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FIELD TASK MODIFICATION REQUEST FORM TO SAMPLING AND ANALYSIS PLAN
FACILITY INVESTIGATION SOLID WASTE MANAGEMENT UNIT 18 (SWMU 18) LOAD AND
FILL AREA SUBAREA G ASID I AREA NSA CRANE IN
2/15/2013
TETRA TECH



TETRA TECH

FIELD TASK MODIFICATION REQUEST FORM

Project/Installation Name SWMU 18 – Load and Fill Area, NSA Crane, IN	CTO & Project Number <u>CTO F201; 112G01851</u>	Task Modification Number <u>G001</u>
Modification to: <u>Sampling and Analysis Plan, RCRA Facility Investigation, SWMU 18-Load and Fill Area</u>	Site Location <u>Subarea G – ASD I Area</u>	Date of Request <u>February 15, 2013</u>

Background. Tetra Tech performed RCRA Facility Investigation (RFI) sampling at Subarea G – Applied Science Department (ASD) I Area – from October 2011 through January 2012 that included the collection of surface and subsurface soil samples, composite soil samples, and groundwater samples (Figure G-1). Surface soil samples were analyzed for metals; subsurface soil samples were analyzed for metals and volatile organic compounds (VOCs); and, groundwater samples were analyzed for VOCs, metals, ammonia, and perchlorate (Table G-1). The distribution of constituents in the site media are illustrated on Figures G-2 and G-3. Water quality measurements for groundwater at Subarea G are summarized in Table G-3, and groundwater flow at Subarea G is presented on Figure G-4.

Based on the human risk assessment, unacceptable risks were estimated for hypothetical future resident for metals in subsurface soil and groundwater. In subsurface soil, cobalt was of concern with the maximum detection occurring near the settling basin north of Building 2947. In groundwater, aluminum, arsenic, cobalt, iron, and manganese were of concern. Table G-2 summarizes the results of the risk assessment for Subarea G based on the data collected to date. Metals in groundwater are being evaluated separately as part of a desktop study for the RFI to determine if concentrations represent background conditions (either naturally occurring or area-wide anthropogenic conditions).

To characterize the nature and extent of contamination in subsurface soil at Subarea G, additional activities are proposed.

Purpose of FTMR. The purpose of this FTMR form is to present the supplemental proposed RFI activities sampling to: 1) collect soil samples to define the extent of metals contamination in and around boring 18GSB003, and 2) collect a sediment sample from the settling basin north of Building 2947.

Proposed Supplemental Activities. The supplemental sampling at Subarea G will be performed as described in this FTMR form and the approved September 2011 SAP. This FTMR form includes figures and tables to perform the additional activities.

The approximate locations of the supplemental soil borings and sediment sample are shown on Figure G-5; the supplemental sampling and analysis is presented on attached Table G-4 and described as follows:

- **Soil Boring:** Four soil borings will be advanced to collect subsurface soil samples to define the extent of cobalt contamination in the area of 18GSB003. The soil borings will be located equidistant approximately 5 feet from the existing location. One subsurface soil sample will be collected from each location. The subsurface soil samples will be collected from similar depths as the existing samples and in accordance with SOP-08, SOP-09, and SOP-10 of the September 2011 SAP. The subsurface soil samples will be analyzed for cobalt.
- **Sediment Sampling:** A sediment sample will be collected from the settling basin located north of Building 2947. The location of the settling basin is shown on Figure G-5. The sediment will be collected in accordance with SOP-07 of the September 2011 SAP. The sediment sample will be analyzed for Target Analyte List (TAL) metals.

Attachments to this FTMR include:

Figures

- Figure G-1 Sample Locations (2011/2012)
- Figure G-2 Exceedances of Analytes in Soil
- Figure G-3 Exceedances of Analytes in Groundwater
- Figure G-4 Groundwater Potentiometric Surface Map
- Figure G-5 Proposed Sample Locations

Table

- Table G-1 Summary of Environmental Samples and Laboratory Analyses
- Table G-2 Summary of Receptor-Specific Human Risks and Hazards and Ecological Risks
- Table G-3 Groundwater Quality Data
- Table G-4 Proposed Supplemental Sampling and Analysis

Reason for Change/Modification: Supplemental activities for characterization of nature and extent of constituents of concern, based on potential unacceptable human health and ecological risks

Person Requesting Change/Modification:

 2/15/13
Tim Evans, Project Manager / Date

Approvals:

