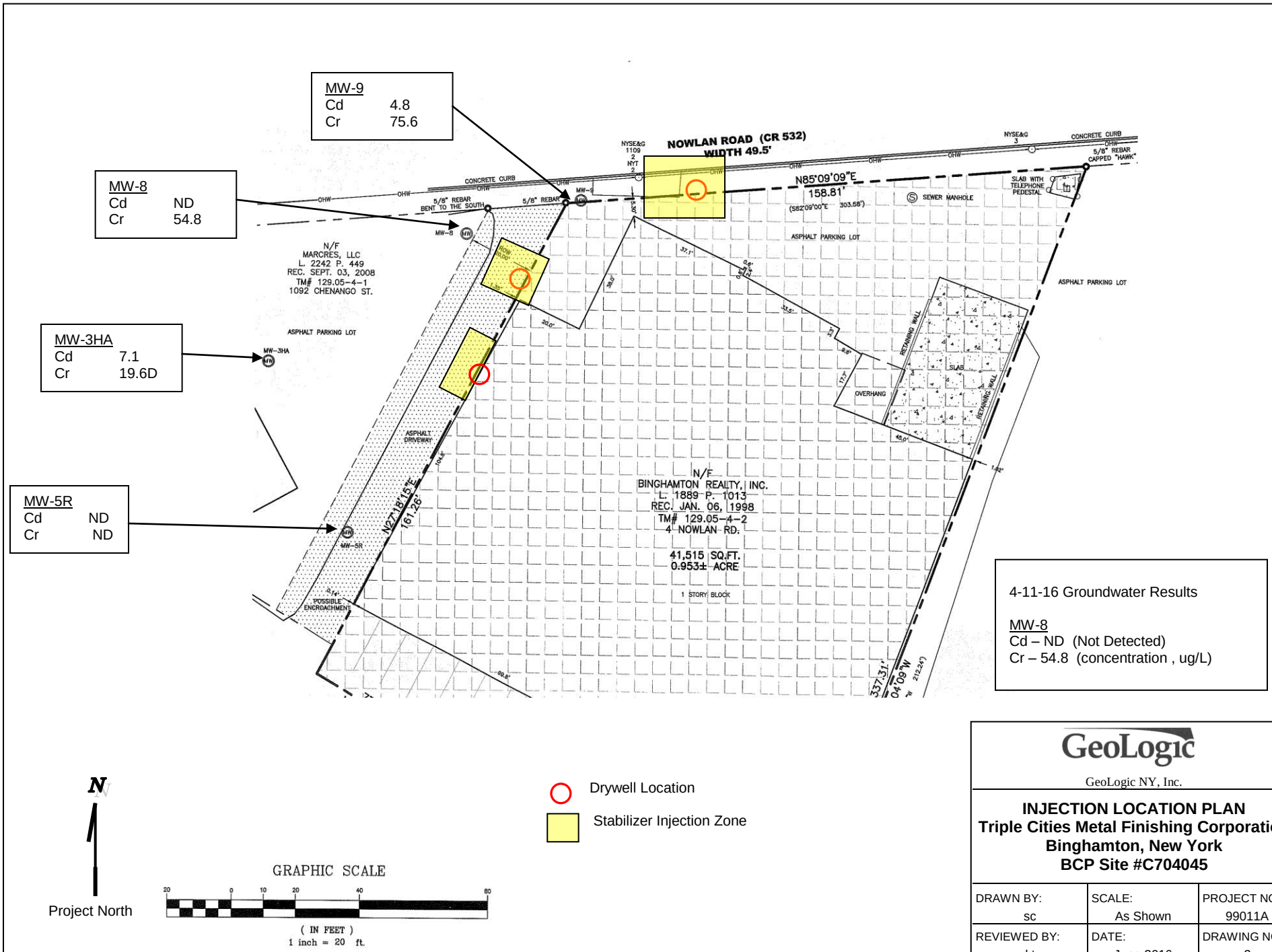

GeoLogic

GeoLogic NY, Inc.

INJECTION LOCATION PLAN
Triple Cities Metal Finishing Corporation
Binghamton, New York
BCP Site #C704045

DRAWN BY: sc	SCALE: As Shown	PROJECT NO: 99011A
REVIEWED BY: kt	DATE: June 2016	DRAWING NO: 2