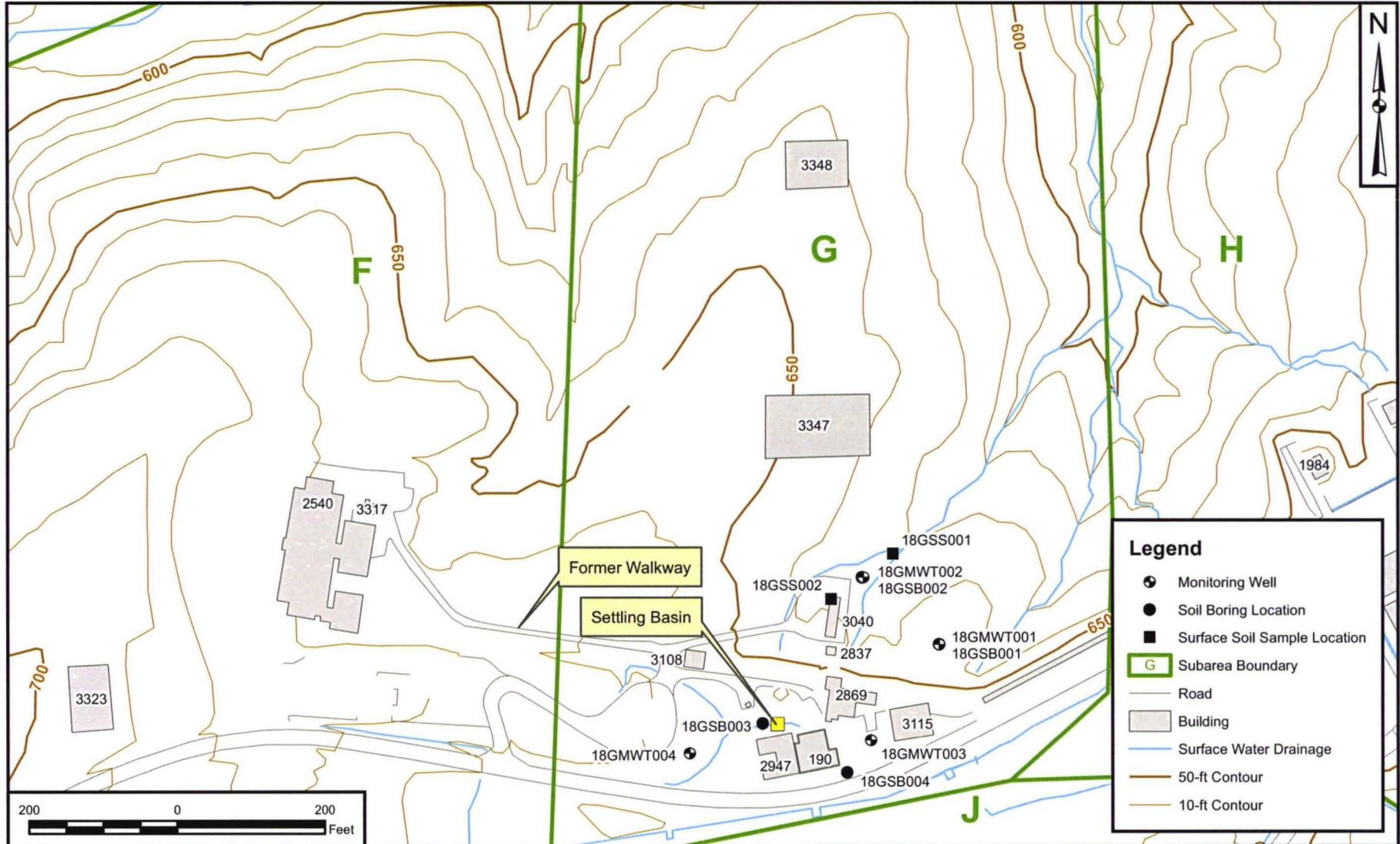
 2/15/13
Ralph Basinski, Tetra Tech Activity Coordinator / Date

Modifications to the HASP required based on this change? Yes No NA

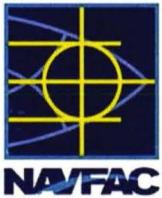
Health Safety Manager (Signature)

Date

FIGURES

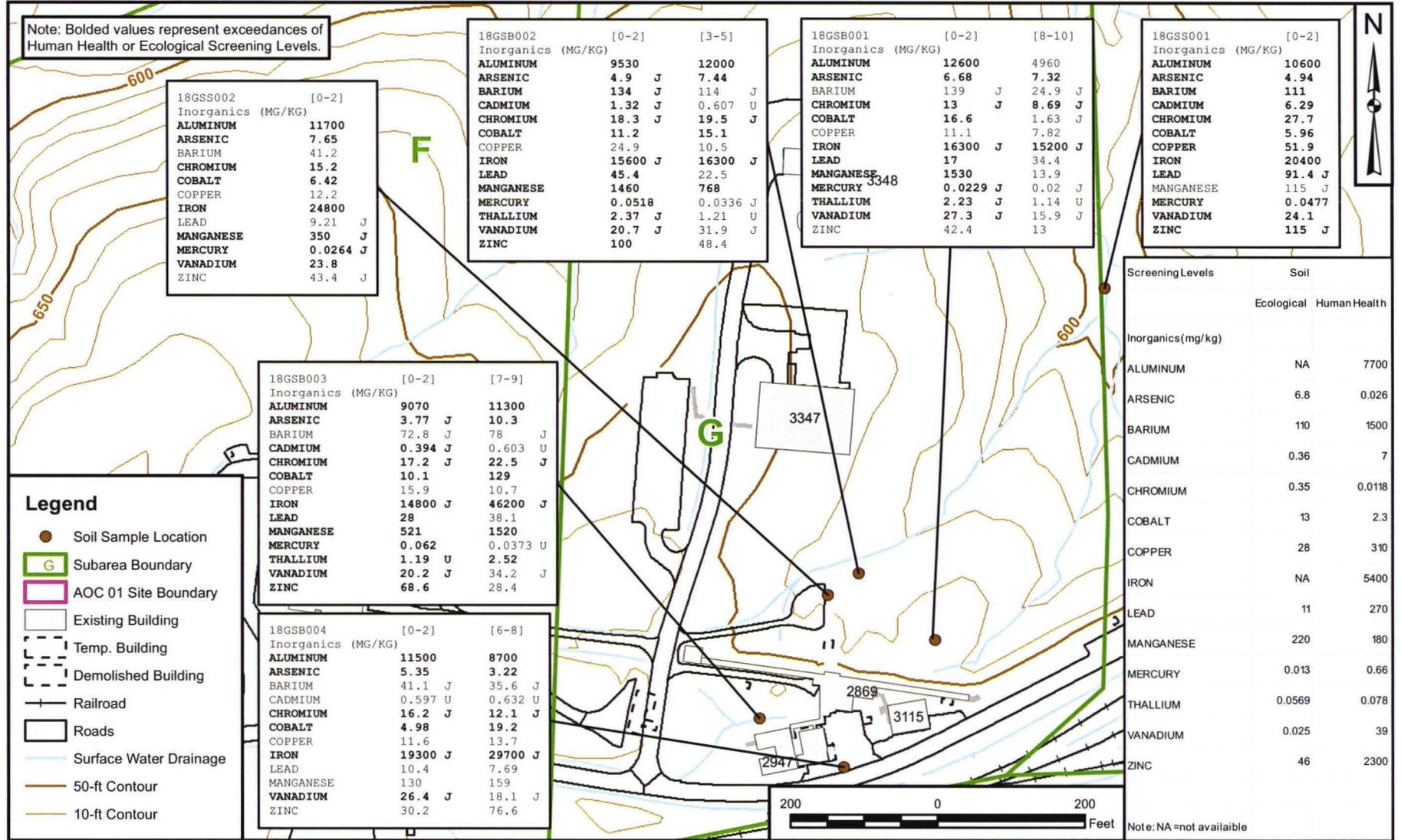


DRAWN BY	DATE
J. ENGLISH	02/16/12
CHECKED BY	DATE
T. EVANS	11/02/12
REVISED BY	DATE
J. NOVAK	11/02/12
SCALE AS NOTED	



SUBAREA G - APPLIED SCIENCE DEPARTMENT I AREA
SAMPLE LOCATIONS (2011/2012)
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
1851	F201
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FIGURE NO.	REV
FIGURE G-1	0