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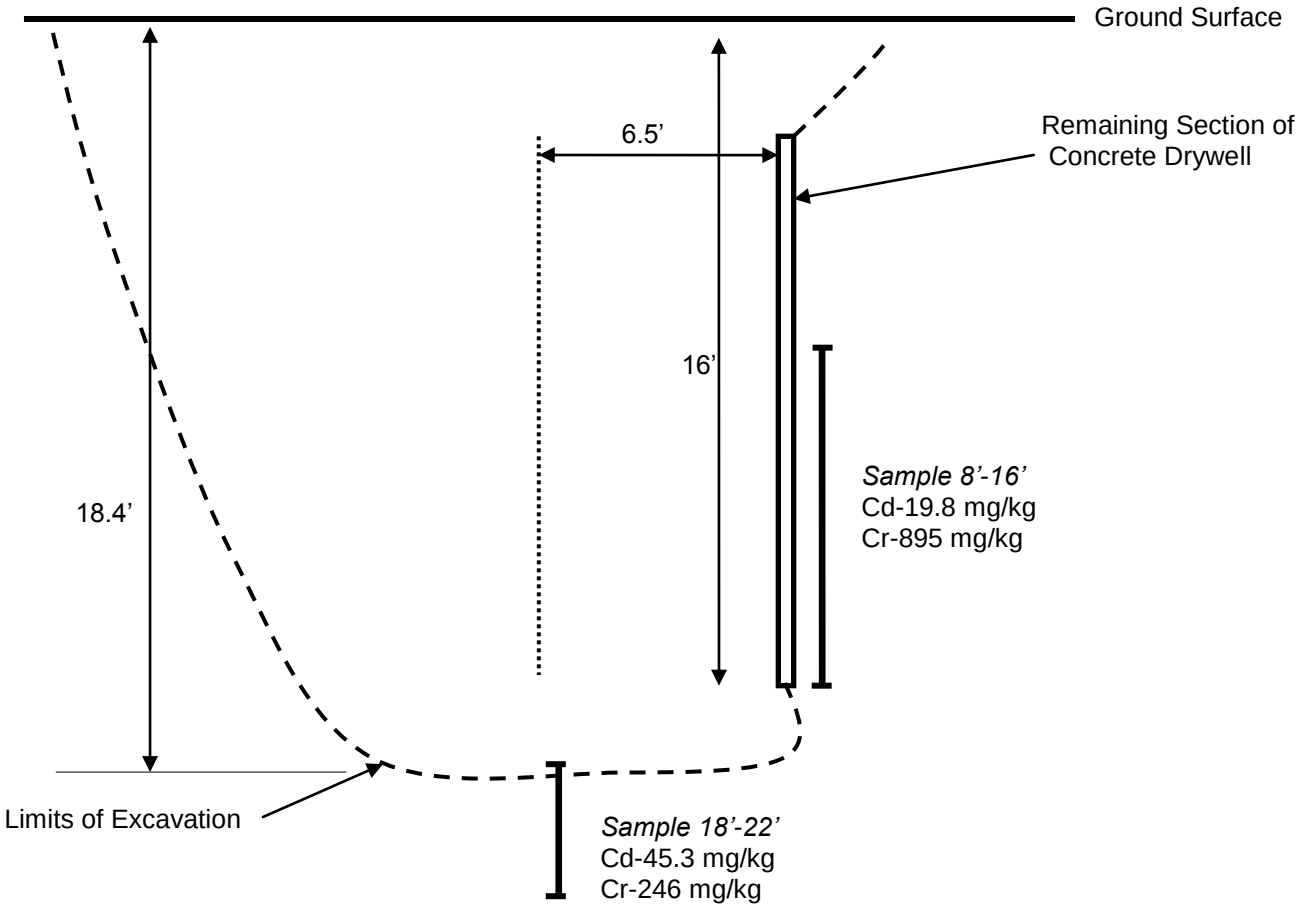
Outfall 002A

Section A-A'



GeoLogic

GeoLogic NY, Inc.

SCHEMATIC OF OUTFALL 002A
Triple Cities Metal Finishing
Binghamton, New York
BCP Site #C704045

DRAWN BY:	SCALE:	PROJECT NO:
sc	Not To Scale	99011A
REVIEWED BY:	DATE:	DRAWING NO:
kt	May 2016	3

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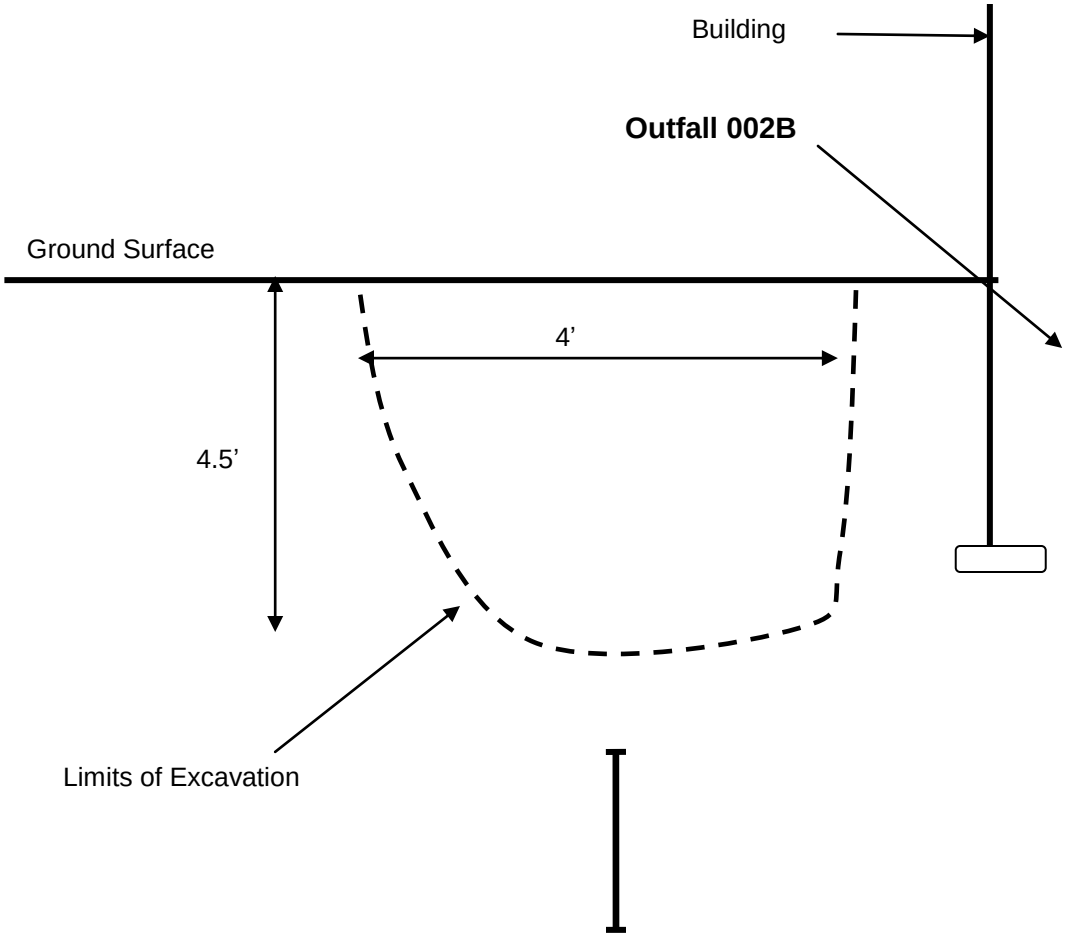
Outfall 002B