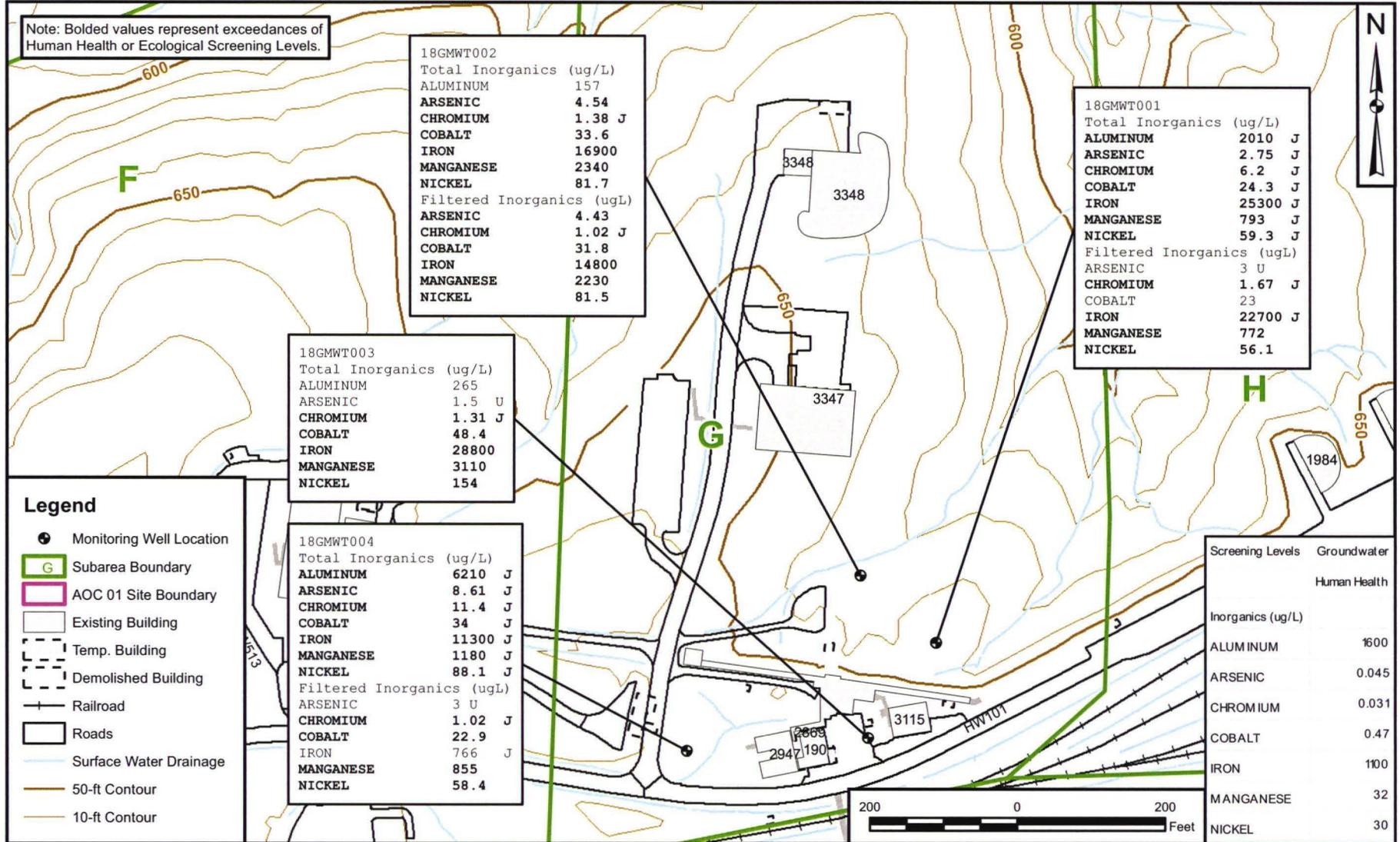


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J. ENGLISH	02/16/12
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M. MENGEL	11/02/12
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J. NOVAK	11/02/12
SCALE	AS NOTED



SUBAREA G - APPLIED SCIENCE DEPARTMENT I AREA
EXCEEDANCES OF ANALYTES IN SOIL
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
1851	F201
APPROVED BY	DATE
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APPROVED BY	DATE
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FIGURE NO.	REV
FIGURE G-2	0

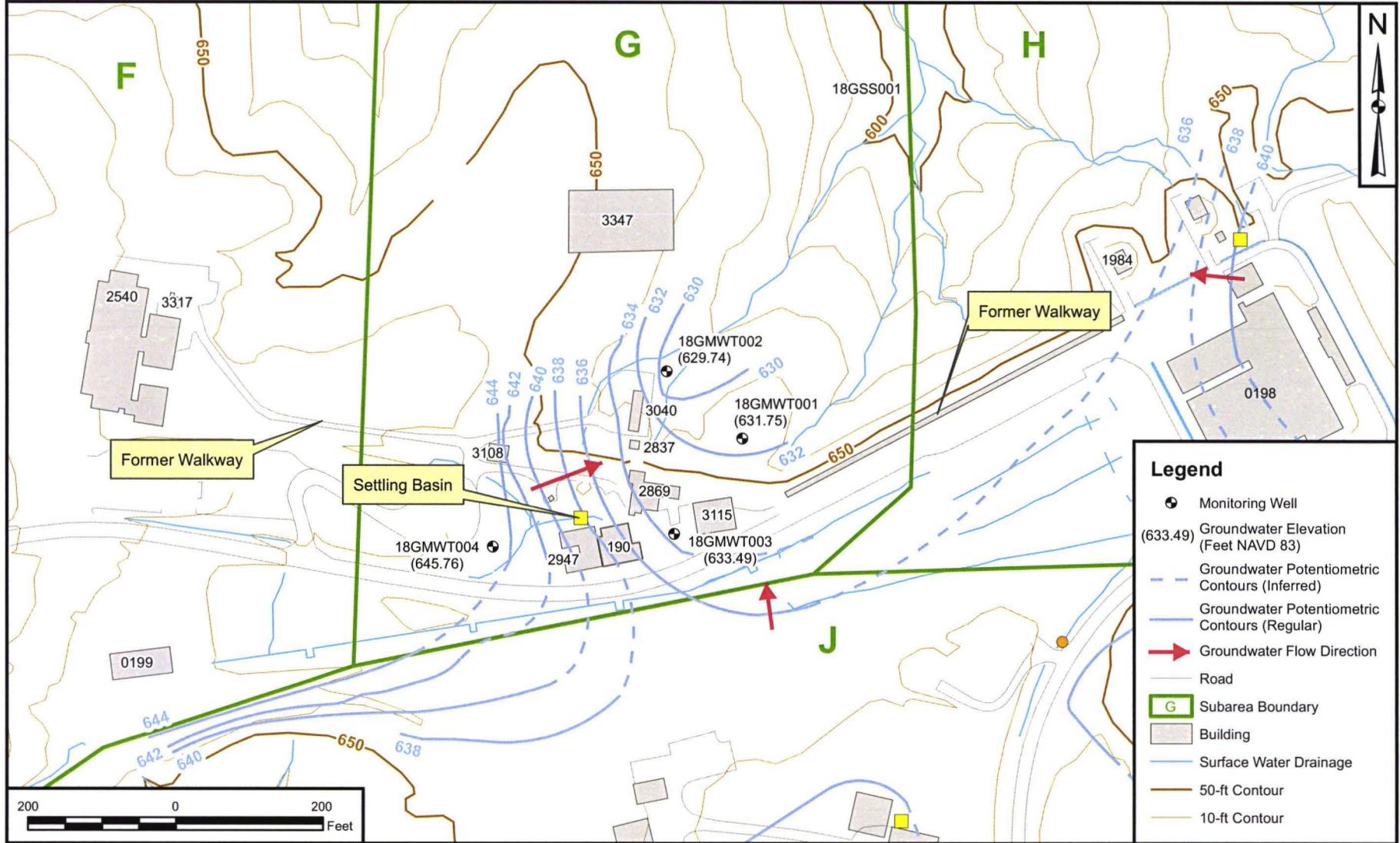


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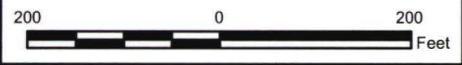
SUBAREA G - APPLIED SCIENCE DEPARTMENT I AREA
EXCEEDANCES OF ANALYTES IN GROUNDWATER
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
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FIGURE NO.	REV
FIGURE G-3	0

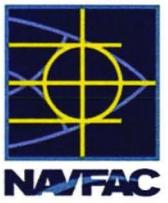


Legend

- Monitoring Well
- (633.49) Groundwater Elevation (Feet NAVD 83)
- - - Groundwater Potentiometric Contours (Inferred)
- Groundwater Potentiometric Contours (Regular)
- ➔ Groundwater Flow Direction
- Road
- G Subarea Boundary
- Building
- Surface Water Drainage
- 50-ft Contour
- 10-ft Contour