Section B – B'



Sample 8'-12'
Cd-44.0 mg/kg
Cr-29.8 mg/kg

GeoLogic

GeoLogic NY, Inc.

SCHEMATIC OF OUTFALL 002B
Triple Cities Metal Finishing
Binghamton, New York
BCP Site #C704045

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sc	Not To Scale	99011A
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kt	May 2016	4

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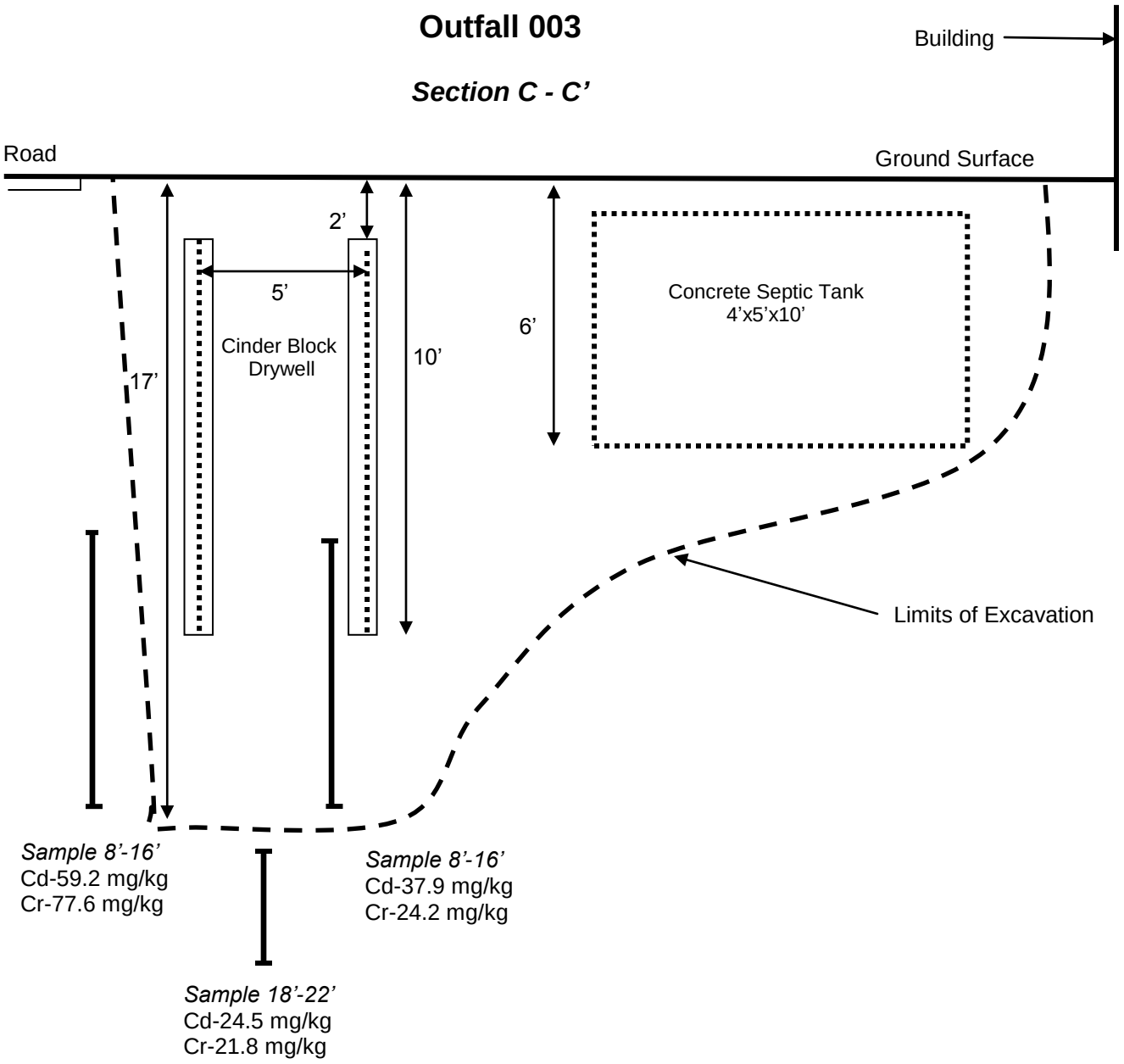
Outfall 003