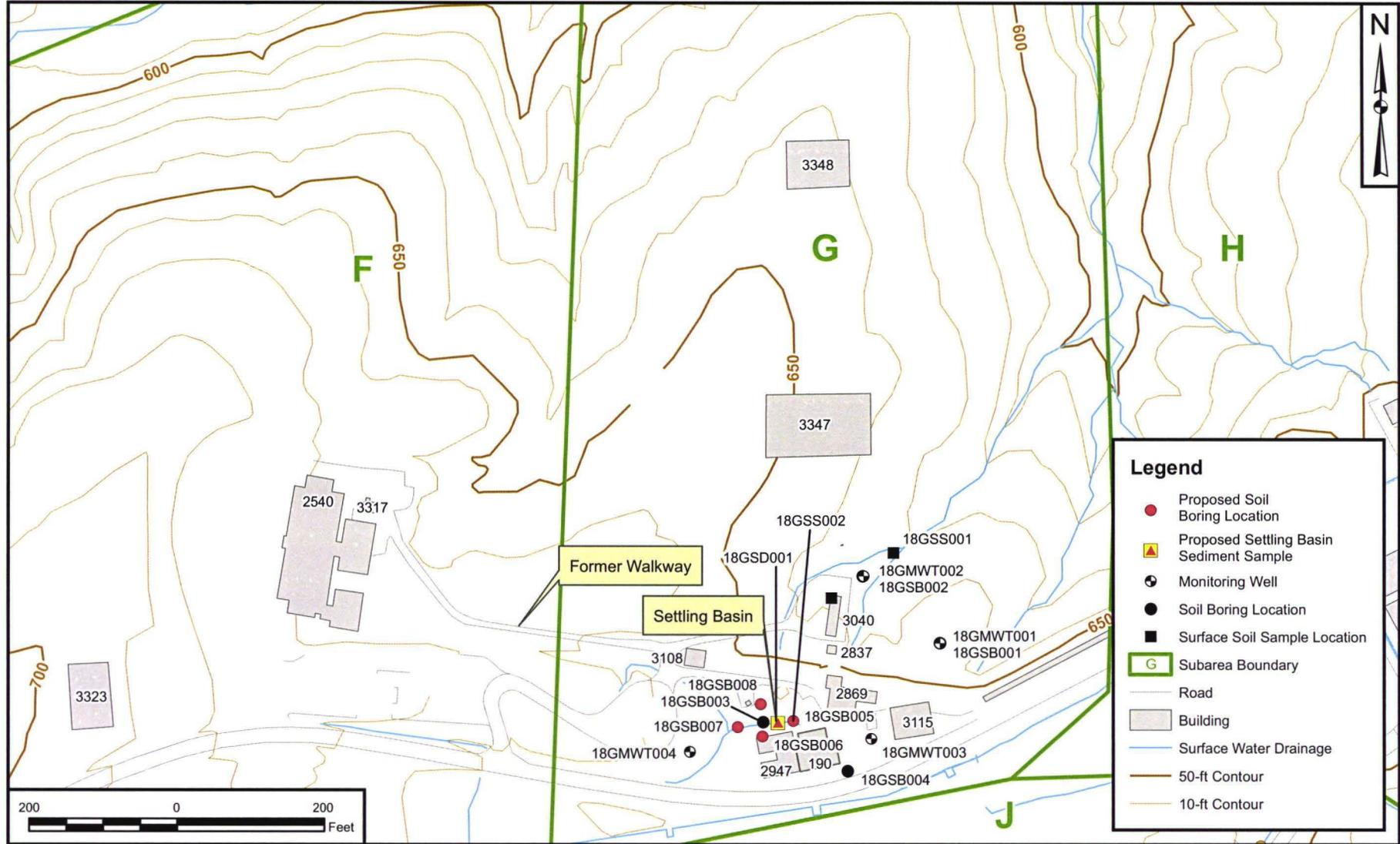


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C. TULLEY	03/06/12
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T. EVANS	10/03/12
REVISED BY	DATE
J. ENGLISH	10/03/12
SCALE AS NOTED	



SUBAREA G - APPLIED SCIENCE DEPARTMENT I
GROUNDWATER POTENTIOMETRIC MAP
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 1851	CTO NUMBER F201
APPROVED BY	DATE
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FIGURE NO. FIGURE G-4	REV 0

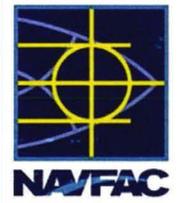


Legend

- Proposed Soil Boring Location
- ▲ Proposed Settling Basin Sediment Sample
- ⊙ Monitoring Well
- Soil Boring Location
- Surface Soil Sample Location
- G Subarea Boundary
- Road
- Building
- Surface Water Drainage
- 50-ft Contour
- 10-ft Contour



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J. ENGLISH	10/03/12
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T. EVANS	12/14/12
REVISED BY	DATE
J. ENGLISH	12/14/12
SCALE AS NOTED	



SUBAREA G - APPLIED SCIENCE DEPARTMENT I AREA
PROPOSED SAMPLE LOCATIONS
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 1851	CTO NUMBER F201
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE G-5	REV 0

TABLES

TABLE G-1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSIS
SUBAREA G - ASD I AREA
SWMU 18 - LOAD AND FILL AREA
NAVAL SUPPORT ACTIVITY
CRANE, INDIANA
PAGE 1 OF 1

Sample Location	Sample Identification	Sample Type	Date Sampled	Sample Depth Interval Sampled (feet bgs)	Energetics	Metals		VOCs	Miscellaneous		Comments
					Perchlorate	TAL Metals (total)	TAL Metals (dissolved)		pH	Ammonia	
Subarea G - ASD I Area											
18GSS001	18GSS0010001	Surface Soil	20-Oct-11	0-2		X			X		
18GSS002	18GSS0020002	Surface Soil	20-Oct-11	0-2		X					
18GSB001	18GSB0010002	Surface Soil	22-Oct-11	0-2		X					
	18GSB0010810	Subsurface Soil	22-Oct-11	8-10		X		X			
18GSB002	18GSB0020002	Surface Soil	22-Oct-11	0-2		X					
	18GSB0020305	Subsurface Soil	22-Oct-11	3-5		X		X			
18GSB003	18GSB0030002	Surface Soil	22-Oct-11	0-2		X					
	18GSB0030709	Subsurface Soil	22-Oct-11	7-9		X		X			
18GSB004	18GSB0040002	Surface Soil	22-Oct-11	0-2		X			X		
	18GSB0040608	Subsurface Soil	22-Oct-11	6-8		X		X			
18GMWT001	18GGWT001	Groundwater	19-Jan-12	15.5-25.5	X	X	X	X		X	Field Duplicate FD011912-02, Perchlorate, Ammonia only
18GMWT002	18GGWT002	Groundwater	24-Jan-12	12-22	X	X	X	X		X	
18GMWT003	18GGWT003	Groundwater	23-Jan-12	21-31	X	X		X		X	
18GMWT004	18GGWT004	Groundwater	19-Jan-12	17-27	X	X	X	X		X	

TABLE G-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS AND HAZARDS AND ECOLOGICAL RISKS
 SUBAREA G - ASD I AREA
 SWMU 18 - LOAD AND FILL AREA
 NSA CRANE
 CRANE, INDIANA
 PAGE 1 OF 3

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human)	Overall Hazard Index (Human)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern
Current/Future Trespassers (Adolescent)	Surface Soil	8E-07	0.001	NA	NA
	Subsurface Soil	1E-09	0.07	NA	NA
Future Construction Worker (Adult)	Surface Soil	3E-06	0.04	NA	NA
	Subsurface Soil	2E-06	0.7	NA	NA
	Groundwater	1E-07	0.06	NA	NA
Future Industrial Worker (Adult)	Surface Soil	4E-06	0.007	NA	NA
	Subsurface Soil	7E-08	0.4	NA	NA
Future Recreational User (Adult)	Surface Soil	7E-07	0.0008	NA	NA
	Subsurface Soil	4E-09	0.04	NA	NA
Future Recreational User (Child)	Surface Soil	5E-06	0.007	NA	NA
	Subsurface Soil	2E-09	0.4	NA	NA
Future Recreational User (Lifelong)	Surface Soil	6E-06	NA	NA	NA
	Subsurface Soil	5E-09	NA	NA	NA

TABLE G-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS AND HAZARDS AND ECOLOGICAL RISKS
 SUBAREA G - ASD I AREA
 SWMU 18 - LOAD AND FILL AREA
 NSA CRANE
 CRANE, INDIANA
 PAGE 2 OF 3