Section C - C'



GeoLogic

GeoLogic NY, Inc.

SCHEMATIC OF OUTFALL 003
Triple Cities Metal Finishing
Binghamton, New York
BCP Site #C704045

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sc	Not To Scale	99011A
REVIEWED BY:	DATE:	DRAWING NO:
kt	May 2016	5

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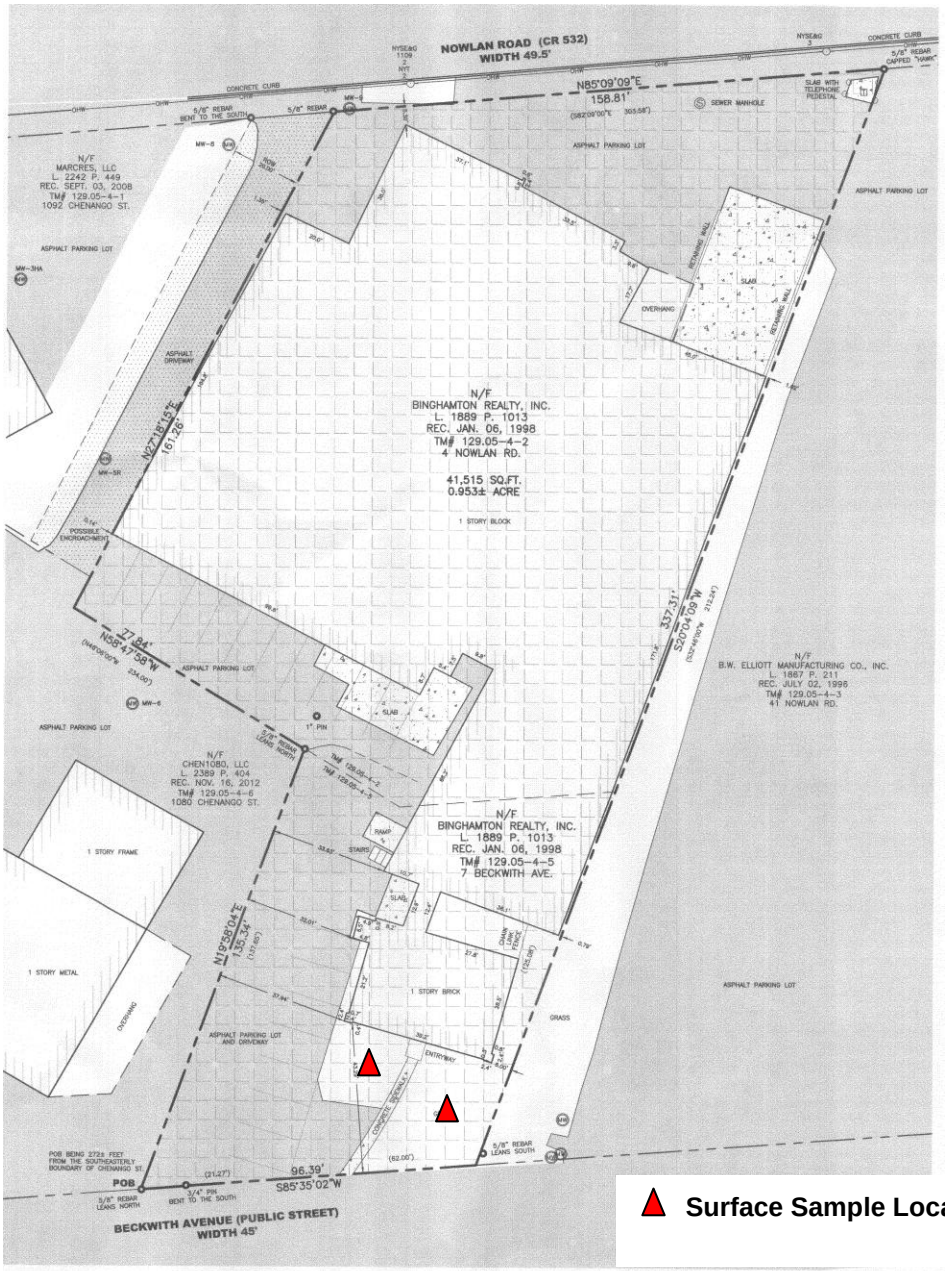
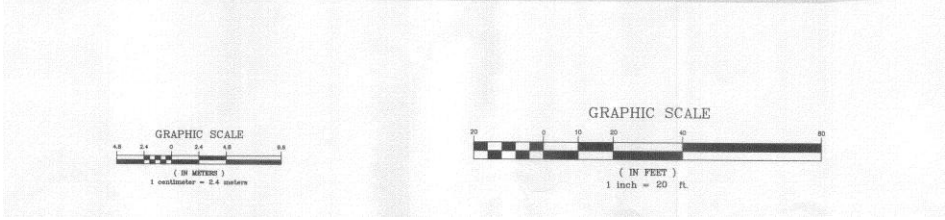


▲ **Surface Sample Location**



N

North

GeoLogic

GeoLogic NY, Inc.