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human)	Overall Hazard Index (Human)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern
Future Resident (Adult)	Surface Soil	1E-05	0.6	NA	NA
	Subsurface Soil	3E-07	0.6	NA	NA
	Groundwater	3E-04 (1E-04) ⁽²⁾	11 (11) ⁽²⁾	NA	Ingestion of groundwater (aluminum, arsenic , chromium, cobalt , manganese)
Future Resident (Child)	Surface Soil	7E-05	0.09	NA	NA
	Subsurface Soil	7E-08	6	NA	Ingestion of soil (cobalt)
	Groundwater	3E-04 (7E-05) ⁽²⁾	26 (25) ⁽²⁾	NA	Ingestion of groundwater (aluminum, arsenic , chromium, cobalt , iron, manganese)
Future Resident (Lifelong)	Surface Soil	8E-05	NA	NA	NA
	Subsurface Soil	4E-07	NA	NA	NA
	Groundwater	6E-04 (2E-04) ⁽²⁾	NA	NA	Ingestion of groundwater (arsenic , chromium)
Terrestrial Plants and Invertebrates	Surface Soil	NA	NA	Acceptable	NA
Mammals and Birds	Surface Soil	NA	NA	Acceptable	NA

TABLE G-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS AND HAZARDS AND ECOLOGICAL RISKS
 SUBAREA G - ASD I AREA
 SWMU 18 - LOAD AND FILL AREA
 NSA CRANE
 CRANE, INDIANA
 PAGE 3 OF 3

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human)	Overall Hazard Index (Human)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern
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Notes

NA = Not Applicable

Shaded cells have unacceptable risk or hazard.

Bolded parameters represent significant contributor to overall risk or hazard.

(1) Target organs hazard index is less than 1.

(2) Chromium was evaluated in the human health risk assessment as hexavalent chromium. Value in parenthesis is cancer risk or hazard index if chromium is evaluated as trivalent chromium.

TABLE G-3

**GROUNDWATER QUALITY DATA
SUBAREA G - ASD I AREA
SWMU 18 - LOAD AND FILL AREA
NSA CRANE, IN**

Well Number	Sample ID	Sample Date	pH	Spec Cond (mS/cm)	Temp (dC)	Turb (NTU)	Diss Oxygen (mg/L)	ORP (mV)
18GMWT001	18GGWT001	1/19/2012	5.02	0.278	10.10	520	0.61	100
18GMWT002	18GGWT002	1/24/2012	5.04	0.273	10.01	18.3	0.39	116
18GMWT003	18GGWT003	1/23/2012	5.22	0.713	16.97	9.5	1.02	97
18GMWT004	18GGWT004	1/19/2012	5.64	0.713	7.90	890	5.60	248

TABLE G-4

**PROPOSED SUPPLEMENTAL SAMPLING AND ANALYSIS
SWMU 18 - LOAD AND FILL AREA
SUBAREA G - ASD I AREA
NAVAL SUPPORT ACTIVITY, CRANE, INDIANA
PAGE 1 OF 1**

Sampling Location	ID Number	Matrix	Depth (feet bgs)	Analysis	Number of Samples	Sampling SOP Reference ⁽¹⁾
18GSB005	18GSB0050002	Soil	0 - 2'	Cobalt	1 + 1 FD	SOP-08, SOP-09, SOP-10
	18GSB005XXXX ⁽²⁾		X - X'		1	
18GSB006	18GSB0060002	Soil	0 - 2'	Cobalt	1	SOP-08, SOP-09, SOP-10
	18GSB006XXXX ⁽²⁾		X - X'		1	
18GSB007	18GSB0070002	Soil	0 - 2'	Cobalt	1	SOP-08, SOP-09, SOP-10
	18GSB007XXXX ⁽²⁾		X - X'		1	
18GSB008	18GSB0080002	Soil	0 - 2'	Cobalt	1	SOP-08, SOP-09, SOP-10
	18GSB008XXXX ⁽²⁾		X - X'		1	
18GSD001	18GSD001	Sediment		TAL Metals	1	SOP-07

Note:

⁽¹⁾ Sampling SOP reference from SWMU 18 RFI UFP-SAP (Tetra Tech, September 2011)

⁽²⁾ XXXX and X - X' represents the interval of the sample from below 2 feet bgs and above top of bedrock. Depth will be determined in the field based on visual and olfactory observations and where bedrock is encountered. For example, if sample is collected from 8 to 10 feet bgs, the depth will be recorded as 0810.

FD = Field Duplicate

TAL = Target Analyte List