SURFACE SOIL SAMPLING
Triple Cities Metal Finishing
Binghamton, New York
BCP Site #C704045

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sc	As Noted	99011a
REVIEWED BY:	DATE:	DRAWING NO:
ky	July 2016	6

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TABLE NO. 1
ANALYTICAL MATRIX
Pre- and Post-Remediation

Revised July 2016

Triple Cities Metal Finishing Corporation
Binghamton, New York
BCP Site C704045

Task	Location	Matrix	Field Screening[1]	Analytical Parameters		
				TCL 8260	RCRA Metals	SVOC/PCB Pesticides
Pre-Remediation	MW-2, MW-3, MW-4, MW-6, MW-7R	Groundwater	DO-ORP- T-C-pH	X	X	
Post-Excavation	**Outfall 002** *(Per Structure)*					
	One Bottom	Soil	PID	X	X	
	One Sidewall	Soil	PID	X	X	
	Outfall 003					
	One Bottom	Soil	PID	X	X	
	Two Sidewall	Soil	PID	X	X	
Post-Excavation	MW-2, MW-3, MW-4, MW-5R, MW-6, MW-7R, MW-3HA, MW-8 and MW-9	Groundwater	DO-ORP- T-C-pH	X	X	
Post-Remediation[2]	MW-2, MW-3, MW-4, MW-5R, MW-6, MW-7R, MW-3HA, MW-8 and MW-9	Groundwater	DO-ORP- T-C-pH	X	X	
Post-Remediation[3]	MW-2, MW-3, MW-4, MW-5R, MW-6, MW-7R, MW-3HA, MW-8 and MW-9	Groundwater	DO-ORP- T-C-pH	X	X	
Backfill	Imported Fill/Re-Use	Soil		X	X	X
Stabilization	Former Outfalls	Soil	pH		X [5]	

Notes:
1 - DO-ORP- T-C-pH: Dissolved Oxygen (DO), Redox Potential (ORP), Temperature (T), Conductivity (C), and pH; PID – Photoionization Detector
2 - Groundwater sampling one month and three months post-remediation
3 - Groundwater sampling semi-annually for one year post-remediation
4 - To be determined based on stabilization product recommendations
5 - Cadmium and Chromium (III and VI) only, including TCLP for Cadmium and Chromium.

TRIPLE CITIES METALS FINISHING CORP.
T A B L E 2
GROUNDWATER DATA SUMMARY
OCTOBER 2007-2016

Sample Location	NYS Standard Water	MW-1 10/2/2007 Water	MW-1 10/8/2008 Water	MW-2 10/2/2007 Water	MW-2 10/8/2008 Water	MW-2 10/29/2015 Water	MW-3 10/2/2007 Water	MW-3 10/8/2008 Water	MW-3 10/29/2015 Water	MW-3 4/11/2016 Water	MW-3HA 4/11/2016 Water	MW-4 10/2/2007 Water
Unit	**ug/L**	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Parameter												
Volatile Target Analyte List (TAL)												
Dichlorodifluoromethane	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	5	0.61	NS	ND	ND	ND	0.16J	0.30J	ND	ND	ND	2.92
Acetone	50	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	2.40J
Carbon disulfide	60	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl acetate	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
methyl tert-butyl ether	10	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	NS	ND	ND	ND	ND	0.16J	ND	ND	ND	ND
2-Butanone (MEK)	50	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	NS	ND	0.16J	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	1.79	NS	0.96	1.25	ND	1.55	1.34	ND	ND	ND	0.88
Cyclohexane	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	9.49	NS	9.09	11.0	1.1	11.6	10.4	1.1	1.0	ND	4.28
Methylcyclohexane	---	ND	NS	ND	ND	ND	ND	0.41J	ND	ND	ND	ND
1,2-Dichloropropane	1	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	0.4	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.4	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	0.16J	NS	0.18J	0.25J	ND	0.21J	0.39J	ND	ND	ND	ND
Tetrachloroethene	5	0.25J	NS	ND	0.13J	ND	0.13J	0.15J	ND	ND	ND	ND
2-Hexanone	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	4.7	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	---	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
RCRA Metals												
Arsenic	25		NS		10	ND		18	9.6	ND	ND	
Barium	1,000		NS		120	63.7		190	113	60.8	45.1	
Cadmium	5		NS		120	35.6		56	27.5	10.5	7.1	
Chromium	50		NS		1700	363		1200	253	161	19.6	
Lead	25		NS		45	6.5		38	26.9	ND	ND	
Selenium	10		NS		ND	ND		ND	ND	ND	ND	
Silver	50		NS		8.6J	ND		6.7J	ND	ND	ND	
Mercury	0.7		NS		0.073J	ND		0.40	ND	ND	ND	

Highlight value exceed TOG 1.1.1 Water Quality Standards and Guidances

TRIPLE CITIES METALS FINISHING CORP.
T A B L E 2
GROUNDWATER DATA SUMMARY
OCTOBER 2007-2016

Sample Location	MW-4	MW-4	MW-4	MW-5	MW-5	MW-5R	MW-6	MW-6	MW-6	MW-7R	MW-7R	MW-8	MW-9
	10/8/2008	10/29/2015	4/11/2016	10/2/2007	10/8/2008	4/11/2016	10/8/2008	10/29/2015	4/11/2016	10/29/2015	4/11/2016	4/11/2016	4/11/2016
	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Unit	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Parameter													
Volatile Target Analyte List (TAL)													
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	5.04	ND	ND	0.56	3.05	ND	5.23	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	1.49J	ND	1.5J	ND	ND	ND	ND	ND	5.2J	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	0.24J	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	0.13J	ND	0.11J	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1.34	ND	ND	1.06	1.15	ND	1.01	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	9.71	ND	ND	8.34	9.1	2.0	10.7	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.12J	ND	ND	0.27J	0.24J	ND	0.10J	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	0.11J	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RCRA Metals													
Arsenic	59	ND	ND		72	ND	19	11.6	ND	ND	13	ND	ND
Barium	450	63.5	58.8		490	35.8	200	171	29	50.3	214	60.0	48.6
Cadmium	1.5J	ND	ND		480	ND	120	80	ND	ND	ND	ND	4.8
Chromium	120	13.6	17.0		850	ND	100	65.2	6.3	45.2	82.5	54.8	74.6
Lead	94	ND	ND		130	ND	39	29.2	ND	ND	36.3	ND	ND
Selenium	3.9J	9.1	ND		3.6J	ND	3.6J	9.6	ND	ND	ND	ND	ND
Silver	ND	ND	ND		9.2J	ND	6.7J	ND	ND	ND	ND	ND	ND
Mercury	0.11J	ND	ND		0.16J	ND	0.20	ND	ND	ND	ND	ND	ND

Highlight value exceed TOG 1.1.1 \

REMEDIAL ACTION WORK PLAN

SCHEDULE

Revised July 2016

Triple Cities Metal Finishing Corporation
Binghamton, New York
BCP Site C704045

	2015-2017																					
TASK	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**May**
Submittal of Remedial Action Work Plan																							
Pre-Remediation Sampling																							
Implementation of Remedial Action																							
Post-Remediation Monitoring																							
Initiate EE, SMP, FER																							

FESI CONFIDENTIAL INFORMATION

SOIL TCLP Cd/Cr FESI-BOND® IN-SITU STABILIZATION PLAN

Prepared for:

Geologic NY
Binghamton NY Cd/Cr Remedial Site

Prepared by:

Mr. Keith E. Forrester, P.E., Pte., MSEnvEng
President, FESI
78 Tracy Way
Meredith, NH 03253

Cell: 603.380.2522
Email: fesi@worldpath.net
Website: www.fesi-bond.com

Technology Synopsis

This stabilization plan presents the chemistry and methods for use of the FESI-BOND® DRY-Q patented complexed Chromium and Cadmium stabilizer proven effective on a variety of materials and wastes for TCLP, SPLP, DI and CALWET control.

The FESI-BOND® DRY-Q process has been approved and used at Superfund projects directed by the USEPA, and used with complete success at state remedial and/or RCRA projects.

FESI projects have been completed in NH, MA, NY, NJ, CT, PA, VA, DE, IL, IN, OH, MI, IO, SD, CO, OK, SC, AL, WA, CA, OR, and ID for material, soil and waste stabilization, and used at numerous remedial sites and facilities throughout the world.

TCLP Cd and Cr stabilization project examples from our web site (fesi-bond.com) follow:

Peabody Tannin Warehouse, MA

In-Situ Cr+6 reducing and Cr+3 soil and brick stabilization and firewater and rainwater on-site plant filter cake production and dewatering to sewer. Tannin facility firewater and groundwater CERCLA project. TCLP Cr and IPP NPDES wastewater limit. On-site solids treatment and off-site reuse as landfill cover.

Boston Facility, MA

In-situ Cd stabilization in soils and residues. TCLP limit. On-site soils resue as fill.

Sumitomo, Tokyo, Japan

Ex-Situ Cr+6 reduction and Cr+3 stabilization for Osaka slag project.
Japan EPA limits DI water – 10 ppb limit. On-site reuse as fill material
.

FESI-BOND® Stabilization Chemistry

The FESI-BOND® DRY-Q patented approach to Cr and Cd stabilization of contaminated soil and residue is based upon converting the existing site elemental compounds to more stable thermodynamic, non-toxic, non-carcinogenic, natural insoluble mineral hydroxides, and complex precipitates, all highly insoluble under induced TCLP, SPLP, DI, CALWET and other leaching.

These water and acetic acid insoluble compounds are formed in an in-situ or ex-situ fashion as either a removal action as defined under CERCLA or RCRA voluntary cleanup action. FESI in-situ methods can be accomplished in a manner exempt from RCRA, as the FESI-BOND® DRY-Q chemical can be applied before the soil is removed, and thus before the soil is a regulated waste.

The FESI-BOND® DRY-Q stabilizer dose rate is determined by sample treatability and characteristic testing, and ranges from 8% to 10% wwb soil/material. The chemical and dilution water application will not significantly alter the character of the soil in any hardness, cohesiveness, workability or grain size distribution manner, and thus maintains a free flowing and workable soil characteristic.

Based on TCLP Cr and Cd treatability studies conducted at FESI LABS as shown in Attachment 1, the suggested FESI-BOND® DRY-Q dose for this subject stabilization project is 20% by weight of soil/waste matrix in a slurry blend at 10 parts chemical plus 10 parts water.

The porosity of fines and cobble stone and soil blends in samples sent to FESI LABS varied from 10% to 20%, mostly on the low percentage range. Accordingly, the slurry chemical-to-water ratio was selected as more viscous and dense, in order to assure that the soil and stone blends would contain at least 10% slurry blend and at best a 20% blend of 10 parts chemical and ten parts water.

Local, State and Federal Stabilization Permitting

The application of FESI-BOND® DRY-Q 50-50 slurry in-situ is not regulated under RCRA due to the fact that soil, whether clean or contaminated, is not defined as a solid waste under 40 CFR Part 260, and is thus not subject to a RCRA 40 CFR Part 261.24 characterization of hazardousness.

This does not change the objective of on-site and in-situ stabilization of heavy metals and resulting immobilization of Cr and Cd, thus limiting th ability of metals to transfer over time and reducing liability of the land owner for any future metals contamination of adjacent soils and groundwaters in-situ.

Soil/Residue Stabilization Release Controls Proposed

Cr/Cd routes of exposure during stabilization activities will be controlled as described below:

(1) Fugitivity Controls

All soil/residue will be semi-saturated in-situ and undisturbed with 50-50 slurry water during processing, thus eliminating fugitivity during FESI stabilization operations. The FESI slurry process itself involves application of a wet stabilizing and complex forming agent, thus further minimizing the potential for wind dispersion of fine particulates from the project site to off-site receptors.

(2) Runoff Controls

All soil and material Cr and Cd stabilized after use of the FESI slurry in-situ stabilization process are water-insoluble, and thus provide a direct means of controlling runoff release of soluble fraction. Surface controls are not required as the waste is slurry stabilized in-place and subsurface.

TCLP and Surrogate Verification and Failure Response

The FESI soil TCLP stabilization process will be verified through composite soil TCLP analyses and FESI SURROGATE pH buffer testing by client contract local state certified lab. The initial verification of stabilized soils was accomplished during FESI treatability and additional naalyses will be conducted on samples from initial day operations.

TCLP Cr/Cd Stabilization Action Levels

Cr and Cd bearing soils and residues leaching above the 1.0 ppm TCLP and 5.0 ppm TCLP (90% UCL) will be subject to TCLP stabilization in-situ and in-place and sampled after slurry contact for confirmation as testing below the TCLP characteristic hazardous waste limits.

FESI-BOND® Project Operations Sequence

The on-site in-situ stabilization project will follow the stabilization and site operations sequence as described below:

(1) Soil and/or residue cell area identification and coordination of stabilization activities;

(2) Identified cell application of selected dosage of FESI-BOND DRY-Q 20% (10-10) slurry chemical via pump delivery system into 1/2" to 2" well point;

(3) Confirmation of cell soil/residue stabilizer slurry contact by operator dug or pushed well sample to assure proper contact of FESI-BOND®DRY-Q slurry within the cell volume prior to cell closure;

(4) Stabilized soil/residue sample collection and TCLP Cr/Cd analyses. Composite samples will be collected for each cell. Based on project experience and expected soil/residue TCLP variability, the operator may choose to proceed to the next cell;

FESI-BOND® DRY-Q Slurry Process Application

The FESI-BOND® DRY-Q slurry process operates on the principle of a simple mass balance where the FESI stabilizer is added on a predetermined mass feed rate to the material, soil and/or residue within the cell to be stabilized.

Accordingly, the FESI-BOND® DRY-Q slurry process requires the material, soil and/or residue mass to be determined prior to well injection addition of the FESI-BOND DRY-Q slurry. Most soils are conservatively assumed to weigh 1.5 short tons (3000 lbs) per yard in place. Material should be subject to a surficial disturbed density test prior to FESI-BOND® DRY-Q slurry application. The FESI-BOND® DRY-Q slurry can be overdosed without adversely impacting TCLP Cr/Cd results, and most field dose rates are set at 200% of stoichiometric requirement in order to compensate for variations in TCLP Cr/Cd available content within the waste/soil matrix.

Depending on the material, soil and/or residue type and character, FESI will determine the ratio of FESI-BOND® DRY-Q slurry required for each cell at specific cell depths. The FESI-BOND® DRY-Q slurry in-situ process is commonly operated at cell volumes of one yard with use of wellpouint injection and monitoring wells and core samples without any form of mechanical mill or screener mixing. In most cases, the penetration of FESI-BOND® DRY-Q slurry into the cell materials, soils or residues provides for sufficient surface and interstitial void contact.

Equipment Mobilization and Demobilization Plans

FESI client will mobilize and demobilize all necessary FESI-BOND® DRY-Q slurry chemical delivery and distribution equipment required for the TCLP stabilization project. The FESI-BOND® DRY-Q in-situ system is comprised of a single slurry tank, one transfer pump and one 1: discharge slurry line connected to a well point for in-place slurry injection into the waste/soil matrix.

Field Equipment Decontamination Methods

All FESI-BOND DRY-Q slurry processing equipment in contact with the site Cr/Cd bearing soils will be dry brushed and high-pressure water washed prior to removal from the site.

Brush and washdown removed material, soil and/or residue from on-site exposed heavy equipment will be subject to on-site TCLP Cd/Cr stabilization by spray of FESI-BOND® DRY-Q slurry over a fixed contamination pad stone bed. The bed collected stabilized fines and stone will then be removed last from the remedial site, leaving only the wellpoint to be high-pressure low-volume water washed over the stone bed within the bed load. All off-site transport equipment will be limited to a clean gravel road and loading area adjacent to the FESI processing location, thus not requiring decontamination prior to off-site haul.

Fugitive dusting will be controlled during all loading operations by use of additional moisture addition to the soils and residues to avoid contamination of exteriors of on-site and off-site hauling vehicles.

Project Health and Safety Plan

The stabilization project will follow Site Health and Safety Plan required under OSHA Hazwoper - 29 CFR. The FESI-BOND DRY-Q stabilizer chemical SDS provides information to support same.

Site Confirmation Sampling and Analyses Plan

FESI-BOND DRY-Q slurry process stabilized soils and residues will be subject to sequential random compositing and analyses for confirmation of TCLP passage. A sequential cell batch composite will be prepared and subject to the formal USEPA Methods 1311 TCLP extraction and subsequent 6010/200.7 ICP aqueous metals content analyses.

Field Composite Sample Laboratory Analytical Methods

The TCLP and pH analyses shall follow standard analytical methods and laboratory QA/QC procedures.

Field Composite Sampling and Laboratory Analyses QA/QC Procedures

The sampling and analyses will follow standard collection and analyses QA/QC procedures.

Project Material TCLP Pb In-Situ Stabilization Production Schedule

The project production schedule will be established during the initial day of operation given slurry production time and injection duration for each cell..

Under most site conditions, the production rate of the FESI in-situ process is limited only by the capability of the material/soil/waste matrix to be contacted with FESI-BOND® WET either through surface penetration or in-cell well-point injection.

Eastern Analytical, Inc.
professional laboratory & drilling services

Keith Forrester
Forrester Environmental Services, Inc.
78 Tracy Way
Meredith , NH 03253

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID:	155446
Client Identification:	Binghamton
Date Received:	4/29/2016

Dear Mr. Forrester :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director	5.4.16	3
	Date	# of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **155446**

Client: **Forrester Environmental Services, Inc.**

Client Designation: **Binghamton**

Temperature upon receipt (°C): 2.9 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
155446.01	1	4/29/16	4/27/16	aqueous		Adheres to Sample Acceptance Policy
155446.02	2	4/29/16	4/27/16	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **155446**

Client: **Forrester Environmental Services, Inc.**

Client Designation: **Binghamton**

Sample ID:	1	2	Analytical Matrix	Units	Date of Analysis	Method	Analyst
Lab Sample ID:	155446.01	155446.02					
Matrix:	aqueous	aqueous					
Date Sampled:	4/27/16	4/27/16					
Date Received:	4/29/16	4/29/16					
Cadmium	**1.6**	< 0.05	AqTot	mg/L	5/2/16	200.8	DS
Chromium	**0.40**	< 0.05	AqTot	mg/L	5/2/16	200.8	DS

155446

CONFIDENTIAL AND PROPRIETARY INFORMATION

FORRESTER ENVIRONMENTAL SERVICES, INC. (FESI)

SAMPLE CHAIN OF CUSTODY

PROJECT: Binghamton

LAB ID:

DATE: 4/27/16

SAMPLER: KEF

SAMPLE FIELD ID	DIGEST REQUIRED	ANALYSES REQUIRED	TURN TIME 48 hr
1	YES[] NO[V]	Pb [] Other CR, Cd	Rush[V] Normal[]
2	YES[] NO[V]	Pb [] Other CR, Cd	Rush[V] Normal[]
	YES[] NO[]	Pb [] Other	Rush[] Normal[]
	YES[] NO[]	Pb [] Other	Rush[] Normal[]

SAMPLE CUSTODY [signature] DATE 4/28/16

SAMPLE CUSTODY Jerry Acorn DATE 4-29-16 1236

RELINQUISHED - Jerry Acorn 4-29-16 1352

SAMPLE RESULTS MAILING and CONTACT INFORMATION [signature] 4-29-16 @ 1400

Forrester Environmental Services
78 Tracy Way
Meredith, NH 03253

Tel: 603.279.3407
Fax: 603.279.5162

Cell: 603.380.2522
Email: fesi@worldpath.net

Temp @ 2.8 °C

QC 5911